Abstract

In coming up with a study on the e-media operation control System, a research was set up, phases in five distinct groups. The major drive of the research was the inefficiency of the patriot newsprint on the market compared to the other established media organizations due to delays in the internal operations of the production of the newsprint caused by long article movement channels and also much use of manual processes on the production process before print.

To tackle this problem, the research was guided by a set of five clear objectives. The objectives included to design a system that enable efficient transfer of articles from one designated desk to the expected recipient from the journalist to the editors, managing the recordings of stock levels from the printed material to the distribution procedures ,meaning the distribution process would be managed electronically ,a system that grants the management the view of all the operations of the organization, making the management process effective the link between the accounting department and the distribution department in terms of the monetary return expected values from the distributed printed material and developing a system that will create an opportunity for the establishment of an I.T department within an organization.

Perfect information was needed in to aid the problem solving (carried out in the second phase of the study). This information was however, not from a single repository or source. As a result, the research conducted the gathering of the required information using three techniques, namely questionnaires, interviews and observations. Interviews, for example, were used on the users of the current system, management and the local readers of the print media done by The Patriot.

Acknowledgements

May I acknowledge that this project would not have seen the light of day without the following people (not necessarily in order of importance thou) to whom I am accordingly indebted. The Lord Almighty (THANK YOU LORD).

My parents – these two people have been the pillar of my education and have always been there for me especially in times of need. They have inspired me in making this project a success due to their advice on hard work and endurance more so on financial aid. I will forever thank them.

Mr. S.Furusa – he has been my supervisor during the entire project. His incomparable contribution and supervision was of utmost importance to the carrying out of the project. He would make periodic review of the entire project as it progressed. This was done to make sure that the project work would remain in the right track. His admirable effort in ensuring that the project be a success is totally second to none. I owe him a lot and am very grateful.

Other Information Systems Staff Members – these gave me the light in the project work. They helped me have a view and importance of decision making in the project work as well as the management side of the project. They also showed me the importance of security in project development.

I am also very grateful to my friends & siblings only to mention a few Gerald, Frank, Jacob, Henry and Maureen who helped me here and there in the project work.

Over and above all, thank you Father for making this research more than just a success, thank you a million times.

Dedication

I dedicate this research to a special woman in my life, my mother and my brother Tinotenda.

Declaration

I, Marusho Innocent. A, hereby declare that I am the sole author of this thesis. I authorize the Midlands State University to lend to this thesis to other institutions or individuals for the purpose of scholarly research.

Signature_____ Date _____

Approval

This dissertation/thesis entitles E-media operations control System by Innocent Marusho meets the regulations governing the award of the Bachelor of Science Information Systems Honours Degree of the Midlands State University, and is approved its contribution to knowledge and literal presentation.

Supervisor:…….. Date ……/……/……..

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List of Acronyms

C

C.S5…….Creative Suite 5

C.B.A……Cost Benefit Analysis

D

D.B.A……..Database Administrator

D.F.D……....Data Flow Diagram

D.N.S……Domain Name Server

D.D.L……Data Definition Language

D.M.L……Data Manipulation Language

E

E.E.R……Enhanced Entity Relationship

E-mail……Electronic Mail

E.R……Entity Relationship

G

GHz……..Giga Hertz

G.U.I……Graphic User Interface

H

H.D.D……Hard Disk Drive

I

I.S.P……..Internet Service Provider

I.T…….Information Technology

L

L.A.N……Local Area Network

M

M.I.S…….Management Information Systems

N

N.P.V……Net Present Value

O

O.D.B.C……Open Database Connectivity

R

R.A.M……..Random Access Memory

R.O.I…….Return On Investment

S

S.D.L.C…….Software Development Life Cycle

T

T.C.O……Total Cost Ownership

U

U.P.S…….Uninterrupted Power Supply

U.M.L……...

W

Wi-Fi……...Wireless Fidelity

Wk.……Week

Z

Z.H.T……Zimbabwe Heritage Trust

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Chapter 1: Introduction

1.1 Introduction

The project seeks to design e-media operations control system of The Patriot. The phase also looks at the organization as well as problem definition and the intended objectives. The advancement of the technological fraternity has led to the development of the e-media operations control system. The project would curb or lessen challenges being faced by the organization in its day to day operations. E-media operations control system would standardize the operations of the Patriot organization in a one go process, thus being the first organization in the Zimbabwean media industry to have a system of this nature.

1.2 Background information

The Patriot newspaper was established in June 2011, in a development to add a new voice to Zimbabwean media. There was high polarization in the media industry The Patriot was designed to counter negative portrayal of Zimbabwe by western media and to promote the country's identity, culture and history. (The *Patriot*'s 13-19 May 2011). "The Patriot will inform the people of their history, cultural heritage and the limitless potential of their natural and human resources instead of waiting for someone else to do it," editorial's note.

It is an arm of the Zimbabwe Heritage Trust (ZHT) a non-governmental organization that champions Zimbabwean identity and heritage. ZHT publish and distribute information to everyone from grassroots level to national level within the Zimbabwean society, therefore becomes the medium for dissemination of research findings, articles and opinions.

The Patriot was established by a consortium of retired civil servants, farmers and academics. In 2010 before setting up premises; staff and equipment early 2011. The first copy of the newspaper hit the streets 13 May 2011.

The paper also seeks to recover lost identities of the youths and inform them of their future and rich heritage.

1.3 Organizational structure

The organizational structure identifies business functions and organizational levels. The Patriot organisation is headed by a board of trustees; these are directors who run overall activities of the organisation. The editor and the deputy editor make up the news team with the journalists. Basically that is what the organisation is comprised of since it is in the media industry. Employees may communicate with persons at any level of the organization as required, but must keep their supervisors informed of their activities (formal channels).

The Organizational Structure for The Patriot is that of a matrix model.

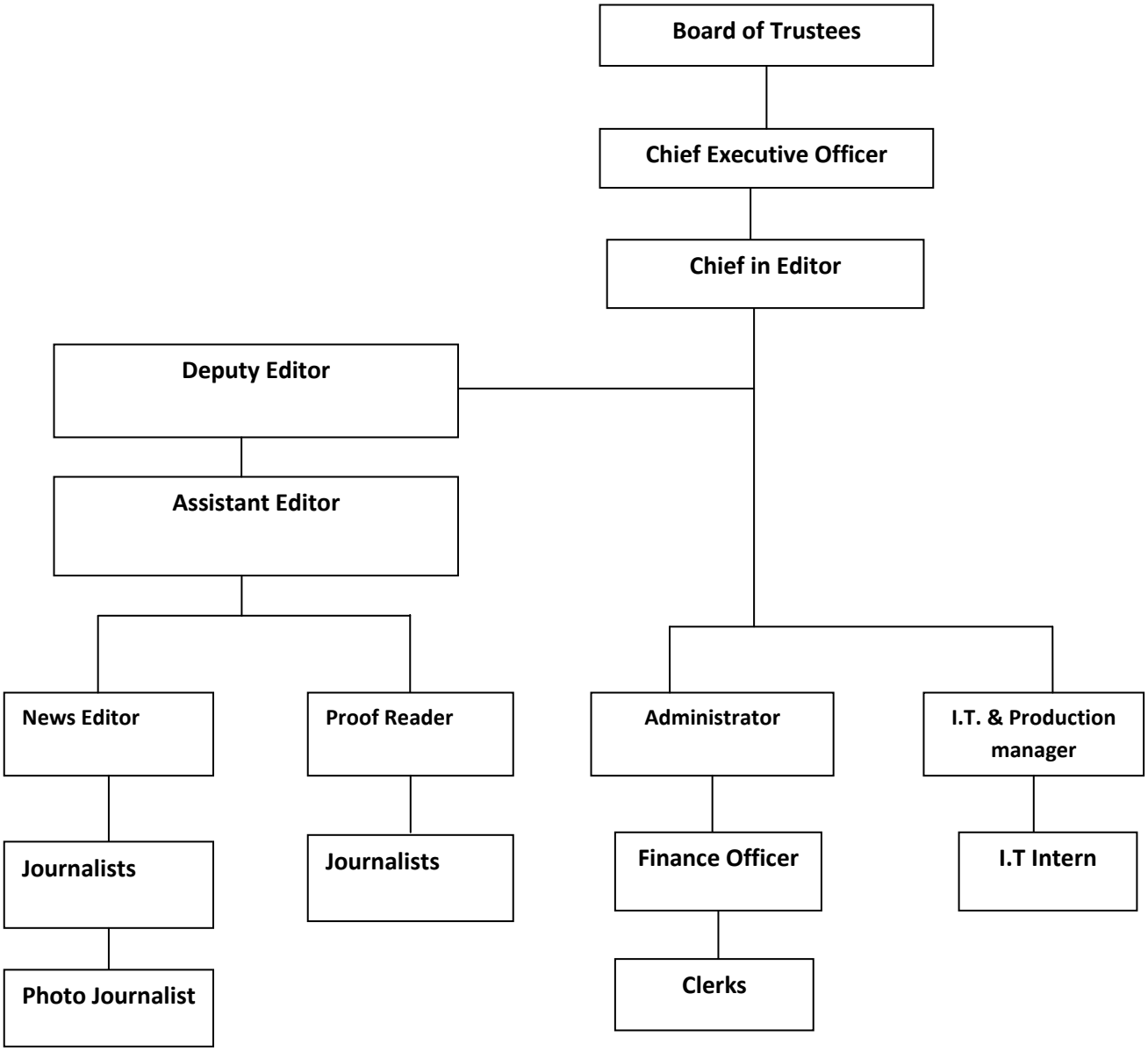


Fig 1.1: Organogram

1.3.2 Vision
To inform the Zimbabwean society at all levels, the wisdom and understanding of what it means to be Zimbabwean, with regards to our shared past, present circumstances and common destiny

1.3.3 Mission statement
To honorably serve the interests of all Zimbabweans by providing them with in-depth and well researched information on Zimbabwe's rich civilization, natural resources and enhance the vast opportunities for economic participation awaiting every willing citizen

1.4 Problem definition
The Patriot is a new organization operating in the Zimbabwean media industry. It operates under the project of The Zimbabwe Heritage Trust. It is a newspaper company with The Herald as its sister company. The Patriot comprises of various departments which are:

- Newsroom
- Proof room
- Production
- Marketing
- Distribution

These departments all need to work hand in hand such that the prime objective of producing a newspaper and promoting high sales.

Currently the movement of information or articles mainly from the journalist to the proof readers and finally to the editors is being done manually by sharing a folder on one central computer that can be accessed by all shared computers. However, if many clients are requesting for the use of the information in the centrally shared workstation, it then restricts the access by limiting the number of users. This is a major problem in a media society since a single delay in the editing or the production of a few articles contributes to the delay of the whole process. It is observed that The Patriot usually faces delays in its appearance in the market on the publication days because of such a problem.

Recording and stock level maintenance is also another problem being faced by the Patriot the system currently being used at the moment is not on site, thus to say it is being done by the sister company The Herald hence pilferage increases since the system has loopholes that do not grant The overall view of how the publication moves from the printers to the distribution departments and accounting procedures of the whole processes.

In the media industry there is the need to cover a wide range of readers hence the need of the setup of a mailing list such that most readers regardless of the geographical location. This criterion is not set which still is a problem that affects not only the publicity but of course the

cash inflow of the publication. The problem in this explanation on the Patriot is that the use of their existing system is not drawing in much more subscribers since the information capturing procedures is still manual. In this case keeping record of all the subscribers both local and international is a challenge to the marketing department. Subscribers are of importance to a media organization since that is the number one rated fixed source of funding than the daily takings.

There is need of an improvement in the current system; this improvement would be then the ability to integrate every department under a single system so as to make a contribution to the media competitive environment by basically granting speed and accuracy to the existing system. Management overall view of all the operations done on site is also another challenge that needs to be addressed in time ,establishment of the technical department is also another aspect that needs to be put in place and also the patriot has the need of a platform that enables the allocation of duties to journalists by department.

1.5 Aim

To design a system that integrates all the operations of The Patriot.

1.6 Objectives

- To design a system that enable efficient transfer of articles from one designated desk to the expected recipient from the journalist to the editors.
- managing the recordings of stock levels from the printed material to the distribution procedures ,meaning the distribution process would be managed electronically
- a system that grants the management the view of the operations of the organisation,
- making the management process effective the link between the accounting department and the distribution department in terms of the monetary return expected values from the distributed printed material
- Developing a system that will create an opportunity for the establishment of an I.T department within an organisation.

1.7 Justification

The main reason why there is existence of this proposed system is not only to reduce overload to journalists, editors and the marketing department but also improve performance in time management. There is need for an integrated system that encompasses all operations that take place within The Patriot. The Patriot has a system, but the system is not integrated and it becomes a problem in management of all processes involved lags behind detriment to the objectives of the organization.

A recent stalemate in the sales level of the Patriot publication has led to this study in that in a more natural sense the proceeds from the sale of the newspaper be it on the streets or through the subscribers, they must cover all the expenses involved and the worst situation being to break-even but it seems it is the opposite with the Patriot and the development of this system might aid in the fault finding mission on where the fault is.

Another reason to compliment the study is that the production manager sometime back decided to quit outsourcing and requested of a system that would cater for all the operations that happen at the Patriot, this being an opportunity for campaigning for a shift in all the factors that affect the competition prevalent in the media fraternity.

1.8 Hypothesis

Windows 7 Operating System - will be the platform on which the system is to be developed. It's a flexible operating system with updated technology features.

Internet Explorer and Mozilla Firefox – easy to use web browsers for accessing and downloading relevant project materials.

Wamp Server 2.0f/2.2e which will be the compiler for the Knowledge base system, it works well in websites and Windows platform. A WAMP server is a computer running these applications:

1. Windows OS

2. Apache

Macromedia Dreamweaver 8 -A flexible and simple Rapid Application Development tool that produces a rich Graphical User Interface.

PHP (Hypertext Pre-processor) – for the core of the system. It will handle task scheduling, report generation, data manipulation and the system interface. The reason for using this software isthat it is easy to use and provides for web-based administration.

MySQL - a multi-threaded SQL database server with a client/server implementation. It's fast, robust, and easy to use and this makes it a popular database for sites with dynamic content.

Adobe CS5 - Adobe Photoshop CS5/6 an application which shall aid the development of the system. It is highly compatible with the Wamp Sever and works well on Windows environment.

1.9 Conclusion

All the problems where clearly identified and stated as well as the objectives. The next phase is the planning phase; this phase will determine if it is feasible to carry out the project and then plan the work schedule.

Chapter 2: Planning Phase

2.1 Introduction

The planning phase outlines necessary strategies to be applied onto the research. The chapter provides the platform to test the feasibility of incorporating the proposed system be it economical, technical or organizational .This is done for the purpose of determining the best route forward given the project constraints. The main objective of the planning phase is to ascertain what the value of the new system would add to the organization. Laundon P etal (2000), Planning is a process of establishing goals and selecting the actions needed to achieve them over a specified period of time. It is of paramount that the proposed system contributes to the stated objectives. Though the major thrust of this chapter shall be the feasibility study, the chapter shall also shade better light on Business Value, Work Plan and Risk Analysis. Shelly Cashman (2011), states that feasibility reviews anticipated costs and benefits and recommends a course of action based on operational, technical, economic and time factors.

2.2 Why build the system

The proposed application is designed to addresses the critical requirements of any organization, especially considering this dynamic technological environment. The system will be expected to be a the sole system in the entire industry, some of the supportive reasons behind the building of the system includes

Customer satisfaction will be improved since every reader can access the news online through subscription without facing any delays.

The system can be used as a web based advertising agent, since most organizations can advertise on this platform because of its frequent updates, hence publicity on a much wider base

Employee motivation especially in such a type of industry in that many operations will be computerized.

2.3 Business values

These are the anticipated gains to the organization's procurement department, which shall be attained as a result of developing the proposed system. The main idea being to undertake a cost benefits analysis that clearly outlines the benefits. Somerville (2006) states that business values pertain to the expected gains to the overall functionality of a system. Some of the business values are listed below:

Costs/Profitability – an ideal system should be one that will reduce costs or probably increase on profitability. As any other system, there is inevitable cash outflow especially during project infancy, but a system with the needed business value as to be more of an asset than a liability.

Decision making – the system has to help with some decision making. For example the decisions in the distribution of the paper according to the sales versus returns level. Perhaps if there would be a system that will help make decisions on quantities to be distribution, then this would be a benefit to the organisation and the customers.

Goodwill – Randall (2005) states that goodwill is one gain that the organization will obviously be looking for. Goodwill is the good name of an organization or the difference between an organization's net assets and its overall worth. It is many at times difficult to quantify. Elements, in the case of this project, that can be used to identify changes in goodwill include the number of visits to the organization's website as well as an assessment of the suggestions passed by fellow readers.

2.4 Feasibility Study

Feasibility study is the process of determining whether the system to be developed by the developer offers solutions to the defined problems. The study defines functional requirements rather than system design or architecture. It clarifies system objectives, assesses the probable impact, identifies constraints and indicates likely interfaces. The factors that affect feasibility are listed below:

Operational Factors

Technical Factors

Economic Factors

Social Factors

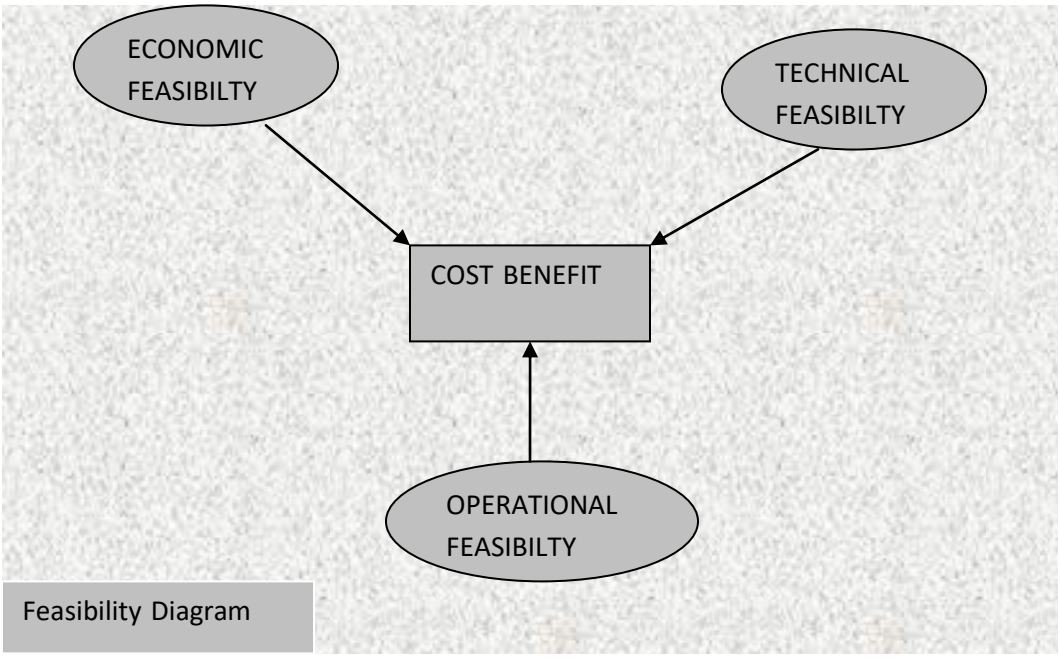


Fig 2.1 Diagram that links the feasibility study

2.4.1 Technical Feasibility

Technical feasibility tries to find out if there are enough hardware and software requirements for the system to be built to completion. It also identifies the skills required for the team members and researchers to see if those skills can be readily available when needed during the development of the new system. Technical feasibility is also about assessing if an organization

can be able to maintain the system once operational. Also, the organization has to be able to support the system in terms of hardware and software.

Technical Expertise

The team involved in the system development has to be technically competent in order to deliver the system as specified. Also of importance shall be the level of expertise of the system users. The success of this system will need at least the skills of a single Php developer, who in this case is very available and quite active in all of the development stages. The users of the system have been put between ranges, ordinary and average.

Hardware and Software Requirements

The System shall require additional hardware, other than that which is currently available at the organization. Major reason justifying new hardware acquisition is that of a need for hardware that shall be solely dedicated to this system. The sole dedication hardware will bring about benefits such as easy to trouble shoot and also the systems will be guaranteed of a speedy performance because there will not be minimum application sharing between servers.

Currently, the hardware on the ground does not allow for any expansion or the development of this system because it does not meet the required needs for the development of the new system. There is a requirement analysis procedure which has to be followed thus how the developer has come to know and also a detailed research has led to this knowledge as the specification list mentioned later in the chapter has shown it. Another area of importance which the developer has taken into consideration is the knowledge on the use of computers by the existing employees , the findings on this aspect have shown that the employees' knowledge on the use of computers is limited which will then also lead to the increase in training costs. All the above then determines the type and quantity of hardware and software needed in the development of the e-media operations control system.

Familiarity of users and developers with the system

Developers: the analyst is familiar with the software applications involved in the project.

Users: most of the employees have been using the Internet facility within the organization and it's expected that they will have few problems in using the system though there is still a need for user training.

Familiarity of users and developers with the technology involved

Developers: the developer has dealt with web-based systems and this system is not expected to pose any serious problems.

Users: the users involved are able to use the Internet thus they will be able to use the system efficiently after undergoing user training

Below is a list, of the hardware that shall support the system.

ITEM REQUIRED	STANDARD SPECIFICATIONS	QUANTITY	AVAILABLE
Laptop Computers	1G RAM, 1,8 GHz, 160G HDD, SATA-RAID, Wi-Fi, DVD/RW	9	Yes
10/100/1000 Base T CAT5/6 Ethernet Cable	100 meter reels	4	Yes
Application Server	4 G RAM, 500G HDD x2, 3.0GHz, Dual core processor	1	No
Data base Server	4 G RAM, 500G HDD x2, 3.0GHz,	1	No

	Dual core processor		
Backup Server	4 G RAM, 500G HDD x2, 3.0GHz, Dual core processor	1	No
User Software's'	Windows XP or 7, Microsoft Office 2007 or 2010, XAMMP, Dreamweaver,CS5 master suit	1 each	Yes
Network Switch	24 port (preferably CISCO switch)	1	Yes
UPS	APvC 180watts, 230Volts (i/o), with +6hours standby time	3	Yes

Table 2.1 Hardware and Software Requirements

Having gone through the factors contained within Technical Feasibility, the developer came to agree that the project is technically feasible. Though the organization did not, at the time of the research, have some of the required hardware.

