

## **Development of a Computerized Faculty Loading, Room Utilization, Subject and Student Scheduling System for Bulacan Polytechnic College**

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*One of the remarkable and much known products of technology advancement is the conversion of manually operated system into automated system. Using the scheduling system, it's easy to arrange class schedule, instructors' loading and room utilization for the students and faculty in every department. This study aimed to develop an automated faculty, room, subject and student scheduling system to facilitate an expeditious service of the school. The study utilized experimental methodology to prove the veracity and efficiency of operation of the system. It was validated by a panel of experts in computer programming composed of professors and instructors of Bulacan Polytechnic College. At the end, the following findings came up: The project was rated as "highly acceptable" in terms of its functionalities: reliability, efficiency, effectiveness, portability and maintainability. The system program was tested for its functionalities and found to be useful for the school scheduler, faculty and students because it satisfied the set objectives. The developed program is now being tested for its functionalities. The administration presently uses the system to assess its functionalities.*

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*Keywords: automated, system, scheduling*

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### **Introduction**

This newly crafted scheduling system for faculty loading, room utilization subject and student schedules are very useful for both the school scheduler and faculty members because it gives an effective and efficient approach. The scheduler must be computer literate to apply the said system without hindrances and other possible glitz in the operation. It is in the vein that the AFLRUS4, the scheduler, can easily identify the duplication of data like faculty, room and subject. The character of this smart program is user friendly in terms of the technical operation. Likewise, the keeping of files system is accurate because of the auto system adapted. The files are automatically saved. There is no need to produce a high-end computer system; the existing computer in the office can be used to run the program. The researchers intentionally crafted the scheduling system in order to contribute to the school's efficiency in scheduling operation.

The main objective of the study was to develop an AFLRUS4 by creating a computerized system for effective and efficient scheduling system. Specifically, it attempted (1) to construct an AFLRUS4 with the corresponding software and hardware; and (2) to evaluate the system for its functionalities: reliability, efficiency, effectiveness, portability, and maintainability.

The use of the system is well much applicable to the setting of Bulacan Polytechnic College. The school has existed for forty-seven years now and experiences complication in scheduling; teachers often have confusion that sometimes leads to overlapping in terms of the use of a certain classroom. Students have to move from one room to another because of the wrong fielding of teachers and assigning of room. Another factor to be considered is the increasing number of enrollees per year as a result of new available course offerings.

