

Chapter # 4

THE ELECTRONIC GRADEBOOK ALTERNATIVE: The Custom-Made Course Administration Spreadsheet

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ABSTRACT

Instructors at all educational levels are responsible for a variety of course-centric administrative duties, which typically include taking attendance, planning lessons, marking and recording homework and other assignments, and calculating students' grades at the end of a semester. While many instructors are drawn to the numerous commercial and open-source electronic gradebooks available to aid with the implementation of such duties, they may only later realize their drawbacks, which can include their being time-consuming to learn, inflexible, inoperable after operating system upgrades, or insufficient in terms of certain desired features. There is no one-size-fits-all electronic gradebook solution, but the often-overlooked gradebook alternative that counters many of these drawbacks is the custom-made course administration spreadsheet. The present chapter seeks to illustrate through explanation and example the reasons and methods by which such spreadsheets can offer instructors effective and adaptable tools for handling their course-related administrative requirements.

Keywords: electronic gradebooks, spreadsheets, teacher administrative duties, student data.

1. INTRODUCTION

The responsibilities of educators are legion. Beyond the teaching of lesson content, instructors are tasked with dutifully keeping records of course-centric information, which includes but is not limited to student attendance information, homework scores, quiz grades, and final exam results. This student data (hereafter, SD) is used primarily by instructors to determine students' semester- or year-end grades, but it is also often required by educational institutions for myriad purposes (e.g., for student academic progress assessment, pedagogical policy and course curricula review, future funding procurement). As such, with the tasks of collecting, organizing, processing (e.g., calculating final grades), and analyzing SD being seen as paramount, instructors should strive to engage and complete these tasks in the simplest, most efficient, and least stressful manner possible.

With the history of personal computers and the internet now spanning decades, there have long been arguments for instructors to transition from traditional pencil-and-paper SD-tracking methods to digital data handling solutions (DDHSs) due to the latter's many apparent advantages (see Hafner, 1992; Vockell & Fiore, 1993). Continual technological advances and the widespread adoption of digital devices like iPads have sustained these arguments, which have been supported not only by the numerous teacher-oriented websites promoting and/or selling such solutions but also those investigating the topic and publishing their findings in academic literature (e.g., Shaw, Pedersen, Cooley, & Callingham, 2013; Vogel, 2022; Zach, 2005). Indeed, as Vogel (2022) points out, electronic gradebooks (i.e., DDHSs) offer significant advantages, as they can easily store and calculate student assessment data. By automating data preparation, processing, and analyses, instructors can not only minimize their time spent on administrative tasks, but they can also focus more of their time and attention on enhancing the quality and quantity of their teaching (Jasińska-Maciąg, 2020).

2. BACKGROUND TO DDHS SELECTION

As there are various types of and use-case scenarios for DDHSs, instructors must consider and weigh a variety of factors prior to DDHS selection, the most common ones being:

- **Overall purpose.** Is SD limited to grade tracking and processing, or does it include other data (e.g., attendance data, seating chart information)?
- **Cost.** Is the DDHS free? If not, what is the payment structure (e.g., a one-time purchase price, a yearly subscription fee)?
- **Features.** Does the DDHS have one's preferred or required features to maximize its utility and justify its use?
- **Intuitiveness and ease of use.** Is the DDHS designed in a way that matches the potential user's sensibilities?
- **Instructional guidelines.** Are there any limitations or restrictions imposed by an instructor's educational institution on DDHS selection or use?

The author of the current chapter examined various DDHSs, which included many well-known and popular ones such as Gradekeeper, iDoceo, Additio, ThinkWave, Google Classroom, and Microsoft Excel spreadsheet templates. These and other commercial and open-source DDHSs, having been specifically created by software developers and educators to aid instructors in recording and utilizing their SD, typically function just as intended. Considering (a) the diversity of educational environments, (b) instructors' various SD-handling requirements, and (c) instructors' preferences based on their specific pedagogical approaches and often unique teaching contexts, no DDHS exists that could possibly be appropriate for all scenarios involving SD recording, managing, and processing. Even so, the above-mentioned DDHS examination has singled out an often-overlooked solution: the common spreadsheet.

