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Interactive Timetable Scheduling Matrix Incorporating Classroom Occupancy and Schedule Visualization Using Google Sheets

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Abstract. Effective class scheduling is a critical aspect of academic administration, influencing resource allocation, faculty workload management, and student learning experiences. Traditional scheduling methods often rely on manual processes or heuristic-based approaches, leading to inefficiencies and scheduling conflicts. This study introduces an Interactive Timetable Scheduling Matrix that integrates classroom occupancy and schedule visualization using Google Sheets. The system leverages real-time data updates, automated conflict detection, and an interactive interface to streamline scheduling processes at the City College of Angeles (CCA). Built upon the Technology Acceptance Model (TAM), the study evaluates the system's Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Towards Use (ATU), and Behavioral Intention (BI) among academic administrators. The research follows an iterative development model and employs a quantitative descriptive design, gathering data from key stakeholders involved in scheduling. Results indicate that the system significantly improves efficiency, minimizes conflicts, and enhances decision-making processes. By utilizing Google Sheets' real-time collaboration features, the developed scheduling tool offered an accessible, cost-effective, and scalable solution for the City College of Angeles in optimizing their scheduling operations.

Keywords: *class scheduling, interactive timetable, classroom occupancy, schedule visualization, Google sheets, Technology Acceptance Model*

INTRODUCTION

Devising and overseeing a class schedule is one of the main tasks that must be accomplished before the start of an academic year in an institution like City College of Angeles. Class scheduling plays a vital role in educational management, influencing both teaching quality and institutional efficiency (Labuanan et al., 2019; Chen et al., 2021). Their schedule must be sent to the respective students, instructors, and other personnel so they can start attending their classes and tending to the rooms. Furthermore, when developing and overseeing a schedule, one must be able to consider the requests of all of the faculty members and cater to the necessary adjustments, which may cause changes and further conflicts to the schedule.

Timetable administration primarily done by hand or using crude heuristic algorithms often yields results with inaccuracies and inefficiencies. The varying constraints and preferences related to scheduling tasks are laborious for these traditional methods to take into consideration, resulting in un-optimized resource allocation, greater administrative effort, and lower stakeholder satisfaction (Pal et al., 2024).

Scheduling systems face the challenge of allocating resources—classrooms, instructors, and times—in a way that minimizes conflicts and maximizes utility (Chen et al., 2021). These are the variables that must be considered when creating an adequate schedule for a college institution. These variables also include classroom type and availability, teaching staff availability and schedules outside the college, and student wellness considerations like break times and length of class day. When creating a schedule to accommodate these variables, conflicts may, and most probably will, arise. May it be with the schedule of the instructor, the students, or the room, these conflicts are causing delays and other challenges to the institution.

Scheduling problems, characterized by their complexity and the multifaceted constraints they must satisfy (Pal et al., 2024; Diallo & Tudose, 2024), have prompted significant academic interest. These challenges are underscored by the need to consider room availability, instructor assignments, and the distribution of courses across different times and days.

The lack of a digitized class scheduling system at City College of Angeles (CCA) has proved to be detrimental not only in resource allocation but also in wasting precious hours and weeks of limited meetings. Oftentimes, schedule conflicts are discovered on the assigned time and day of class and are only resolved days or even weeks after—delaying the start of some classes and in turn, negatively impacting the eagerness of students to learn as well as further limiting the number of meetings each class takes. These errors could have been sorted out had they been foreseen ahead of time. The current utilization of “pen and paper” by most institutes of CCA as a visualization tool has shown to be inadequate, if not ineffective at all, and can be considered as a crude heuristic.

As class sizes and subject requirements become increasingly complex, the development of freely-accessible visualization tools that aid in conflict resolution and decision-making is progressively becoming more and more essential. As a result, the researchers delved into alternative and free solutions, such as the Google Sheets. This free product offered by Google is a web-based spreadsheet manipulation tool that can be used as long as one is connected to the internet, which is very convenient for accessing and managing data from any device (Chai, 2021). Unlike traditional spreadsheet software, Google Sheets allows for real-time collaboration, enabling users to edit, comment, and work on the same file simultaneously. With features such as built-in formulas, data visualization tools, and seamless integration with other Google Workspace applications such as Google Forms and Google Drive, Google Sheets is a versatile tool for organizing and analyzing data. Additionally, it supports automation through Google Apps Script, allowing users to create custom scripts to streamline repetitive tasks, such as scheduling and data processing. One practical application of Google Sheets's powerful features is in timetable creation. Whether for academic schedules, employee shift planning, or project timelines, Google Sheets provides an efficient way to organize and manage time-based data. With customizable formatting, conditional logic, and automation capabilities, users can easily design, update, and share timetables to suit their specific needs.

With that said, the researchers focused their attention to the advantages of real-time and robust timetabling visualization features of Google Sheets in identifying potential schedule overlaps and conflict resolution. In this study, the researchers highlighted the significant impact of interactive timetable scheduling matrix in mitigating schedule conflicts by utilizing classroom occupancy visualization and dynamic visual representation of students' and instructors' schedules.
The researchers used the Technology Acceptance Model (shown in Figure 1) as its foundational theory to gauge the impact of acceptance of their study. Developed by Fred Davis in 1989, the TAM suggests that two primary factors influence the acceptance of and use of technology: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). In this study, PU referred to the degree to which the deans and class schedule managers deemed the timetabling matrix to have helped improve their task efficiency, while PEOU was described as the extent to which they felt using the system was intuitive and free from effort.

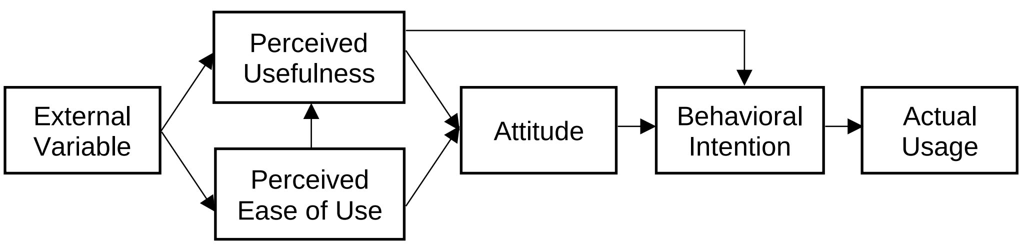


Figure 1. *Technology Acceptance Model (TAM)*

Additionally, Attitude Towards Use (ATU) reflected the users' positive or negative feelings about using the system, while Behavioral Intention (BI) referred to the likelihood or probability that the target users had engaged in using the scheduling system. In addition, ATU captured the deans' and coordinators' perceptions of the system—whether they considered it facilitated their work, reduced their tasks' complexity, or enhanced their work efficiency, while BU was measured with how motivated or inclined the users were to adopt and use the new system.

