E-Class Scheduling and Room Utilization: An Innovation in the Instruction Process of BISU-Main Campus

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Abstract. This article documents the process, discusses outcomes and identifies recommendation for sustainability of an E-Class Scheduling and Room Utilization process as an innovative measure to improve instruction delivery in Bohol Island State University, Main Campus. The initiative to innovate the process springs from the chronic difficulties and problems, such as schedule conflicts, lack of classrooms in particular hours while underemployed classrooms during other hours, and sustained re-sectioning of classes, among others, encountered by all colleges during every start of a semester. A system was then devised based on gathered data from those who are directly involved in class scheduling and with the aid of Google Spreadsheet as a support software, the e-process was implemented. It was found out that after two consecutive semesters, the e-process (1) facilitated agreement and consensus among schedulers through secured plotting position, transparency of inputs, and ease of communication; and (2) generated heatmaps that indicate arbitrarily preferred day and time schedules (favorites) ushering for interventional adjustments to democratize and maximize room utilization. It is recommended that policies be effected to institutionalize and thereby sustain the e-class scheduling and room utilization for improve quality as well as effective and efficient delivery of instruction.

Keywords: E-Class Scheduling, Room Utilization, Google Spreadsheets, Innovation in Instruction, Bohol Island State University

Introduction

Quality, effective and efficient service is one requirement more pronounced and expected in the government. Section 4 of Republic Act No. 6713 (1989) specifically requires that "every department office and agency... conduct continuing studies and analyses of their work systems and procedures to improve delivery of public services." Given its nature as a

national statue, this law is binding in government organizations and state instrumentalities, including Bohol Island State University (BISU).

One enabling aspect crucial to the delivery of quality, effective and efficient instruction – the primary mandated function of BISU – is the class scheduling process and room utilization. For the past years, paper and pen method has been the rule of the game. Individuals are assigned by Program Chairpersons as schedulers who manually plot courses to instructors and professors (including themselves) with corresponding room assignment. This usual process engenders difficulties and problems that are chronically experienced, though eventually mitigated as classes in a semester progress.

With the establishment of the College of Arts and Sciences, which has offered additional three curricular programs and centralized the offering and management of the General Education courses, the usual process is no longer tenable. Problems continue to arise because, (1) paper and pen causes more delays due to manual handling of the plotted schedule from college to college through filled-out forms or electronic files such as word doc or spreadsheets; (2) manual plotting obscures transparency of use that favors monopoly and inequitable assigning of classrooms and like facilities/resources; and (3) absence of equitable control so that any scheduler can intentionally (or not) plot over an already assigned schedule.

The solution was the development and utilization of a centralized class scheduling process using Google Spreadsheet that can act as a database to store and share information through sheet importation from one spreadsheet to another. The spreadsheet facilitates ease and efficiency in the scheduling process using truncated functions to show library details and recorded schedule and identify restrictions which are helpful for predefined logical evaluations of the scheduling process.

This presentation documents the development and utilization process of the E-Class Scheduling and Room Utilization through Google Spreadsheet, with a discussion of attendant findings and recommendation for policy development.

Methods

Gathering Narratives. Consultation, through dialogue and discussion, with the different key informants of the colleges was taken as the first step. They were generally asked about their usual process of class scheduling, difficulties encountered, counter-measures, those that were considered milestones, and suggestions for improvement.

Responses were then recorded, transcribed, sequentially organized and presented back to the informants for validation. Printed samples of past

schedules were also gathered as supplementary data. With necessary and sufficient validated data, Narrative analysis came next.

Analyzing the narratives. A set of guidelines was established based on the following criteria: (1) common techniques performed by all of the colleges; (2) common rules and guidelines on which the colleges base their scheduling process; (3) unique technique to each college; (4) unique rules and guidelines along with reasons/justifications for each taken and practiced action; and (5) legal bases and institutional guidelines with which their implementation was aligned.