It is understandable that, at first glance, spreadsheets may seem more appropriate for non-educational use cases (e.g., budgeting, accounting, inventory control). Being general rather than specific in nature, the simple spreadsheet may appear less suitable for managing SD compared to other electronic gradebook options. However, technology utilized for course purposes should be viewed as a tool (Martin, 2022), and as such, the tool should provide certain expected benefits. A DDHS need not necessarily be complex or costly for use in educational settings. Indeed, as is argued here, instructors employing a spreadsheet of their own design can reap numerous benefits, and depending on their unique situations and requirements, they may discover further significant advantages should they choose the approach of creating and utilizing their own electronic gradebook spreadsheets.

3. COMMERCIAL VERSUS CUSTOM-MADE SPREADSHEET GRADEBOOKS

It must be reiterated from the outset that no DDHS is inherently better or worse than any other. DDHS selection comes down to understanding and considering a range of factors and weighing the benefits and drawbacks of each against their use-case scenarios. Why a custom-made spreadsheet should be considered a viable choice can be illustrated by relating the various benefits and drawbacks to the different types of DDHSs available for

use. Although far from exhaustive, the following lists the advantages and disadvantages of each type.

Commercial software benefits include:

- **Common tasks are built in.** Most include features to track and process SD, such as attendance data, seating chart information, assignment scores, and final grades.
- **Overall wide variety.** With many choices available, instructors can often easily test and evaluate which DDHS option might best suit their purposes.
- **Troubleshooting assistance.** Commercially available DDHS software should have avenues available by which instructors can solve any usage problems.

Commercial software drawbacks include:

- **Lack of timely updates.** This could be catastrophic, especially after operating system (OS) updates. A DDHS may become completely inoperable if it is not updated for use on the new OS.
- **Discontinuation.** Sellers may stop developing their software, sometimes without warning. This leads to inevitable incompatibility with future OS versions and risks SD that has been archived in a proprietary format becoming inaccessible or unretrievable.¹
- **Limited platform availability.** Some software may be Windows-only, or it might not function on specific devices (e.g., iPads).
- **Upfront and/or hidden costs.** Few are completely free. Even if bought via a one-time purchase, it is possible for developers to later switch to a subscription model, which may be too costly for individual instructors to sustain.
- **Customizability limitations.** Many DDHSs are inflexible in terms of how they allow data to be entered, displayed, and processed. Restricting the customization of minor yet desired aspects of a DDHS can become a huge impediment in the efficient handling of SD.
- **Inelegant documentation.** This could come in the form of overly concise or overly exhaustive manuals (see Vogel, 2022).
- **Regional limitations.** There may be some features that are only available for use within the DDHS's country of origin.

These are not the only drawbacks to such commercial software. Instructors should also be aware of several additional points:

- Time must be devoted to DDHS investigation and familiarization (e.g., features, compatibility in specific use-case scenarios).
- Instructors will necessarily be forced to repeat the investigation and familiarization process should they wish (or be forced) to switch to a new DDHS.
- Some DDHSs may lack intuitiveness or otherwise clash with a user's sense of aesthetics.

Custom-made spreadsheet electronic gradebooks also have benefits and drawbacks. Their advantages can be seen in the following:

- **Overall customizability.** Instructors decide the type of data to be collected and how that data will be input, displayed, and ultimately processed. Visual elements for data

comprehension purposes may also be utilized. In other words, specific data may be made more distinguishable by giving it a unique cell color or by placing it in a certain location. Adjustments to spreadsheets (e.g., appearance, formulas to be used) may be made as needed.

- **Nearly guaranteed non-obsolescence.** This is particularly true for spreadsheets made with software developed by Microsoft and Apple (see below), as there is every reason to believe that their applications will continue to be updated and enhanced indefinitely, with backward compatibility with previous versions included.
- **Troubleshooting assistance largely unnecessary.** The spreadsheet is user-constructed, meaning the user is cognizant of every facet and function (i.e., the formulas used for SD processing purposes) found within. Most problems, difficulties, or general queries can be solved or answered by a simple internet search.
- **Online templates available.** If instructors do not wish to start building their spreadsheet from scratch, they have the option of downloading free templates from the internet and tweaking those to their satisfaction.