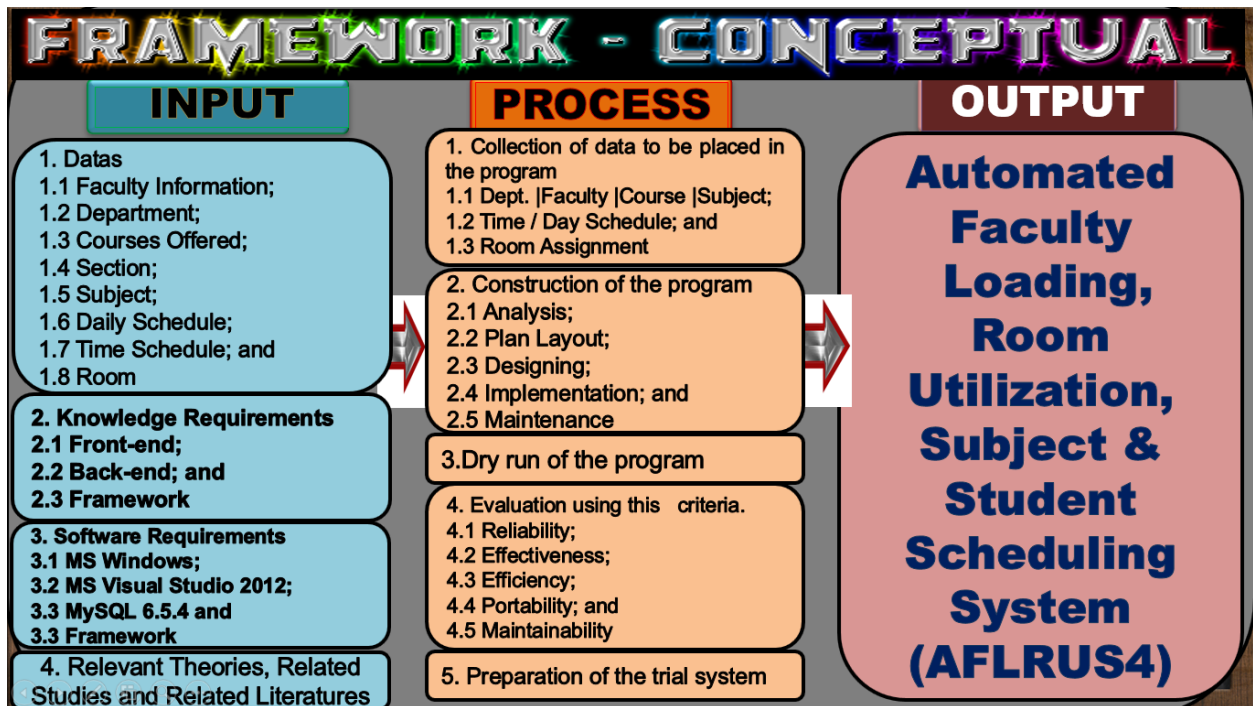


Figure 1. Conceptual Framework

The conceptual framework of the study as shown in figure 1 comprises of three frames.

The first frame includes the data needed in the system such as faculty information, department, courses offered, section, subjects, daily schedule, time schedule and rooms. Knowledge requirements for the development of the project processing system includes the concept of the project, which is basically necessary to have knowledge in database, interface and framework. Windows 7, MS Visual Studio 2012, mysql-connector-net-6.5.4, MySQL 6.4.5, Net Framework 3.5, .Net Framework 4.5, *Report Viewer* 2012 were used for the software development. The input also included the relevant theories, related studies and literatures to provide foundation of knowledge and identify inconsistencies like gaps in research, conflicts in the previous studies and open questions left from other researches. The inputs given ensured that the software ran smoothly to give better transition during development of pre- and post-project proposals.

The second frame covers the collection of data, and construction of the program by using the effective design and interface, which serve as the input forms. Coding involves the actual conversion of flowcharts to an actual machine and arrangement of the intended users. Over all, it is the tangible side of the software development testing. Evaluation implies the correctness of the output system; it involves data testing for logical errors and bugs. Furthermore, evaluation is when the system is checked based on ISO 9126 standards. Evaluation is also the stage where notes are made for future developments and probable recommendations.

The third frame is the design for the automated faculty loading, room utilization, subject and student scheduling system. The fourth frame is the assessment of the conflict of schedule in the system.

## Literature Review

There can be little doubt that technology – both in its process and quality dimensions when combined with human development – makes a critically important contribution to economic growth which in turn leads to advances in human development as a society’s bottom-line achievement. In a 1997 STRICERD article “Development Thinking at the Beginning of the 21<sup>st</sup> Century” Amartya Sen endeavored to distinguish between human progress by dint of BLAST, i.e., “achieve in Blood, Sweat and Tears,” also known as savings and investment, and GALA by a combination of human development and technology (Sen, 1997).

One of the two channels runs from human development back to economic growth once again with technology playing an important role. This theory relates to the study since it intends to focus on the impact of human development and technology on economic growth; in other words, this shows the importance of human development combined with technology in generating growth as an instrument for further improvements in human development (Ranis, 2011).

## Methods

The research methodology used in this study was experimental. Review of relevant theories, related studies and literature, observation, interview and informal surveys were conducted to discover the current scheduling system of BPC, which was found out to have the following disadvantages: a) it needed three or four people to operate the system; b) it needed a bigger space; and c) it took at least two months of plotting the schedule. To address the problem, a work plan was developed for the automation of the scheduling system using the agile development methodology.