For any system if the expected benefits equal or exceed the expected costs, the system can be judged to be economically feasible. In economic feasibility, cost benefit analysis is done in which expected costs and benefits are evaluated. Economic analysis is used for evaluating the effectiveness of the proposed system.

2.4.2 Economic Feasibility

In economic feasibility, the most important is cost-benefit analysis. As the name suggests, it is an analysis of the costs to be incurred in the system and benefits derivable out of the system.

Cashman (2011) states that economic feasibility are the projected benefits of the proposed system that outweigh the estimated costs usually considered as the Total Cost of Ownership, which includes ingoing support and maintenance costs, as well as acquisition costs.

In addition to costs, there is need to assess tangible and intangible benefits to the organization. The systems' review will, together with the costs, help in deciding whether to pursue the project beyond the preliminary investigation phase.

Tangible Benefits – Cashman (2011) states that tangible benefits are benefits that can be measured in monetary value, Tangible benefits result from a decrease in expenses, an increase in revenues or both.

Intangible Benefits – Cashman (2011) states that intangible benefits are advantages that are difficult to measure in monetary value but are important to an organization, Examples of intangible benefits include the following:

A user-friendly system that improves employee job satisfaction

A new website that enhances corporate image

There will also be a consideration for the development timetable, because some benefits might occur as soon as the system is operational, but others might take place until later.

TANGIBLE BENEFITS	COST (USD)
Subscriptions (online and walk in)	$9000/month
Decrease in pilferage	$8000 /month
INTANGIBLE BENEFITS	**COST (USD)**
Improved corporate identity	$8000
User friendly system	$ 5500
TOTAL	**$28 500**

Table 2.2 Benefits in Monetary Value

Development and Running costs

The firm is going to incur some development, as well as running costs in the systems' life – cycle. Development costs are meant to cover the costs incurred during the development of the system and these can include:

- Salaries for the development team
- Traveling and research costs
- Communication costs
- Stationery costs

Running costs are meant to cover for the upkeep of the system, as it is not being developed in-house. These costs will include the software license, which is a one off payment, and the annual license, which is paid quarterly every year. The running costs will also include upgrades to the system and any other modifications to be done to the system. The running costs also cover the support costs, which will be conducted using telephones, or site visits. Installation and training costs are also part of the running costs; these costs cover the costs of setting up the system on the clients' computers and also the training of the company's employees on some aspects of the

system. The below tables and illustrations show the breakdown of the development and the running costs:

QUANTITY	DESCRIPTION	UNIT COST(USD)	TOTAL COST(USD)
2	Modem	$30	$60
3	Server	$5 500	$11 000
1	Surge Protectors (industrial)	$50	$50
1	UPS	$50	$50
12	Power Cables	$3	$36
1	Network Switch	$550	$550
1	Router	$750	$750
1	Tape Drives	$15	$15
3	Laptop Computers	$600	$1800
1	Cabinet	$100	$100
1	Air Condition System	$250	$250
15	Ethernet Cables (100m CAT 5)	$15	$225
1	Patch Panel	$75	$75
15	Patch Codes	$5	$75
	TOTAL		**$15 036**

Table 2.3 Development Cost

Operational Costs

Operational costs include items such as supplies, equipment rental and software leases, Phillip Kotler (2000). These are the costs that the organization is to expect. These costs will emanate from the running of the system. Using the transaction cost theory, it is expected that operational costs will go down with time. The theory suggests that firms and individuals seek to economize on transaction costs such as they do on production costs.

The diagram below gives an over view of the Operational Cost applying the transactional cost.

COST	**AMOUNT IN FIRST YEAR**	**AMOUNT IN SECOND YEAR**
System Maintenance		
Repairs, replacements and upgrades	$1500	$500
Antivirus upgrades	$275	$200
Personnel		
Data entry and backup	$500	$300
Support and maintenance	$300	$85
Operational wages and salaries	$200	$75
Training	$150	$50
TOTAL COST	**$2925**	**$1 210**

Table 2.4 Operational Costs

Cost Benefit Analysis Table

Benefits		**US$**	**US$**	**US$**
	Tangible	17 000		
	Intangible	13500		
			30 500	
Costs	Development	15 036		
	Operational	2 925		
			17 961	
TOTAL BENEFITS				12 539

Table 2.5 cost benefit analysis

Total Benefits – Total Costs

= (Tangible + Intangible) – (Developmental + Operational)

= ($17 000 + $13 500) - ($15 036 + $2 925)

= $30 500 - $17961

= **$12 539**

Recommendation: the total benefits outweigh the total costs. The research is Economically Feasible.

Comment on cost/benefit results

Having gathered information on the costs and benefits of the project, the benefits clearly outweigh the costs. Thus a decision to proceed with the project is undoubtedly the right decision. Having passed the cost/benefit feasibility test, the project will also have to make a timely return on investment. Thus time also becomes an issue.

Return on Investment

The Return on Investment (R.O.I) is a percentage rate that measures profitability by comparing the total profitability (the return) received from a project to the total costs (the investment). R.O.I is a common method for comparing projects on the basis of their cash flow forecasts. Since there was no other project to compare the e-media operations control System with, the research uses a minimum R.O.I of 15% instead. In the case of the e-media operations control System, R.O.I is calculated as below:

$$R.O.I = \frac{\text{Total Benefits} - \text{Total Costs}}{\text{Total Costs}} \times 100$$

Where: Total Benefits = $30 500

: Total Costs = $17 961

Therefore: R.O.I = ((30500 – 17961)/ 17 961) x 100

= 69.8%

Recommendation: the research has a R.O.I that is well above the set minimum of 15%, so the research passes the R.O.I test. This means that the research can be continued with, but there are yet other Economic Analysis techniques to try out before we arrive at a definite recommendation.

Table 2.6 ROI

Net present value

According to Cashman (2011), he states that like the other project analysis techniques, the Net Present Value (N.P.V) technique assesses the profitability of engaging in any new project, however taking into account the time value of money. The technique has been known for its wide assumption that a dollar today is greater in value than a dollar tomorrow. The Net Present Value technique adjusts the future costs and expenses in terms of the current dollar thereby taking into account the current value of the money. The year in which the project is started is shown as year zero. The table below shows the workings for Net Present Value for the research over a period of.

Net Present Value (6% Discount Rate)

	YEAR 0	YEAR 1	YEAR 2	TOTAL
Benefits	-	**$**39 000	**$**39 000	
Discount Factor	-	0,943	0,890	
PV for Benefits	1	$36 777	$34 710	
				$71 487
Costs	$17961	$1 125	$1 125	
Discount Factor	1	0,943	0,890	
PV for Costs	$17961	$1 060,88	$1 060,88	
				$20 082, 76
		NET PRESENT VALUE		**$51 404.24**

Table 2.7 Net Present Value

The Time Value of Money, Net Present Value, and analysis show a positive value of $51 404.24, showing that the research is worth the investment.

2.4.3 Social Feasibility

Social feasibility chiefly focuses on identifying the project beneficiaries other than the organization and its stakeholders but rather considering the wider society. This involves analyzing how the system affects other organizations and the ordinary man on the street.

The project will create awareness of the company to prospective customers and the general public. The social responsibility model requires the developer to begin with the social system and work through the technical or engineering and operational system to accomplishment rather than have the social feasibility as the last to be taken into account if at all.

The system can be said to be one that will be not of harm to the society, but rather one that will be informational and helpful. Hence it also can be suggested that it be implemented. Having

mentioned the above aspects ,also the community will be affected negatively in that there is going to be job deskilling since some operations will be run by the system which were previously being run by humans which is also a factor that can lead to the resistance by the employees in implementing it which is a social effect.

2.4.4 Operational feasibility

A Lawrence P Leach (2002) state that operational feasibility means that a proposed system will be used effectively after it has been developed. If users have difficulties with a new system, it will not produce the expected benefits. Operational feasibility depends on several vital issues. For example, a consideration of the following questions:

1. Does management support this system?

2. Will the new system result in a workforce reduction? If so, what will happen to affected employees?

3. Will the new system require user training? If so, is the organization prepared to provide the necessary resources for training current employees?

4. Will users be involved in planning the new system right from the start?

5. Will any risk to the company's image or goodwill result?

6. Does the development schedule conflict with other company priorities?

7. Do legal or ethical issues need to be considered?

From the offset of the research, the input of users has been set as a chief driving force of the research. User input is critical to any or most researches simply because the results of the research will, in most cases, be for user needs and/or desires satisfaction. When effort is concentrated on this, it will help in giving answers to questions 1 and 4 above.

Questions 2 and 5 have been addressed by the social feasibility above as being negative both to the company and the community hence contributing to the operational feasibility in a way.

Question 3 is by no means avoidable in that after the implementation of the project there is need for user training which is prime to the operations of the system.

Operational feasibility is mainly concerned with issues like whether the system shall be useable if it is developed and implemented. Whether there maybe resistance from users that might affect the possible application benefits. The proposed system has been placed in line with the mission statement of the organization which has been clearly outlined in the proposal phase. With the organization's much placed emphasis on quality service so as to outperform its competitors, this system goes a long way in ensuring that this attribute is met.

2.4.5 Risk Analysis

This stage looks at the risks or undesirable effects that may affect the success of the project. It is also about minimizing and avoiding these adverse effects or unforeseen events. This can be achieved by drawing up contingency plans to deal with these risks. The risks cited are as follows:

Resistance to Change.

The workers, sponsors and management may resist changing to the current system due to fear of the unexpected consequences it might bring about or be reluctant to adapt to new things and environments. Users may also fear that the system development costs will be passed down onto them through reduced benefits. Other users might welcome this change because using the new system is less tedious, easy to use, and offers quick response time to their requests. The project is highly supported by all these stakeholders so the risk is very low.

Viruses

The use of network and foreign disks on the machine may bring and distribute viruses' hence antivirus needs to be installed on the machines and it also needs to be continuously updated.

Unauthorized Access

Hackers can access the system database and modify or delete data from the database or perform fraudulent activities. Use of passwords and access levels will beef up the security of the system and also the use of access levels how and who can add and edit data in the system.

Changeover Strategy.

Since the current system will not be abolished but just added with a new feature hence only incremental changeover is only possible with very minimal risks.

Hardware and Software Factors

There might be risks of installation when the system is developed on one hardware platform and it is to be installed on another hardware platform. To reduce this risk there is need to try the system on different hardware and software platforms before implementation.

Environmental Factors.

Changes in the environment of the project may affect the success of the project for example changes in legislation or change in authority due to unstable political ground.

Investment Risk

There will be loss of resources or funds in case that the system fails to deliver the expected functionality or when the organization fails to fund the project. User consultation at each and every stage of development may reduce this risk.

The majority of the risks, however, impinge on customers. Customer risks are of a variety of kinds, including the following:

Embarrassment;

Violation of personal space;

Publication of sensitive personal data;

Use of sensitive personal data to bring psychological pressure to bear on the person, up to the level of blackmail and extortion.

Economic Risks that is associated with the cost of the project.

Due to the unable economic environment in the country, the project is at risk of termination at any given time. If the organization really needs the system, it has to budget for it to avoid shortfalls in the development process. All the resources must be available first and on time and fully functional.

Other Risks

The users may think that it's very challenging to use the new system, thus there is need to restore confidence to the users otherwise the system is bound to fail due to sabotage.

There is need to assure the employees that no jobs have been threatened by the new system.

The project is being developed for a department that is not fully functional and relies on IT Consultants. Therefore there is a risk of not getting enough of time to do sufficient tests. This is a minor setback compared to the overall factors that have been considered for this project.

Operational Feasibility Conclusion

The implementation of the project will be welcomed by all users as the technology used is user friendly and users in the organization saw the need for the new system. The project is fully supported by all the stakeholders in the organization and the risks have been ascertained and measures to encounter them have been set.

2.5 Project Work Plan

This is a work plan that records and keeps track of all tasks that need to be accomplished over the life of the project. It identifies the tasks and their expected durations. The System Development Life Cycle will be used to model the activities that are going to be followed in the development of the project. The project time allocation for each phase is shown below with their respective dates in the Gantt chart that follows. Break down of all tasks to be done during project lifecycle and their duration.

Phase	**Start**	**End**	**Duration(weeks)**
Proposal	08/11/2012	13/11/2012	1
Planning	12/01/2013	29/01/2013	2
Analysis	11/02/2013	22/02/2013	2
Design	25/02/2013	18/03/2013	3
Implementation	18/03/2013	01/04/2013	2
Maintenance	01/04/2013	05/04/2013	1

Table 2.8 Project Schedule

The Gantt chart supporting time allocation table above.

ACTIVITY	WK 1	WK 2	WK 3	WK 4	WK 5	WK 6	WK 7	WK 8	WK 9	WK 10	WK 11
Project proposal											
Planning											
Analysis											
Design											
Implementation											
Maintenance											
Documentation											

Table 2.9 Gantt chart.

2.6 Conclusion

The project-planning phase enabled us to assess the risks that could be faced in developing the proposed system. We managed to come up with ways that would help in curbing these risks. During the planning phase we discovered that it is feasible to carry out the project after conducting a feasibility study. It also enabled us to come up with a plan to be used throughout the project activities. The Analysis of the new system is the next phase to follow.

Chapter three: Analysis Phase

3.1 Introduction

A good deliverable product is the one that works to the expectations of the end user. Efforts should be made to come up with these end user requirements. What is lacking in the current system should be addressed in the proposed system and it is at this time that the developer has to work hand in glove with users so that he gets to know the loopholes of the current system and try to appreciate what the end users would appreciate in the proposed system. As a developer I had to use some fact-finding techniques to identify system requirements in order for me to perform a requirements analysis.

The analysis phase is one of the most important phases in the project life cycle. This section fully scrutinized all the information (input and output) and processes of the current system. It outlined who is currently using the system, what data, how and where the data is handled in the current system. It also involved the process modeling, that is, how the current processes are modeled. The analysis phase was broken down into the following processes:

- Process modeling
- Weakness of the current system.
- Strengths of the current system
- Requirements of the proposed system

3.2 Information gathering techniques

Ranges of research methods were implemented during the research process and these ranges from interviews, questionnaires and participative observations. Data was collected from both internal and external sources, which in a way improved the reliability and validity of the research findings. And to gather useful information, the following fact-finding techniques were employed:

3.2.1 Interviews

According to Gillham (2000), an interview is a conversation, usually between two people. But it is a conversation where one person the interviewer is seeking responses for a particular purpose from the other person: the interviewee. I also conducted interviews with identified key employees within the company. The interviews helped to give an insight of how the company functions, and to provide answers to questions that could not be answered by the former techniques. For staff at the same level, asked the same interview script to help me get a wide range of answers and opinions on similar topics or issues.

Types of Interviews

Two types of interviews were used in the gathering for the analysis of the existing system namely structured and unstructured interviews.

Unstructured interviews

Grix (2001) states that an unstructured interview is one in which the researcher has a random list of concepts or loose questions, which he or she converts into spontaneous questions during the interview and a good example would be an oral history interview.

Structured interviews

Grix (2001), a structured interview is the most rigorous and the least flexible in the way it is set up. Predetermined questions are put to the interviewee in a specific order and the responses are lodged (either by recording electronically or by note - taking).

Advantages of Interviews

- Interviewer can motivate the respondent to answer freely and openly
- Interviewer can probe for additional information and feedback from the interviewee
- Questions can be better re-worded or restated for better clarity
- In comparison to techniques like Town Hall Meetings or other large group events, interviews have reduced field costs since they do not require the booking of any venues.

Disadvantages of Interviews

- Interviewing is quite time consuming
- Interviewing maybe impractical due to the geographical location of the interviewees
- Interviewee maybe biased and thus may not give all the necessary information.

3.2.2 Participatory

Participating proved to be the most effective technique. It generally involved my personal involvement in the operational activities at The Patriot for a period of one week.

I got involved in the Production and design department and during that period I was involved in the assistance of the development of the website and also the uploading of the online news as per publication, recording of how the production department is distributing its output and its stock management procedure as what the supervisor would have told me to do.

In the I.T department another area of interest was the uploading of the paper on different sites on the web as to make the paper visible worldwide. Getting personally involved helped me to identify some bottlenecks that could have otherwise gone unnoticed. It also helped me to get that much needed first-hand experience of the problems being faced by the users of the current system. I also had the opportunity to propose the development of a new website which I was given the go ahead to develop it with the address www.thepatriot.co.zw.

Another arm of the Participatory strategy was the document review which involved observing those operations that I could personally get involved in during the participatory activities. I observed all steps in the selling cycle in the marketing department and reviewed forms, records and reports used throughout the organization.

Findings

From the above strategy I found out that the tasks to be done were still manual in a way that made the whole process delay the production of the print media. In the newsroom department the movement of articles to different departments was and is still a concern since it will take time for one article to reach its intended recipient.

3.2.3 Questionnaire

Questionnaires were presented to staff at The Patriot. The purpose was to gain some preview into the already existing system through the users' opinion. A date was set for the return of the questionnaire.

The fact-finding techniques helped me to achieve a high level understanding of the current system, which is described below.

Questionnaires were targeted to random users of the existing system and also a few readers of the paper on what they would want to expect and also what they are experiencing with the use of the existing system. Since The Patriot is a small organization I only gave out ten questionnaires on which I would calculate the response rate from those and also get the response thereof.

Advantages

- It saved time as it was distributed to many respondents con-currently
- It was easier to arrange and conduct as compared to interviews as there is no personal monitoring.
- Respondents completed questions at their convenience, as there was ample time for them to think about the questions before responding and thus allowing them to give comprehensive answers.
- Anonymity was maintained which enhanced the chances of genuine responses, as there was no room for intimidation by other employees.

Disadvantages

- There was no guarantee that respondents would answer all questions posed as some questions came back unanswered or poorly answered.
- Questionnaires were time consuming as the response was not immediate as in the case with interviews
- The return rate did not match the number of questionnaires handed out.

3.3 Analysis of the current system

P Landon et al (2011) states that system analysis is the examination of a given system with the intension to know it better. Current systems analysis is an important source of information for requirements determination. Data, processes and user references of the current system can help determine critical requirements of the proposed system. A requirements determination effort should include a review of whatever documentation about the current system if it exists.

Analysis of the current system is divided into:

- Process Analysis
- Data Analysis

3.4 Process analysis

Landon P etal (2011) states that process analysis fully analyses all the information (inputs and outputs) and processes of the current system. It gives an outline of the users of the current system, the data, and how the data is used within the system. The following are the processes that are currently done by the existing system;

A process analysis can be used to improve understanding of how the process operates, and to determine potential targets for process improvement through removing waste and increasing efficiency. Currently the system is disintegrated.

Inputs

This is the data that is entered into the current system and all these processes are manual. This system offers very little efficiency and lots of human errors.

In this process, a journalist logs into his or her machine and checks for a connection on the local area network through the use of the Ethernet cables. This act is made possible by the sharing of one machine in the newsroom, once there are not many clients connected to the said server the journalist is able to open his or her folder as they will be folders for every journalist such that the news editor can access the stories by sections i.e. sports , top news section.

Also the input of the amount of newsprint to be printed which will then be sent to the printers.

Processes

Once the journalist has gained access to this server he transfers the story to the designated folder and the process is the same for the news editor to the proof readers then back to the editor for publication once approved. A folder is also on the shared machine of the unpublished stories for the next publication. The process on this explanation is the use of the local area connection through the use of the Ethernet cables to communicate between the two departments which is not of course reliable.

Outputs

This is what the system brings out at the other end after going through all the above mentioned processes.

When the publication is printed and ready for sale the quantity of the produced papers is then taken care of by the sister company Zimpapers (pvt) ltd ,thus when distribution comes into place whereby drivers are allocated a number of copies to deliver to vendors along the streets for selling. The returns are then kept by the vendors awaiting the collection date by Zimpapers. When the returns are given back by the vendors they are then further directed to The Patriot office for storage and recycling.