Like their commercial counterparts, custom-made spreadsheets have their share of shortcomings:

- **Possibly time/energy intensive.** Spreadsheets may require substantial time and energy to construct, though this is dependent on the level of complexity and amount of visually distinguishing features desired. Those wholly unfamiliar with spreadsheets would likely require additional time for familiarization purposes.
- **Potentially challenging or intimidating.** This is particularly true for first-time spreadsheet users or those unsure of the various spreadsheet functions available.
- **Lack of desired features.** Spreadsheets are not specifically designed as course-centric SD managing software. As such, they may not include specific features commonly found in commercial gradebook software (e.g., collaboration tools, online accessibility for students/parents).

The selection of a DDHS is without doubt a serious responsibility requiring significant diligence. Instructors should be as informed about their DDHS choices as possible before they decide to commit to one, and they must understand and weigh their DDHS preferences and desires with their real-life use-case situations. Because all teaching in formal educational contexts involve SD collection and processing, instructors are strongly advised to thoroughly evaluate their DDHS options and implement the solution that best suits their needs as soon as possible.

4. THE SPREADSHEET

In this section, custom-made course administration spreadsheets (hereafter, CMCASs) will be explained. This explanation should prove enlightening to those wishing to learn more about how spreadsheets may be used as a DDHS as they weigh their DDHS options.

4.1. Spreadsheet Background

Before delving into the specifics of CMCAS construction and use, several preliminary points must be relayed. First, the CMCAS discussed here should be thought of as an example CMCAS only, albeit one set up for a specific type of course (in this case, a

university-level course where SD such as mid-semester grades and attendance information need not be shared online with students or parents²). Second, its appearance and utility as described here may not fully align with readers' expectations, preferences, or requirements. This is not a concern, as this chapter aims to present an example use-case scenario for illustrative purposes. Readers are encouraged to utilize the explanations provided here to develop their own CMCAS (i.e., one tailored to their own specific needs), or at minimum use the information presented here to more critically evaluate commercial or other gradebook options.

Third, readers are expected to possess a basic understanding of spreadsheets (e.g., menu bar items, toolbars, headers and footers), as detailed explanations of a typical spreadsheet's various elements are beyond the scope of the current chapter. Lastly, only fundamental functions (i.e., formulas used for automated calculations) are utilized and explained here. Much variation exists in instructors' spreadsheet needs and technological skills (Bennett, Maton, & Kervin, 2008), so that which is presented here is a simple CMCAS suitable for explanatory and illustrative purposes. Instructors may later explore and add more complex functions at their discretion.

With the current chapter providing only basic spreadsheet explanations, those considering implementing CMCASs are strongly encouraged to first ascertain what SD need to be recorded and processed. For instance, must student attendance be tracked? If so, are late students penalized (e.g., three tardies equal one absence)? Are students allowed to drop their lowest quiz grade? Does the educational institution require descriptive statistics for the students enrolled in a course (e.g., average grades, minimum and maximum final exam scores)? Spreadsheets could easily perform all these tasks and more, but it is the duty of the CMCAS creator/user to determine where these functions are to be included and how their output is to be presented. There is ample documentation available on the internet, including dedicated webpages and video tutorials, to aid CMCAS designers in configuring their spreadsheets.

As a supplement to the current discussion, the CMCAS described in this chapter is accessible as a template (in different formats) found at the following website, which is enclosed within brackets: [<https://www.isc.meiji.ac.jp/~rubrecht/CMCAS/index.html>]. Readers are encouraged to visit the website to gain a comprehensive understanding of the CMCAS detailed in the following sections. Furthermore, readers are granted unrestricted use of this example CMCAS template (which is occasionally updated) and may modify it in whichever ways they deem fit.

4.2. Spreadsheet Programs

Should a CMCAS be chosen as a DDHS, instructors must then select a spreadsheet program. There are numerous options from which to choose, with each offering distinct advantages and limitations that cater to different preferences and needs. Listed below are several common spreadsheet software choices:

- **Excel (Microsoft):** Widely recognized as the standard in spreadsheet software, Excel is available for both Mac and Windows platforms. It typically requires purchase, though many academic institutions provide it for free to instructors. Excel is renowned for its robust functionality and versatility in handling complex data sets.
- **Numbers (Apple):** Available exclusively on Mac (though compatible with Windows once converted to Excel format), Numbers is a free alternative known for being user-friendly and visually appealing. It offers seamless integration with other Apple devices through iCloud, ensuring automatic syncing across devices.

Compared to Excel, Numbers may have limited capabilities for advanced data manipulation.

