Simulating Retail Banking for Banking Students

Mahadevan Supramaniam
Electronic Data Management and Database Engineering Unit, EDGE
Taylor's University College,
Level 3A, Block B1, Leisure Commerce Square, No.9 Jln PJS 8/9,
46150, Petaling Jaya,
Selangor, Malaysia
Email: mahadevan.s@taylors.edu.my
Tel No: +603-7876 3939
Fax No: +603-7876 3399

Professor Bala Shanmugam
Banking and Finance Unit
School of Business,
Monash University,
Jalan Lagoon Selatan
46150 Bandar Sunway,
Selangor Darul Ehsan,
Malaysia
Email:
bala.shanmugam@buseco.monash.edu.my
Tel No: +603-5514 6282
Fax No: +603-5514 6326

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ABSTRACT

The purpose of this study was to examine the implementation flow and development of retail bank management simulation based training system which could provide a comprehensive knowledge about the operations and management of banks for the banking students. The prototype of a Retail banking simulation based training system was developed based on Waterfall model. The research is also about developing a prototype for the simulation based training system and understanding the implementation flow based on a methodology referred as waterfall model. The waterfall model is a sequential development process, in which development is seen as flowing steadily downwards through the phases of Analysis, Design (validation), Implementation, Testing and Integration and Maintenance. During the testing and integration phase, evaluation was done to validate Bank Management Training Simulation system. The prototype was modeled as a client server system. It was developed through Active Server Pages (ASP) server scripting environment and MySQL Server was used to set up the web database for the system. Retail Bank Management Simulation Training system involves the participation of an instructor and a group of participants to initiate a training session. The evaluation was done by twenty-four banking students from a total of six different universities. The evaluation process involves six important aspects in evaluating the usefulness of Retail bank management simulation (RBMS) training system as a training module and to evaluate the user participation in using the system. The variables were measured by using a rating based structured questionnaire. The questionnaires contain a rating scale from 1 to 4 as shown below. Results indicate that 62.7% of the participants have evaluated the content to be excellent. Results show that the majority of the participants of Retail Bank Management simulation (RBMS) training system prefer to have a practical and experienced learning approach especially on the banking industry. It is recommended that additional features such as automated analysis and business intelligence to be incorporated into the system to guide the participants in decision making.

Keywords – Retail Bank Management Simulation (RBMS) system, retail banking

1.0 INTRODUCTION

The rapid integration of economies, societies and industries through globalizations in recent years, has significantly affected the structure and operations of financial institutions. Most of the financial institutions worldwide are undergoing the process of consolidation and merges to increase their global presence as well as to maximize their earning and the scope of activities. The liberalization of domestic financial system through globalization would further reduce the barriers for the domestic financial markets. The banks should be prepared to face new challenges ahead with strong and skillful banking personnel. The banks are expecting a more knowledgeable and experienced graduates in order to be more competitive and productive. The students are encouraged to have a practical experience rather than a normal theoretical study.

The use of information technology would be the best solution for the banking students to gear up for the challenges ahead. The banking schools and universities need a system that could emulate the overall banking management system, which will be used to practice, create strategies and resources for the growth of the economic. The paper focuses on providing training for the students to upgrade their skills and expertise in the banking sector. The training system will be able to provide financial information system based on the strategies created by the students participating in the training and evaluates the results gathered from their participation.

The Retail Bank Management Simulation (RBMS) system will be the key strategy in developing the human capital and to upgrade the e-infrastructures. The objectives of developing the application relates indirectly as a tool to serve this dynamic economy efficiently and effectively, and to ensure that the banks will have a leading role, more focused and innovative.

The paper is organized as follows. Section 2 gives background studies on existing simulation based training system. In section 3, the Bank Management Simulation system framework is presented. Section 4 discusses the evaluation done to validate the performance of Bank Management Simulation System (BMS). Finally, section 5 discusses the contribution of this research and future work.