The conceptual framework of the study, shown in Figure 2, detailed the research processes involved. During its early stages, the researchers planned the outline of the study by specifying the requirements and variables involved, as well as by conducting preliminary interviews, observation, and literature review. In this stage, the researchers identified and defined the variables affecting the decision-making and conflict resolution in class schedules. Afterwards, the researchers designed the timetable matrix of each lecture and laboratory classrooms, instructors schedule, and per section's schedule. These matrices were automatically populated by whichever values inputted on the primary sheet used, and were then plotted on the said matrices. After successfully creating the reference sheets, the researchers have developed a general overview of the three matrices and integrated them into a single visualization tool with a user interface for picking which section and which instructor's schedule to view. Once completed, the researchers had the interactive timetabling matrix evaluated by the intended users designed using the Technology Acceptance Model. The evaluation results underwent Data Analysis and Interpretation before arriving at a conclusion.

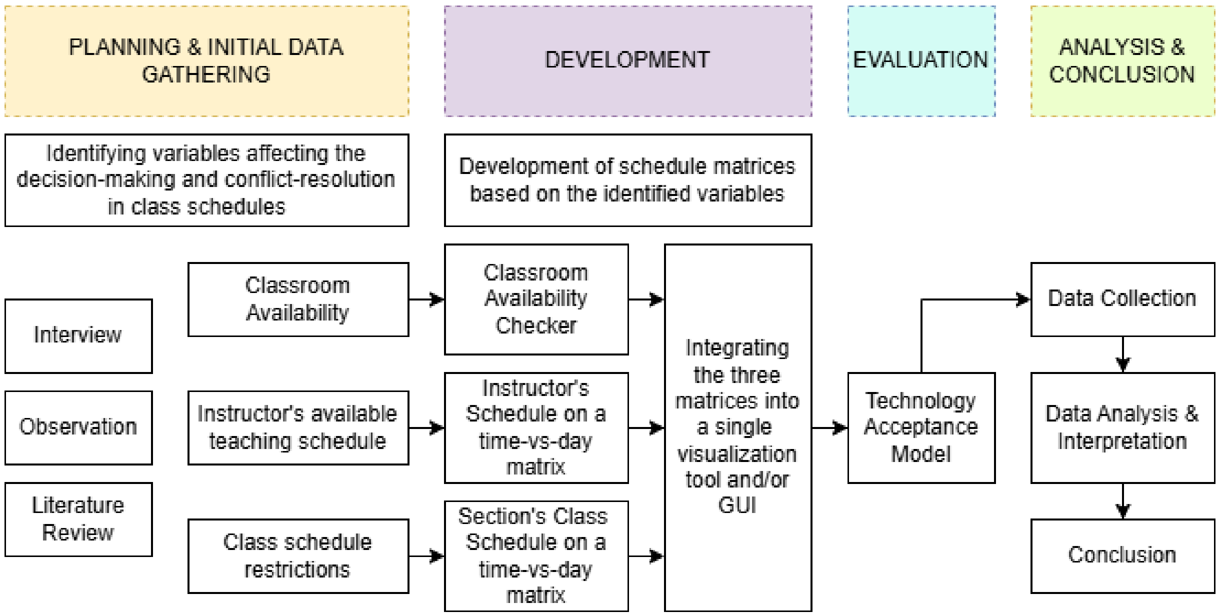


Figure 2. *Conceptual Framework*

This study generally aims to devise an interactive timetable scheduling matrix by integrating a representation of classroom occupancy and a dynamic timetable matrix that would show both the instructor schedules and class schedules. It specifically aims to:

1. Identify the factors affecting the class scheduling processes and conflict resolution,
2. Map out potential scheduling conflicts in advance,
3. Describe the impact of the developed system in terms of improving the task efficiency and productivity,
4. Streamline the class scheduling processes,
5. Describe the comprehensive user experience while using the system,
6. Determine the likelihood to adopt the system in future class schedule management.

METHOD

The researchers used the iterative development model (shown in Figure 3) as their methodology in designing and building the interactive timetable scheduling matrix. According to Miraz & Ali (2020), the iterative development model is said to be a cycle of working toward a complete solution. It takes various iterations of development and collaboration to create an evolving solution. As such, the researchers developed and tested each feature one at a time until it was ready, which were subsequently added to the whole system when it was ready for deployment.

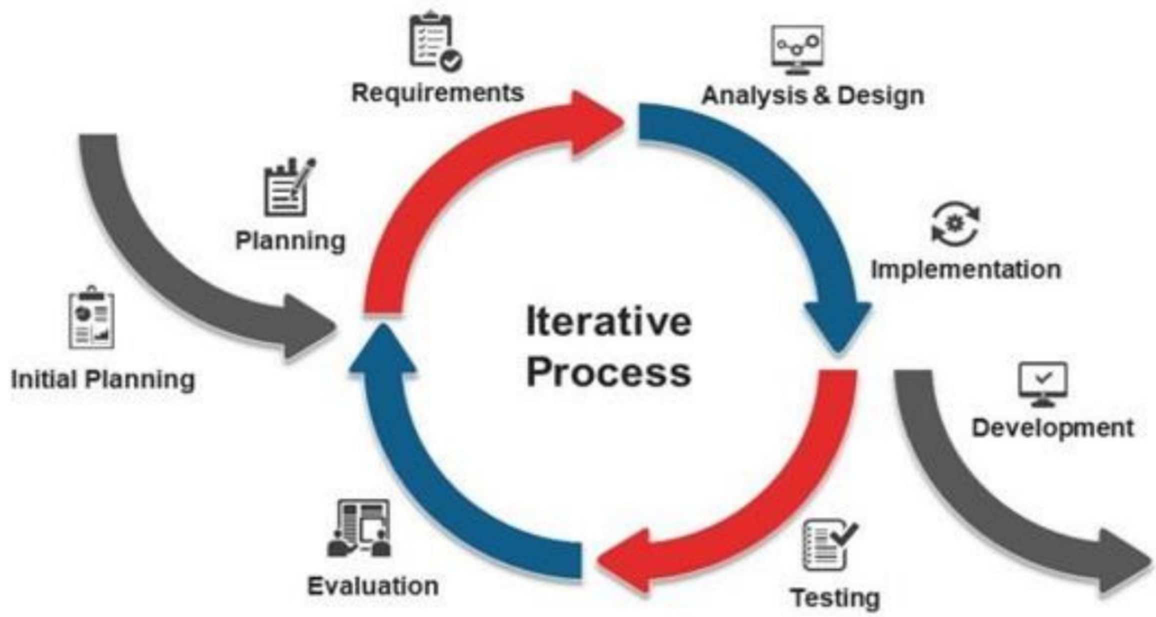


Figure 2. *Iterative Development Model*

Furthermore, the researchers used the quantitative descriptive research design in order to gather numerical data based on the impact of the developed system to the intended users' experiences in the overall class scheduling process. A quantitative research design involves the collection and analysis of numerical data that can be used to describe, control, and predict the variables collected (McLeod, 2019), while a descriptive design is used to describe events, individuals, or conditions by studying them in nature (Siedlecki, 2020).