Constructing the Framework. Given the set of guidelines, a framework was then developed that involved the following steps: (1) The Program Chairperson will plot or assign a group (instructors/professors) to plot the schedule; (2) The assigned scheduler is then given a link to the college library (database) where initial data were stored and registered as new program(s). He or she then, updates instructors' status including, among others, designation and de-loading, adds new set of courses offered, and updates the classroom; (3) The scheduler is given another link for him or her to plot the schedule and store the data in the sheet. The stored data are then reflected in the main database where the main database in turn broadcasts the plotted schedule to the other schedulers to avoid conflict; (4) The flow of the scheduling process starts with the plotting of (a) the major courses, (b) the General Education courses, (c) the professional courses, and (d) the courses without shop or laboratory (mostly with 3 hours duration). Scheduling conflict are reconciled between and among department/program chairpersons and schedulers; (5) After finalizing, the schedules are then printed. The printed outcome is through a sheet linked to the database that is formatted based on institutional specifications (CHED and ISO-consistent); and (6) The final step is the analysis of the database. Data would include room percentage utilization, distribution of class load, and balance and equitable shifts scheduling, among others.

Developing the software. The software was developed based on the framework of the class scheduling process that took consideration of the of availability of resources, familiarity of the users, and speed of deployment and modification. Google spreadsheet with the google app script, a JavaScript-based programming, was apt because of its data handling capabilities (Google, n.d.).

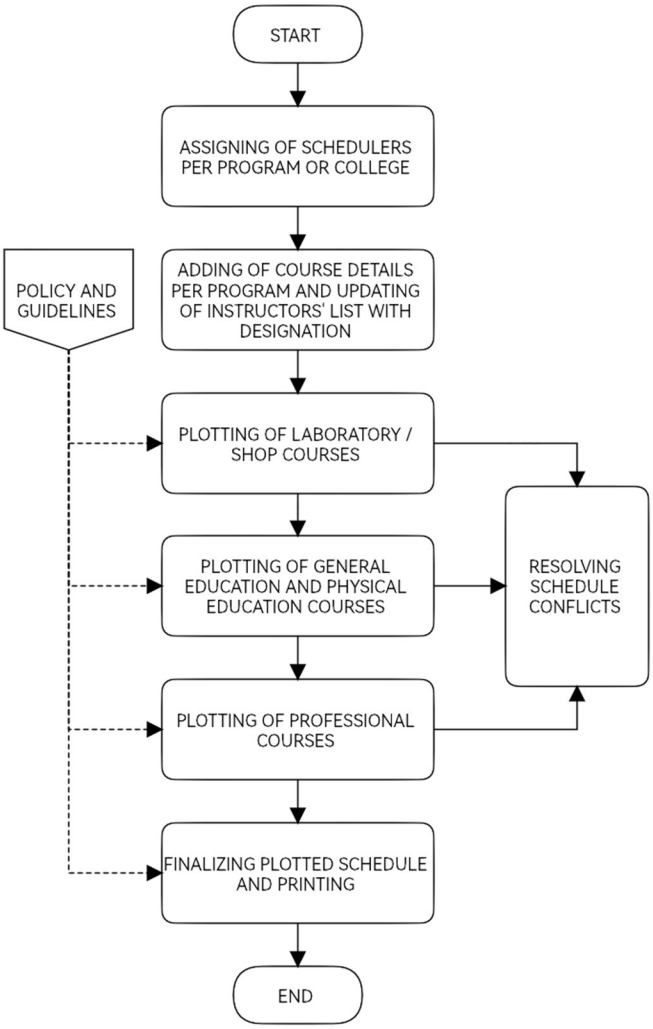

Figure 1. Framework of the Class Scheduling Process

The developed software had multiple spreadsheets linked together for diverse features and purposes. There is (1) the library which stores the preliminary data - programs, courses, instructors, rooms and other process details; (2) the scheduler's spreadsheets which adds, modifies, stores, and removes schedules based on policies and guidelines; (3) the database

spreadsheet which collects and shares the plotted schedules with the other spreadsheet; and (4) the printable sheets formatted based on institutional requirements for dissemination and compiling of hardcopy outputs.