2.0 BACKGROUND STUDIES

2.1 Simulation System

The usage of computer simulation began in the late 1950s and has gradually applied across multiple disciplines. Researchers began to move beyond static process development to a more dynamic process development, which is able to show the dynamic behavior of a system or an interactive system. The main objective of a system simulation is (Levary et. al. 1991):

1. To understand the relationship within a complex system
2. To experiment with the model to assess the impact of actions, options and environmental factors.
3. To test the impact of various assumptions, scenarios and environmental factors
4. To predict the consequence of action on a process
5. To examine the sensitivity of a process to internal and external factors

2.2 Comparison between Simulation based Training System and E-Learning

Computer simulation is actually an extension of e-learning concept. Basically e-learning concept has been introduced to merge with the current technology. Traditional e-learning

which is sometimes referred to as first generation e-learning- is now past the market creation phase and well into a value creation phase (Hall, 2000).

E-learning was regarded as a failure in creating quality based education for the students (Guralnick, 2002). According to Guralnick the failure of e-learning is because:

1. Students are less involved in creating the e-learning modules
2. Lack of appropriate software tools for students – most of the application software involves technical programming which is difficult for the trainers who do not have technical background.
3. Technical implementation details take time, preventing trainers from focusing on context and pedagogy.

There are many advantages of using simulation based system for the students. The most important advantage is that the cost of failure is low as it provides a safe way to experiment the real life environment. As the learners need individual training, the application can be customized according to the user's perspective. The organization will be able to save time by training many people at a given time duration compared to the traditional training system. The simulation based system is able to accommodate complex tasks in a short duration. This is very important for the trainees in order to understand certain task, which is associated with analysis based task.

Furthermore, the simulations provide the opportunity for the students to experiment with many different scenarios and see the effects on key measures (Hall, 2000). The students will be able to transform the factual knowledge by applying the knowledge and the skills in the simulation based system.

2.3 Simulation of Banking Management

Financial based simulations are used extensively in both educational and industrial sector. Simulation games have been used in business schools since 1957 (Watson, 1981). A 1962 survey of 107 AACSB member schools in the USA reported that 71.1% were using simulation games in at least one course (Dale & Klasson, 1962) within the business faculty. Two surveys of AACSB member schools undertaken in 1967 indicated that 90.7% (Graham & Gray, 1969) and 94% (Day, 1968) of the responding schools used simulation games in their curricula. Roberts and Strauss (1975), using the same sample of schools as used by Dale and Klasson (1962), reported that 94.5% of the responding schools were then using simulation games. Finally, Faria (1987) reported that 95.1% of AACSB member schools used at least one business simulation game in their program during the 1985-1986 academic years.

According to Faria (1987), business school deans then were asked which disciplines within their faculties were currently using simulation games. The responses to this question, along with a comparison to the Faria (1987) survey that also addressed this issue, are shown in Table1. The details were compared with another survey which was done in the year 1998 which shows an increase in the use of simulator based system in all the programs.

Table 1
Simulation Usage at AACSB Member Schools by Discipline

Programs	Faria(1987)	Survey (%)	Faria(1998)	Survey (%)
Business Policy	107	52.9	155	65.7
Marketing	103	51.0	148	62.7
Finance	50	24.8	92	39.0
Management	36	17.8	105	44.5
Accounting	18	8.9	37	15.7
Other courses	34	16.8	44	18.6

The higher educational institutions should be more proactive in introducing simulation based e-learning system to better equip the graduates with knowledge and skills by practicing the real scenario through simulation systems. The only way to expose students to the working environment and to gain experience in banking industry is through simulation based e-learning concept. There is a lot of development in financial based products in foreign countries such as Financial System Simulator (FSS), Real Money Simulation system and InterBank Simulation System.

2.3.1 Interbank Simulation

Interbank Simulation system is used to bridge the gap between the Executive level (strategy) and Operational level (operations) within the banking organization. It also accelerates the development time of key personnel/targeted personnel through a steep learning curve. The system will be able to simulate the operations of a universal bank based on the decision of the management teams. The basic operational unit of the program is the individual bank. For each quarter the system will calculate the earnings and operating results of each team. Interbank simulation system is a standalone system and need to be installed in each and every participating computer.

2.3.2 Financial System Simulator (FSS)

FSS is an internet based interactive teaching aid that introduces undergraduate students to the domestic and international consequences of monetary policy (Santos, 2002). FSS was implemented at South Dakota State University during the full 1999. According to the university's survey, 90% of those surveyed agreed the simulation should be a permanent component of the money and banking course. Most economic faculty agrees that interaction exercises maintain (or gain) the students interest in economics, as well as dispel their preconceived notions that economic theory is an esoteric subject (Goerce and Holt, 1999).