Post-development, the researchers and one assigned class schedule manager utilized the system to assist them in the class scheduling process for two semesters in order to fully simulate the decision-making processes and conflict resolution. In addition, the researchers presented the system to three more academic heads who also play pivotal roles in the construction of their respective class schedules. These five (5) participants were selected through purposive sampling primarily due to their influence in the class scheduling process of the City College of Angeles.

To assess the impact of the development of the system, the researchers devised an evaluation questionnaire based on the Technology Acceptance Model using a 5-point Likert Scale to enable quantitative analysis of data, which was then administered to the participants in person after the semester had ended. Likert scales are well-known in research because they allow the operationalization of perceptions. In collecting data using Likert scale, one must present Likert-type questions or statements where each item provided is given a numerical score to rate so that the data can be analyzed quantitatively (Bhandari, 2022).

Table 1 presents the measurements of the responses that the participants gave in each item in the questionnaire. They evaluate the characteristics of the IDE in accordance with what is indicated: functional suitability, performance efficiency, usability, compatibility and reliability. Each numerical rating has different interpretations ranging from excellent to poor.

Table 1. *Five-point Likert Scale*

Numerical Rating	Description
5	Strongly Agree
4	Agree
3	Neutral
2	Disagree
1	Strongly Disagree

Table 2 presents the scale for the interpretation of the evaluation results of the participants. To interpret the overall responses, weighted average was used to summarize the analysis of the participants' responses in the questionnaire.

Table 2. *Scale for Interpreting the Evaluation Result*

Numerical Rating	Description
4.20-5.00	Excellent
3.40-4.19	Very Good
2.60-3.39	Good
1.80-2.59	Fair
1.00-1.79	Poor

To gauge the user acceptance of the system, evaluation questions were formulated using the variables from the Technology Acceptance Model, particularly Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Towards Use (ATU), and Behavioral Intention (BI). The questions were tailor-fitted to describe their perception and experience in using the system. Table 3 shows the list of questions formulated based on the technology acceptance model and to which factor they are categorized in.

Table 3. *Evaluation Questions and their Categorization*

Factors	Questions
Perceived Usefulness	The system helped me develop and oversee the schedule.
	I can identify schedule conflicts in a timely manner.
	I can resolve schedule conflicts in a timely manner.
Perceived Ease of Use	The interface is intuitive and can be used without complex instructions.
	The user interface can be used comfortably without difficulty.

	I believe that the system helped reduce my tasks' complexity
Attitude Towards Use	I believe that the system enhanced my work efficiency
	The system helped me feel confident in my ability to manage the schedule.
Behavioral Intention	I will continue to use the system in the foreseeable future.
	I will recommend the system to other dean/s, coordinator/s, and/or designated schedule manager/s.

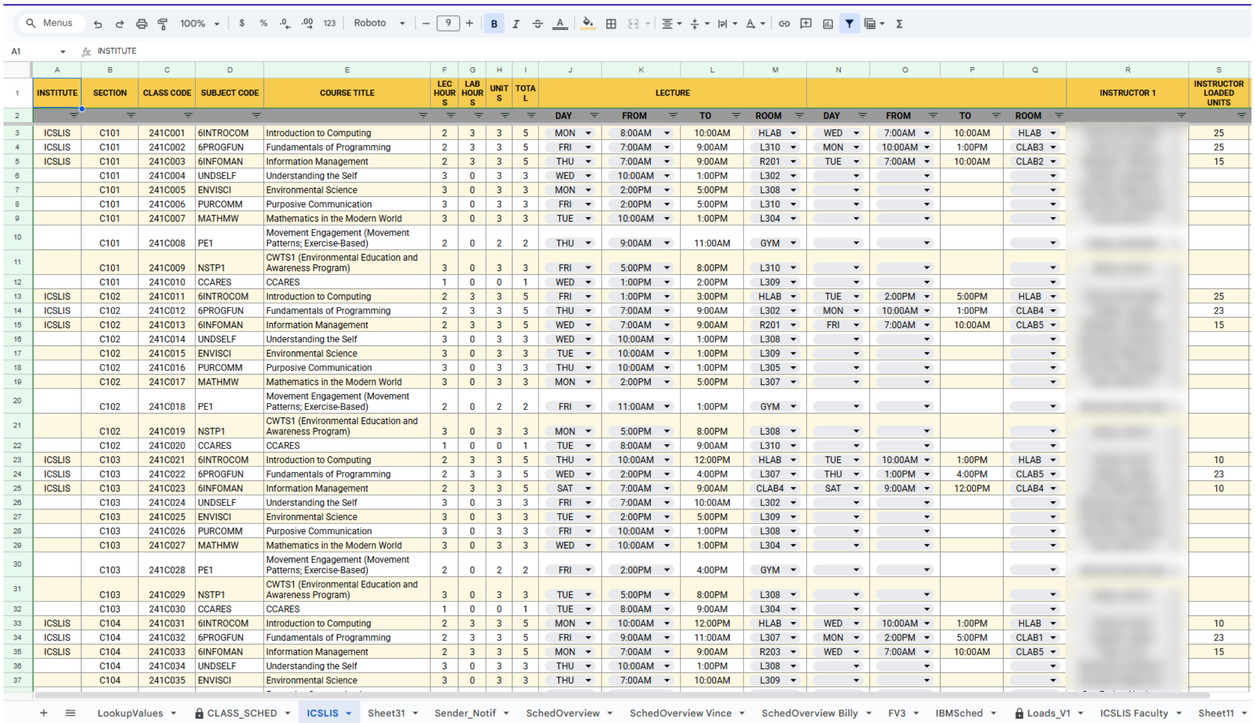
RESULTS

This section presents screenshots of the developed system and the results of the analyzed evaluation responses.

System Outputs

This section exhibits the screenshots of the actual outputs from the developed system.

Firstly, shown in Figure 4 is the sheet where the institute dean and class schedule managers manually plot the start time, end time, lecture room, laboratory room, and assigned instructors. This tab was no different from the other institutes' schedule sheets aside from column S. Column S was modified to show the number of loaded units to an ICSLIS instructor in order to assist the institute dean in identifying whether the selected instructor had full loads already or not. To further facilitate and minimize encoding error, the researchers tweaked the formula for the *end time* column such that it would automatically output the sum of *start time* and *lecture* or *lab hours* depending on which column it falls under.