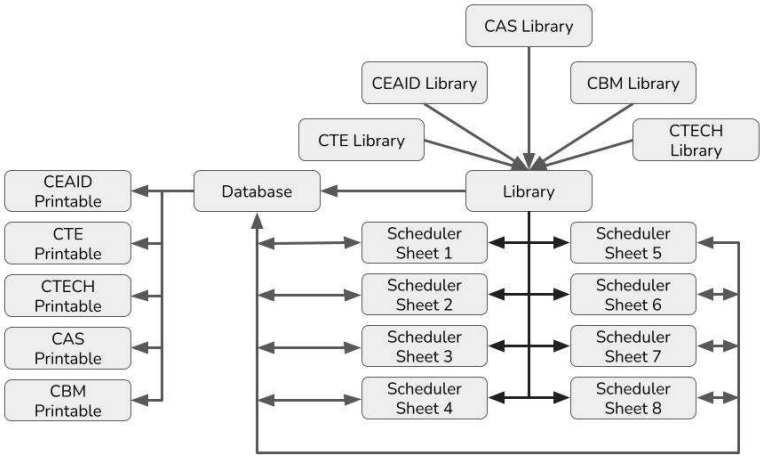

Figure 2. Centralized group of spreadsheets of the class scheduling support software

Most of the spreadsheets, with the exception of the scheduler's spreadsheet, handle and store significant data. The scheduler's spreadsheet has the internal framework of collecting from and storing data in the main library and other databases. It has three functions: (1) apply policy and guidelines, (2) present data collected from both the library and the database for scheduling purpose and for avoiding schedule conflict, as well as (3) add, modify and remove schedules from the sub-database. It also interfaces with other utility sheets for more effective and efficient scheduling process.

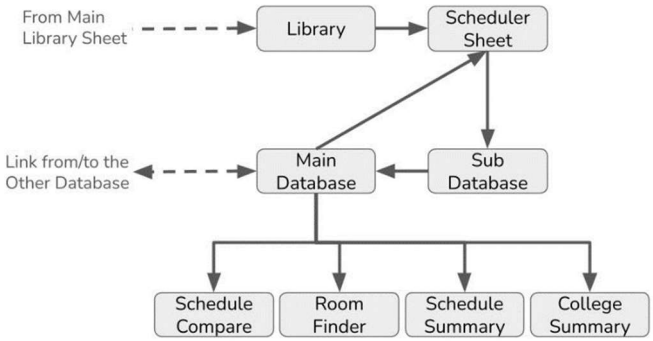

Figure 3. Individual Scheduler's spreadsheet

Implementing the Software. Based on the framework, an e-class scheduling and room utilization using google spreadsheets and google app scripts is implemented. To get started, all the necessary preliminary data are stored in the library and the scheduler's sheet is prefilled with required information.

The sheet is also embedded with needed restrictions for the scheduler to easily avoid conflicts as well as hints for already uploaded or identified instructor, class section or room.

When plotting is finalized, the schedule is stored in the database. Only the scheduler himself or herself can delete what he or she has plotted.

Testing the Software. The first implementation of the e-class scheduling and room utilization process generated the following results:

(1) Percentage of room utilization, number of face-to-face classes without room; and number of online classes; (2) Heatmap of the number of rooms with classes during a particular day and time of the week; (3) Status of classes of both instructor and student; and (4) All forms of analyses that can be extracted from the schedules.

Likewise, it was noted that there was no conflict of schedule within the system. Some were identified, though, in the actual conduct of classes due to lack of classrooms.

Results

It was observed that during the initial stage of implementation/running of the process, plotting of schedules was manually done by the Program Chairpersons who were still adjusting to navigate the e-scheduling system. They then forwarded it to the assigned schedulers who in turn encoded/plotted it in the system.