Activity Diagram of the Current System

Departments:

newsroom	Proof room &editing	production	Marketing & distribution	administration

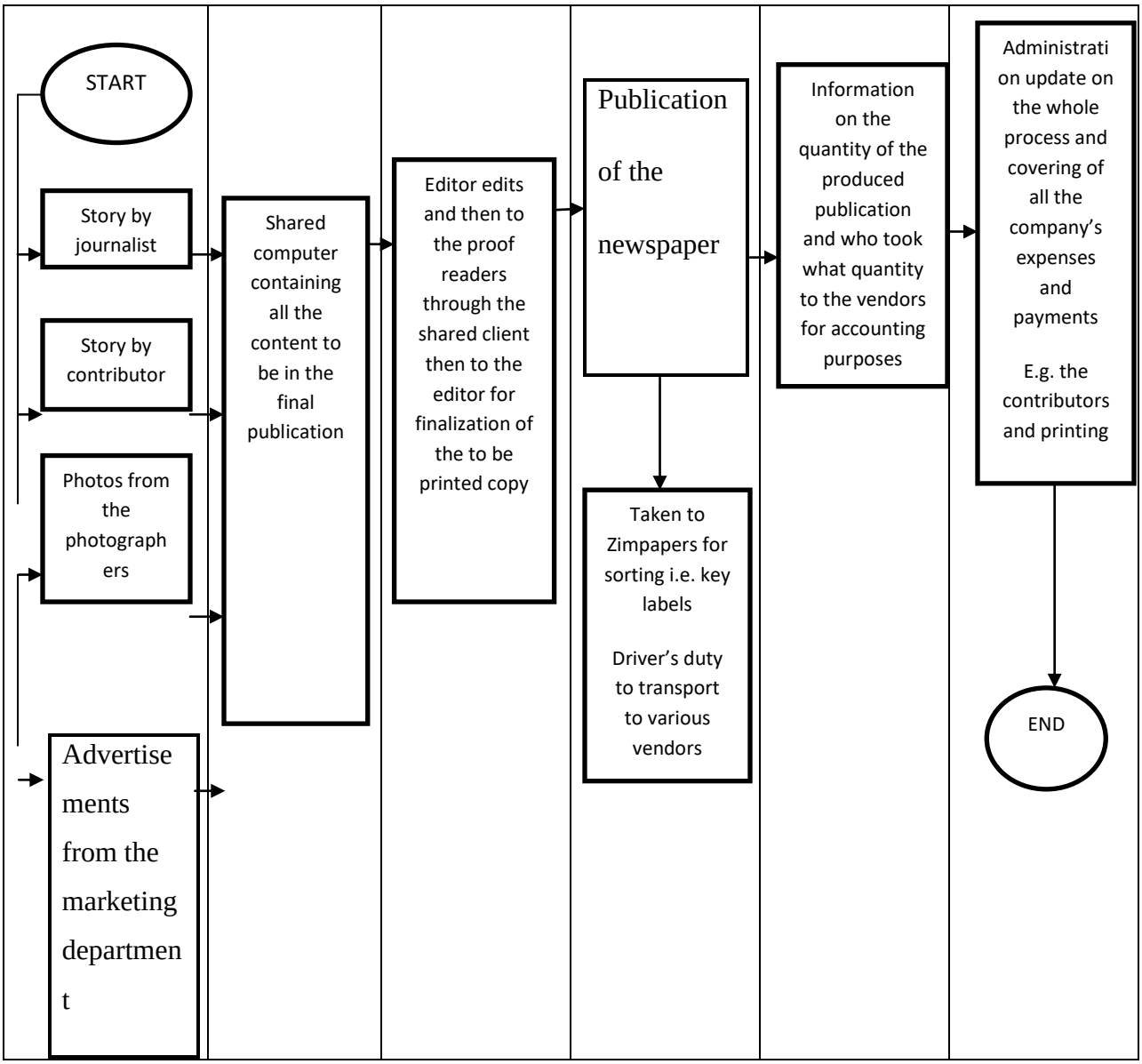


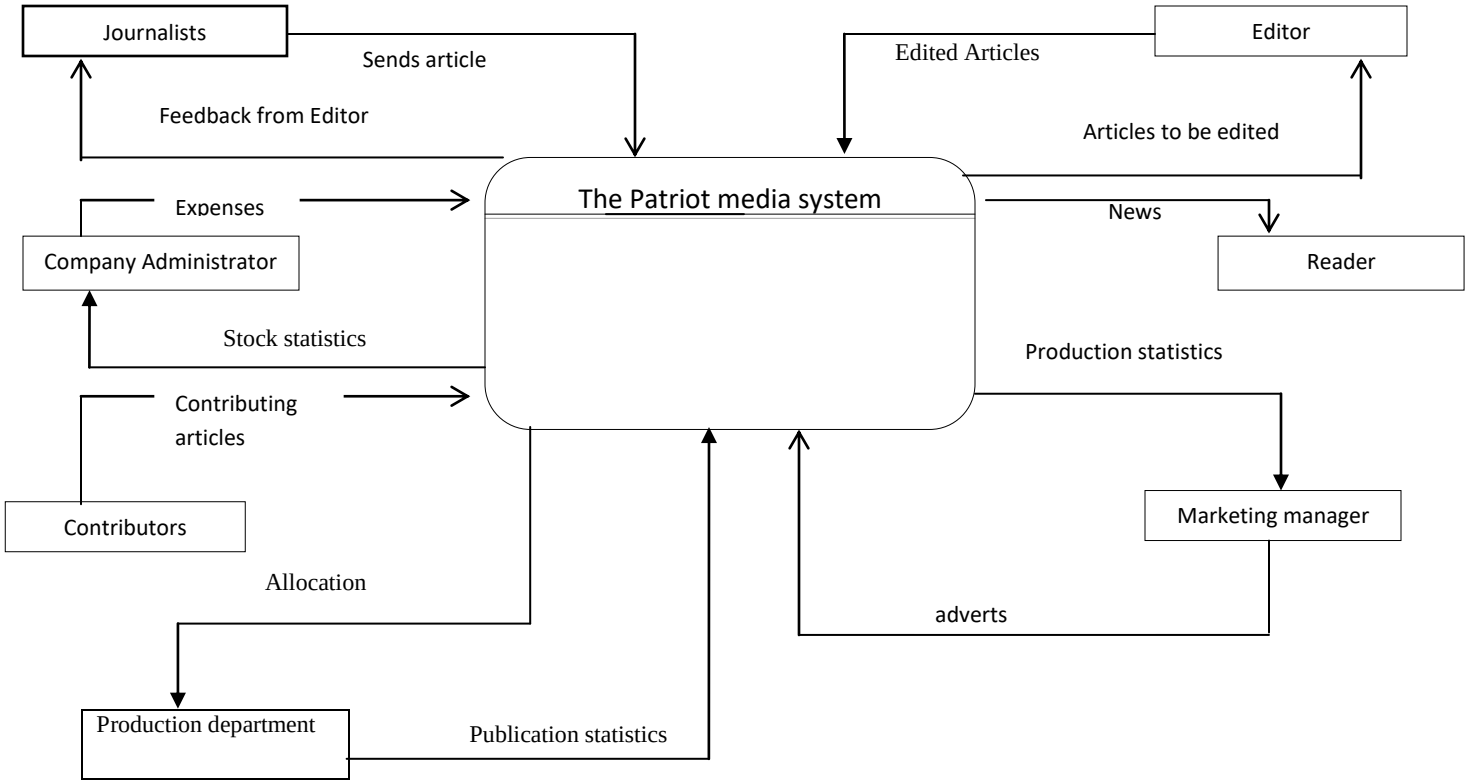
Figure 3.1 Activity Diagram of Current System

As explained by Donald R Coughanour (1990) the activity diagram helps enlightenment of the current system by clearly showing a step-by-step breakdown of the phases of a process (used to convey the inputs, outputs) and operations that take place during each phase.
It can be a milestone in continuous improvement. The process boundaries are defined by the entry and exit points of inputs and outputs of the process.

3.5 Data analysis

Data analysis is a practice in which raw data is ordered and organized so that useful information can be extracted from it. The data analysis of the current system has been carried out using a context and a data flow diagram. A context diagram is a top level data flow diagram; it only contains one process node that generalizes the function of the entire system in relationship to external entities. Data flow diagrams illustrate how data is processed by a system in terms of inputs and outputs, these diagrams represent a system at any level of detail with a graphic network of symbols showing data flows, data stores, data processes and data sources or destinations.

Context Diagram



Key

Entity **Data Flow** **Process**

Figure 3.2 Context Diagram

Data flow diagram

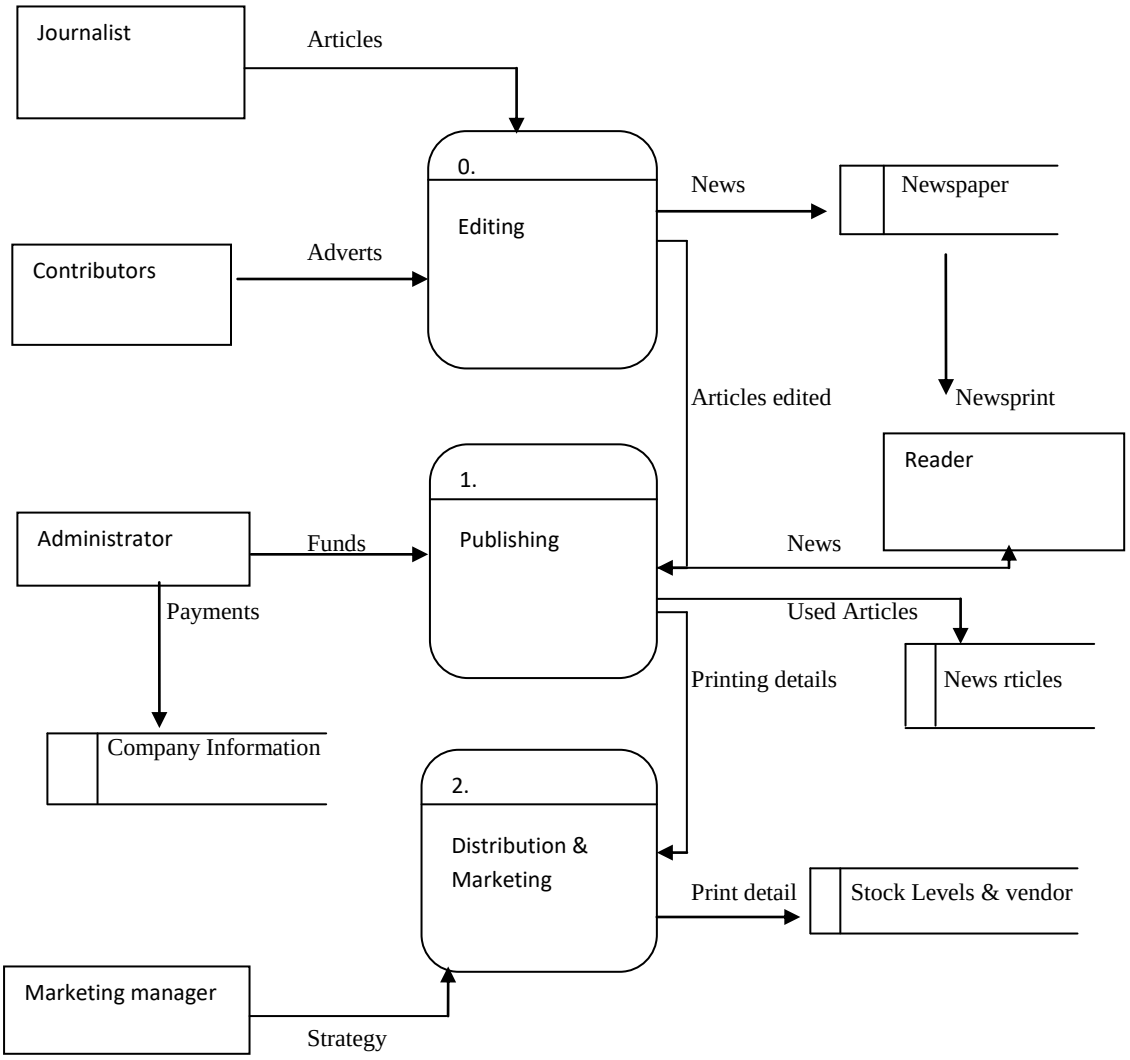
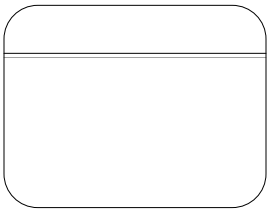


Fig 3.3 Data Flow Diagram

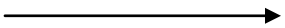
Key



Process

Entity

Data or Information store



Information flow

3.6 Weakness of the current system

- Article transfer is not reliable
- Allows for pilferage thus meaning leaving some loopholes in the stock management process
- It does not generate some reports on what would have been done
- There is no direct link on who carried what quantity to which vendor
- Readers who are international cannot reliably access the publication
- No Information technology department within the organization
- The system does not allow for the allocation of duties

3.7 Alternative evaluation

The comparison between possible ways of coming up with a better system is of importance since there is need to adopt a way that does not become a huge expense to the organization and some available solutions that the developer has put across are out sourcing, systems upgrade and in-house development. These are then to be discussed below:

3.7.1 Out sourcing

Cite SeerX papers (2000) define out sourcing as the process or act of acquiring the services of a firm that specializes in a given area. With globalization taking over at enormous rates, organizations have over time learnt to cut all possible costs whenever possible. This has also given birth to core competence. Now organizations will dedicate valuable time and energies to their core business. Out sourcing will definitely reduce internal costs while giving an organization that is out sourcing the privilege to focus on core competence hence it is always healthy and advisable to outsource.

Cite SeerX (2000) identified the following advantages and disadvantages of outsourcing:

Advantages

Time effective – out sourcing means that someone is dedicating their time and resources to your product. This is not the case when you are developing your own product.

Cost effective – helps conduct a cost effective business by cutting down on possible training and wage costs that could be incurred during own development of software

Risk mitigation – you can extenuate risk by choosing an out sourcing firm that has a high quality project management system. Also, the firm has to be one that has been, tried, tested and trusted. This will obviously reduce the risks involved in software projects e.g. project failure.

Technological advancements – with the current high speed advancements in technologies. It is always advisable to have the help of someone well vexed with current technologies and their associated trends as you embark on any technological voyage.

Lack of in-house experience – when internal work force is not adequately equipped to develop the desired product, out sourcing is always the best next solution. The organization being out sourced will obviously be specialists in the service that they are being sought for. As a result, they will certainly carry more experience than the out sourcing organization's human resource. Thus they are bound to deliver

Disadvantages

Time zones – this creates disadvantages to Information Technology out sourcing. In a case with the vendor and the customer being in different time zones, it is possible that the product delivery may not be as the customer intended it to be.

Cultural differences – this is usually a common case when out sourcing is derived from foreign countries. The different cultures and languages may at times bear limitations and thus result in poor project delivery

The customer, the rookie – the customer is always the novice in such projects. In a bid to now satisfy the customer, it is always easy to lose track of the desired product and the initial objectives.

If The Patriot was to out-source, it would probably spend about US$5 000. This will also be at the expense information security since as what happened before that some records went missing. Now as alien employees work on a project of such nature, they will at one point need certain information, which might also be confidential to the organization. Once such information is shared with the alien employees, there is high risk of losing the information they possess to competitors.

3.7.2 Systems upgrade

Cite SeerX papers (2000) Highlight that systems Upgrade involves the process of data gathering again to get information on the changes in user requirements over time, of an existing system. By upgrading the existing system, there is an obvious need to first integrate it. After the system becomes one, then concerns to overcome previous difficulties as well as adding a module that will help fight malnutrition can now be met. The challenge in this case is that The Patriot does not have an existing system that is upgradable but it needs a new system that collectively places all its concerns under a single click.

Cite SeerX (2000) identified the following advantages and disadvantages of Systems upgrade:

Advantages

- Documentation of the current system is available
- Quick implementation
- Reduced file corruption
- Improved file control and information handling

Disadvantages

- Maintains a lot of paperwork
- Limitations of the current system can be easily inherited into the new system
- Retrieval of record will be time consuming and tiresome
- Maybe error prone in mathematical calculations since the system would be first an integration of many independent systems.

Some scholars argue that systems upgrade cannot be an independent alternative as the upgrade can be either carried out by in-house personnel or an out sourced task force. Thus systems upgrade becomes dependent on out sourcing and in house development.

If the Systems Upgrade, with In-House development, is to be applied on the development of a system for this research, it would obviously cost as much as it would for the In-House

development, $3 000. The reason for a similar cost for the two is that both will be developed by the same people. However, having gone through the merits and demerits of the Systems Upgrade, the discussion on the In-House development will show how the latter is better than the former.

3.7.3 In-house development

The Cite SeerX papers (2000) define In-house development as such a development that will be carried out by the internal human resource of an organization.

Cite SeerX (2000) identified the following advantages and disadvantages of In-house development:

Advantages

- Increased accuracy, that is, in mathematical calculations and information held
- Reduced paper work
- Confidential data will be kept securely from unauthorized users
- Access time for records will be much faster
- Quick and improved services will be provided as processing is done electronically and information is received instantaneously. Unlike if it was being transmitted to the outside world, here there will be need for information verification and possibly encryption thus demanding more time
- Redundant unnecessary operations are eliminated

Disadvantages

- There is a great deal of time in this exercise, from investigation to implementation
- There is a great deal of expertise required in the development of such a system
- Members may also resist a new system if a proper training has not been conducted
- The requirements gathering can be biased because of it being carried out by personnel that is not independent of the organization

Developmental Methods Cost Justification

	OUT SOURCING	SYSTEMS UPGRADE	IN - HOUSE
COST	**$5 000**	**$3 000**	**$3 000**
CHOICE			

Figure 3.4 Developmental Methods Costs Justification

After going through the strengths and the downside of the last development technique, the In-House development decision has been made. This research shall embark on in house product development. The researcher will lead the product development and implementation and The Patriot production staff will help administrate and maintain the system.

3.8 Requirements analysis

These are the capabilities of the functions that will be performed by the system. The research from the existing system made us to come up with the functional requirements of the system. We did this by obtaining the required information from the users of the current system using different techniques of information gathering.

Tashuya Taguchi (1990) refers to requirements analysis as a process through which the user's expectations of a new system or modified system are determined. Quantified, relevant and detailed requirements will aid in the delivery of a complete and user satisfying end product. Such information is in Software Engineering referred to as Functional Requirements, and such is an important aspect of project management.

Requirements analysis entails a continuous effective communication with users as the developers work on the system. The users will be the people to work with the system after it is developed. Therefore there is need that the system is made to satisfy their desires and need to do whatever activity the system will be developed for. The most important information to gather is the users' specific expectations of the system to be develop as well as the users' level of understanding technology, all this will help and avoid the development of a system that will not be more advanced than its users.

3.8.1 Functional requirements

Sommerville (2000) states that functional requirements are statements of services the system should provide, how the system should interact to particular inputs, and how the system should behave in particular situations. In some cases, the functional requirements may also explicitly state what the system should not do. It refers to essential system requirements in a software engineering process. These include elements such as technical specifications, system design parameters and guidelines, data manipulation data processing and calculation modules.

Functional requirements are in contrast to other software design requirements referred to as Non-functional requirements. Non -functional requirements are primarily based on parameters of a system performance, software quality attributes, reliability and security, cost, constraints in design or implementation.

Normally a software architect makes use of the use case and scenarios (instances of use cases) generally following a standard in order to capture the functional requirement through a system analysis process

The key goal of determining functional requirements in a software design and implementation is to capture the required behavior of a software system in terms of functionality and the technology implementation of the business process.

3.8.2 Use Case

Use case is a graphical notation depicting interactions between a role (“actor") and a system, to achieve a goal. Sommerville (2000) states that the actor can be a human or an external system. Use cases are created based on identified functional requirements but are not mapped one-to-one to requirements. A use case has a sequence of steps that encompass an interaction between a user and a system. A complete set of use cases specifies all the different ways of using the system, and thus defines all behavior required of the system without dealing with the internal structure of the system. Below are the actors identified?

Administrator

The administrator’s functions basically include every actor’s views of the system and their function. This is to enable him/her to be able to trouble shoot the system if and module goes wrong

Journalist

The journalist’s function in this use case diagram is to show where the input of data into the system will be mainly from

Editor

This is also another input of data into the system and this information is the information that would be authenticated to be published in the final product

Reader

All the operations in this case do need to produce an output which is highly of concern to the reader

Use Case Scenario

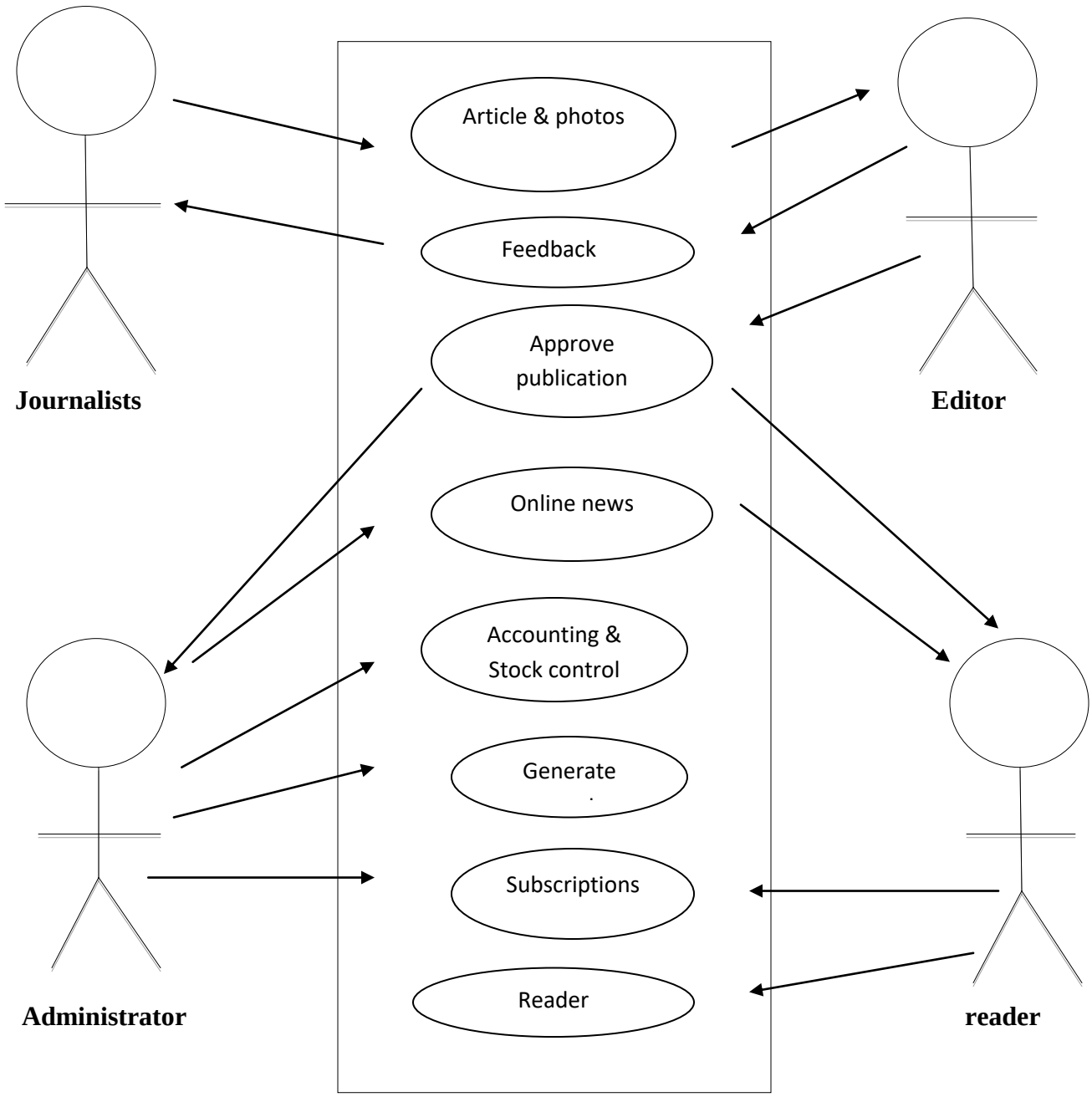


Figure 3.5 Use Case Scenarios

KEY

Actor

Activity/data flow

E-media operations control System

3.8.3 Non-functional requirements

Sommerville (2000), states that non-functional requirements often constrain the system being developed and the development process being used. These might be product requirements, organizational requirements or external requirements. They often relate to the emergent properties of the system and therefore apply to the system holistically. Systems must exhibit software quality attributes, such as systems efficiency, graphical user interface, report generation, user requirements and backup and recovery.