INSTITUTE	SECTION	CLASS CODE	SUBJECT CODE	COURSE TITLE	LEC HOURS	LAB HOURS	UNITS	TOTAL	LECTURE								INSTRUCTOR 1	INSTRUCTOR LOADED UNITS
									DAY	FROM	TO	ROOM	DAY	FROM	TO	ROOM		
ICSLIS	C101	241C001	6INTROCOM	Introduction to Computing	2	3	3	5	MON	8:00AM	10:00AM	HLAB	WED	7:00AM	10:00AM	HLAB		25
ICSLIS	C101	241C002	6PROGFUN	Fundamentals of Programming	2	3	3	5	FRI	7:00AM	9:00AM	L310	MON	10:00AM	1:00PM	CLAB3		25
ICSLIS	C101	241C003	6INFOMAN	Information Management	2	3	3	5	THU	7:00AM	9:00AM	R201	TUE	7:00AM	10:00AM	CLAB2		15
	C101	241C004	UNDSELF	Understanding the Self	3	0	3	3	WED	10:00AM	1:00PM	L302						
	C101	241C005	ENVISCI	Environmental Science	3	0	3	3	MON	2:00PM	5:00PM	L308						
	C101	241C006	PURCOMM	Purposive Communication	3	0	3	3	FRI	2:00PM	5:00PM	L310						
	C101	241C007	MATHMW	Mathematics in the Modern World	3	0	3	3	TUE	10:00AM	1:00PM	L304						
	C101	241C008	PE1	Movement Engagement (Movement Patterns; Exercise-Based)	2	0	2	2	THU	9:00AM	11:00AM	GYM						
	C101	241C009	NSTP1	CWTS1 (Environmental Education and Awareness Program)	3	0	3	3	FRI	5:00PM	8:00PM	L310						
	C101	241C010	CCARES	CCARES	1	0	0	1	WED	1:00PM	2:00PM	L309						
ICSLIS	C102	241C011	6INTROCOM	Introduction to Computing	2	3	3	5	FRI	1:00PM	3:00PM	HLAB	TUE	2:00PM	5:00PM	HLAB		25
ICSLIS	C102	241C012	6PROGFUN	Fundamentals of Programming	2	3	3	5	THU	7:00AM	9:00AM	L302	MON	10:00AM	1:00PM	CLAB4		23
ICSLIS	C102	241C013	6INFOMAN	Information Management	2	3	3	5	WED	7:00AM	9:00AM	R201	FRI	7:00AM	10:00AM	CLAB5		15
	C102	241C014	UNDSELF	Understanding the Self	3	0	3	3	WED	10:00AM	1:00PM	L308						
	C102	241C015	ENVISCI	Environmental Science	3	0	3	3	TUE	10:00AM	1:00PM	L309						
	C102	241C016	PURCOMM	Purposive Communication	3	0	3	3	THU	10:00AM	1:00PM	L305						
	C102	241C017	MATHMW	Mathematics in the Modern World	3	0	3	3	MON	2:00PM	5:00PM	L307						
	C102	241C018	PE1	Movement Engagement (Movement Patterns; Exercise-Based)	2	0	2	2	FRI	11:00AM	1:00PM	GYM						
	C102	241C019	NSTP1	CWTS1 (Environmental Education and Awareness Program)	3	0	3	3	MON	5:00PM	8:00PM	L308						
	C102	241C020	CCARES	CCARES	1	0	0	1	TUE	8:00AM	9:00AM	L310						
ICSLIS	C103	241C021	6INTROCOM	Introduction to Computing	2	3	3	5	THU	10:00AM	12:00PM	HLAB	TUE	10:00AM	1:00PM	HLAB		10
ICSLIS	C103	241C022	6PROGFUN	Fundamentals of Programming	2	3	3	5	WED	2:00PM	4:00PM	L307	THU	1:00PM	4:00PM	CLAB5		23
ICSLIS	C103	241C023	6INFOMAN	Information Management	2	3	3	5	SAT	7:00AM	9:00AM	CLAB4	SAT	9:00AM	12:00PM	CLAB4		10
	C103	241C024	UNDSELF	Understanding the Self	3	0	3	3	FRI	7:00AM	10:00AM	L302						
	C103	241C025	ENVISCI	Environmental Science	3	0	3	3	TUE	2:00PM	5:00PM	L309						
	C103	241C026	PURCOMM	Purposive Communication	3	0	3	3	FRI	10:00AM	1:00PM	L308						
	C103	241C027	MATHMW	Mathematics in the Modern World	3	0	3	3	WED	10:00AM	1:00PM	L304						
	C103	241C028	PE1	Movement Engagement (Movement Patterns; Exercise-Based)	2	0	2	2	FRI	2:00PM	4:00PM	GYM						
	C103	241C029	NSTP1	CWTS1 (Environmental Education and Awareness Program)	3	0	3	3	TUE	5:00PM	8:00PM	L308						
	C103	241C030	CCARES	CCARES	1	0	0	1	TUE	8:00AM	9:00AM	L304						
ICSLIS	C104	241C031	6INTROCOM	Introduction to Computing	2	3	3	5	MON	10:00AM	12:00PM	HLAB	WED	10:00AM	1:00PM	HLAB		10
ICSLIS	C104	241C032	6PROGFUN	Fundamentals of Programming	2	3	3	5	FRI	9:00AM	11:00AM	L307	MON	2:00PM	5:00PM	CLAB1		23
ICSLIS	C104	241C033	6INFOMAN	Information Management	2	3	3	5	MON	7:00AM	9:00AM	R203	WED	7:00AM	10:00AM	CLAB5		15
	C104	241C034	UNDSELF	Understanding the Self	3	0	3	3	THU	10:00AM	1:00PM	L308						
	C104	241C035	ENVISCI	Environmental Science	3	0	3	3	THU	7:00AM	10:00AM	L309						

Figure 4. *The Sheet for Plotting the Schedule*

As shown in Figure 5, this sheet housed the visualization tool of the plotted class schedules. This sheet was divided into three parts: instructor schedule timetable matrix, section schedule timetable matrix, and the classroom occupancy matrix (from left to right). Class schedule managers could choose from the drop-down menu of all the ICSLIS instructors. Once the value of cell D1 had been updated, the instructor timetable matrix on the left would automatically update. Similarly, once the value on S1 was updated, the timetable matrix in the middle would display the class schedule of the selected section. The region on the right would display the availability of classrooms—green would mean the room is occupied, uncolored would mean the room is vacant, while red would indicate that there were two or more sections or classes occupying at the same time.

Additionally, in both the timetable matrix for instructors and sections schedule, should there be conflict or overlap in their schedule, it would return a reference (#REF!) error. Class schedule managers could then expand the column on its right to see the class codes of the subjects associated with the schedule conflicts. This would direct the assigned schedulers' attention to only the identified conflicting classes—minimizing the wild goose chase.

