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CUSTOM-MADE COURSE ADMINISTRATION SPREADSHEETS AS AN ELECTRONIC GRADEBOOK ALTERNATIVE

Brian G. Rubrecht
School of Commerce, Meiji University (Japan)

Abstract

Instructors at all education levels are responsible for a variety of course-centric administrative duties. These typically include the taking of attendance, lesson planning, the marking of submitted homework and other assignments, and the calculating of students' final grades. Although many commercial and open-source electronic gradebooks are available to aid them with such duties, some may find such software intimidating or off-putting, as they may be time consuming to learn, expensive, inflexible, or lack certain desired features. While there is no one-size-fits-all electronic gradebook solution, one often overlooked alternative is the custom-made course administration spreadsheet. The current paper aims to introduce by explanation and example why and how such spreadsheets can provide instructors with robust and flexible ways to manage course-related administrative requirements.

Keywords: *Electronic gradebooks, spreadsheets, teacher administrative duties, tracking student progress and performance.*

1. Introduction

Educational instructors are tasked with more than just teaching lesson content. They are typically required to keep meticulous records of student data (e.g., attendance, homework scores) and make calculations (e.g., of final grades). Such data are often required by educational institutions as a matter of course, but by analyzing them stakeholders can better understand student academic achievement, educational outcomes, and the effectiveness of teaching methodologies. Ideally, such data handling—which includes collecting, organizing, calculating, and analyzing student data—should be carried out in the simplest, most efficient, and most stress-free ways possible.

Traditionally, data handling was strictly a pencil-and-paper affair, with all record-keeping and course-outcome-calculating activities done in paper-based gradebooks. The rise of the personal computer revolution brought with it arguments in favor of digital data handling solutions, or DDHSs (Hafner, 1992; Vockell & Fiore, 1993). Because of advances in technology and the popularization of digital devices (e.g., iPads), these arguments continue to be made via both academic articles (e.g., Shaw et al., 2013; Vegel, 2021; Zach, 2005) and the Internet's many teacher-centric websites that recommend or even sell such solutions. As explained by Vegel (2021), the main advantage of electronic gradebooks as a DDHS comes from their ability to store and calculate data, with the ultimate goal being to share that data either immediately with others online or for final grade reporting. Because their use allows data preparation, calculation, and analyses to be automated, instructors can spend less time on non-teaching duties and more time on improving the quality and quantity of their instruction (see Jasińska-Maciążek, 2020).

2. Method

There are various types and use scenarios of such DDHSs, and which an instructor selects depends on factors that include but are not limited to purpose, cost, features, intuitiveness, ease of use, and academic institution directives. An inspection was made of common DDHSs (e.g., Gradekeeper, iDoceo, ThinkWave, Google Classroom, Microsoft Excel spreadsheet templates). These and other commercial and open-source software programs and spreadsheets have been created by software developers (and instructors themselves) specifically with instructors' typical duties and needs in mind (e.g., attendance taking, seating charts, final grade calculations). Even so, considering various educational situations and specific instructor requirements, none could possibly provide a one-size-fits-all solution. From this inspection, however, one DDHS stands out: the spreadsheet. Although it may not be readily

apparent, as it may seem relatively low-tech compared to other alternatives, instructors need not turn to other, more complicated or even more feature-rich DDHSs for their electronic gradebook requirements. Depending on their own specific needs and use cases, they may find much benefit in the often-overlooked option of constructing their own electronic gradebook spreadsheets.

3. Commercial versus custom-made

Each type of DDHS comes with its own benefits and drawbacks. To illustrate the rationale behind instructors potentially turning to constructing their own electronic gradebooks, presented here is a brief non-exhaustive list of such benefits and drawbacks.