The FSS uses the client server technology with the server doing the churning, calculation and processing of the computer code. The students will participate in the FSS for a period of six weeks and the Instructor will check the progress of the team. The teams need to download their summary statistics and prepare graphs for the presentation. The banking component of FSS focuses on commercial banking theory, including information asymmetries, structure and legislation, investment banking and international finance.

3.0 Retail Bank Management Simulation System (BMS) Architecture

This section presents the Retail Bank Management Simulation system that has been developed. The architecture explains the methodology and the implementation of Bank Management Simulation system.

3.1 Bank Management Simulation System Methodology

In this research the focus was to evaluate on students participation towards the use of RBMS. This research involves the development of IBMS and evaluation process that need to be done on the developed prototyped system. Considering the scope, sensitivity and the depth of the prototype implementation, Waterfall model was used as a research framework in order to develop the system. Later an evaluation procedure was used to evaluate the system performance.

The Waterfall Model shown in Figure 1 describes the development method for the research in a linear and a sequential way that have specific goals for each phase of development. The development phase moves from analysis, through design, implementation, testing and integration. The object oriented modeling techniques have been incorporated in the Waterfall model for a better and in depth development process. In the design phase, class diagrams were used to identify the important components related to the development of the system. The integration and maintenance part were not elaborated as it is still a prototype product.

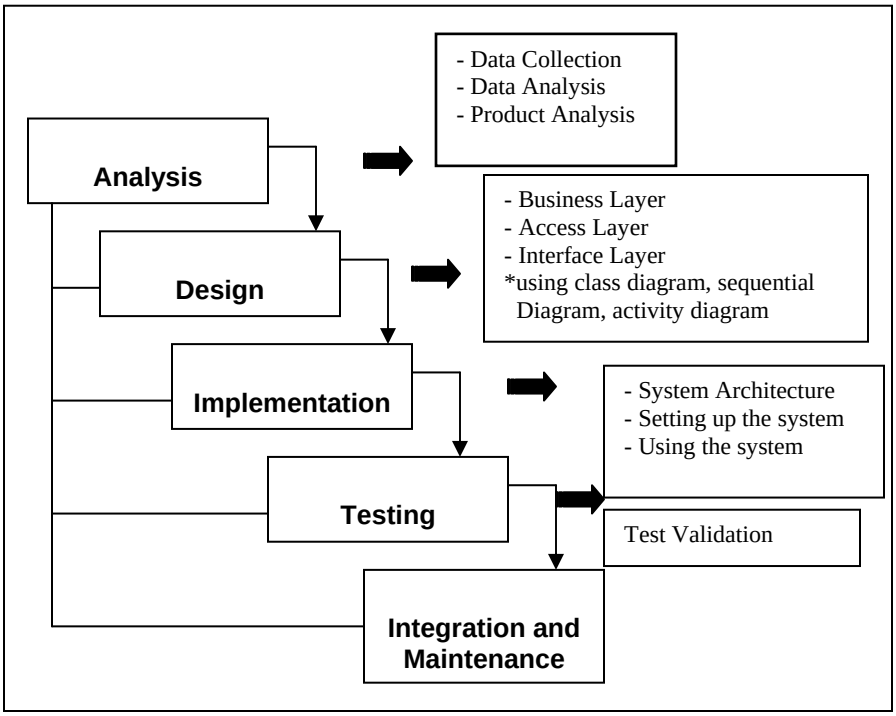

Figure 1: Waterfall model incorporated with object oriented modeling technique

3.1.1 Analysis

The Requirement Analysis for Bank Management System is shown below:

3.1.1.1 Subjects

In order to increase the validity of the study, four banking students from six different universities had been recruited for the survey.

3.1.1.2 Data Collection

The secondary(historical) data in the form of magazines, newspaper articles, journals and articles from the website that reflect the simulation based training system in both local and international were collected. The primary data collection methods will include the questionnaires.

The banking data were also collected from Bank Annual Report and Central Banks reports which consist of economic statistics and statistics on interest rate for both deposit and loan.