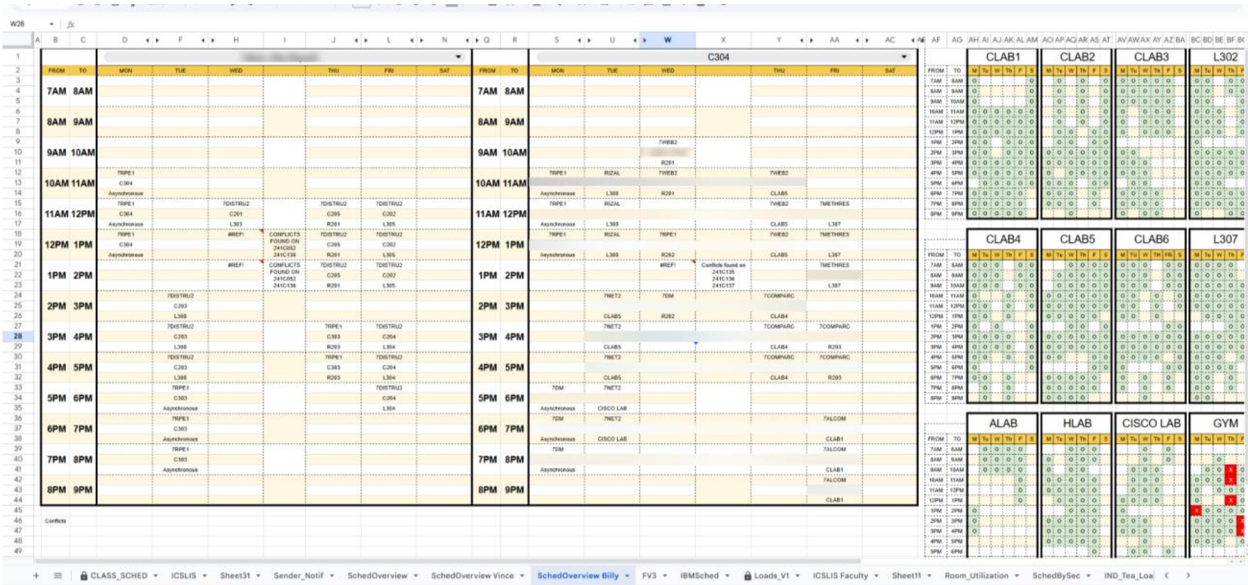
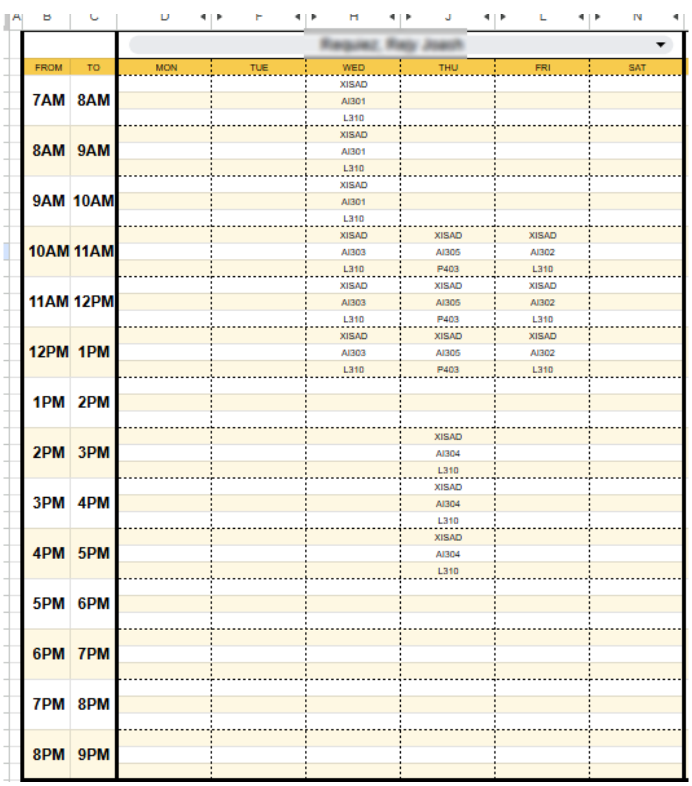


Figure 5. *The Visualizing Page with Interactive UI*

Figure 6 shows the instructor's schedule timetable region of the visualization tool. Schedule managers and academic heads would simply choose from the selection of instructors and the timetable would update its values to reflect the real-time schedule of the selected instructor.



FROM	TO	MON	TUE	WED	THU	FRI	SAT
7AM	8AM			XISAD AI301 L310			
8AM	9AM			XISAD AI301 L310			
9AM	10AM			XISAD AI301 L310			
10AM	11AM			XISAD AI303 L310	XISAD AI305 P403	XISAD AI302 L310	
11AM	12PM			XISAD AI303 L310	XISAD AI305 P403	XISAD AI302 L310	
12PM	1PM			XISAD AI303 L310	XISAD AI305 P403	XISAD AI302 L310	
1PM	2PM						
2PM	3PM				XISAD AI304 L310		
3PM	4PM				XISAD AI304 L310		
4PM	5PM				XISAD AI304 L310		
5PM	6PM						
6PM	7PM						
7PM	8PM						
8PM	9PM						

Figure 6. *Instructor Schedule Timetable Region of the Visualization Sheet*

Figure 7 shows the class section's schedule timetable region of the visualization tool. Schedule managers and academic heads would simply choose from the list of sections under their institute and the timetable would update its values to reflect the real-time class schedule of the selected section.

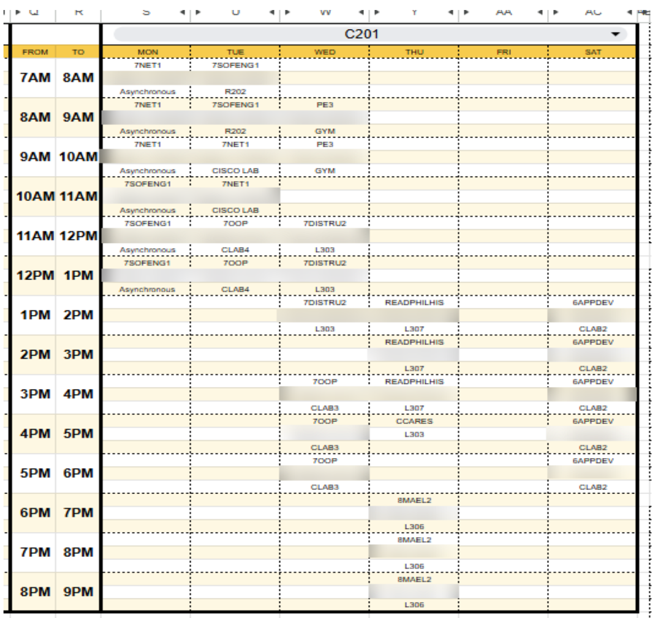


Figure 7. *Class Sections Schedule Timetable Region of the Visualization Sheet*

Sections with conflicting schedule (i.e., overlapping time for two or more classes) would have a reference error (#REF!) on the specific time slot, as shown in Figure 8. Schedule managers and academic heads could expand the column directly on its right to see which class codes were affected—focusing their attention only to those specific subjects.