However, such non-functional requirements are difficulty to address in many projects, even though there are many techniques to meet functional requirements in order to provide desired functionality. The following topics discuss the exhibits of the system:

System Efficiency

The proposed system is supposed to

- Produce timely reports.
- Allow for data backup, feedback and information security.
- Facilitate the creation of realistic budgets.
- To aid better information extraction

Graphical User Interface

- The system is to be simple and easy to learn and browser through
- User interface must be self-explanatory
- System should allow for error recovery
- System should be user friendly

Requirements

The following have been revealed by the users as their expectations of the system. The system is to:

- Be able to ensure better data sharing
- Be a system that shall make the security of the information reliable
- Be one that should be reliable. Users cited that they desire a system that shall be accessible when there is need
- Be user friendly. Users have to be able to navigate and browse through with no problems
- Be able to facilitate error handling. The system has to aid users in troubleshooting of errors

Back Up and Recovery

The database system should be backed-up continuously in order to minimize data loss in the case of a catastrophic failure. The system administrator should maintain the system and its databases to ensure integrity and availability of information.

3.8.4 Constraints

Users might be resistant to the change in the system being proposed.

Management might not be willing to share some information perhaps because they will fear being exposed for corruption.

The ultimate decision to implement the system might be red tapped. As a result, the system can take long to be implemented, or worse, it could be sabotaged

3.9 Conclusion

The analysis phase outlined all the operations in the current system. It gave a full view of the current system. The existing system was fully analyzed as the necessary information about the activities with it was gathered. Advantages and disadvantages of the current system were also analyzed as well as the data flow and the relationships between the current entities. All this information prepared the researcher for the design of the new system using all the information gathered.

Chapter 4: Design phase

4.1 Introduction

The system design chapter will give an outline of physical design, the architecture design, interface, database design, and program design. Dreamweaver was used in the development of the proposed system's model. System design is simply a formal method for pursuing the physical development of the system. It describes the approach to be followed in transforming the logical system requirements into a functional, physical system.

This phase is based on what the logical designs are, and how these are going to be converted to physical ones. Also it is going to outline how the proposed system should work as it is part of the systems development which concentrates on how to design an effective, reliable and maintainable system.

4.2 System Design

Gary et al (2003), highlights that system design is a step by step process for developing high quality information systems. In this phase it is being shown how the system will work as the developer will highlight.

A well designed system should have following characteristics:

Efficiency: The system should run operations and other transactions in very short spaces of time. It should also enable the user to process jobs in a small number of commands and should be simple enough to allow novice user to easily find their way around the program quite easily.

Security: System must provide privacy and confidentiality and must be used by those who are authorized to do so.

Reliability: Most computer systems are susceptible to failure. In an environment where there are constant power outages and load shedding, the system should be able to maintain a certain level of reliability. A transaction should not be lost in the case of power failures and database transactions should not interfere with each other thereby reducing data integrity. The same process/transaction should not yield different results if faced with the same data. In the case of a system failure in whatever facet, it should be possible to return to the most recent steady state.

User friendliness: System must be used with minimal support and consultation.

Maintainability: it should be easy to maintain and update in line with technological changes in the environment or changes in the business need.

How will the system work?

The e-media operations control system will perform the following functions:

- Enable the movement of articles from the journalist to the editors
- Allow the registration of agents who will do the selling
- It will capture all the activities of the production department to provide clear statistics
- Enable the calculation of the commission payable to the agents as per their request
- Allow the articles to be edited and preparing them for print
- Allow the ordering of newspapers online by the agent

The e-media operations control system is internal and it will allow for the movement of articles from the journalist to the editor by means of uploading and downloading. This movement of articles will see to it that the usual time lags which were being found in this process will be reduced to the benefit of the organization. For purposes of accountability and the monetary aspect the system will also bring the functionality of registering agents into the system so that it is known that what quantity would have been distributed since also the distribution points would have been entered into the system. This will also give an option of expansion in distribution areas not covered; this is a drive which will also provide the know-how of how the marketing department is to make use of the highlighted areas. The e media operations control system allows agents to place orders with the proof of their identification for verification purposes. Reports will be produced at any time if needed. The system will then take account of the ordered quantities to be printed which curbs the gap currently existing of pilferage within the ordering and production stage.

4.2.1 Context Diagram of the Proposed System

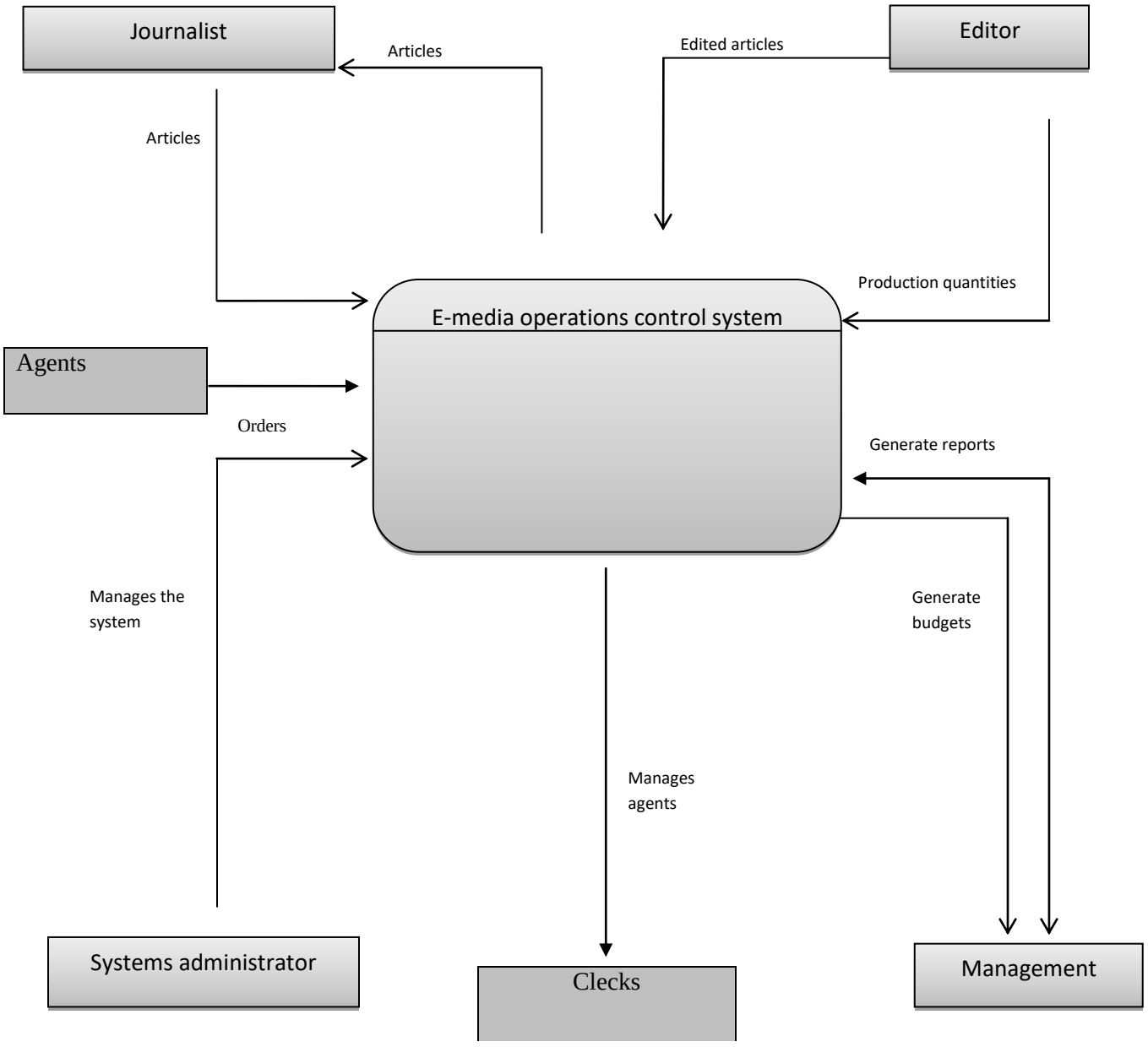


Figure 4.1 Context Diagram for Proposed System

Key

Entity proces irection

The Context Diagram shows six groups of people how are going to be interacting with the system. The system will have a universal view that will be accessible and visible to all the groups as well as some views with discretion.

4.2.2 Data Flow Diagram of the Proposed System

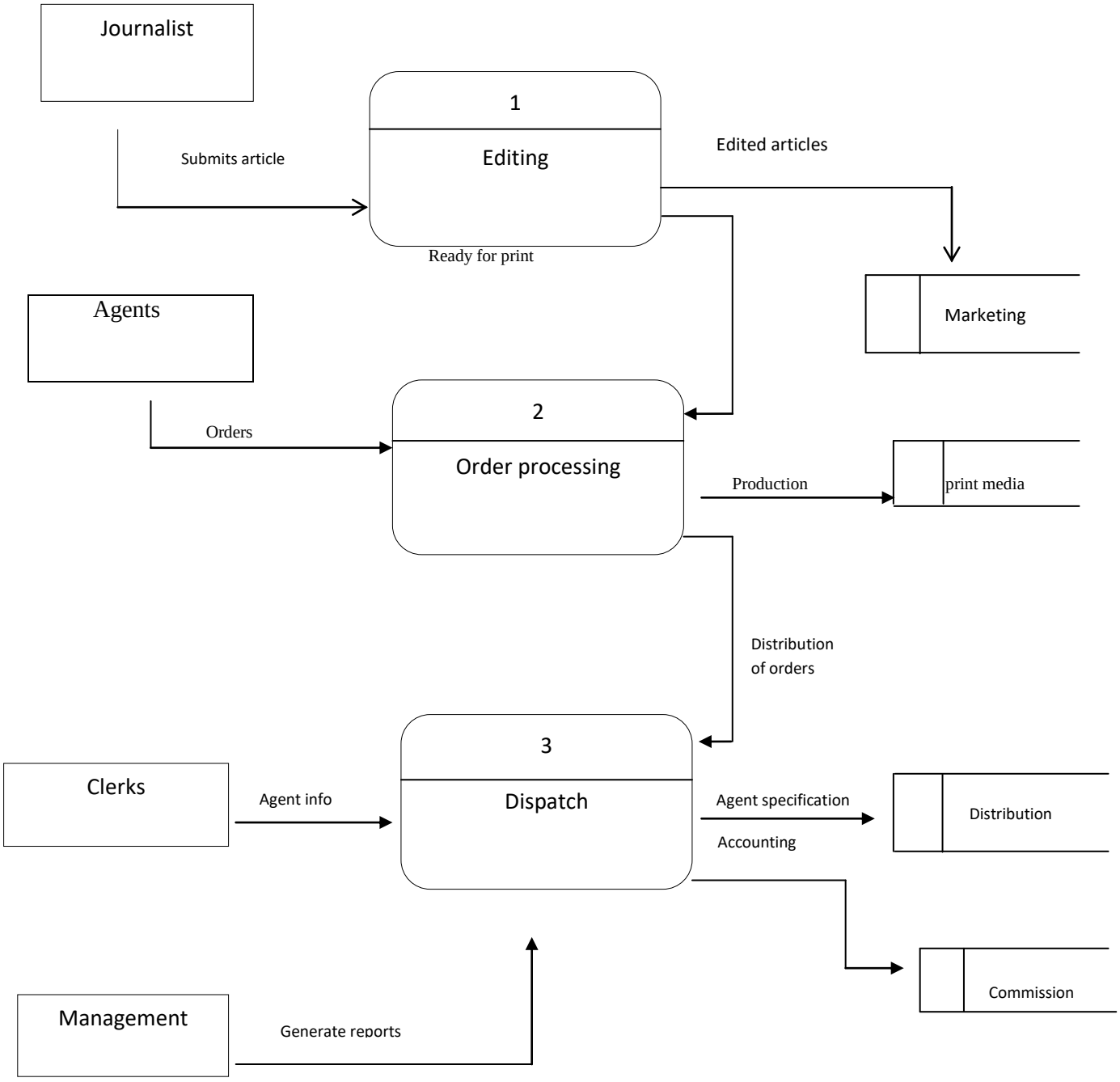
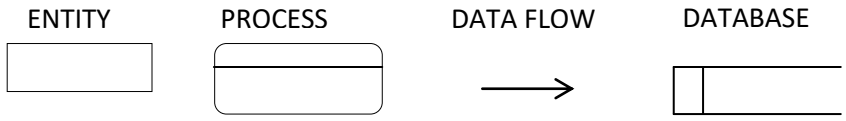


Fig 4.2 Data flow diagram

KEY



Sommerville (2011) defines a data flow diagram as a model that shows a functional perspective where each transformation represents a single function process. D.F.D's are used to show how data flows through a sequence of processing steps.

4.3 Architectural design

Ian (2011) defines architectural design as where you identify the overall structure of the system, the principal components (sometimes called sub-systems or modules) their relationship, and how they are distributed. It serves as the blueprint for the system. Architectural design defines the work assignments that must be carried out through design and implementation.

It is the design of a communications network. It is a framework for the specification of a network's physical components and their functional organization and configuration, its operational principles and procedures, as well as data formats used in its operation. In telecommunication, the specification of a network architecture may also include a detailed description of products and services delivered via a communications network, as well as detailed rate and billing structures under which services are compensated.

The architecture is the primary carrier of system qualities, such as performance, modifiability and security none of which can be achieved without a unifying architectural vision. Architecture is an artifact for early analysis to make sure that the design approach will yield an acceptable system. Architecture holds the key to post deployment system understanding, maintenance and mining efforts. In short, architecture is the conceptual view that holds every phase of the project together. The objective of architecture design is to minimize bottlenecks in the system caused by hardware, software and architectural factors. The system should run on a reliable hardware platform and measures should be backed up regularly in case the system is corrupted. The researcher also considered measures that should also be put in place to reduce the negative

effects of power cuts on the system and this involves installation of backup power systems as shown by the required hardware list in preceding chapters.

System Architecture

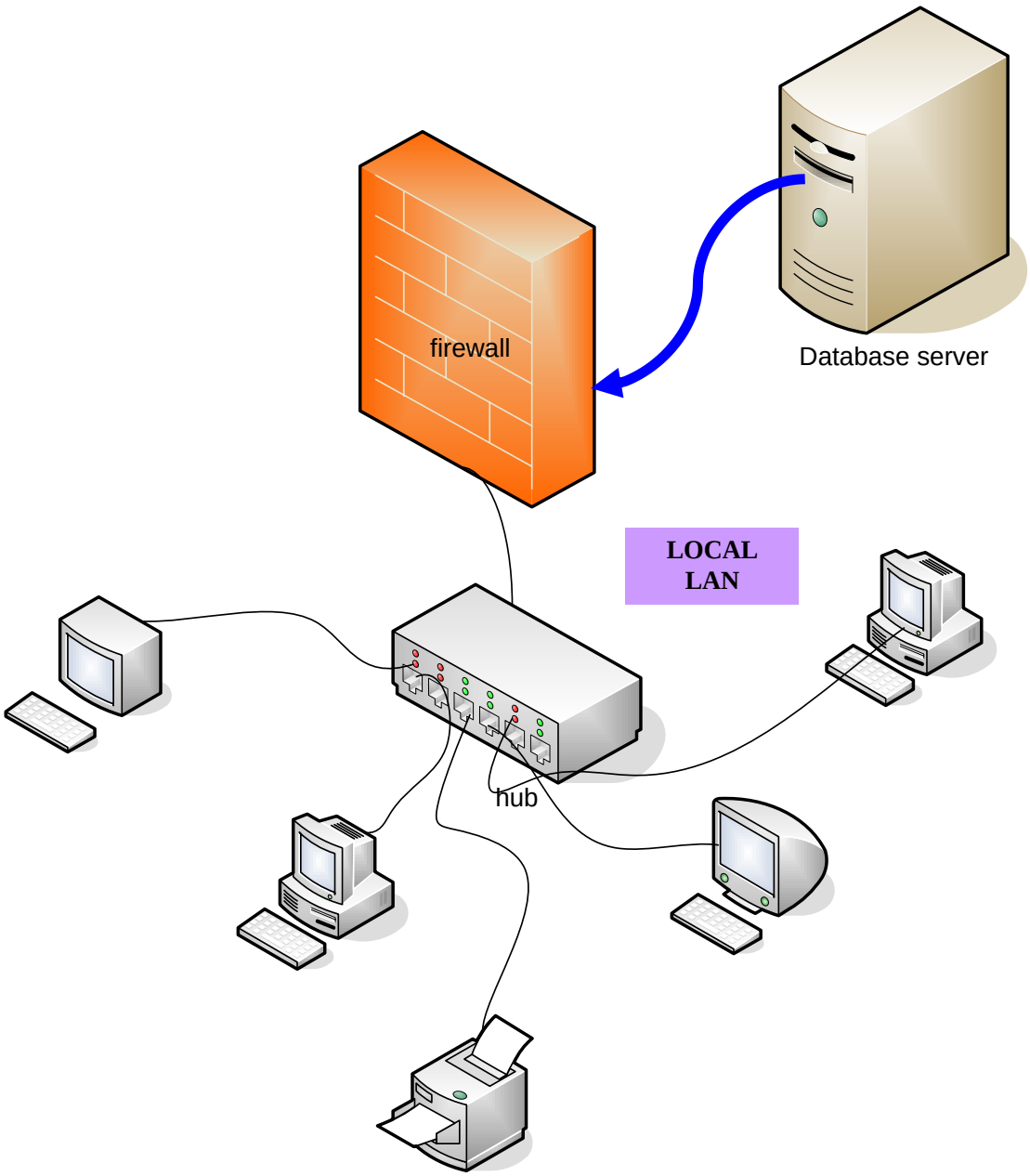


Fig 4.3 System Architecture adapted from Stair M et al (2011)

4.4 Physical design

Stair M et al (2011), highlights that physical design refers to how the tasks are accomplished, including how the components work together and what each component does. Physical design specifies the characteristics of the system components necessary to put the logical design into action. In this phase, the characteristics of the hardware, software, database, telecommunications, personnel and procedure and control specifications must be detailed.

Stan Liao (2008), states that physical design is a process of mapping the logical to the physical implementation. The design shows the interaction between the hardware and the software. The system is going to depend on the network as users will be spread over in a large building. Each user will have their machines configured (a data source added to the DNS) in their respective offices so that the machine will be able to access the database on the server. They will then log with their login details that will permit them into the system. The administrator will be able to use the server from any other machine when performing administrative duties by making use of Administration utilities. The database on the server machine is backed up regularly using back-up tapes that will be stored offsite.

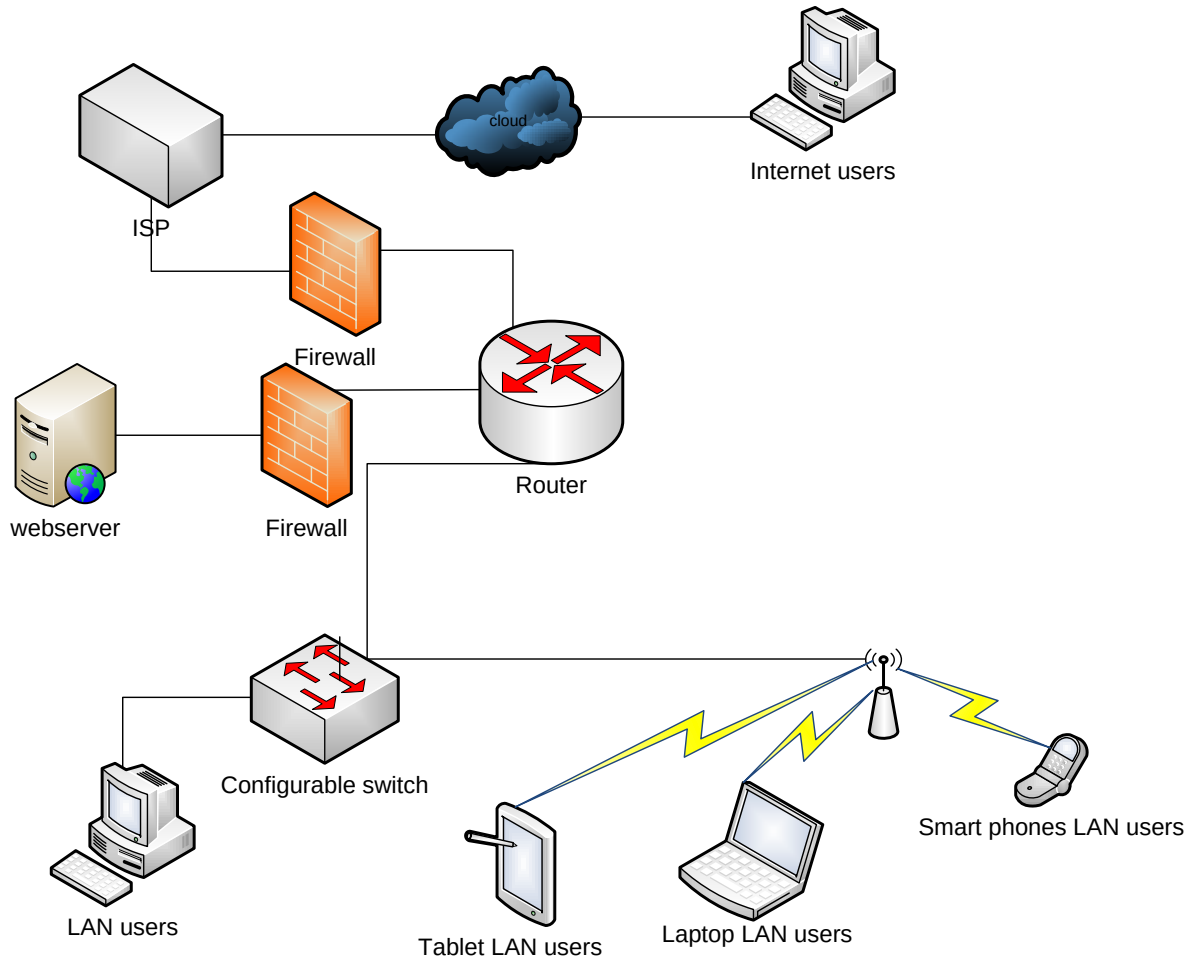


Fig 4.4 Physical Design of the system adapted from Singh S.K (2001)

4.5 Database Design

Singh S.K (2001) states that database design is a process of arranging the corporate data fields into an organized structure needed by one or more applications in the organization. The organized structure must foster the required relationships among the fields while confirming to the physical constraints of the particular database. The success of the proposed system will depend largely on the structure and functionality of the data repository. To ensure this success the data repository should ensure data integrity, data consistency and reduction in data redundancy then the efficiency in processing database queries. In designing the database xamp will be used to design a database from which information can be stored, manipulated, and updated.