3.1.1.3 Interviews

Interviews were conducted with the banking students and their lecturers. The duration of each interview was approximately one hour and conducted on a one-to-one basis. There were four interviewee from each university.

3.1.1.4 Data Analysis

Data Analysis focused on analyzing the current Bank Management Simulation that is available for target users. A number of products such as Interbank Simulation and Financial System Simulator were analyzed.

3.1.1.5 Product Analysis

Product Analysis involves two main components:

1. RBMS Functional Requirement
2. RBMS Non-Functional Requirement

The Functional Requirement involves the identification of user and system functionalities. The non-functional requirement was done to identify the constraint under which Retail Bank Management Simulation System need to be met and the standards that need to be met.

3.1.2 Design

In the design phase an architectural design will be developed according to the flow of the system and after the identification of the important components in IBMS. The design phase will be divided into business layer, access layer and interface layer.

Business layer will include a class diagram that represents the business (both data and behavior) or the operational process as shown in Figure 2. The class diagram was used to represent the interaction and relationships between RBMS components to accomplish the business processes. The class diagram captures

the static and dynamic relationship that exists in between the business objects. It includes the associations and aggregations in between objects.

Access layer is responsible for the representation of the storage class. The access layer was responsible for translating request. It should be able to translate any data-related request from the business layer into appropriate protocol for data access. The layer is also responsible for translating results. It should be able to translate the data retrieved back into the appropriate business objects and pass those objects back to business layer.

The interface layer is responsible for the representation of the user interface for BMS. The interface layer is useful in managing the banking system.

3.1.3 Implementation

As RBMS is a web based system, the architecture need to be identified to set up the web server and database server. RBMS was modeled as a three tier client server system with the setting up of web server and database server. The procedures of using the system were clearly identified.

3.1.4 Testing

The testing was done on the system to validate that the software functions with sufficient accuracy with respect to its requirements specification. The test data will be compared with the Central Banks' data to validate the accuracy of the test data.

3.1.5 Integration and Maintenance

The system does not include the integration and maintenance yet as it is only a prototype system.

3.2 Implementing Retail Bank Management Simulation System

The following components are identified to constitute Bank Management Training Simulation system.

1. Financial Information System

The users of the system who had registered have their own bank management page. RBMS able to provide the financial information of the previous quarter as a reference to further improve in their current quarter.

2. Management Information System

The management information system is a combination of financial information system which provides the necessary information to manage the bank. Users of the system who had registered have access to their bank management record and will be able to view the results for each quarter (balance sheet and profit report).

3. Decision Support System

RBMS were able to generate necessary information such as income statement and balance sheet from the participants input which were used to make a

decision for the next quarter. Users of the system who had registered will be able to change the rates (deposit, loan etc) with comparison to the previous record

4. Knowledge Based System

The system was able to provide necessary information or help if the participants were not able to make a decision through the tutorial module. The registered users will also be able to sit for the on line test.