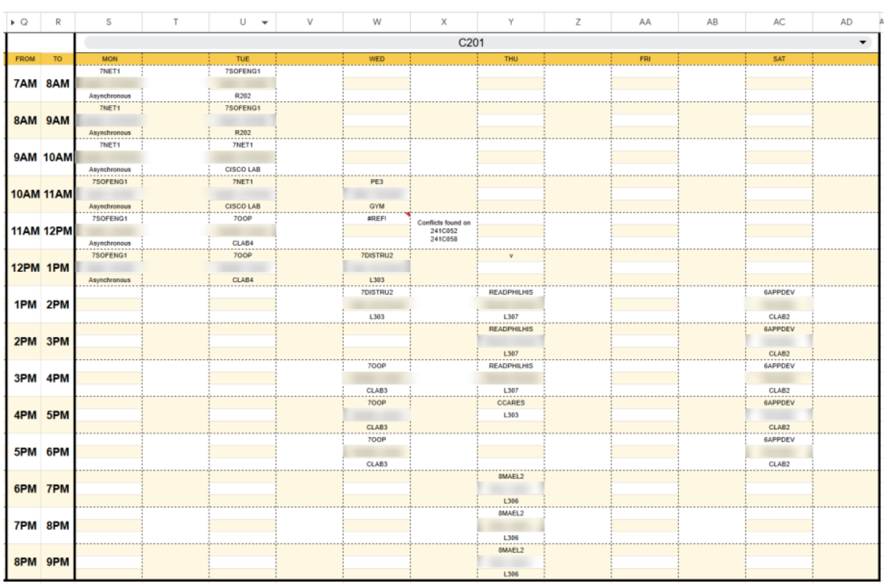


Figure 8. *Expanded Class Sections Schedule Timetable Region*

Figure 9 presents the classroom occupancy region of the visualization sheet. This showed an array of timetables for all the classrooms under ICSLIS and were automatically populated using conditional values. Schedule managers and academic heads could easily identify which classrooms were assigned with overlapping classes or were still available for use.

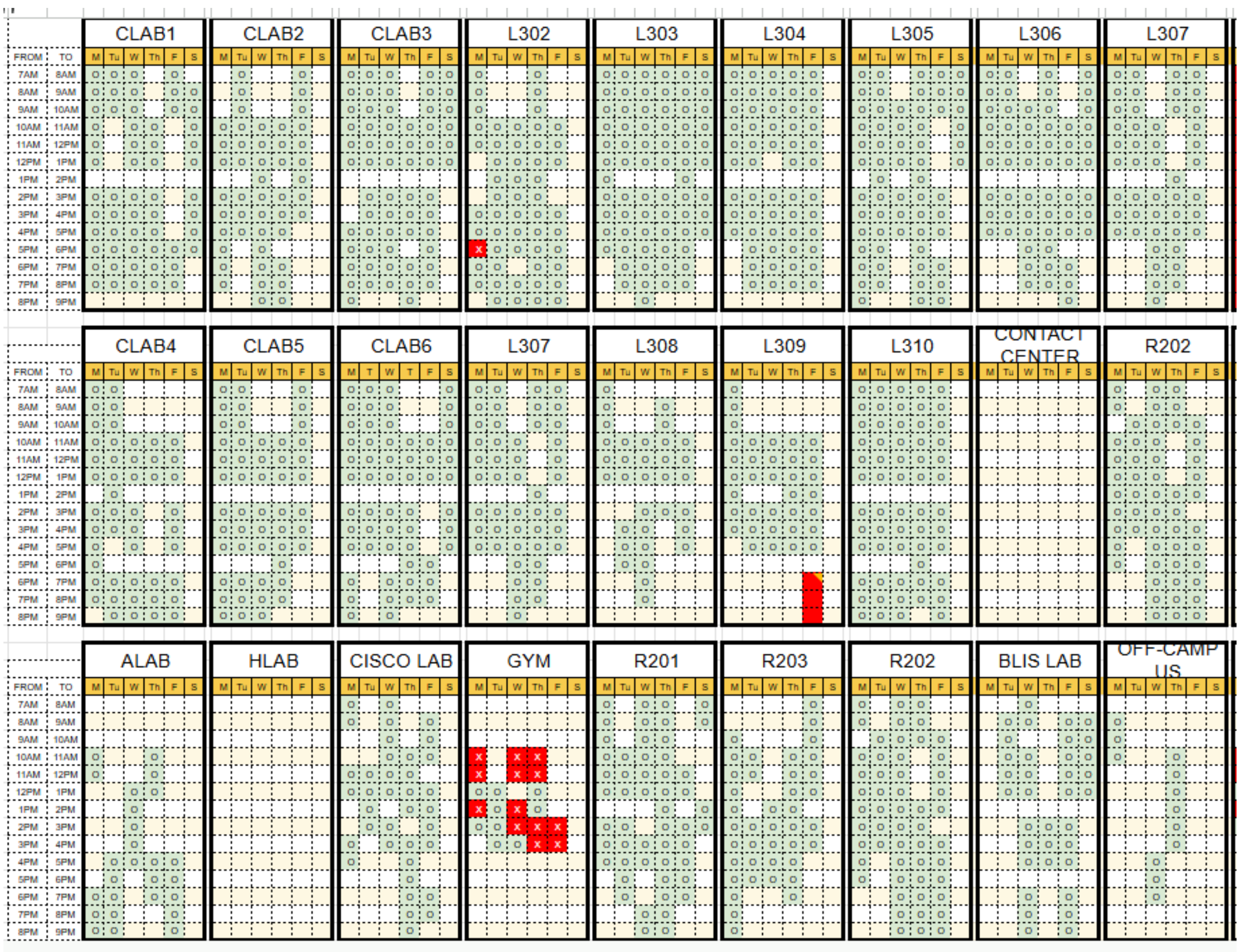


Figure 9. *Classroom Occupancy Region of the Visualization Sheet*

Figure 10 shows the consolidated timetables of classes held in laboratory classrooms. On top of presenting a more detailed view of the occupancy of laboratories, this sheet also displayed additional information such as the section and instructor assigned to specific laboratory hours. These timetables were usually hidden and served only as reference in another sheet called *LabFiltered,* however, on rare occasions such as when instructors needed to transfer to a different laboratory classroom due to unforeseen circumstances, they were pulled up to support in decision making and conflict resolution.

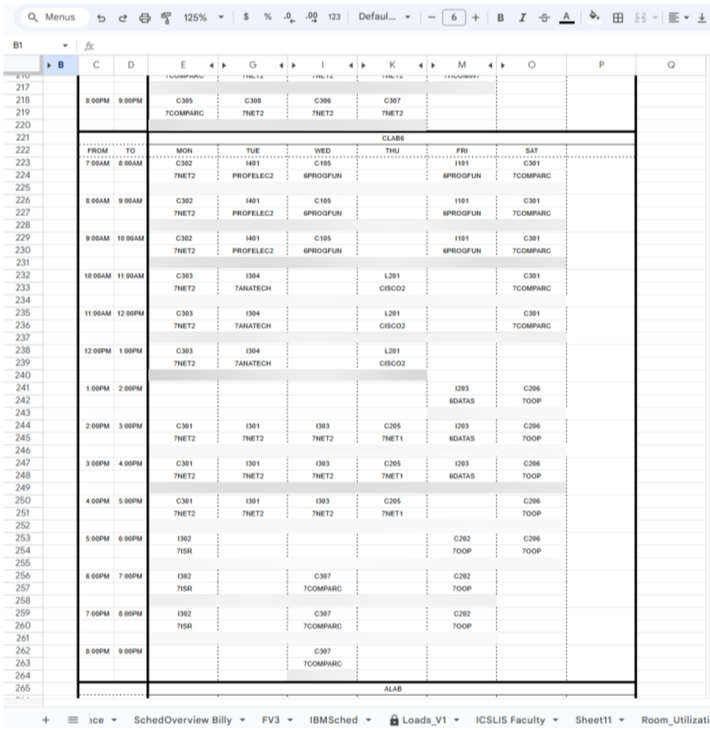


Figure 10. *Consolidated Timetables of Laboratory Classes*

Shown in Figure 11 is the *LecFiltered* sheet—a more compact view of the sheet presented in Figure 10. This sheet featured a dropdown menu where users could select which laboratory classroom's timetable to view, instead of browsing through the whole list of laboratory timetables.