The benefits of commercial software and open-source electronic gradebooks or spreadsheets include (a) common tasks being built in (e.g., attendance charts, final grade calculation formulas), (b) the wide selection to choose from, and (c) the possible availability of troubleshooting assistance. However, the drawbacks are many. For specific commercial software, the drawbacks can include their (a) lacking timely updates, (b) being discontinued (sometimes without warning), (c) limited platform availability (e.g., no iOS version), (d) upfront or hidden costs (e.g., when free software switches to a pay-based system), (e) customizability limitations, (f) numerous confusing checkboxes and pull-down menus, many of which influence how data is ultimately (and sometimes unexpectedly) calculated, (g) overly concise or overly exhaustive manuals (see Vegel, 2021), and (h) features that are unsupported outside country of origin. Other general drawbacks to such software also include (a) the time needed to fully investigate functions/applicability before committing, (b) users repeating the familiarization process if they switch to a new DDHS for whatever reason, (c) the interface may lack intuitiveness or clash with the user's sense of aesthetics, and (d) their often being constructed for data (i.e., numbers) input only without space for memos or notes, which may be necessary in some cases, or at least be found useful.

For custom-made spreadsheet electronic gradebooks, the benefits include their (a) being fully customizable (e.g., for type of data collected, data calculation method, data display), (b) being made intuitive and/or aesthetically pleasing, (c) flexibility in terms of visual elements (e.g., color and size adjustments to text/cells), (d) nearly guaranteed non-obsolesce (e.g., Apple and Microsoft spreadsheet applications will continue to exist indefinitely), (e) technical support being usually unnecessary, and (f) being free spreadsheet templates available online. The drawbacks include (a) their possibly being time-intensive when either creating or altering templates, (b) their possibly being intimidating/challenging for first-time users, (c) they may require time/energy to learn spreadsheet functions (e.g., how to input formulas), (d) their inherently/initially lacking desired features (e.g., collaboration tools, student or parent online access, visually pleasing elements), and (e) being unappealing to non-tech-savvy instructors or those otherwise experiencing teaching burnout.

As can be seen, DDHSs come with tradeoffs, which is a point that must be emphatically stressed. Instructors must carefully consider and weigh their needs and personal preferences. However, as data collection and calculation are prerequisites in nearly all educational situations, it behooves instructors to assess their DDHS options and begin utilizing that which would benefit them the most as soon as possible. Thus, instructors should be as informed of their DDHS choices as possible before committing to one.

4. The Spreadsheet

4.1. Spreadsheet background

Before discussing several details of a custom-made course administration spreadsheet (hereafter, CMCAS) to be used for explanation purposes, several points must first be made. First, the CMCAS explained here is specifically meant for instructor-use-only scenarios, for example, at the university level where grades and other course progress factors need not be shared immediately online with students or parents. This does not, however, preclude some student data from being shared or uploaded via other means. Second, readers are expected to have some basic familiarity with spreadsheets, as their details (e.g., menu bar items, toolbars) are simply beyond the scope of the current paper. Third, only basic functions (i.e., formulas used for making automatic calculations) are used/explained here. The reasons for this include (a) a simple spreadsheet example is being presented, (b) effective CMCASs only require basic functions, (c) some functions are complicated and require explicit explanations for use, (d) CMCASs are inherently customizable, allowing for later function inclusion, (e) there is natural disparity in instructors' CMCAS needs/technology skills (Bennett et al., 2008), and (f) being for illustrative purposes, the CMCAS explanations here—as well as the spreadsheet template (see below)—should be as brief, simple, and transparent as possible.

Naturally, readers who decide to adopt CMCASs for use should explore how such spreadsheets can provide them maximum utility, for instance, by including functions to have their spreadsheets

automatically calculate descriptive statistics (e.g., averages, minimum and maximum scores), drop a student's lowest score, or convert number grades to letter grades. These functions may require some investigation and practice on the part of individual instructors, but there is ample information about spreadsheet functions, including tutorials, on the Internet.

Fourth, the current paper explains the construction and use of a simple CMCAS **for example purposes only**. It depicts a simulated CMCAS that mimics in part one typically used to great effect previously by the author. The author is cognizant of the fact that its look and utility as explained here may not fully meet readers' expectations, preferences, or requirements. This is not a concern, as readers are encouraged to use the explanations provided here to either (a) develop CMCASs most appropriate for them or (b) examine commercial and/or open-source gradebook solutions with a more critical eye.