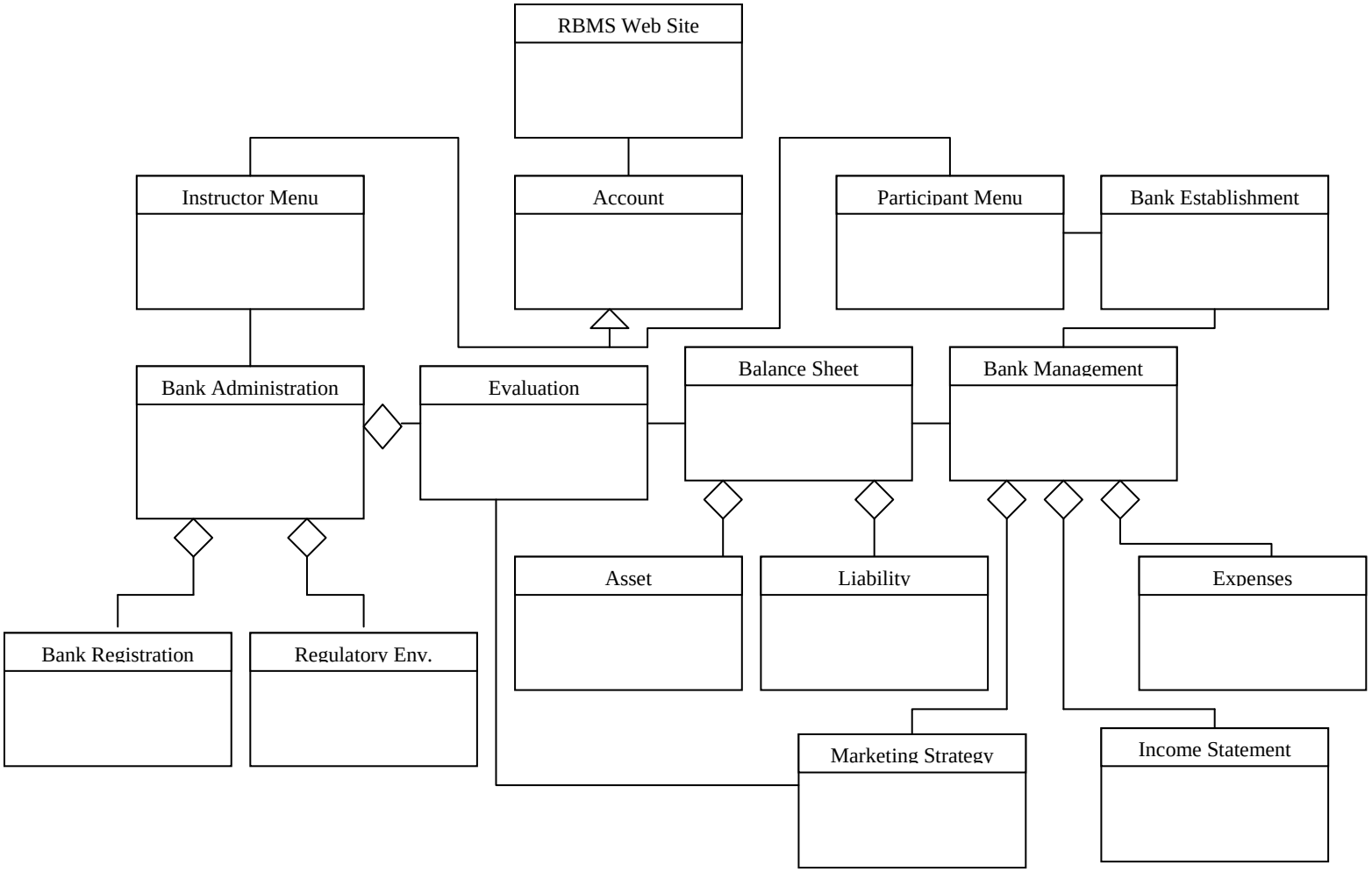

Figure 2: Business Class Diagram

3.3 Using the System

The instructor will start a new game by registering the group of participants or students and their bank details. The instructor needs to activate the regulatory environment which consists of banking regulatory details.

Next the participating students will log in to the system. Each group will have their own respective banking page, with the bank regulations that need to be followed. Each group will go through four quarters. The teams will be given a deadline to make a decision and to submit the decisions made for that quarter. Before the team makes decision on each quarter, they need to analyze the results of the previous quarter through the quarterly balance sheet and income statement. In order to make decisions for the coming quarter, the teams need to configure the deposit interest rates, loan interest rates, expenses, securities and dividend rates in accordance to the economic growth.

The quarterly results will be evaluated by the instructor and will be rated accordingly. The performance of loan and deposit will also depend on the rate given by the instructor for each quarter. At the end of the last quarter, the winner will be announced based on the bank profit and the evaluation that have been done by the instructor.

The instructors and the participants need to have pre-knowledge of banking before using the system. As been explained in the implementation, the users need to follow the specified procedures before using the system. The activity diagram shown in the Figure 3 is an abstract view of the RBMS operations.