4.5.1 Data architecture design

Architecture design refers to the arrangement of data in a database in the form of layers known as schemas. There is the physical layer, the conceptual layer and the application layer. The schema is the description of the database which is specified during database design and the instance is the data that it stores in the database at given time. The diagram below shows the Database Architecture of the proposed system.

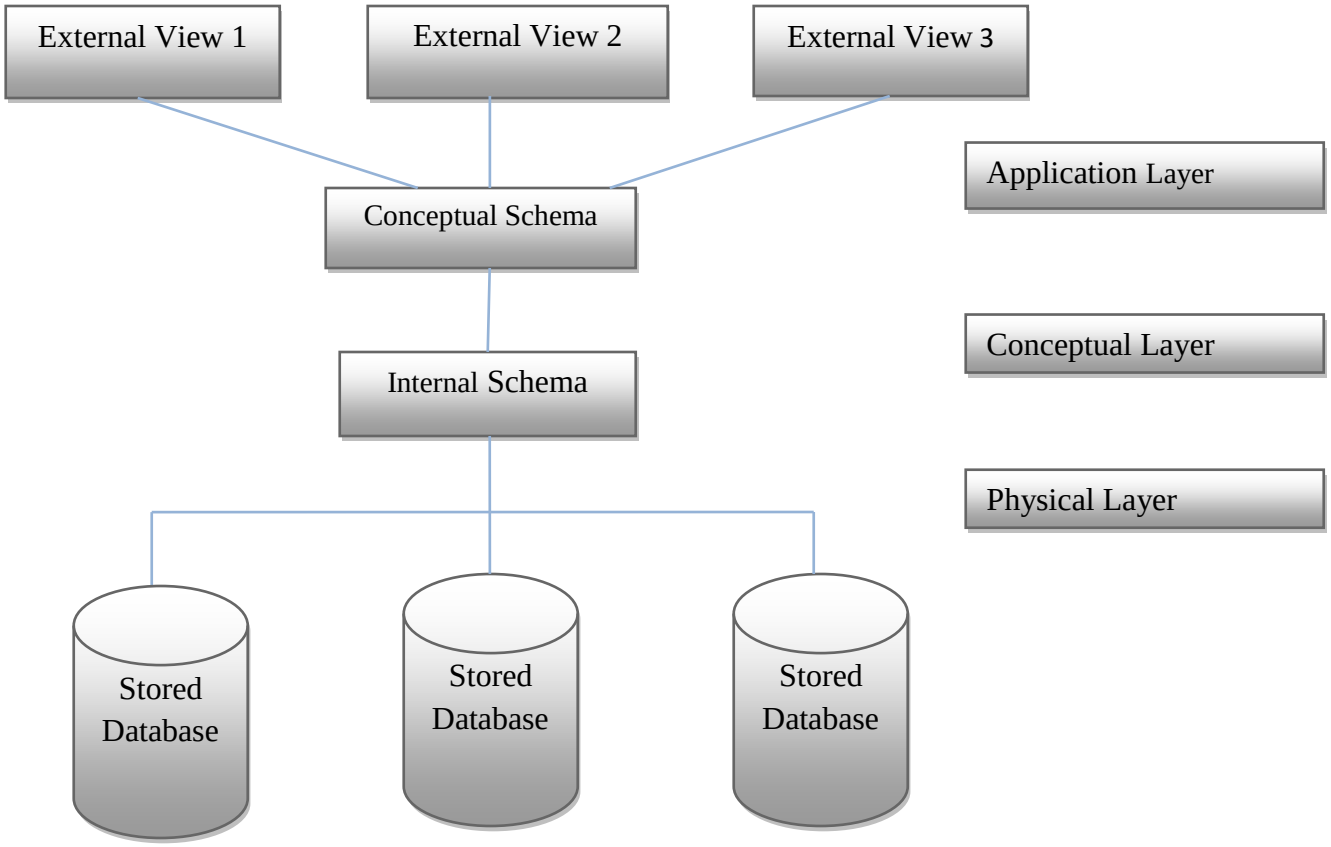


Fig 4.5 Database design program

A commonly used view of data approach is the three-level architecture suggested by ANSI/SPARC (American National Standards Institute/Standards Planning and Requirements Committee). The three levels of the architecture are three different views of the data:

1. External - individual user view

2. Conceptual - community user view

3. Internal - physical or storage view

The three level/schema database architecture allows a clear separation of the information meaning (conceptual view) from the external data representation and from the physical data structure layout. A database system that is able to separate the three different views of data is likely to be flexible and adaptable. This flexibility and adaptability is data independence.

The view of each of these levels is described by a scheme. A scheme is an outline or a plan that describes the records and relationships existing in the view. A database schema is a description of the Database and this is specified during the Database design and is not expected to change frequently.

External Level

This is the level at which users interact with the system via applications programs, a host language or data sub language.

The data definition language (DDL) and the data manipulation language (DML) are the most common interface tools used in this schema.

This level describes that part of the database that is relevant to a particular user. It is usual for a user to require only certain tables (or parts of them) containing specific records and logical relationships between these records.

Within these records the user may need access to only a few selected fields in order to perform the specified tasks. The external schema supplies the user with this limited window on the conceptual schema.

Conceptual Level

The conceptual view is a representation of the entire information content of the database. This level describes what data is stored in the database and the relationships among the data.

This level contains the logical structure of the entire database as seen by the database administrator (DBA). The conceptual schema hides the details of physical storage structures and concentrates on describing entities, data types, relationships, user operations, and constraints. This level mainly represents:

All entities, their attributes and their relationships.

Security and integrity information.

This level must not contain any storage-dependent details (e.g., storage structure and access technique).

The schema can be regarded as derived from a model of the organization and should be designed with care as it is usual for its structure to remain relatively unchanged in the life of the database.

Internal Level

The internal view is a low-level representation of the entire database. This level describes how the data is stored in the database and the access paths for the Database.

The internal view is described by means of the internal schema which defines the various stored record types, how stored fields are represented, what indexes exist, what physical sequence the stored records are in, and so on. It is concerned with storage details that are not part of a logical view of the database.

The internal view does not deal in terms of physical records (blocks or pages) or with any device-specific considerations such as cylinder or track sizes. In other words the internal view effectively assumes an infinite linear address space; details of how that address space is mapped to physical storage are system-specific.

Hence, it is generally understood that, below the internal level, there is a physical level which is managed by the operating system under the direction of the DBMS. The physical level below the DBMS consists of items only the operating system knows, such as exactly how the sequencing is implemented and whether the fields of internal records are stored as contiguous bytes on the disk.

The internal view is the view about the actual physical storage of data. It tells us what data is stored in the database and how.

The e-media operations control System includes the following tables:

- Agents

- Commission
- Distribution
- Edited stories
- Newspapers
- News section
- Orders
- Paper prices
- Raw stories
- Read stories
- Sales
- Stories to print
- Users

In designing the database, above named tables were created:

SHORTENED NAME	FORMAT	DESCRIPTION
User_id	AutoNumber	identification
Full Name	Text	Users' name
Password	VarChar	Users' password
Group	Text	User's group
E-mail address	Text	user's e-mail address
Blocked	Integer	Blocked users

Table 4.1 system user's Table

SHORTENED NAME	FORMAT	DESCRIPTION
agent_id	AutoNumber	identification
Distbnid	VarChar	Distribution identification
Name	VarChar	Agent's name
Address	Text	Agent's address
Password	VarChar	Agent's password
User_name	VarChar	Agent's username
E-mail address	Text	user's e-mail address
Blocked	Integer	Blocked users

Table 4.2 Agent's Table

SHORTENED NAME	FORMAT	DESCRIPTION
com_id	AutoNumber	identification
Paper_id	VarChar	Newspapers identification
Agent_id	VarChar	Agent's identification
Com_amount	Double	Commission amount
Date	Date	Date
Disbursed	Integer	Distributed papers

Table 4.3 commission Table

SHORTENED NAME	FORMAT	DESCRIPTION
Distbnid	Integer	Distribution identification
Distbnid	VarChar	Area identification

Table 4.4 distribution Table

SHORTENED NAME	FORMAT	DESCRIPTION
Id	Integer	identification
Read_story_id	Integer	Story to be read
User_id	Integer	user identification
date_edited	Date	Date the story was edited
File path	VarChar	Path where the stories are saved and retrieved

Table 4.5 edited stories Table

SHORTENED NAME	FORMAT	DESCRIPTION
Orderid	Integer	Order identification
agent_id	VarChar	agent identification
Paper_id	VarChar	paper identification
Papername	VarChar	Name of the paper
Collection_date	Date	Date to be collected
Collected	Integer	Quantity of papers collected
Quantity	Integer	Number of papers

Table 4.6 orders Table

SHORTENED NAME	FORMAT	DESCRIPTION
Saleid	Integer	Sales order identification
agent_id	Integer	agent identification
Paper_id	VarChar	paper identification
Sales_units	Double	Number of the papers to be sold
Date	Date	Date to be collected
Returns	Double	Number of returns

Table 4.7 sales Table

4.5.2 ENHANCED ENTITY RELATIONSHIP (E.E.R) DIAGRAM

K C Loundon and Jane P Loundon (2011) define the EER as a high-level or conceptual data model incorporating extensions to the original Entity-Relationship (ER) model, used in the design of data bases. It was developed to reflect more precisely the properties and constraints that are found in more complex databases

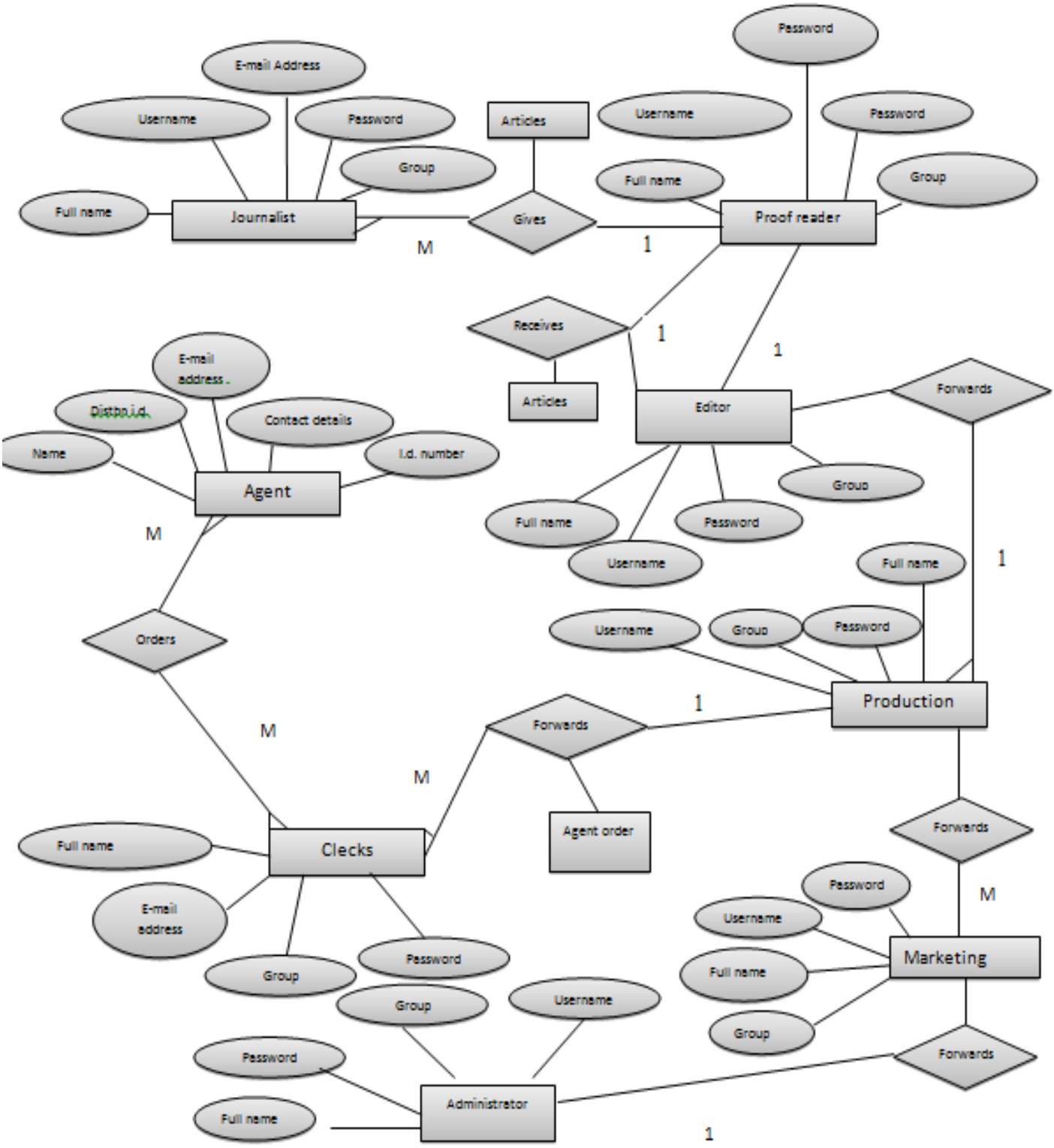


Fig 4.6 Entity Relationship Diagram

Key

Data flow

M / 1 many / one (1)

4.6 Program design

Abbott. R (2005) states that program design entails the semantic design of pseudo code for the implementation of this proposed application. In this section the Analyst will detail the conceptual design of the programs that will be used to implement the functions in this application. An Object Oriented approach will be adopted in this program. This methodology makes it easy to systematically represent real world entities in their most realistic nature. Having specified all other design requirements, the next task is to design (to link the database and application).However there was no need to design the programs that were required to run on client machines. The following were the tools used for the program design:

- Package diagram

- Class diagram

- Sequence diagram

4.6.1 Package Diagram

A Package Diagram is a modular structure of the system that depicts the breakdown of system modules and their interaction. The different classes within the system were grouped into packages to reduce the complexity and thus enabling us to have a better understanding of the proposed system. A package is a collection of logically related elements and is shown by the UML package diagram.

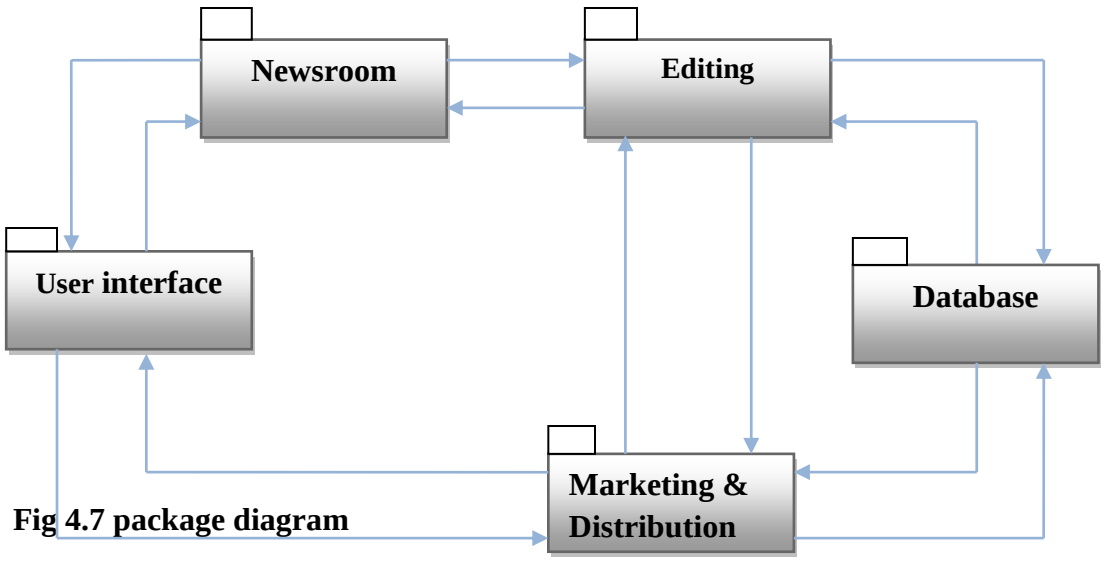


Fig 4.7 package diagram

4.6.2 Class Diagram

Class diagrams are used to describe the types of objects in a system and their relationships. Class diagrams model class structure and contents using design elements such as classes, packages and objects. Class diagrams describe three different perspectives when designing a system, conceptual, specification, and implementation.

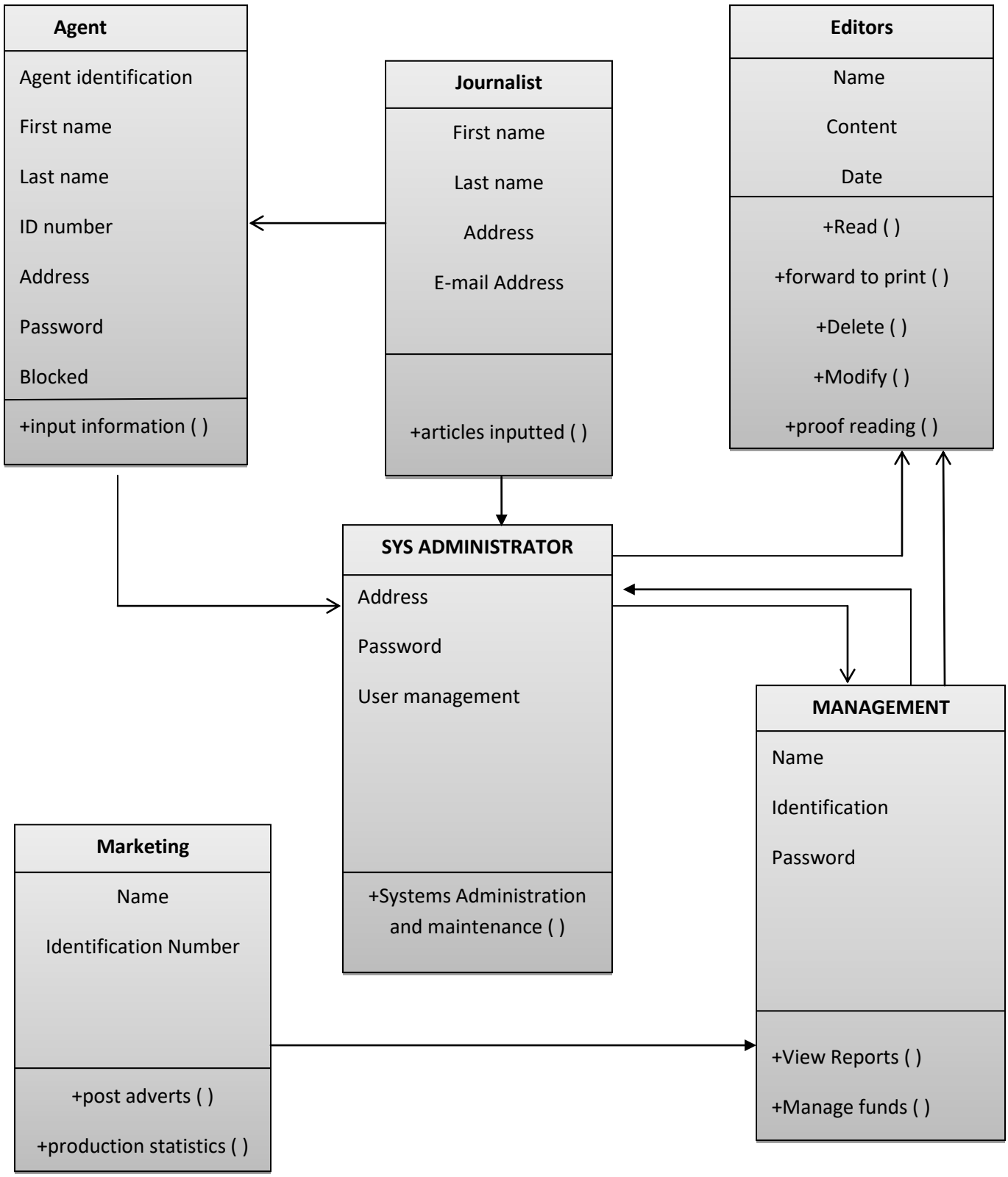


Fig 4.8 Class Diagram

4.6.3 Sequence Diagram

Somerville (2000) defines Sequence Diagrams as diagrams that show interactions between actors and the system and between system components. A sequence diagram shows object interactions arranged in time sequence. It shows the objects and classes involved in the scenario and the sequence of exchanges between the objects needed to carry out the functionality of the scenario. Sequence diagrams typically are associated with use case realizations in the logical view of the system under development. Sequence diagrams are sometimes called event diagrams, event scenarios, and timing diagrams.

A sequence diagram shows, as parallel vertical lines (lifelines), different processes or objects that live simultaneously, and, as horizontal arrows, the messages exchanged between them, in the order in which they occur. This allows the specification of simple runtime scenarios in a graphical manner.