Expectedly, conflict (in schedule) could not be avoided. These were resolved, however, firstly because the system does not allow conflict, inconsistency and unnecessary duplication, and secondly, it enables all schedulers to view plotting from all ends. It is through the system that they communicate and resolve emerging issues without the need for physical presentation and discussion. Additionally, it also allows schedulers to find rooms with ease through other utility sheets like room finder and schedule compare. Likewise, it can also be easily monitored by the Program Chairpersons and Deans since it also features a college summary sheet where an overview of the load of all the instructors can be accessed and viewed.

First Semester, 2024-2025

College:	MAIN	Total # of Rooms Utilized			75	82
Time	MON	TUE	WED	THU	FRI	SAT
7:30-8:30	35	48	23	43	31	2
8:30-9:30	57	54	27	53	32	5
9:30-10:30	56	57	26	55	37	7
10:30-11:30	52	51	25	49	38	3
11:30-12:30	37	33	7	28	21	5
12:30-1:30	49	50	23	48	37	5
1:30-2:30	56	55	24	52	39	6
2:30-3:30	55	55	29	48	36	3
3:30-4:30	58	54	36	54	39	4
4:30-5:30	56	54	44	54	50	4
5:30-6:30	56	52	43	51	47	2
6:30-7:30	36	30	24	31	30	0
7:30-8:30P	30	27	18	29	22	0

Face to face Class without room	1917	31.18%
Face to Face Class with room	2656	43.20%
Total Face to face class	4573	
Online Class	1575	25.62%
Total Class Hour	6148	100.00%
Percentage Room Utilization	54.48%	

(a)

Second Semester, 2024 - 2025

College:	MAIN	Total # of Rooms Utilized			72	82
Time	MON	TUE	WED	THU	FRI	SAT
7:30-8:30	38	56	23	44	36	2
8:30-9:30	54	59	26	55	38	5
9:30-10:30	59	59	32	60	39	5
10:30-11:30	52	56	36	51	37	2
11:30-12:30	33	30	14	23	25	4
12:30-1:30	48	46	34	48	34	3
1:30-2:30	51	53	42	53	35	3
2:30-3:30	61	51	46	55	35	1
3:30-4:30	55	52	43	50	36	3
4:30-5:30	59	53	48	56	42	3
5:30-6:30	53	52	40	57	43	2
6:30-7:30	34	32	27	28	25	0
7:30-8:30P	29	28	20	31	21	0

Face to face Class without room	1290	23.08%
Face to Face Class with room	2741	49.03%
Total Face to face class	4031	
Online Class	1559	27.89%
Total Class Hour	5590	100.00%
Percentage Room Utilization	58.57%	

(b)

Figure 1. Tables with details on the percentage of room utilization including the heatmaps of the concentration of room utilization from (a) First Semester, 2024 - 2025, (b) Second Semester, 2024 – 2025 generated from the system

Comparing the two tables above, the result shows that arbitrarily preferred (favorite) day and time-slots have been significantly reduced indicated by the sparser or lighter color in the heatmap of the second table. Moreover, the occurrence of face-to-face classes without rooms is also significantly reduced from 31.18% to 23.08%. With proper and consistent use of the system, it is projected that face-to-face classes without rooms could eventually be cleared-out.

Overall, testing of the system indicated significant reduction in scheduling conflicts and processing time.

Conclusion

The integration of both the framework developed and the class schedule plotting and room utilization support software provides a well-defined class scheduling process which can reduce conflict and room insufficiency. After two consecutive semesters of running the system, results indicate that it (1) facilitated agreement and consensus among schedulers through secured plotting position, transparency of inputs, and ease of communication; and (2) generated heatmaps that indicate arbitrarily preferred day and time schedules (favorites) ushering for interventional adjustments to democratize and maximize room utilization.

E-Class Scheduling and Room Utilization proves to be an innovation in the instruction process of BISU-Main Campus by addressing key inefficiencies in the traditional scheduling process. The system is scalable, adaptable, and can serve as a base for favorable enhancements to properly manage both human and capital organizational resources.

It is recommended that institutional policies be implemented to sustain its use for quality, effective and efficient service to BISU's clientele.

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