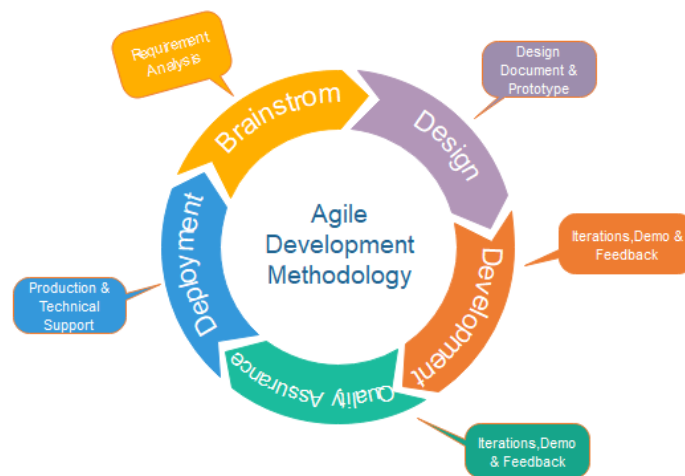


Figure 2. Theoretical Model

Figure 2 shows the theoretical model of the study that promotes continuous iteration of development like coding, unit testing and testing throughout the software development lifecycle where at each phase some minor or major functionality was built in the system.

**Brainstorming.** The researchers conducted brainstorming, gathered and arranged the needed information for the scheduling process by interview and survey.

**Design.** In this stage, the researchers started creating the system flow chart and other diagrams that served as bases for the structure and flow of the scheduling system.

**Development.** This is the code generation, or the conversion of design into machine-readable form using the system algorithm.

**Quality Assurance.** Alpha testing was done by the system user to test whether the system responded relative to its proper function and design. Several debugging, modifications and updates as per request by the Vice President for Academic Affairs (VPAA) were made.

**Deployment.** After the functional and non-functional testing was done, the AFLRUS4 was deployed to the Office of the VPAA.

### Discussion of Results

To prove the veracity and functionality of the operation of the system, it was tested by seventy five (75) respondents: (1) VPAA, (1) the Assistant to the VPAA, five (5) students and (5) instructors per course offered (BSOM, BSIS, CHS, CS, CCM, HRS, CIT-Electronics, Electrical, and Welding), and three (3) administrative staff and was validated by a panel of experts in computer programming who were professors and instructors of computer of Bulacan Polytechnic College. Likert scale was used to obtain the respondents' preferences or degree of agreement with a statement (or set of statements) in the questionnaire.

Table 1. Likert Scale



LIKERT SCALE		
Rating	Equivalent	Range Interpretation
5	4.51-5.00	Highly Acceptable
4	3.51-4.50	Acceptable
3	2.51-3.50	Moderately Acceptable
2	1.51-1.50	Unacceptable
1	1.00-1.50	Highly Unacceptable

Since Likert scales are a non-comparative scaling technique and one-dimensional in nature, the respondents were asked to indicate the level of agreement with a given statement by way of an ordinal scale.