The CMCAS described in this paper is found at the author's website, the address of which is located in the following brackets: [https://www.isc.meiji.ac.jp/~rubrecht/index.html]. Readers are encouraged to view the CMCAS there to fully understand the explanations below. Readers are also granted free use of the example CMCAS template and may make changes to it as they deem necessary.

4.2. Spreadsheet programs

Next, instructors have spreadsheet program options. Considering the benefits and drawbacks of each, many have strong preferences for one over another. Several common choices are:

- Excel (Microsoft): most common spreadsheet type; available on Mac and Windows, but requires purchase (though often free to instructors through their academic institution)
- Numbers (Apple): free, but Mac only; easy to use for simple spreadsheets; attractive visuals; not as fully functional as Excel
- Google Sheets (Google): free; can be made collaborative; not suitable for offline work; some scalability and functionality limitations
- OpenOffice Calc (Apache): free; not optimal for large complex documents; users may encounter some interoperability/sharing/collaboration issues

The current article presents a basic Numbers spreadsheet that contains multiple sheets (worksheets). Reasons for this choice include its pleasing visuals, its "futureproofness," its automatic syncing available through iCloud, and there being no need to utilize open (online) gradebooks.[1]

4.3. The basics

Before presenting the example CMCAS, a few spreadsheet basics will first be discussed. The first is *sheets*. Generally speaking, a single CMCAS should contain multiple sheets, with each sheet containing specific student data (e.g., attendance, homework scores). Next are *headers*. Column and row headers should be "frozen" or "locked" to ease viewability. The information each contains will depend on instructor preferences and course requirements. Most instructors will find it intuitive to have the left-hand column headers contain student information (e.g., student names and ID numbers, which can often be easily copied or imported from an XLS or CSV file) and the header rows contain sheet categories (e.g., lesson dates, homework assignment names). *Fonts, lines, and cells* must also be considered. To increase efficiency and overall viewability, CMCASs and the sheets within should follow a standardized format (e.g., uniform font type, font size, border style). To reduce time and energy expenditures, it is strongly recommended that cell information differentiation be limited to font/cell color changes only, not to cell or line width or height.

Finally, there is the matter of *printing, uploading, and sharing*. Instructor preferences and unique teaching situations will dictate whether or not CMCAS sheets should be printed for in-classroom use, uploaded to the cloud, or made collaborative with other stakeholders. As is to be expected, benefits and drawbacks regarding these matters abound. To provide some perspective on the matter, CMCAS online-only storage include the instructor benefits of (a) being potentially accessible on any device (e.g., via a classroom desktop computer or the instructor's iPad if using a service like iCloud) and (b) not requiring data duplication, that is, the transfer of the handwritten data to the electronic gradebook. However, the drawbacks include (a) personal and technical issues may hamper online-only CMCAS use (see Shaw et al., 2013), (b) constant attention being paid by the instructor to digital devices often distracts all classroom participants, and (c) no physical backup means data loss is possible.

A hybrid digital/printed CMCAS configuration, on the other hand, includes the benefits of (a) printed sheets that allow for quick and easy marking, which is advantageous when there are time constraints or multiple classroom activities occurring simultaneously, (b) eliminating technical issues, and (c) the mitigation of data loss. The drawback is that data duplication is necessary, thereby introducing later time/energy costs as well as additional opportunity for input error.

[1] While advantageous in many respects, such "open gradebooks" have their own drawbacks (see McKenna, 2016).

5. The example CMCAS

5.1. Attendance sheet

By way of preliminary explanation, the author takes the hybrid approach and routinely prints this first sheet at the beginning of a term. This is done for several reasons. First, given the perceived importance of and repetitive nature of attendance taking, especially for remote teaching and learning during the COVID-19 pandemic (see Rubrecht, 2020, 2021a, 2021b, 2021c), a simple, low-tech, and unobtrusive method of marking attendance (and other common grading criteria) is advisable. Attendance taking must be done each lesson, so such sheets should be made available for immediate marking free from potential complications (e.g., no Internet access, technological issues, keystroke errors). This is especially true in cases where criteria (e.g., attendance, punctuality) have grading components attached to them. Second, there is no need to divert attention or switch a computer in use (e.g., during a PowerPoint slideshow presentation) to a different screen just to input attendance markings, for instance, when students arrive late to class every few minutes. Third, a printed sheet allows for quick, easy, and accurate sharing of attendance data, especially as students often wish to confirm their absences near a term's end.[2]