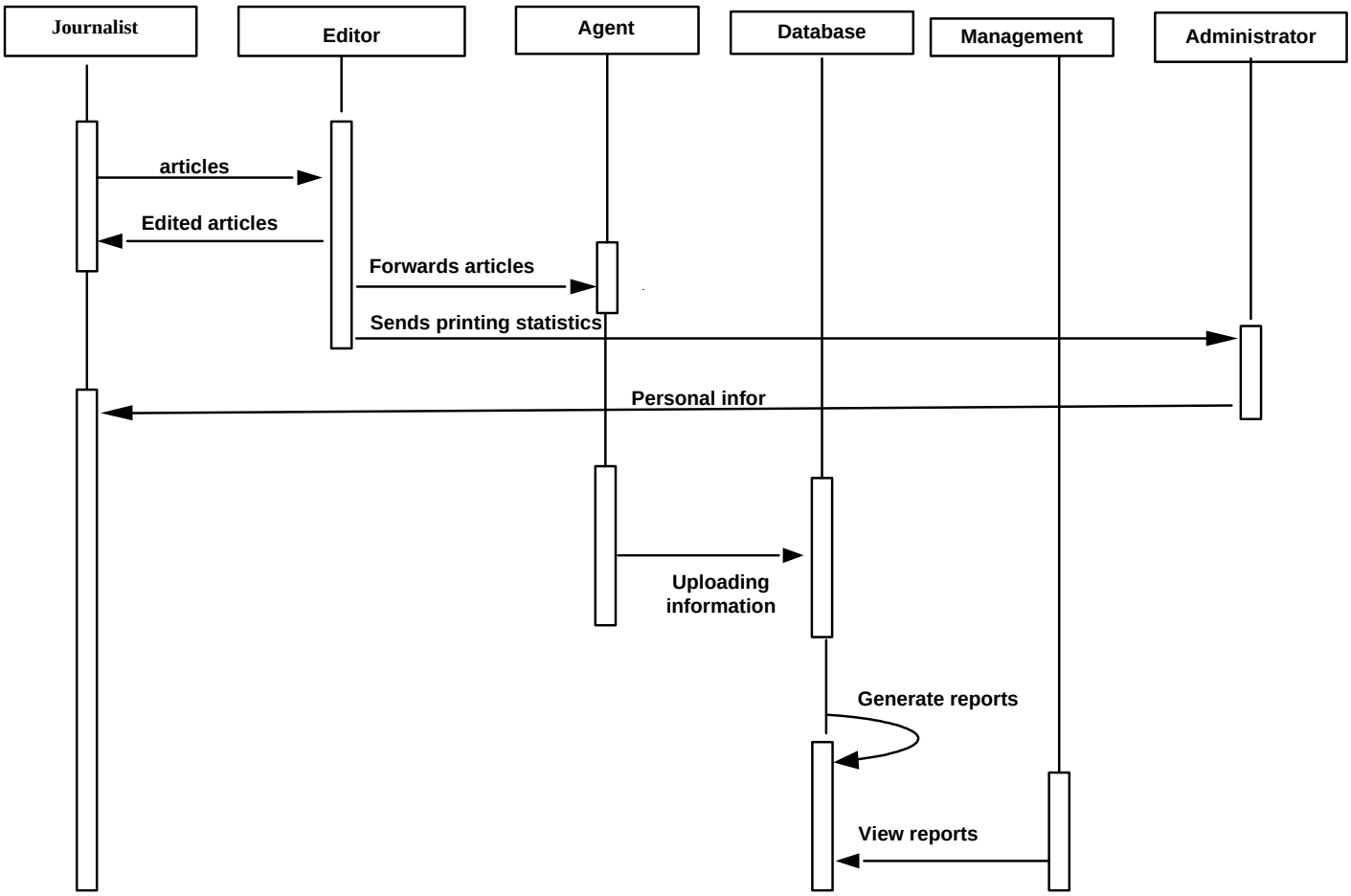


Fig 4.9 Sequence Diagram

Key

Entity

Activation

Sending message

Returning message

4.7 Interface design

This defines how the proposed system will interact with external entities. It outlines the design of the menus and forms for data entry into the system and gives an outline of the structure of the input and output of the system. The interface design will then define the way in which users will interact with the system and the nature of inputs that the system will accept. Screen design of the e-media operations control system has been designed in such a way that it provides a user friendly Graphical User Interface (GUI). The details on the interface aid the operators in entering stories, agent's details, sales and production statistics and then send to the database. To avoid unauthorized use of the system, it is required that the user first log into the system.

Also to add on the interface designs there are factors that have been highlighted by Weinschenk (2010) that are:

Can do

Will do

Still do

Can Do Factor

It is important that website designers always create sites that are easy to use. In coming up with the interface design, questions like, "can users find information they are looking for?", "can they find the button that they are looking for?" This constitutes the Can Do factor. The factor is based on a user centered design process.

Will Do Factor

This factor answers questions about user potential behavior. The researcher was centered on answering questions such as, "if the user finds the button they were looking for, will they press on it?" Users do not have independent behaviors when they are browsing through a site. Design persuasions can be used to influence user behavior. For example, to induce users to better attention to a certain column, colorful-motion pictures can be used. If everything else on that page is still, they motioning and colour of the images will definitely capture the user's attention. But this still is not enough for a site with an exceptional interface.

Still Do Factor

This factor applies some of the new principles and research on factors like Persuasion, Emotion and Trust. These research factors yield three principles that can make a website so engaging, these will push an interface designer from Can do, to Will do and through to Still do

Navigation mechanism

Upon clicking text of choice on the screen will make able the navigation within the system.

Choice of language

The main development tool that was used is PHP. This language was used because of its GUI capabilities and the developer familiarity with the language.

Choice of environment

The system will run on any machine with Windows XP or better which is accessible to all computers on the network. This will make access faster and control of the database central to the Administrator.

Input Design

Log in form

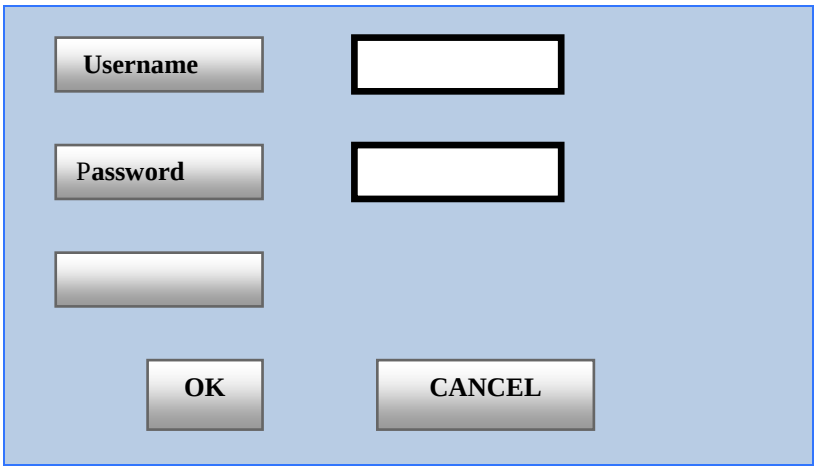
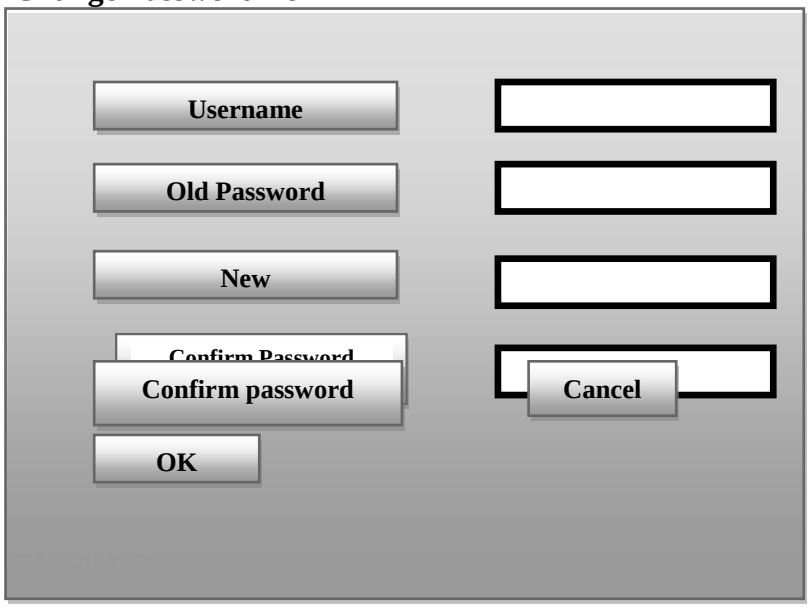


Fig 4.1.1

Data will be validated on entry into the system

The tab/enter keys on the keyboards will be used to move to the next field for data input and the enter key.

Change Password Form



Add user

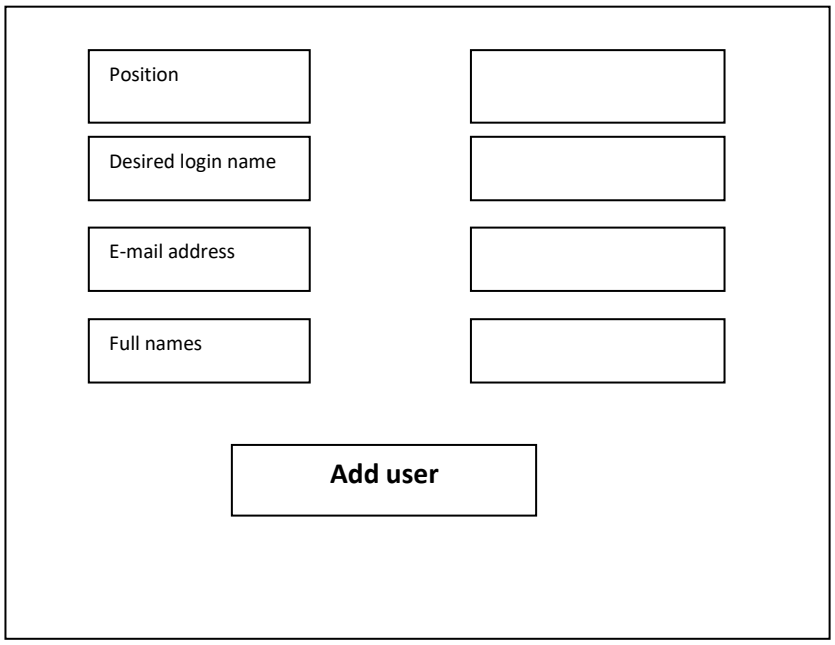


Fig 4.1.3

Register new agent

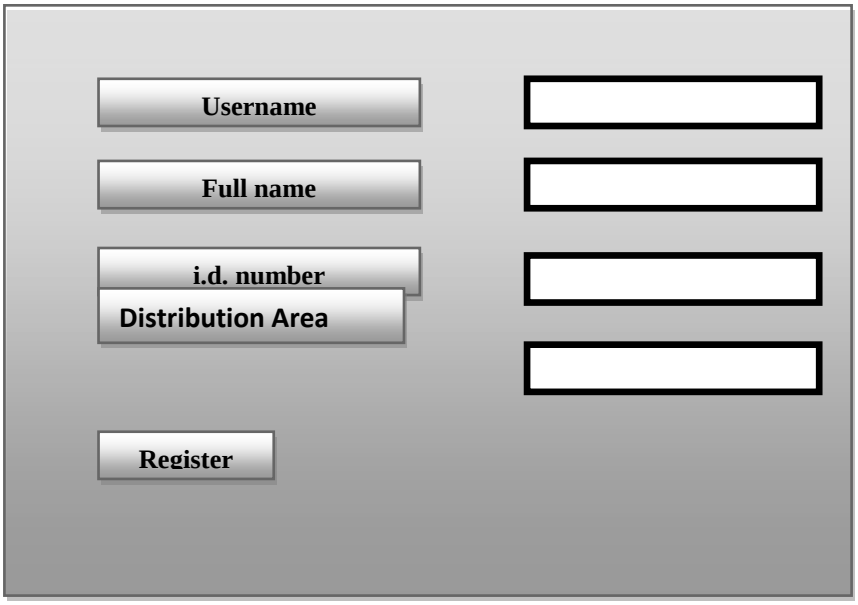


Fig 4.1.4

Report generator

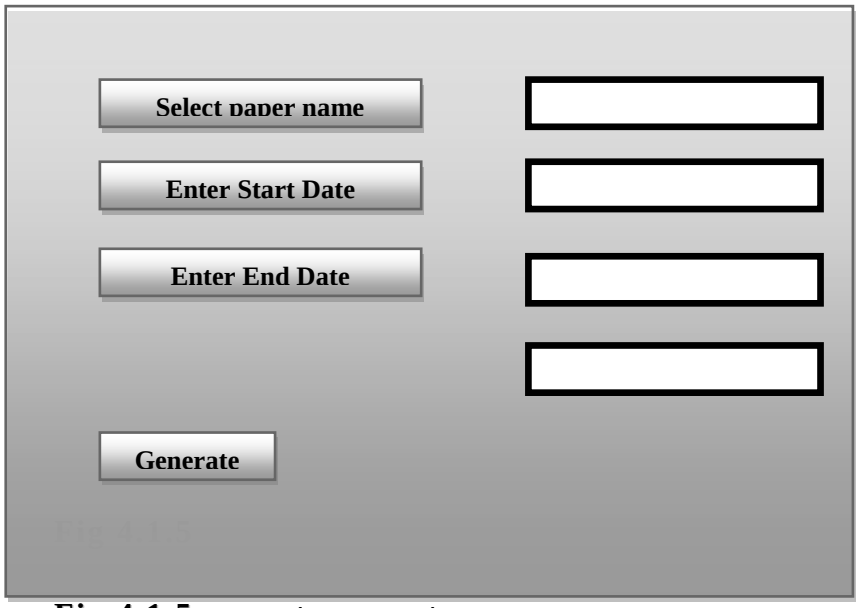


Fig 4.1.5 report generator

Output Design

There will be forms of output in the newly proposed system that will be in the form of reports. Below is the list of reports that are going to be designed by the system. The output of the system can either be viewed on the screen or if a hard copy is required output can be sent to the printer.

The design of the report is shown as below:

SUMMARIZED	SALES	REPORT FOR ALL	NEWSPAPERS
Paper	**Sales Volume**	**Total Returns**	**Net Sales**
The Patriot	100	23	77
Total	**100**	**23**	**77**

Fig 4.1.6 report structure

Paper	**Production Quantity**	
The Patriot	150	
Total	**150**	

Fig 4.1.7 report structure 2

4.8 Conclusion

All the designs have been made during this stage. A systems specification has been produced. It is expected that the new system should be coded and tested. The design phase enabled us to come up with the way the new system is supposed to appear. All the design was carried in the design phase. Inputs, processes and outputs of the new system were designed. There was also design of the data flow, entity relationships and the database as a whole. All this was done to prepare for the implementation of the proposed system.

Chapter 5: Implementation phase

5.1 Introduction

During the implementation phase involves the following: coding, testing, installation and maintenance. The phase also involves the graphical controls that the user is going to interact with for the proposed system to operate as desired. The systems implementation phase also includes a continuous assessment called Systems Maintenance. Sommerville (2000), states that the maintenance phase will determine whether the system operates properly and if costs and benefits are within expectations.

The user interface allows the interaction between the users of the system and the system itself. It provides a channel of communication between the two entities. The user interface will mainly consist of inputs and outputs. This also includes output media such as reports and other utilities like data grids. Interface design outlines the design for menus, forms and reports. Drop down menus and command buttons will be used to navigate the system. This was done in compliance with the general international standards set by software house like Microsoft. The system will have the login form where users enter passwords to enter the system.

5.2 Coding (pseudo coding)

A code is a set of letters or numbers that represent a data item, Cashman (2011). Codes can be used to simplify output, input, and data formats. Pseudo coding on the other hand, is an informal high-level description of the operating principle of a computer program or other algorithm, Sommerville (2000).

Menu Form show

Start:

If (request problem solution)

Then

Knowledgebase form show

End if

Else

If (post new problem)

Then

Fault form show

End if

Else

If (registration request)

Then

Registration form show

Select date and Time

End if

Change password

Enter agent number

If (correct)

Then

Check old password and new password

If (matching)

Then

Save new details

Else

Try again

If (number of tries =3 and logon is unsuccessful)

Then

Log out

End if

Report processing

Invoke a database query

If query is valid then

Refresh report data

View report on screen

Set report to be printable

Else

Generate informative message to user

End if

Pseudo Code for Logging In

Start

Select system

Enter username and password

If (username and password) valid Then

Log in

Else

Wrong username or password.

End if

End.

Pseudo Code for User Form

Start

If (check user) is administrator Then

If (add user) then

Enter user details and add

End if

Else if (delete user)

Enter username to be deleted

End if

User Form Show

Start

If (check user) is administrator Then

If (add user) then

Enter user details and add

End if

Else if (delete user)

Enter username to be deleted

End if

Logging Out

Start:

If (selection choice = preview)

Then

Go to Main form

If (selection choice = Logout)

Then

Go to Home page

End if

End

5.3 Testing

After coding the system, system testing had to be carried out. Testing establishes system defects, Sommerville (2000). Program testing, where the system is executed using simulated data, is the principal validation technique. The system was tested against the entire project objectives. The testing was aimed at ascertaining whether the system was able to meet the initial objectives of the project and thus answering the question of whether the problems currently faced by the organization have been addressed. The diagram to follow shows the process flow to be followed during testing.

Testing Process

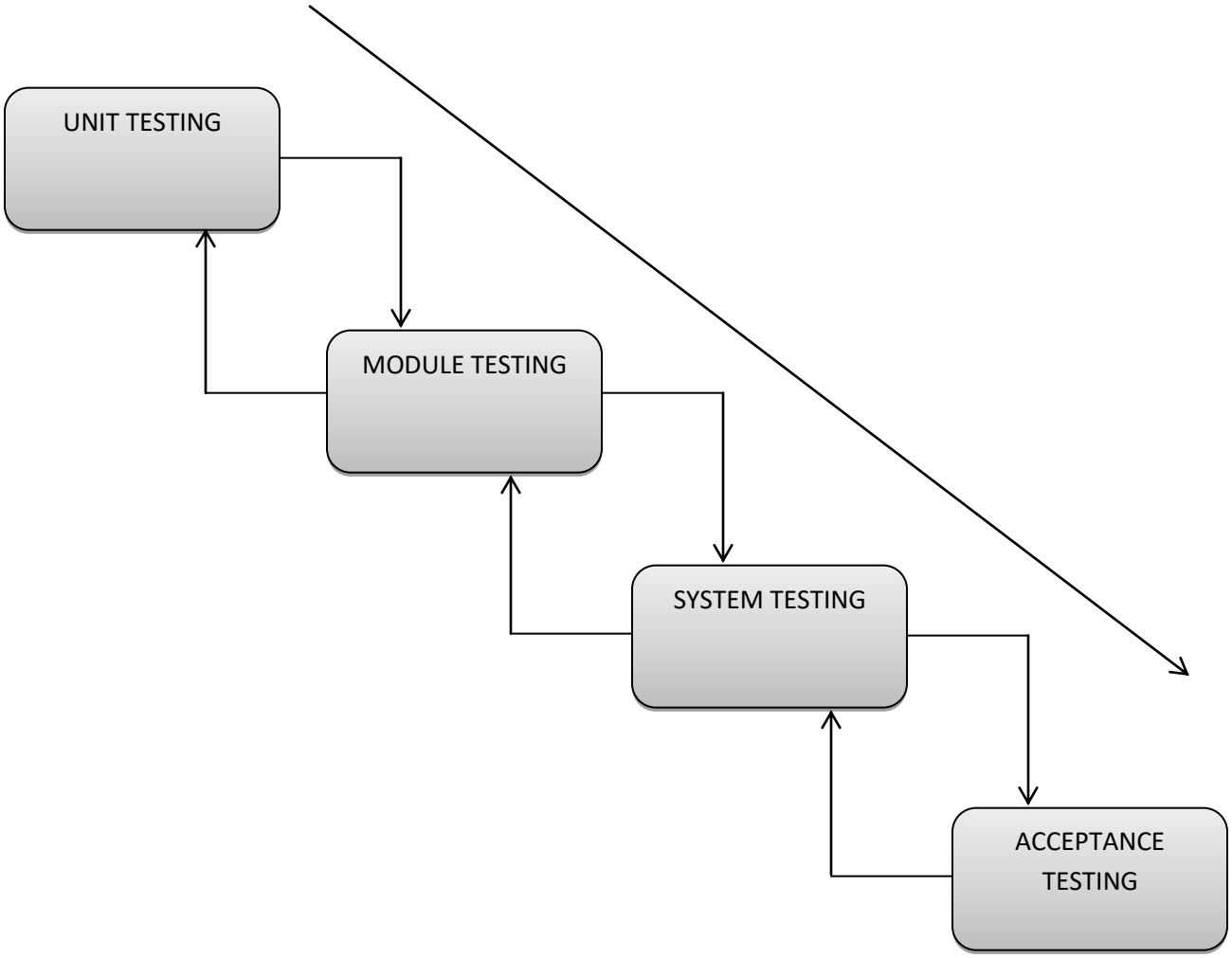


Fig 5.1 Testing Phases (Source: Sommerville (2000))

5.3.1 Unit Testing

The testing of an individual program or module is called Unit Testing. The objective is to identify and eliminate execution errors that could cause the program to terminate abnormally, and logic errors that could have been missed during desk checking. Desk checking is the process of reviewing the program code to spot logic errors, which produce incorrect results, Shelly (2000). The unit tests were done in two scenarios which are logical testing/white box testing and functional testing /black box testing.

White Box Testing – (also known as Clear Box Testing, Open Box Testing, Glass Box testing, Transparent Box Testing, Code-Based Testing or Structural Testing) is a software testing method in which the internal structure/design/implementation of the unit being tested is known to the tester, Cashman (2011). The researcher here chose inputs to exercise paths through the code and determined the appropriate outputs. Programming know-how and the implementation knowledge is essential. White Box testing is testing beyond the user interface and into the tiny, unnoticeable parts of a unit under testing.

Though carrying out Unit testing using the White Box yields the following advantages:

Early commencement of testing because there is no need to wait for the Graphical User Interface (G.U.I)

Through testing with the possibility of covering most paths: The technique has its own shortfalls that have brought about the need for yet unit testing technique, the Black Box testing. The disadvantages of the White Box Testing are listed below as explained by Cashman (2011)

Since tests can be very complex, highly skilled resources are required, with thorough knowledge of programming and implementation

Test script maintenance can be a burden if the implementation changes too frequently

Since this method of Unit Testing is closely tied with the application being tested, tools to cater to every kind of implementation/platform may not be readily available

White Box Testing is also applicable to Integration Testing and Systems Testing

Black Box Testing – this focuses on the overall functionality of the software .It uncovers faults like incorrect or missing functions, errors in any of the interfaces, errors in data structures of the database and errors related to the performance of the system. Black box testing is used to test the given program behavior against its specifications without making any reference to the internal structure of the program, Cashman (2011). It is concerned with the inputs and outputs of a unit only.