- **Google Sheets (Google):** This free cloud-based solution allows collaborative work and real-time updates, but only with an internet connection. Its features do not extend far beyond basic spreadsheet functionalities.
- **OpenOffice Calc (Apache):** As part of the free OpenOffice suite, Calc is available across multiple platforms and offers basic spreadsheet functionalities, though these are even less robust than those of Google Sheets. Users may face challenges when manipulating large complex spreadsheets and may experience compatibility issues when sharing files.

The CMCAS discussed in this chapter (and the original version of the template as found on the author's website) is an Apple Numbers spreadsheet featuring multiple sheets.³ Numbers was selected because of its aesthetically pleasing visuals, future-proofness, and automatic syncing and use through iCloud. Also, the author has no need to utilize "open" (i.e., online) gradebooks.⁴

4.3. Spreadsheet Basics

For the uninitiated, there are several fundamental aspects to spreadsheets.

- **Sheets:** It is strongly recommended to construct/use a CMCAS that contains multiple sheets, with each one designed to store/display/process a specific type of SD (i.e., attendance tallies, lesson plans, homework grades, semester-end final grade calculations).
- **Headers:** It is crucial that column and row headers are "frozen" or "locked" to maintain on-screen visibility. Their content may be tailored to suit instructor preferences and course requirements, but left-hand column headers are commonly used to display student identification details (e.g., names and student numbers, which can often easily be imported from XLS or CSV student roster files often provided to instructors by educational institutions) while top header rows are usually used to show category information (e.g., lesson dates, homework assignment names).
- **Fonts, lines, and cells:** Their formatting and presentation are crucial to the visual aesthetics of the CMCAS. As such, it is strongly recommended that uniform (i.e., standardized) font types, sizes, and border styles be used throughout. Doing so reduces CMCAS construction time, increases overall readability, and eliminates style disparities when copying and pasting within and across sheets. It is also advisable to limit differentiation within cells to *changes in font or cell color only* rather than altering font type or cell borders (e.g., border type, width, color).
- **Printing, uploading, and sharing:** Instructor preferences and specific teaching contexts will dictate if (a) any CMCAS sheets will be printed, (b) the CMCAS will be placed in the cloud, or (c) others (i.e., stakeholders) will be granted access. Each option carries its own set of advantages and drawbacks. For instance, cloud storage allows for accessibility across various devices (e.g., on classroom desktops or iPads via services like iCloud) and eliminates the need for later input of handwritten data (e.g., attendance information). However, an online-only CMCAS comes with several potential (and possibly significant) drawbacks. Access may be blocked or hampered by personal or technical issues (see Shaw et al., 2013). Instructors' constant attention

to digital devices to record SD can become a distraction for all course participants. Additionally, there is always the risk of data corruption/loss, which leads to additional time/energy/financial concerns with the creating, maintaining, and storing of backups.

5. THE EXAMPLE CMCAS

The various sheets of the example CMCAS template will now be briefly explained. Readers should note that the space where the left-hand and top headers overlap is a space reserved in each sheet for course identification purposes (e.g., instructor name, course name, course day and period).

5.1. The Attendance Sheet

This attendance sheet (or more literally in this case, the class contribution sheet) is the first of the sheets, as students' attendance data must be collected each lesson. As is evident in the template, the left-hand column contains student identification information while the top header rows contain data identifiers, for instance, lesson dates and grading criteria associated with attendance (e.g., punctuality).

Of special note is that this sheet—like most of the CMCAS sheets in the template—has allocated full marks to all students for *each grading criterion* prior to course commencement. This is done as a time- and energy-saving measure. Instead of individually inputting data into each cell for every criterion for each student each lesson, adjustments (i.e., reductions in marks) to preexisting full-mark data are made only if a student does not meet expected performance standards. Depending on the sheet these adjustments may be implemented either by copying the color-coded cells with predetermined values from the lower-left section of the left-hand header into the corresponding cell (e.g., as seen on the attendance sheet) or by manual input (e.g., as seen on the exam sheet). Pre-made color-coded cells are not strictly necessary, but their use allows for quick identification of criteria where marks have been deducted.

A further advantage of a CMCAS over other DDHSs is that specific cells in various columns and rows may be used to include notetaking spaces. On the attendance sheet, memo space is included for each lesson date in columns adjacent to students' attendance grades. Here, one may record reasons a student was absent (e.g., participation in an intercollegiate tournament) or keep track of specific and possibly recurring problems (e.g., when students continually sleep in class or come to class without textbooks or dictionaries).