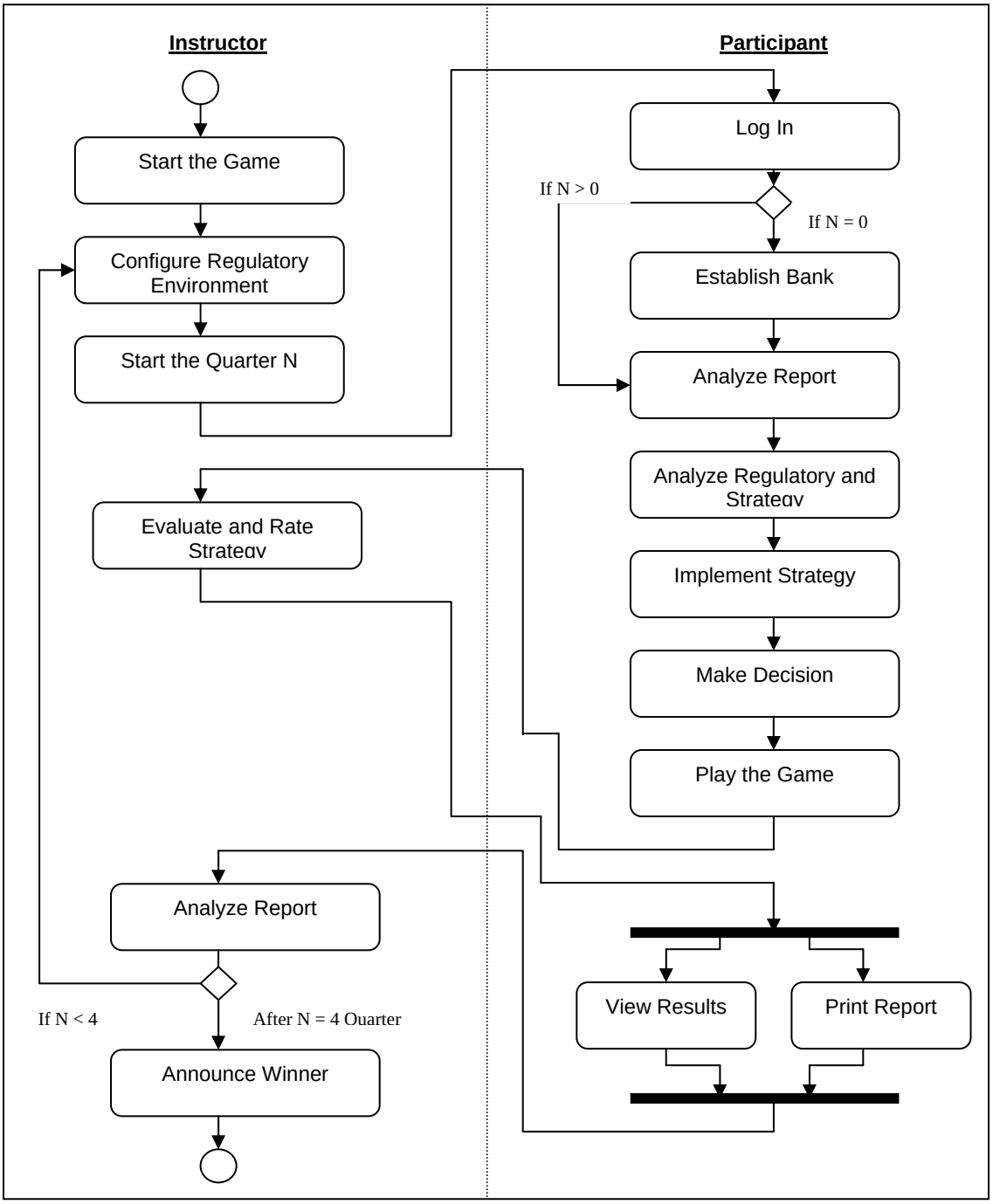

Figure 3: RBMS Activity Diagram

4.0 EVALUATION

This section discusses the evaluation done to validate Retail Bank Management Training Simulation system. The evaluation was done by twenty-four banking students from a total of six different universities. The evaluation process involves six important aspects in evaluating the usefulness of RBMS as a training module and to evaluate the user participation in using the system.

The variables were measured by using a rating based structured questionnaire. The questionnaires contain a rating scale from 1 to 4 which represents bad, average, good and excellent. The evaluation process was conducted using an Evaluation form. The details of each and every aspect are explained in detail as below.

1. **Program Content**
   The questionnaires were focused towards system objectives, information accuracy, supporting materials and quality of the instruction in reference to the objectives. From the evaluation, 62.7% of the participants have evaluated the content to be excellent.