Advantages of Black Box Testing

Test is unbiased because the tester and the designer are independent of each other.

The test is done from the point of view of user not the designer.

The tester does not need knowledge of any specific programming language.

Disadvantages of Black Box Testing

Testing every possible input stream is unrealistic.

Test cases are difficult to design.

Black Box Testing is applicable to all known levels of Software Testing

5.3.2 Module Testing

This is the testing of a collection of dependent components in this case procedures and functions, Shelly (2000). A properly running system should have modules that are not viewed during system run. A module is a collection of dependent components that is a collection of procedures and functions. By module testing the researcher tested whether the set commands that carry out certain procedures are properly running.

5.3.3 System Testing

System components are integrated to create a complete system. This process is concerned with finding errors that result from unanticipated interactions between components and component interface problems, Cashman (2011). It is also concerned with showing that the system meets its functional and non-functional requirements, and testing the emergent system properties. For large systems, this may be a multi-stage process where components are integrated to form

subsystems that are individually tested before these sub-systems are themselves integrated to form the final system.

5.3.4 Acceptance Testing

This is the final stage in the testing process before the system is accepted for operational use. The system is tested with data supplied by the system customer rather than with simulated test data. Acceptance testing may reveal errors and omissions in the system requirements definition, because the real data exercise the system in different ways from the test data. Acceptance testing may also reveal requirements problems where the system's facilities do not really meet the user's needs or the system performance is unacceptable.

Advantages of Testing

Test is unbiased because the tester and the designer are independent of each other.

The test is done from the user point of view not the designer.

The tester does not need knowledge of any specific programming language.

Disadvantages of Testing

Testing every possible input stream is unrealistic.

Test cases are difficult to design.

5.3.5 Validation and Verification

Validation refers to the limit of acceptable values that users can enter, Sommerville (2010). There are rules in Validation which improve input quality by testing the data and rejecting any entry that fails to meet specified conditions. Reducing input errors is meant to eliminate unnecessary data entry.

The Eight Rules of Validation (drawn from Cashman (2011))

Sequence Check – used when data must be in some predetermined sequence. If the agents must enter identification number in numerical sequence, for example, then an out-of-sequence order indicates an error, or if the agent must enter details in some chronology form, then details with an out-of-sequence data indicates an error.

Existence Check – used for mandatory data items.

Range Check – tests data items to verify that they fall between a specified minimum and maximum value.

Reasonableness – identifies values that are questionable, but not necessarily wrong.

Validity Check – used for data items that must have certain values.

Combination Check – is performed on two or more fields to ensure that they are consistent or reasonable when considered together. Even though all fields invloved in a combination check might pass their individual validation checks, the combination of the field values might be inconsistent or unreasonable.

Batch Controls – are totals used to verify batch input? Batch controls might check data items such as record counts and numeric field totals. For example, before entering a batch of orders, a user might calculate the total number of orders and the sum of all the order quantities.

5.3.6 Defect testing

It was used to test the system for the defects so that they are exposed before the system is delivered to the end –users. A successful defect test will result in good system performance. The figure below shows an outline of the defect testing process

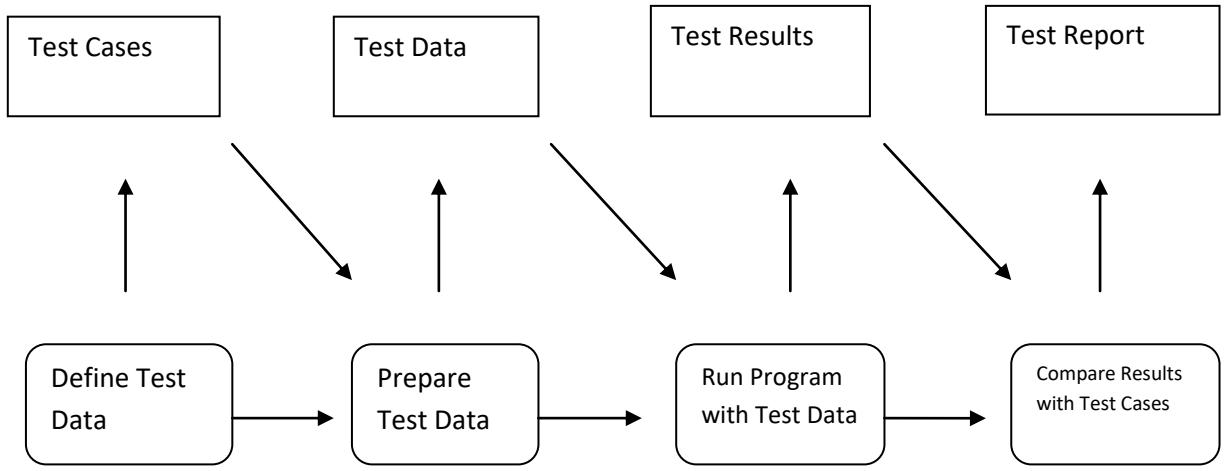


Fig 5.2 Processes involved in defect testing

Test Cases

These are the input and output specifications and the statement of the module under testing.

Test data

These are the data inputs that have been devised to test if the system will compile relevant reports and queries as per system specifications.

Test reports

This is a report, which is prepared at the end to highlight the important considerations in the test. Table below depict results obtain during testing.

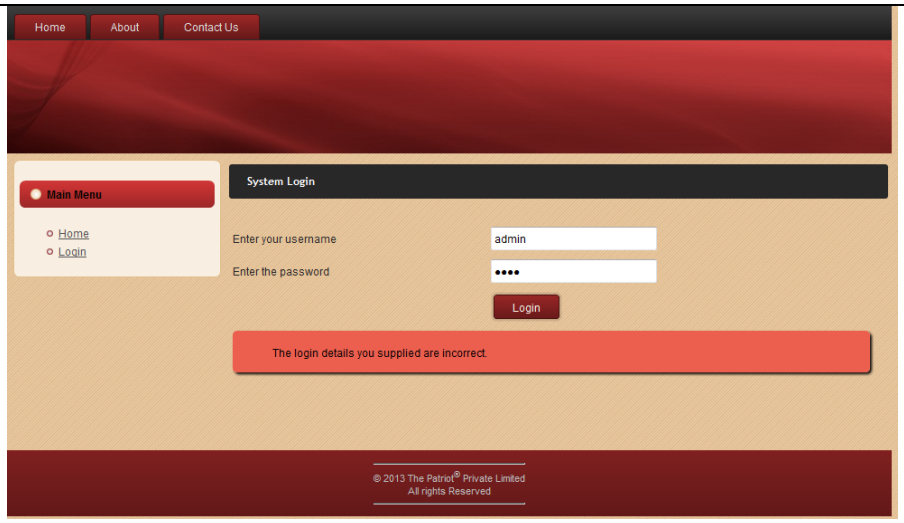
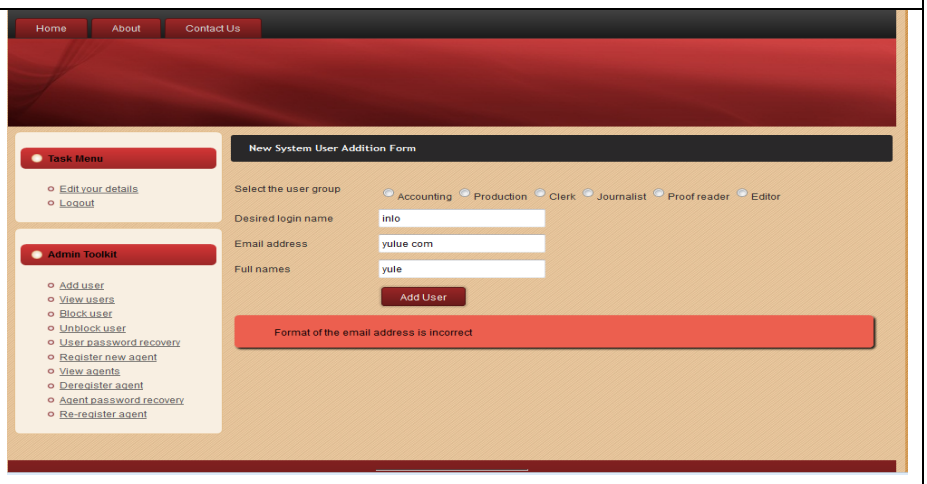
Test Case	Condition Tested	Results Obtained
Logging In	Using Incorrect details	
Inputting data	Incorrect details	

Fig 5.3 Test Report

The following numbers of system screen shots illustrate the system's validation abilities:

Login interface

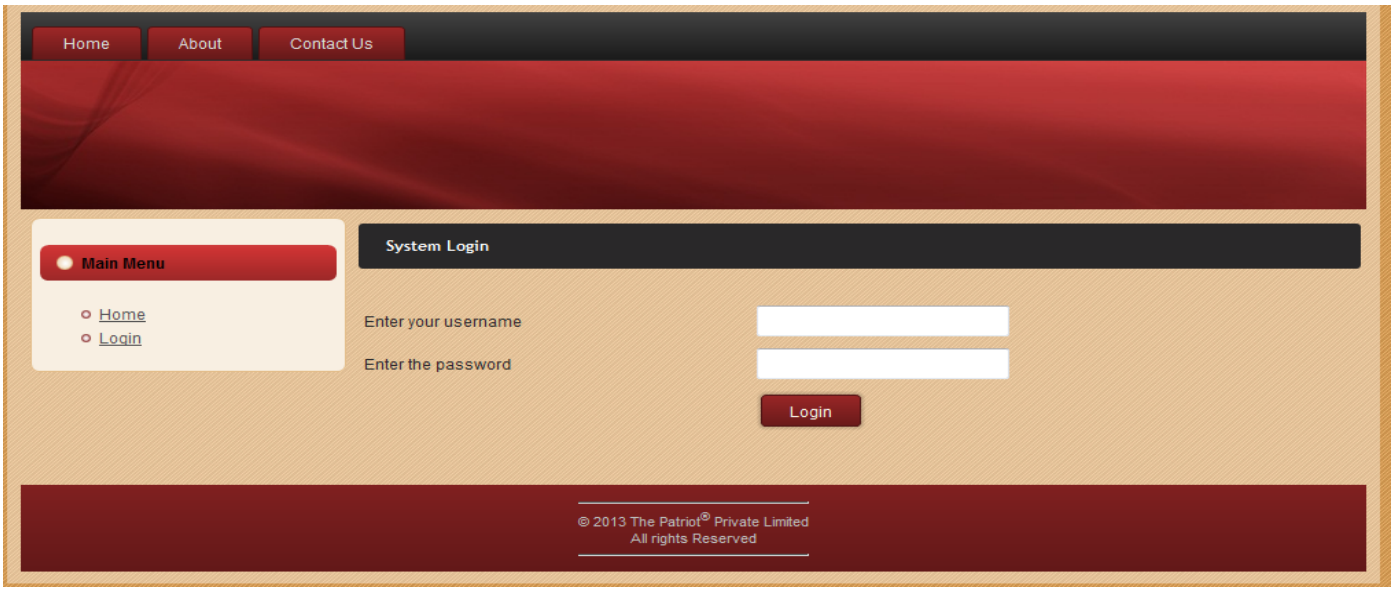


Fig 5.4 login interface

Incorrect Input

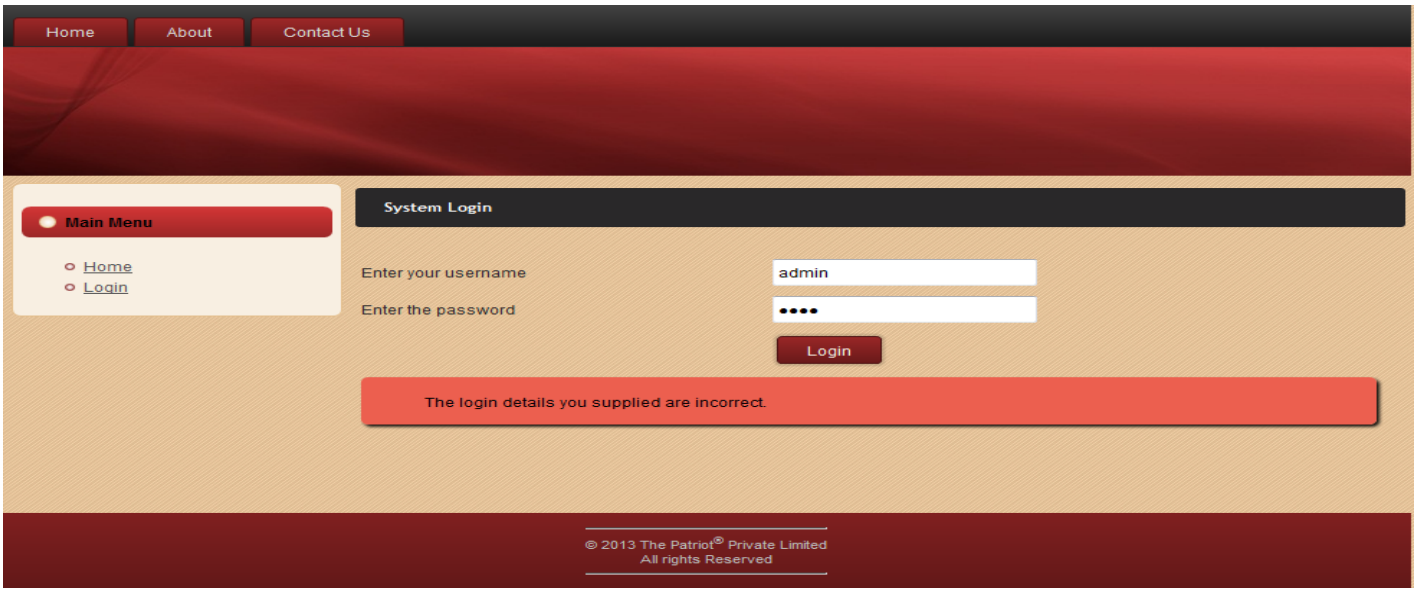


Figure 5.5 ScreenShot1

The incorrect input diagram message box popups up when a user has input either a wrong username or password, or both. This type of validation falls under the validity check which has been described in detail above.

Sequence Check Validation

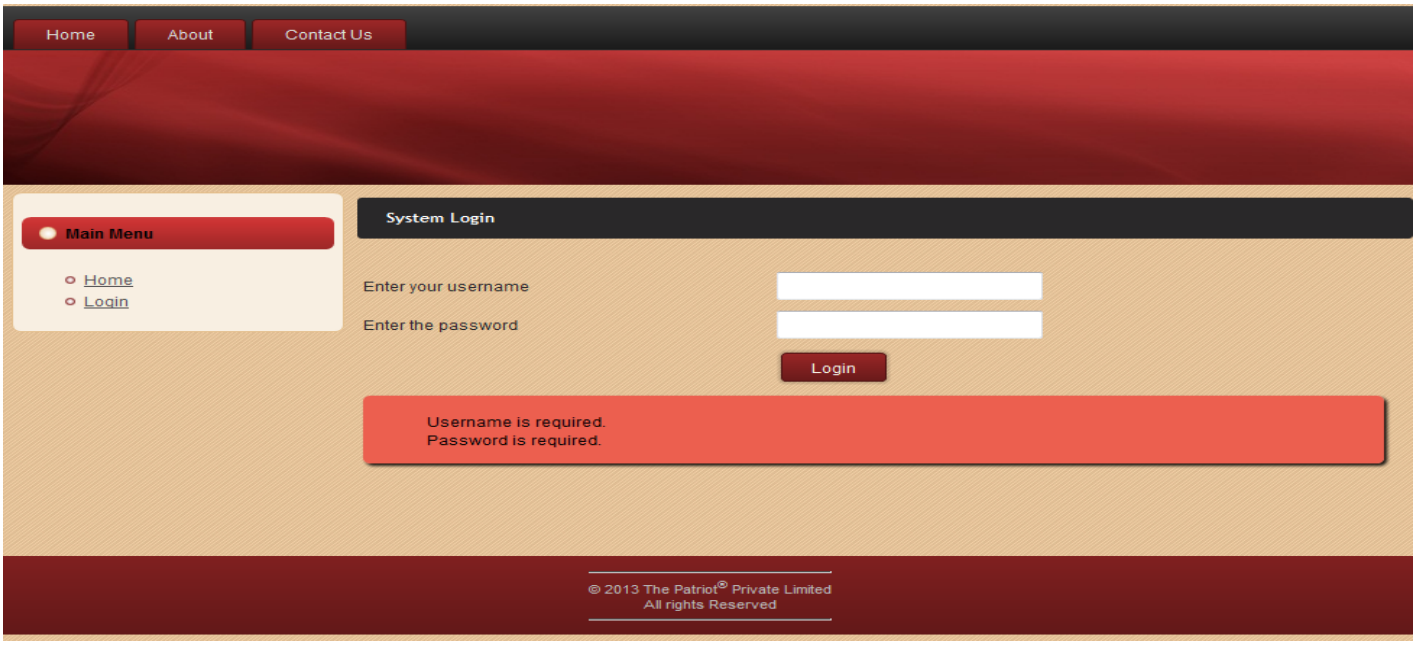


Figure 5.6 ScreenShot2

To illustrate the system's ability to add new users the screenshot below is highlighting how it will be done and what it will show as to allow input to the administrator.

Adding a new user

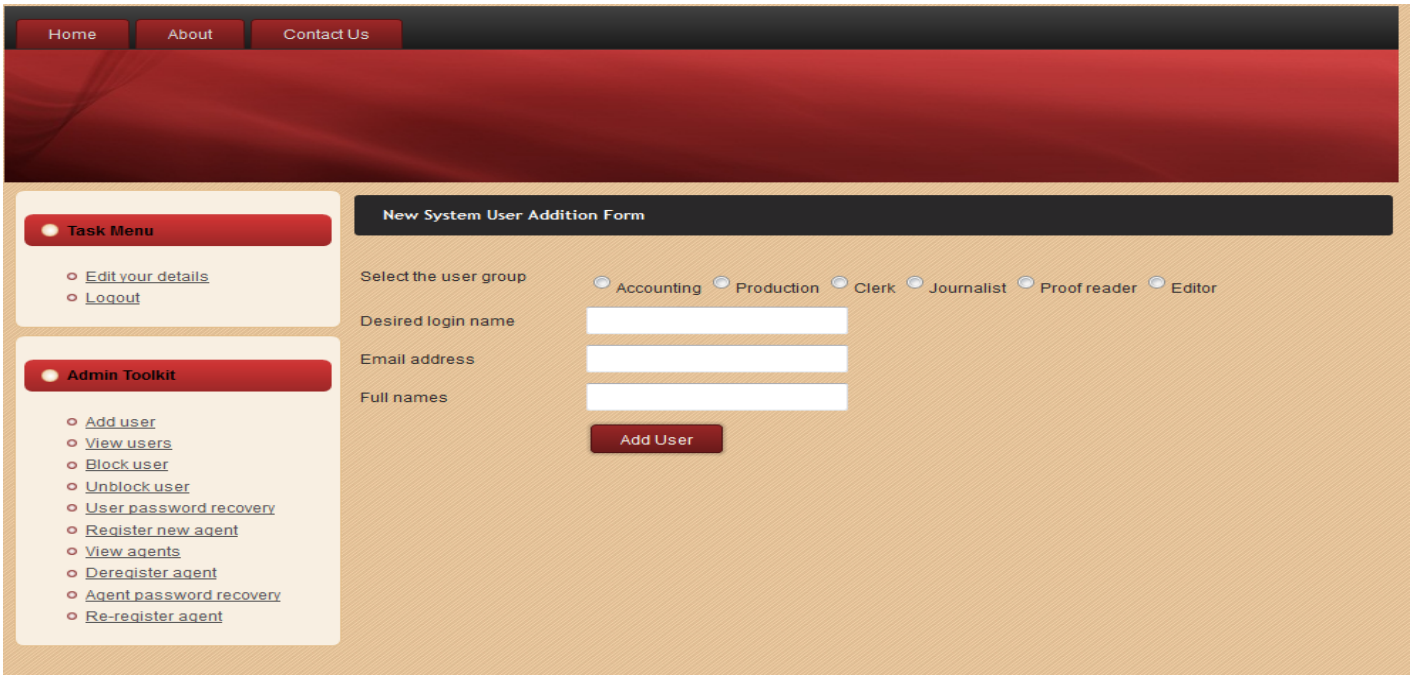


Figure 5.7 ScreenShot3

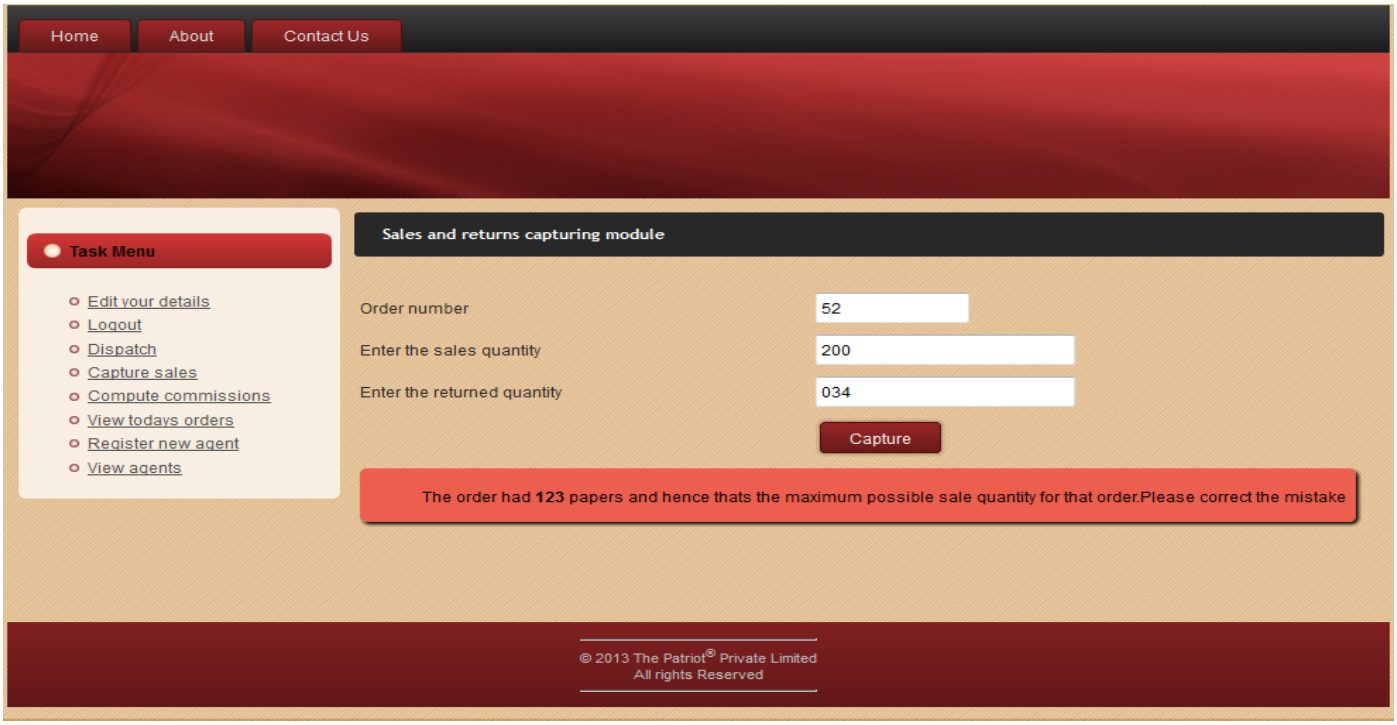


Fig 5.8 incorrect paper declaration

Though at times used inter-changeably, validation and verification are not the same. Both processes are concerned with checking that the software being developed meets its specifications and delivers the functionality expected by the people paying for the software. Validation, which was discussed earlier, answered the question, “Are we building the right product?” Verification, conversely, answers the question,” Are we building the product right?”