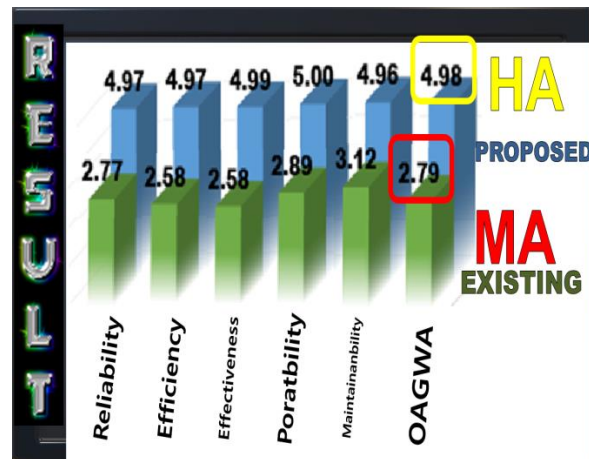


Figure 3. Mean between Existing System and Proposed System

Figure 3 shows the result of the survey in terms of system functionalities where the study could set the attributes that bear on the existence of set of functions of using paper and pencil against the use of the computer system. The functions are those that satisfy the stated or implied needs of the school: reliability (the study can set the attributes that bear on the capability to maintain its service provision under defined conditions for defined periods of time); efficiency (the study can set the attributes that bear on the relationship between the level of performance of existing scheduling system in terms of time behavior and resource behavior); effectiveness (the study can set the attributes that bear on the capability of the software to maintain its level of performance under stated conditions for stated period of time); portability (the study can set the attributes that bear on the ability of the people to manipulate the proposed study); and maintainability (the study can set the attributes that bear on the effort needed to make specified modification on the existing system).

Based on the results, “portability” has the mean of 5.00 while “maintainability” has the lowest mean of 4.96; both variables are highly acceptable. In the existing system resulting to moderately acceptable because the “Efficiency and Effectiveness has the lowest mean of 2.58, while “Maintainability” has the highest mean of 3.12.

At the end, the following findings came up. The project was rated as “highly acceptable” in terms of its functionalities: reliability, efficiency, effectiveness, portability and maintainability. Further, the precision of the system was proven functional since the said system is now being used by the institution.

## Discussion

The system is inflexible to changes or adjustment of class schedules, frequent time conflicts in the usage of classrooms, student and faculty.

The output referred to in this study is automated faculty loading, room utilization, students and subject scheduling system.