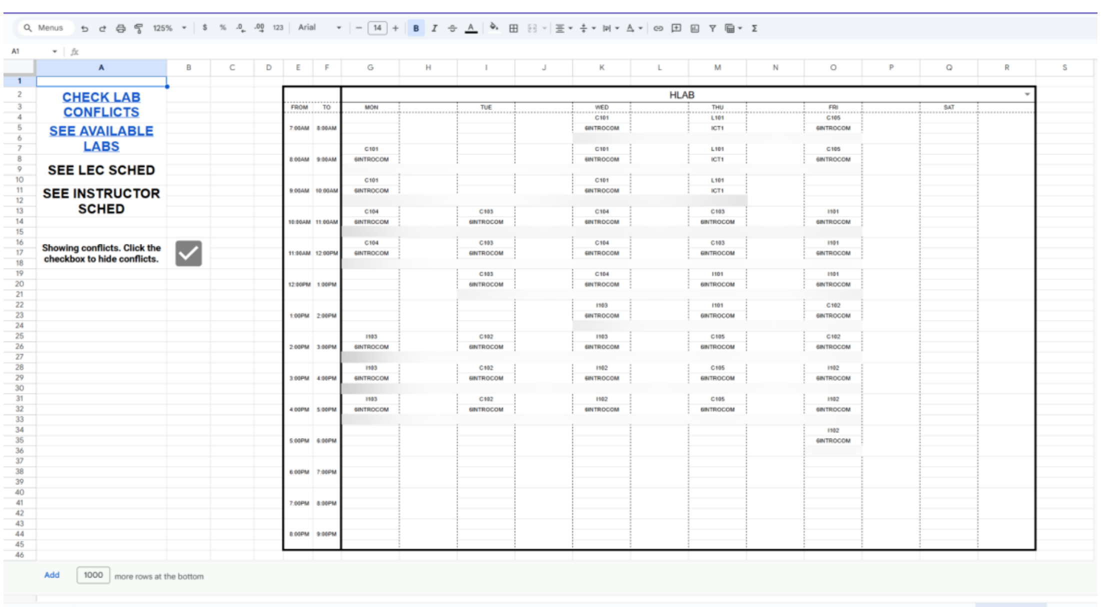


Figure 11. *Laboratory Classroom Filter*

Figure 12 shows the consolidated timetables of classes held in lecture classrooms. Similar to Figure 10, this sheet displayed extended information such as the instructor, class section, and subject name assigned to each time slot.

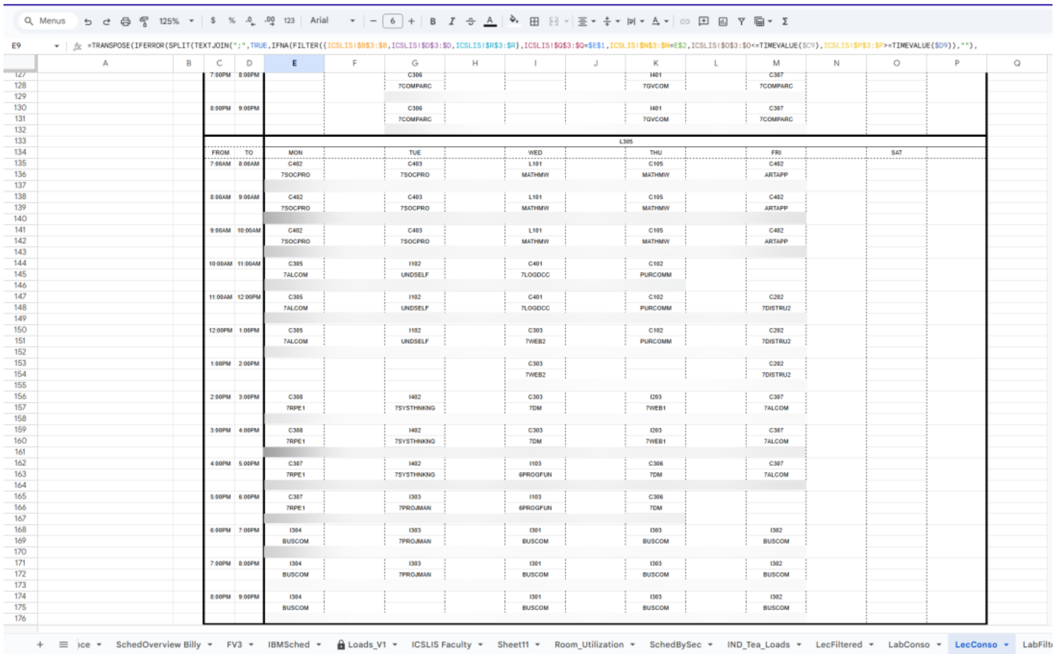
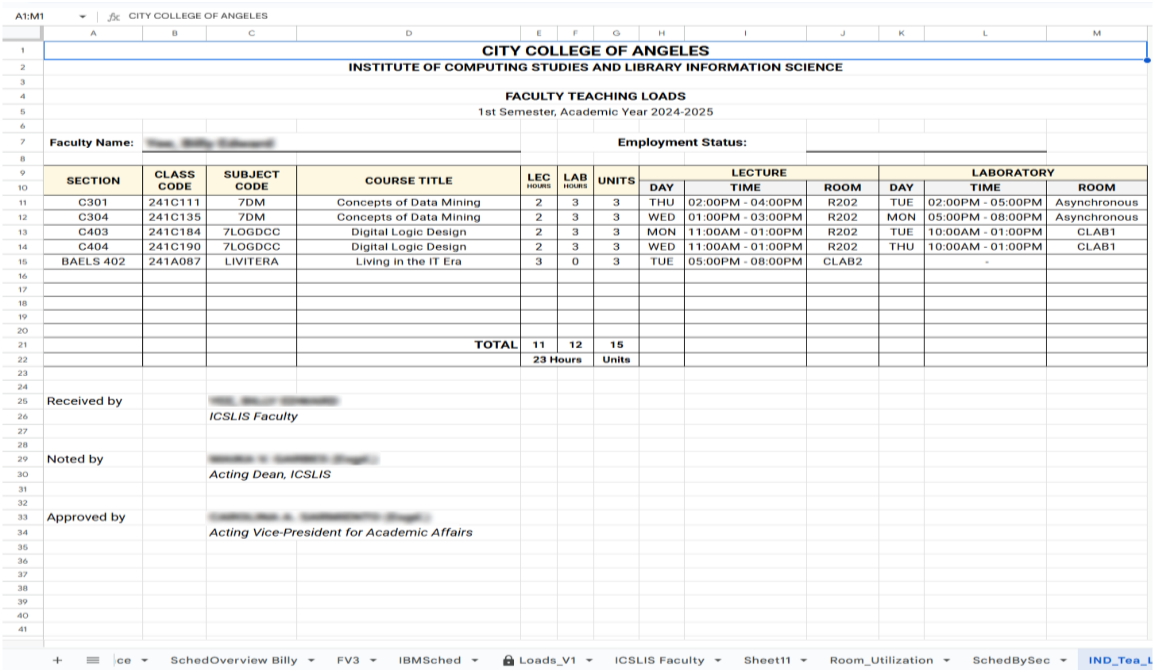


Figure 12. *Consolidated Timetables of Lecture Classes*

Figure 13 shows the individual teaching loads sheet. This sheet mimicked the faculty loading sheets usually sent by the academic heads to their respective instructors at the start of semester after creating the overall class schedules. This was used to formally inform the instructors of their assigned teaching loads, along with the assigned time and classroom.