2. **Effectiveness**
   The questionnaires were related to student's capability to recall the information presented through RBMS, development of individual interest towards banking through the use of RBMS and the appropriateness of the system as a training module. According to the evaluation results, 75% of the participants have evaluated RBMS to be excellent.

3. **Practice / Assessment / Feedback**
   The evaluation was done on the type of feedback received through the responses, objective accomplishment and about collaborative learning. It was concluded that 54.20% have evaluated it to be good while 30.2% have evaluated it to be excellent.

4. **Users Appeal and Suitability**
   The evaluation was related to the suitability of the tutorials, interest level towards the training system and input appropriateness. According the evaluation results, 47.90% have evaluated the system to be good.

5. **Ease of Use**
   The questionnaires were more focused towards user navigation, system consistency, responses and interfaces. It was evaluated that 57.4% of the participants have evaluated the system as excellent.

6. **Presentation**
   The evaluation was focused towards the quality of screen displays, text and system layout. It was identified that 52.1% have rated the system to be excellent.

The evaluation results conclude that RBMS is an effective tool if not a reasonably well developed tool which can be used for training purposes. The evaluation shows positive results in terms of using a simulation based training system. The participants have also evaluated that the system plays an important role in providing training for the participants to manage a bank and create strategy and decision making for the banking industry.

5.0 CONCLUSION

This research has three main contributions. Firstly, it contributes to the development of a training program for universities and financial institutions. It will provide hands-on training for the students and to evaluate the effectiveness of the system for the development of future training programs.

Secondly, the research provides a tool for the students to practice the theories learned in books. If the theories perform well in the system, it will increase the confidence of the users in making strategic decision especially for the managers. Thirdly this will help the lecturers to evaluate the performance of students in managing the bank.

The research has produced a product, which could be used as a reference product by the banking schools and universities in developing a system, which accommodate the learning of retail banking management. The concepts used to develop the Retail Bank Management System (BMS) are in accordance to the general economic scale and could be used as a cross reference with the retail banking textbooks.

RBMS has incorporated most of the main features that constitute a good bank management training system. However, additional features that can further increase the effectiveness of this system should be considered. The effectiveness of RBMS can be improved further by

- Introducing automated analysis to all components in RBMS. This is very useful as user will have guidelines in analyzing the banking performance through business intelligence and expert system. The system needs to be logically sound and it can be done if the system is able to analyze the results without the user's interference.
- Enhancing the capability of the RBMS into a virtual banking training system which can handle both the customers and the bankers.

In conclusion, Retail Bank Management Training Simulation Training (RBMS) system, as one of the most successful simulation based training system, deserves further research so as to explore their full potential.

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BIOGRAPHY

	Dr.Mahadevan is the Head and Consultant of the Electronic Data Management and Database Engineering Unit in the School of Computing, Taylor's University College, Malaysia. He is a SAP Certified Solution Consultant as well as an Oracle certified expertise. Prior to joining Taylor's University College, he was a Software R&D Engineer in Motorola Malaysia and Xyratex, United Kingdom. He holds a Doctorate in Business Administration from the European Business School and a Master of Software Engineering from University of Malaya. Dr.Mahadevan has extensive industry experience and had worked on projects such ERP implementation, business process management, virtual reality simulation systems and product management test system for the manufacturing sector
	Professor Bala Shanmugam is the Director of the Banking and Finance Unit in the School of Business and Information Technology, Monash University, Malaysia. He also holds the Chair of Accounting and Finance. His last appointment was Associate Professor of Banking and Finance at the University of New England, Armidale Australia. He holds a PhD in Finance from the University of Wollongong, a Master of Business Studies (Banking) Honours from the National University of Ireland, Dublin, and Bachelor of Arts Honours (Banking) from the University of Wales, Bangor. Professor Shanmugam has extensive industry experience, has published extensively (over 40 refereed publications and 15 books), and has served as editor for a number of journals. His book on Bank Management has been the standard text for tertiary level as well as professional studies in Banking in several Commonwealth countries (including Australia and Malaysia). Professor Shanmugam is a co-author of *E-Banking in Malaysia*, 2002