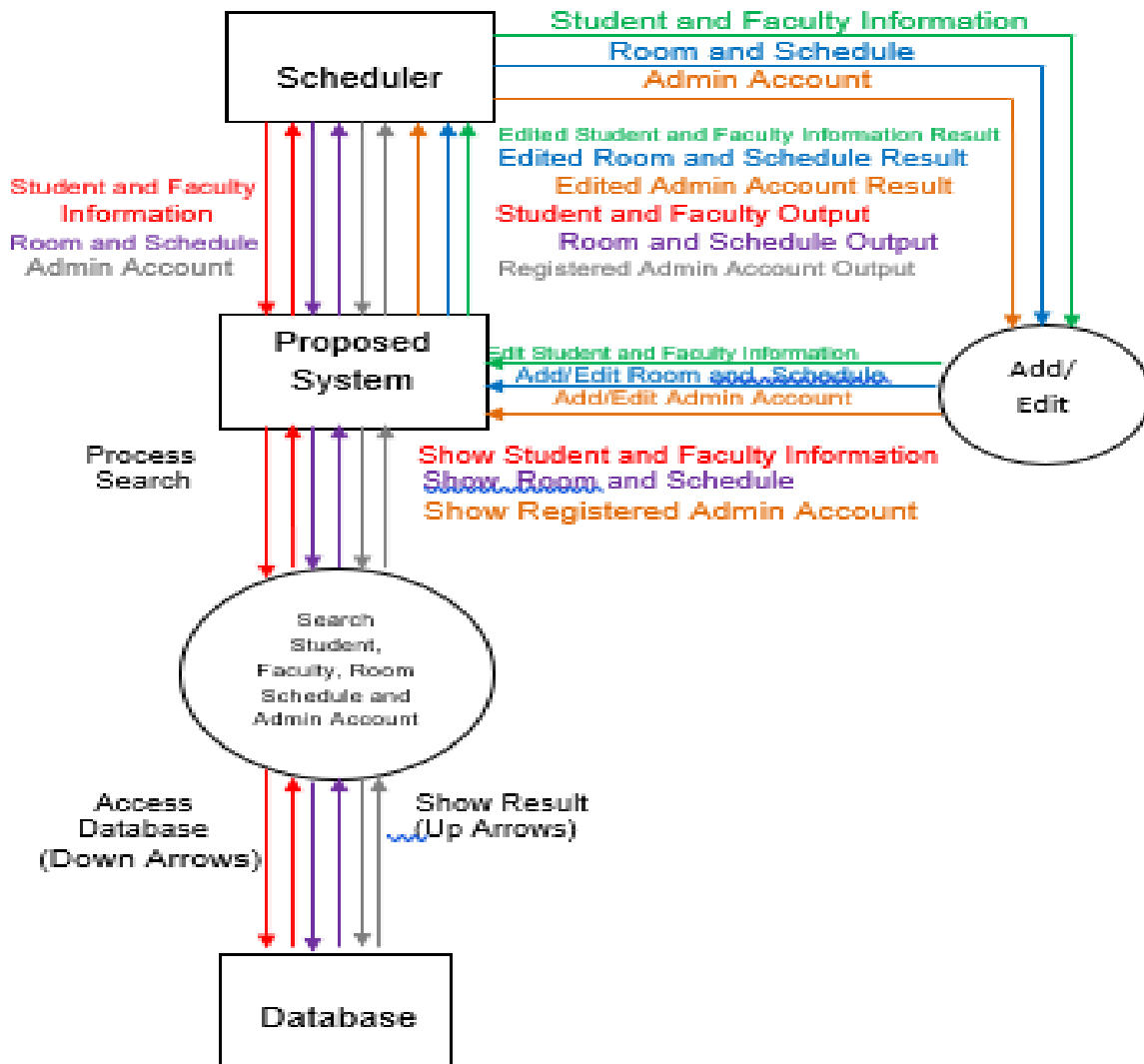


Figure 4. Flow Sheet Diagram for AFLRUS4

The development of the project wherein the operating system went with the ensuring data flow program. Following Figure 4, the scheduler writes the faculty, room, student and schedule information to the MS Excel draft form which is to be processed by the manual system. Using the manual system, the scheduler searches faculty, room, student, and schedule information which is to be accessed by the other personnel. The manual database shows the needed information. They use their manual system when they wish to add or edit faculty, room, student and schedule information.

Figures 5 – 8 show the layouts of the program and the created and selected image files for the scheduling system icons.