To the far right of this (and other scored sheets) is a space for students' tallied scores. A simple sum formula adds up each student's individual grading criterion (e.g., punctuality), and these are then added together via another simple sum formula to compute each student's overall class contribution score on this attendance sheet.

Check spaces (i.e., cells) are also included in strategically placed locations in this and in all other sheets. These spaces are to be ticked only when the accuracy of data input has been confirmed. This becomes especially useful and important when sheets are printed for classroom use (i.e., when handwritten SD is later transferred to the digital CMCAS).

By way of explanation, the author employs a hybrid approach and regularly prints only this attendance sheet at the beginning of each semester. This practice presents several distinct advantages. First, considering the perceived significance and repetitive nature of attendance taking, particularly in the context of remote teaching and learning during the COVID-19 pandemic (see Rubrecht, 2020, 2021a, 2021b, 2021c), it is advisable to use a

simple, low-tech, and unobtrusive method for recording attendance and other common grading criteria. Since attendance must be recorded each lesson, having this attendance sheet readily available in printed form can help avoid potential issues such as internet connectivity problems, technological glitches, or keystroke errors. Second, using a printed sheet eliminates the need to divert attention away from a computer-centric activity (e.g., a PowerPoint presentation) to input attendance data into the CMCAS.⁵ Third, a printed sheet facilitates quick, easy, and accurate sharing of attendance information with students, for instance, when they ask to verify their number of absences toward the end of a semester.

5.2. The Lesson Plan Sheet

Many instructors are tasked with creating detailed lesson plans for a course. Including such plans as a dedicated CMCAS sheet presents several advantages. First, switching from one sheet (e.g., the homework sheet) to the lesson plan sheet aids organization, as both sheets are within the same spreadsheet, which eliminates the need to switch applications. Second, occasionally the order of lesson activities needs to be changed, that is, activities that were planned to be carried out at a specific time can be moved up or postponed. As lesson activities are written individually in rows within a sheet, they can effortlessly be reordered by drag-and-drop. Third, completed lesson activities can be marked with a tick (as explained above), which provides users a clear visual indication of course activity completion. Fourth, these sheets can be easily reviewed and reused in subsequent semesters, with modifications to the order or the planned activities themselves made as necessary.

While printing this particular sheet remains an option, accessing it solely on a digital device offers specific benefits, including (a) quick and unobtrusive checking as a lesson transitions from one topic or activity to another and (b) ease of sheet construction, as sheet layout (i.e., row height, column width) requires only minimal attention.

5.3. The Assigned Activity Sheets

Just as there is an attendance sheet, there should also be corresponding sheets for the other components of a course, for instance, homework, quizzes, projects, and final exams. These sheets can be constructed in one of two different ways, depending on the nature of the various tasks and activities involved, as well as on instructor preferences.

5.3.1. Method 1: Empty Cells

This method is best used for planned assignments (e.g., homework or quizzes) that, for whatever reason, *may possibly not get assigned or carried out* during a semester (e.g., because of time constraints). For this method, a sheet is created that has three distinct header rows. The top row lists the names of that grading component's various planned assignments across columns. The row beneath that notes the maximum score possible for each assignment, for instance, "20," "28," "16," and so on. These maximum assignment scores are summed via a function in a column on the far right to indicate the *total expected points* for that grading component. The next row below has cells left empty. These are also to be filled with each assignment's maximum possible score, but each is input *only as each assignment is completed*. As these figures are also summed in a column at the far right, instructors need only look at this sum to determine the final component score for final grade calculation, thereby minimizing incorrect total possible score calculations.

Unlike the attendance sheet, all student activity score cells for a sheet such as this should be filled in individually via typing (or possibly by copy-and-paste) as grading is completed. This is because the span of possible grades is often extremely wide, for instance, from 0 to 20, 0 to 28, 0 to 16, and so on.

5.3.2. Method 2: Range/Completed Cells

This method is best used for grading components like major projects or final exams where individual aspects may be given a range of grades, for instance, a final exam with exam questions that are graded on multiple criteria (see sample template). Using a fictitious English course writing exam as an example, one row in the top header is dedicated to listing the details of what is to be assessed for each question of that exam. For example, for part of the exam, students are expected to write two English sentences, and those sentences will be checked for grammar, vocabulary, and overall coherence. The row below will list the *range of possible scores* (e.g., 0 to 3). The student score cells below will be populated with a score of 3 *prior to grading* and will only be changed should point deductions be required.