As can be seen on the CMCAS template for a fictional course, the first sheet is the attendance sheet.[3] It includes student identification information, lesson information (e.g., dates and lesson numbers), and grading criteria with maximum grading points for each. Of note is that students are given full marks in the sheet for each grading criteria each lesson at the start of a term. Changes are only applied if a student performs less than satisfactorily. These changed are done by copying the color-coded values in the lower-left section of the sheet to the appropriate cell. This method drastically eases the instructor's workload, as numerical values do not need to be input for each student each lesson for each criterion, and makes criteria with reduced marks easily identifiable.

Also of note are the (a) columns and cells that can be used for lesson note spaces (e.g., for individual student progress or noted problem areas), (b) check spaces to indicate that the instructor has confirmed the accuracy of input data after the duplicated date has been input, and (c) simple sum formulas at the far right of the sheet that first individually calculate each student's individual criterion scores and then calculate each student's final attendance sheet score.

5.2. Lesson plan sheet

The constructing and refining of lesson plans must not be overlooked, as instructors should keep track of what they aim to accomplish over the course of a lesson or a term and record what was actually achieved. This practice both informs instructors about their teaching decisions and aids them in keeping track of lesson progress, which is needed when absent students need to know what they missed in a lesson. Additionally, educational institutions (and their funding governments demand accountability, especially with the proliferation of online-only courses and hybrid lessons brought about from the recent pandemic.

The benefits to a spreadsheet lesson plan sheet include (a) lesson activity rows can be moved by drag-and-drop to change their order, (b) completed lesson activities can be marked with a check, and (c) such sheets can be easily inspected and reused in later terms, with alterations made as needed. This sheet need not be printed. If accessed digitally on a device, (a) checks or notes can be quickly and unobtrusively added as the lesson switches between activities, and (b) one need not be concerned about row height, column width, or overall sheet size.

5.3. Homework, final exams, and final calculations sheets

Just as there is an attendance sheet, there should be applicable sheets for other important course areas such as homework and final exams. At the end of a term all criteria must be gathered, given their appropriate weighting, and summed to provide students with their final score and/or grade for the course. A sheet dedicated to calculating students' final scores should be made. Tallied scores are simply copied from their respective sheets, multiplied by their weighting or percentage, and then added together. The use of (simple) functions in this final calculations sheet is strongly recommended.

6. Discussion

It understood that the CMCAS explained here is not suitable for all instructors in all teaching situations. The takeaway here is that instructors should consider both the elements extant in any particular DDHS and their particular DDHS needs and find a match that works best for them.

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[2] While advantageous in many respects, such "open gradebooks" have their own drawbacks (see McKenna, 2016).

[3] For the sake of brevity, not all details of this and other sheets are explained.

A few final pieces of advice regarding CMCAS creation and use may now be proffered.

- Consider your gradebook needs *before* committing to a gradebook system.
- Electronic gradebooks should be easy to use and understand. Avoid complexity whenever possible.
- If using a CMCAS, make a trial one first. Inspect it very carefully (e.g., its required number and type of sheets, embedded functions, colors and layout) before making it a template for other courses.
- Make a backup of this CMCAS (for both recovery and template purposes).
- Avoid complex functions (or overly complicated functions) for calculations.
- Relatedly, avoid creating sheets that automatically construct graphs or charts (e.g., bar charts indicating students' overall grades) unless necessary (e.g., for specific pedagogical purposes).
- Remember that a CMCAS should be dynamic. Occasional updates and tweaking (e.g., by the including or removing of features) will result in a customized gradebook that works as intended.

As with any digital format containing vital and sensitive information, users are strongly encouraged to make regular backups and utilize security features. Readers may also wish to print all CMCAS sheets to mitigate disaster (see Warren, 2012).

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