Figure 5. Log-in Window

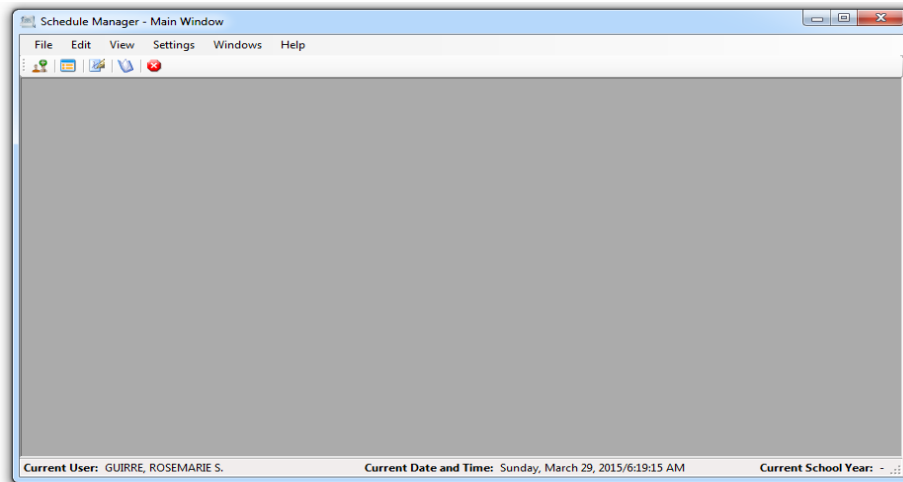


Figure 6. Schedule Manager Window

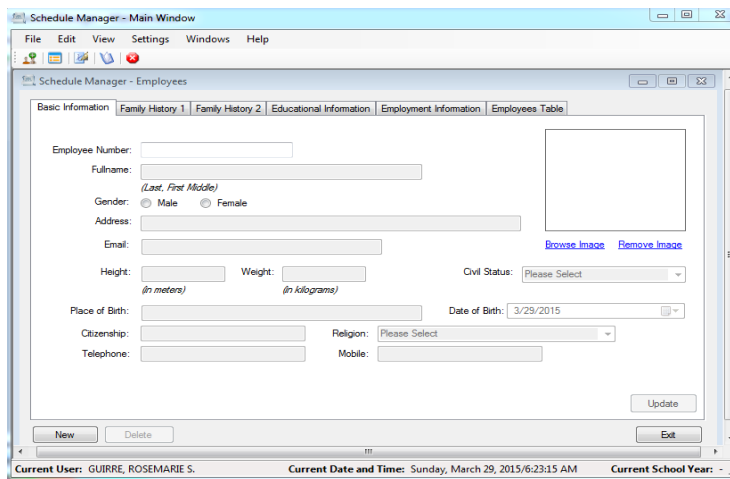


Figure 7. Adding of Employees Window

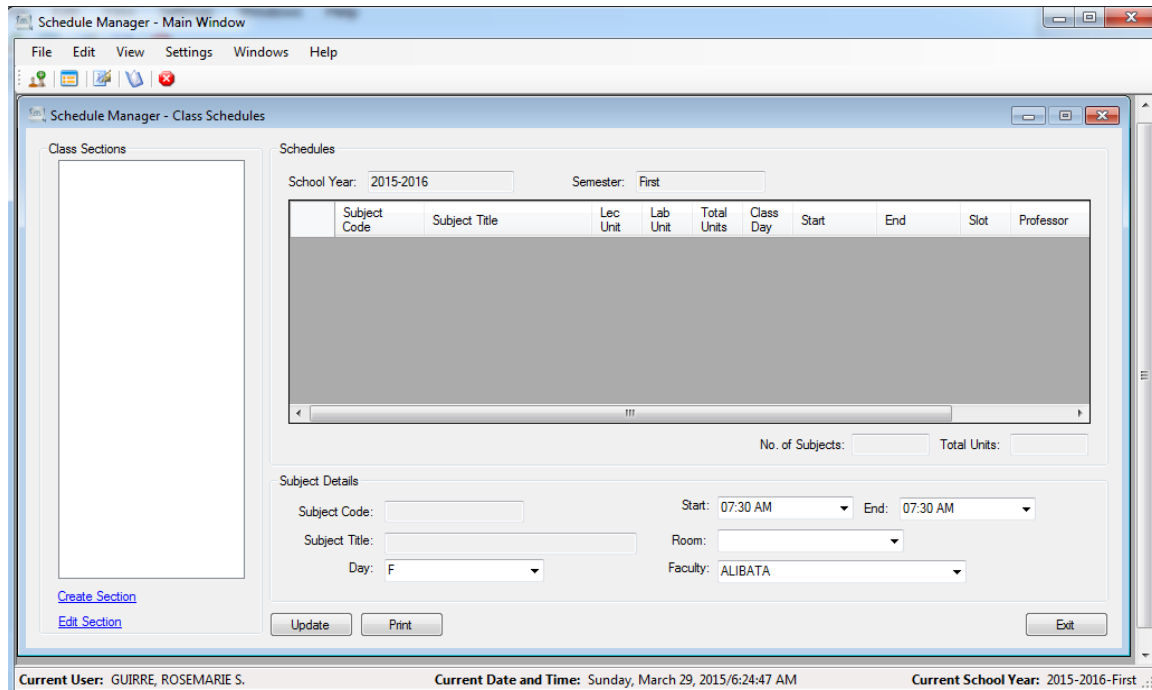


Figure 8. Class Schedule Window

## Conclusion

In the light of the findings of the study, a conclusion was drawn. The crafted AFLRUS4 is ideally good because of the presence of the functionalities. Compared to the traditional system, it (AFLRUS4) can process the scheduling system with less time and less persons and can automatically detect conflict in the schedule of room, student and faculty.

## Recommendation:

The system users, VPAA and Assistant to the VPAA, recommend that the system automatically detect the prescribed maximum of two-hour vacant time for both teachers and students.

The program heads suggested to consider as one of the system users in plotting the major subject.

More further testing and evaluation to enhance the system functionalities may be conducted.



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