CITY COLLEGE OF ANGELES
INSTITUTE OF COMPUTING STUDIES AND LIBRARY INFORMATION SCIENCE

FACULTY TEACHING LOADS
1st Semester, Academic Year 2024-2025

Faculty Name: [illegible] Employment Status:

SECTION	CLASS CODE	SUBJECT CODE	COURSE TITLE	LEC HOURS	LAB HOURS	UNITS	LECTURE			LABORATORY		
							DAY	TIME	ROOM	DAY	TIME	ROOM
C301	241C111	7DM	Concepts of Data Mining	2	3	3	THU	02:00PM - 04:00PM	R202	TUE	02:00PM - 05:00PM	Asynchronous
C304	241C135	7DM	Concepts of Data Mining	2	3	3	WED	01:00PM - 03:00PM	R202	MON	05:00PM - 08:00PM	Asynchronous
C403	241C184	7LOGDCC	Digital Logic Design	2	3	3	MON	11:00AM - 01:00PM	R202	TUE	10:00AM - 01:00PM	CLAB1
C404	241C190	7LOGDCC	Digital Logic Design	2	3	3	WED	11:00AM - 01:00PM	R202	THU	10:00AM - 01:00PM	CLAB1
BAELS 402	241A087	LIVITERA	Living in the IT Era	3	0	3	TUE	05:00PM - 08:00PM	CLAB2		-	
			TOTAL	11	12	15						
				23 Hours		Units						

Received by [illegible]
ICSLIS Faculty

Noted by [illegible]
Acting Dean, ICSLIS

Approved by [illegible]
Acting Vice-President for Academic Affairs

Figure 13. *Individual Teaching Loads Sheet*

Evaluation Results

This section unveils the evaluation results of the study in relation to its objectives. The evaluation was conducted by providing evaluation questionnaires to academic heads and schedule managers who had used and seen the system worked first-hand.

Table 4 presents the summary of the evaluation ratings for each evaluation question garnered from all the five (5) participants. All evaluation questions have earned a 4.80 rating except for the question "*The interface is intuitive and can be used without complex instructions.*" with a 4.40 rating. It can be deduced that while the system received a positive rating on all other aspects, there is still room for improvement in terms of how intuitive the system was used.

Table 4. *Evaluation Questions and their Evaluation Rating*

Questions	Evaluation Rating
The system helped me develop and oversee the schedule.	4.80
I can identify schedule conflicts in a timely manner.	4.80
I can resolve schedule conflicts in a timely manner.	4.80
The interface is intuitive and can be used without complex instructions.	4.40
The user interface can be used comfortably without difficulty.	4.80
I believe that the system helped reduce my tasks' complexity	4.80
I believe that the system enhanced my work efficiency	4.80
The system helped me feel confident in my ability to manage the schedule.	4.80
I will continue to use the system in the foreseeable future.	4.80
I will recommend the system to other dean/s, coordinator/s, and/or designated schedule manager/s.	4.80

Table 5 shows the evaluation results in terms of the identified criteria based on the technology acceptance model. Perceived usefulness (PU), Attitude Towards Use (ATU), and Behavioral Intention (BI) all received a 4.80 rating which is equivalent to an *Excellent* rating. This means that the participants deemed the system to have helped improve their task efficiency, had felt positive about using the system, and were likely to adopt or keep using the system. On the other hand, Perceived Ease of Use (PEOU) received a 4.60 rating and reflects an *Excellent* rating. This also means that the participants felt using the system was intuitive and free from effort, albeit a bit lower when compared to other criteria.

Table 5. *Evaluation Results*

Criteria	Weighted Average Evaluation Rating	Descriptive Rating
Perceived Usefulness	4.80	Excellent
Perceived Ease of Use	4.60	Excellent
Attitude Towards Use	4.80	Excellent
Behavioral Intention	4.80	Excellent
Total	**4.75**	**Excellent**

Overall, the system received a total of 4.75 evaluation rating which translates to an Excellent rating. This means that the developed system not only fulfilled its intended use and purpose but that the participants also felt it was easy to use. This also meant that the users considered the system to have facilitated their work, reduced their tasks' complexity, enhanced their work efficiency, and are likely to keep using the system.

DISCUSSION

Class scheduling has always been an arduous task requiring rigorous attention to details in order to mitigate scheduling conflicts. Heuristic approaches have proven to be detrimental to limited resources. In an attempt to solve these problems, the researchers developed a system that leverages real-time data updates, automated conflict detection, and an interactive interface to streamline scheduling processes.
The academic heads and schedule managers have found the developed system to be a remarkable inclusion to the existing class scheduling process. By rating the Perceived Usefulness an average of 4.80, they recognized with the introduction of the system, they were able to identify and resolve schedule conflicts in a timely manner, thereby helping them develop and oversee the class scheduling processes. Although the Perceived Ease of Use received an Excellent rating of 4.60, the researchers found this criterion to be the lowest—a good starting point for improvements and adjustment for simplicity and intuitiveness.

Furthermore, the participants' Attitude Towards Use of the system has been revealed to be extremely optimistic—receiving an Excellent rating of 4.80. With the introduced system, the participants felt confident in plotting their class schedules and addressing the potential conflicts. As a result, their Behavioral Intention or intent to adopt or keep using the system reflected an Excellent rating of 4.80 as well.

With that said, the results indicate that the development of the system has improved their overall efficiency, enhanced their decision-making capabilities, and minimized the class scheduling conflicts. By utilizing Google Sheets' real-time collaboration features, the developed scheduling tool offered an accessible, cost-effective, and scalable solution for the City College of Angeles in optimizing their scheduling operations.

Conclusion

After the exhaustive analysis of the evaluation results, the researchers arrived at the following conclusions:

1. The developed system aided in identifying and resolving the scheduling conflicts in advance
2. The developed system had a significant impact in improving the task efficiency and productivity.
3. The participants recognized that the system had streamlined the overall class scheduling process.

While there may be improvements on the ease of use of the system, the participants are still likely to keep using and/or adopt the system in the future.

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