However, on this example exam, students are also being tested on their knowledge of specific vocabulary words that were taught to them in the course. As the grading for these questions are binary in nature (i.e., students' answers will be judged to be either correct or incorrect), the maximum score for each question is inserted in the header row (e.g., a score of 3), and the student score cells are all pre-populated with this same maximum score. Only the answers deemed incorrect require instructor intervention, with those scores of 3 being changed to 0.

5.4. The Final Calculations Sheet

At semester's end, all grading criteria from the various course components must be compiled, appropriately weighted, and summed to calculate each student's final score and/or letter grade for the course. To facilitate this process, a dedicated sheet for processing final scores should be created. This sheet consolidates the tallied scores from the course's various sheets. Each score is multiplied by its designated weight or percentage and then summed to determine final grades. Utilizing separate simple functions for these calculations is strongly recommended, as it ensures accuracy and efficiency in determining final scores.

6. DISCUSSION

As it is not specifically designed to be a DDHS, it is understandable that some instructors would prefer to tolerate deficient commercially available software rather than spend any amount of time and energy constructing or refining various sheets in a CMCAS. This is particularly true for non-tech-savvy instructors or those experiencing burnout. Nevertheless, it is speculated that instructors overlook the spreadsheet due to its reputation as being little more than number-crunching software, which unfortunately is undeserving and undermines its potential to be taken seriously as a serviceable DDHS.

The CMCAS described here should be taken as an example DDHS only and should in no way be considered suitable for all instructors in all teaching situations. It is but one possible way to manage course-centric administrative tasks, and the explanations presented here should at minimum spur instructors to consider ways to better streamline their various administrative duties and ultimately find a DDHS that works best for them.

In closing, the relaying of several final points and recommendations will serve to round out this explanation of DDHSs.

- **Needs evaluation.** First and foremost, instructors should determine their DDHS requirements.
- **Aim for simplicity.** Gradebooks should be user-friendly. Unnecessary complexity (particularly with formula or function use) should be avoided.
- **Trial and inspection.** If a CMCAS is chosen for use, first create a trial version. Examine all aspects of it carefully, including sheet number and type, functions to be included, and the standardized font and colors to be used throughout. Only then should it be made into a template for use across courses and semesters.
- **Partition whenever possible.** The CMCAS as explained here has multiple sheets for a reason. Each sheet serves a specific purpose. Separate sheets should also be made across semesters, even for the same students in the same course. Sheet differentiation can be accomplished in many ways (e.g., by changing alternating row colors or colors of headers).
- **Backup creation.** Always create a backup of your DDHS if possible, for both recovery and template-making purposes. Printing all CMCAS sheets may be considered a form of backup, which can help mitigate disaster (see Warren, 2016).
- **Stay dynamic.** Remember that a CMCAS should be adaptable. Periodic updates and adjustments, such as adding or removing features, will help in creating a customized gradebook that functions as intended.

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Short biographical sketch: Dr. Brian G. Rubrecht is a Professor in the English Department in the School of Commerce at Meiji University, Tokyo, Japan. He has degrees in TESOL and Bilingual Education (Georgetown University, 2000) and Foreign Language Education (The University of Texas at Austin, 2004). He has delivered over fifty presentations at conferences worldwide and has had the honor of serving as a conference keynote speaker. His work spans more than five dozen publications, which include both book chapters and journal articles. His research interests range from language learning motivation and pronunciation to language use in the classroom and pedagogical practices that influence the teaching and learning of other languages. He is currently exploring practical solutions to better prepare his students for life in our increasingly digital world.

1. Vegel (2022) notes experiencing this several times; the author of the current chapter has as well, hence the reason for exploring the subject of electronic gradebooks.
2. This does not preclude such information from being shared via other means.
3. In Microsoft Excel parlance, it is a workbook featuring multiple worksheets.
4. As explained by McKenna (2016), such “open gradebooks” have their own drawbacks.
5. The convenience of having a printed attendance sheet becomes immediately apparent as soon as tardy students make their way to the classroom one by one, thereby intermittently bringing the lesson to a halt, as the computer application currently in use must be switched to the CMCAS to digitally input figures to reflect this SD.