The aim of verification is to check that the software meets its stated functional and non-functional requirements. Formal verification, where there is production of mathematically rigorous arguments that a program conforms to its specification.

The ultimate goal of verification and validation processes is to establish confidence that the software system is “fit for purpose”. This means that the system must be good enough for its intended use.

5.4 Installation

Systems Installation involves the setting up of the developed system for use by the organization. The E-media operations control system will need to be hoisted since it is a web based system. The system's database is going to be loaded on the server machine in such a way that it will allow multi-user access by the entire users. The database connection will be through the Open Data Base Connectivity (O.D.B.C). The O.D.B.C is a technology that programs use to access a wide range of databases (or data sources), Sommerville (2000). For example, O.D.B.C can be used to import data from a MySQL database into a Microsoft Excel spreadsheet. To do this, all machines will need the correct O.D.B.C driver and data source. After all has been set up and the web site hoisted, the system administrator will have to run site maintenance and administration.

Application, Software Installation Steps

Install the operating system (windows server) on HP 370ML Proliant server.

Install MacAfee 8.8 Antivirus, update and set auto update.

Install XAMP server

Copy the system directory from the CD in to the web server root folder.

Verify that the system is installed properly, that is all folders are installed. It's accomplished by running http://localhost/patriot in browser if it succeeds the web server is successfully created and installed.

Upload the database with initial data for administrator to create accounts.

Installation Steps

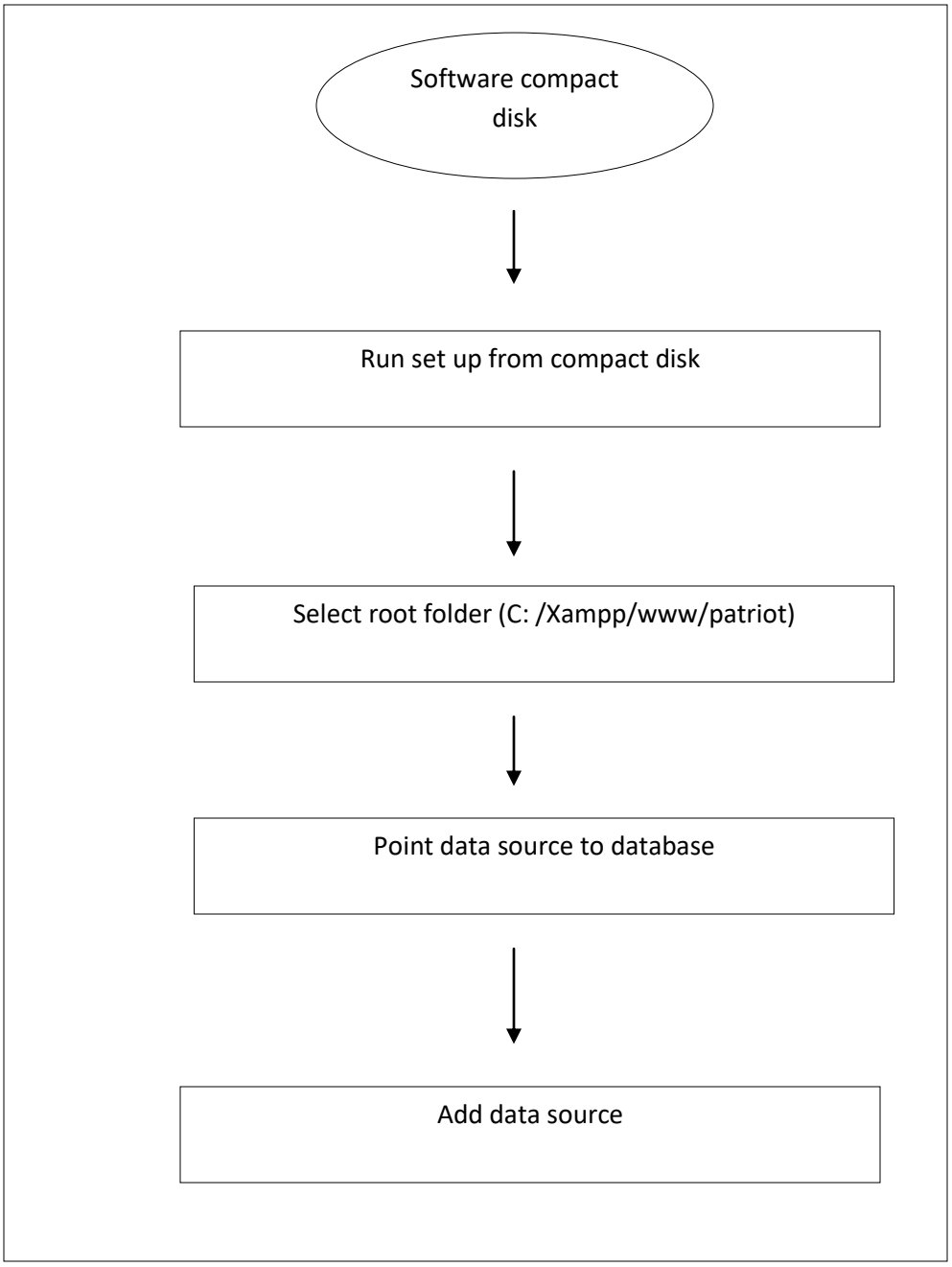


Fig 5.9 Installation Steps (Source: Cashman (2011))

These are the softwares' that must be installed in the computer:

a) Dreamweaver screenshot

Fig 5.1.1 Dreamweaver

b) Xampp should be installed as the server for it to run and all the services must be running as it is shown below

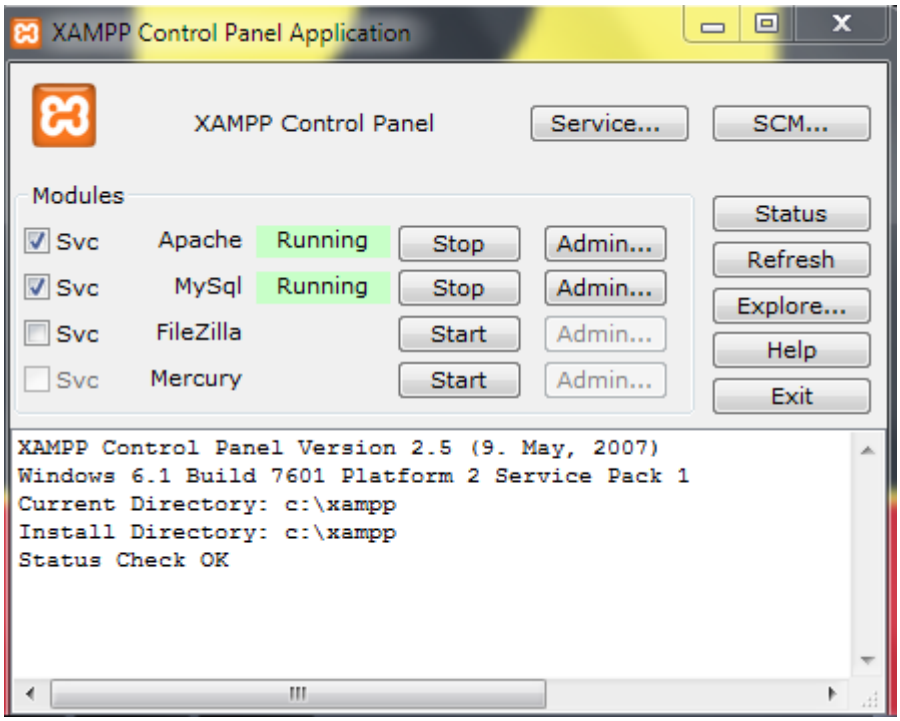


Fig 5.1.2 Xampp server

The above mentioned softwares must be installed in the machine for this system to run efficiently.

The process of shifting from one system or process to another, System Conversion, was yet another issue as to how the newly developed system will come to be used by The Patriot.

System Conversion

Conversion is the process of changing from the old system to the new system, Cashman (2011). It entails file transfer and initiation of new procedures. Four main conversion strategies can be employed: the parallel strategy, the direct strategy, the pilot strategy and the phased approach strategy.

Parallel Strategy – both the old system and its potential replacement are run together for a time until everyone is assured that the new one functions correctly, Cashman (2011). This is the safest conversion approach because, in the event of errors or processing disruptions, the old system can

still be used as a backup. However, this approach is very expensive, and additional staff or resources may be required to run the extra system.

Direct Change-Over Strategy – replaces the old system entirely with the new system on an appointed day, Cashman (2011). It is a very risky approach that can potentially be more costly than running two systems in parallel if serious problems with the new system are found. There is no other system to fall back on. Dislocations, disruptions, and the cost of corrections may be enormous.

Pilot Study Strategy – introduces the new system to only a limited area of the organization, such as a single department or operating unit, Cashman (2011). When this pilot version is complete and working smoothly, it is installed throughout the rest of the organization, either simultaneously or in stages.

Phased Approach Strategy – introduces the new system in stages or phases, either by functions or by units, Cashman (2011). This strategy is however not applicable in the case of e-media operation control system as the system's functionality can only be experienced if the system it treated as a holistic entity.

Chosen Conversion Strategy

After having gone through the available four conversion strategies, the parallel strategy was decided to be the most applicable strategy in the research situation. The strategy gives the old system as a fall back plan. Also, it does not compromise on organizational productivity. As personnel are getting acquainted with the new system, they can still carry on doing their work on either system with little fear of mistakes.

User Training

This is the process by which all the prospective users of the system are introduced to the system and are made to be fully acquainted with the system, Shelly (2000). Basically, the organization's own are the people to which formal training shall be conducted. For the rest, donors and beneficiaries, the system's interface has been made in such a way that enables navigation with little effort. The front desk personnel shall however be there to help any users with any problem. This will ensure a smooth transition from the old to the new system.

5.5 System vs. Objectives

The system was tested against the entire project objectives. This testing is aimed at ascertaining whether the system was able to meet the initial objectives of the project and thus answer the question of whether the problems currently faced by the company have been addressed. The objectives are:

- To design a system that enable efficient transfer of articles from one designated desk to the expected recipient from the journalist to the editors.
- managing the recordings of stock levels from the printed material to the distribution procedures ,meaning the distribution process would be managed electronically
- a system that grants the management the view of all the operations of the organisation,
- making the management process effective the link between the accounting department and the distribution department in terms of the monetary return expected values from the distributed printed material
- Developing a system that will create an opportunity for the establishment of an I.T department within an organisation.

The above objectives were met as is highlighted later in the chapter for example the transfer of articles from the journalist to the editor

5.6 Security

System security is one of the major objectives of developing the e-media operations control system. It ensures that the hardware, software, stored data and the information generated are secure. Recognition of the need for security is a natural outgrowth of the belief that information is a key organizational resource. The system should be protected against unauthorized access, deletion of data, modification of data, disruption, destruction and other disasters. Security has three interrelated aspects which are physical, logical and behavioral. All aspects must combine together to ensure maximum security.

Physical Security

Computer physical security is a methodology for safeguarding computer systems, peripherals and all I.T departments' assets. It is enforced using physical key locks and security guards.

- System backups

System backups shall be done regularly to avoid data loss due to hardware failure. The main back up service is run on the backup server to store the data. In addition, the use of Rewritable compact disks and external hard drive that are kept away from premises. The hard copies used for balancing the day to day transactions can also be used as backups

- Lock the machine

This is physically locking the machine, for example locking the desktop computer using a locking lugs or locking the laptop using a cable locks that are made of hardened steel.

- Other physical security concerns to be used include the following:

    1. The use of firewalls that prevent direct communication between the network and external computers by routing communicating through the proxy server located outside of the network will also be incorporated.

    2. Access to the computer room to be controlled by means of machine-readable badges.

    3. A human sign in/out system is also going to be used.

    4. Alarms that notify appropriate people of fire, flood or unauthorized human intrusion must be in working order all times.

- Logical security

This refers to logical controls within the software itself, such controls include the use of passwords that permits entrance into the system or a particular part of the database provided a correct password has been entered. It is usually implemented through antivirus, firewall and encryption software applications.

- Use of passwords

This is software-based security that is a mechanism to avoid data destruction by un authorized users. This ensures privacy by assigning a distinct password and username to each user with their different access levels. Passwords can be changed if there is suspicion that a password has been stolen. Access to very sensitive database areas such as the administration

section on which user accounts are manipulated is only for the Database Administrator who is privileged with access rights.

- Behavioral expectations

The behavioral expectations of the organisation are encoded in its policy manuals and even on the bulletin boards

In the e-media operations control system the below screenshots highlight the security features on the system:

Incorrect login:

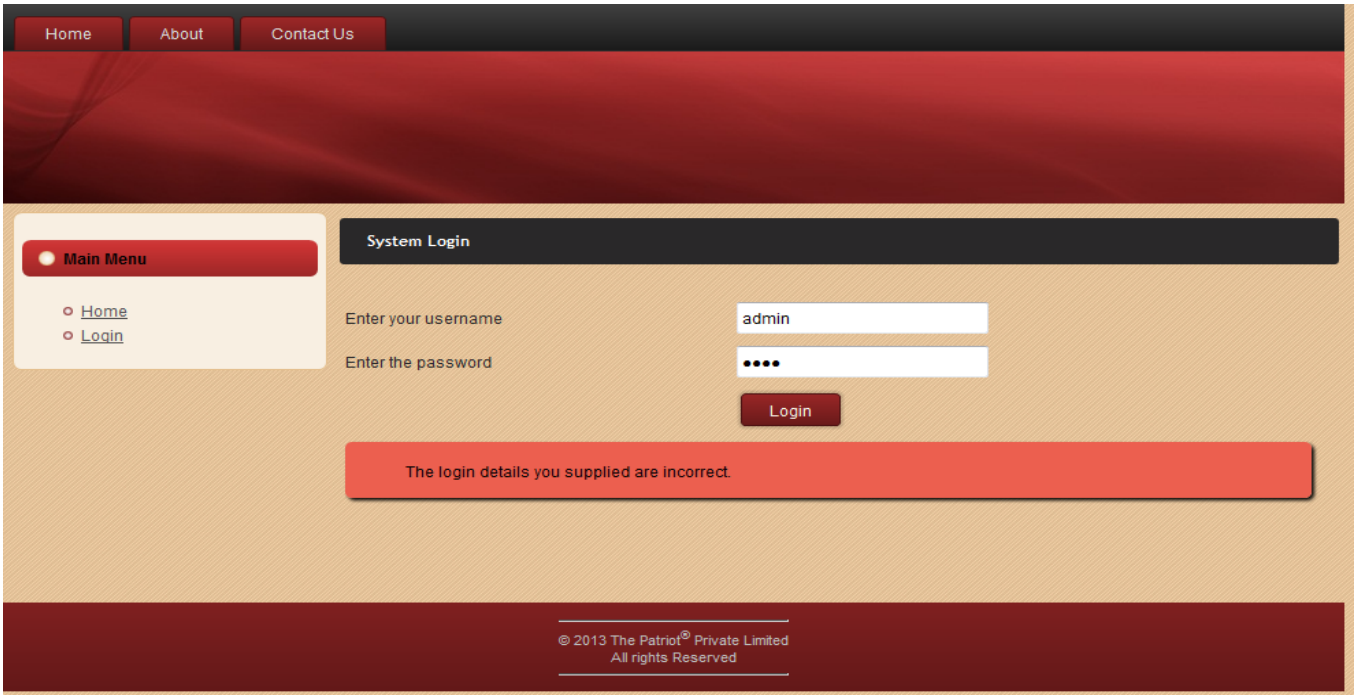


Fig 5.1.2 incorrect login form

Add user error:

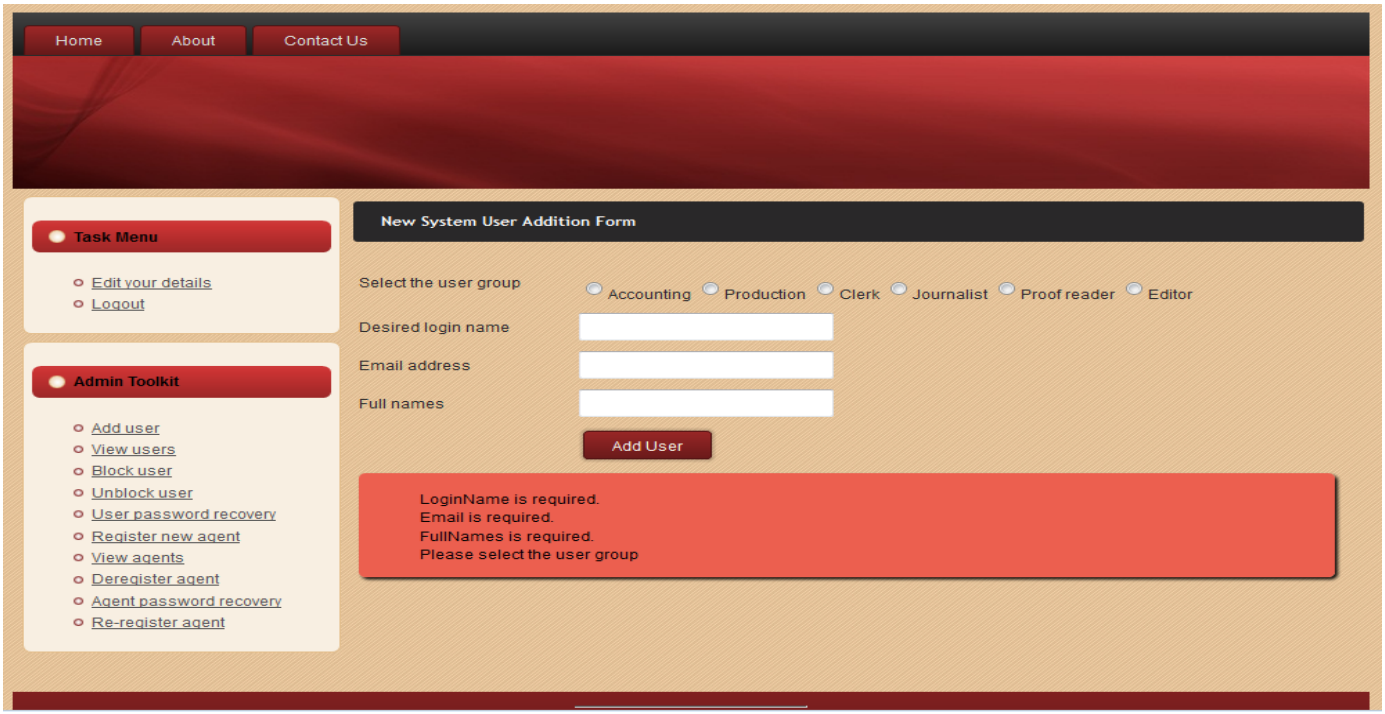


Fig 5.1.3 adding user error

System Back-Up

This is one of the most important things to be considered. It is of paramount importance that every system provides for system-data back-up and recovery. Back-up refers to the process of copying data at prescribed intervals, or continuously, Shelly (2000). Recovery on the other hand involves restoring the data and restarting the system after an interruption, Cashman (2011). The IT department of The Patriot is to come up with a System Back-Up and Recovery Plan, one that will cite the interval at which back up is to be performed and who is to be responsible for the back-up. Back up media was already identified in Chapter Two (Planning Phase) as drive tapes. There however is many types of backing up as shown in the diagram to follow. This will help in deciding which type to carry out and when to carry it out.

Types of Back-Up

BACKUP TYPE	CHARACTERISTICS	PROS AND CONS	TYPICAL FREQUENCY
Full	Backs up all files.	Slowest backup time and requires the most storage space. Rapid recovery because all files are restored in a single step.	Monthly or weekly.
Differential	Only backs up files that are new or changed since the last full backup.	Faster than a full backup and requires less storage space. All data can be restored in just two steps by using the last full backup and the last differential backup.	Weekly or daily.
Incremental	Only backs up files that are new or changed since the last backup of any kind.	Fastest backup and requires the least storage space because it only saves files that have never been backed up. However, requires many restore steps – one for each incremental backup.	Daily or more often.
Continuous	Real-time, streaming method that records all system activity.	Very expensive hardware, software, and network capacity. Recovery is very fast because system can be restored to just before an interruption.	Usually only used by large firms and network-based systems.

Fig 5.1.1 Types of Back-Up (Source: Shelly (2011))

5.7 Maintenance

Maintenance, the process of monitoring, evaluating and improving the developed system so that it continues to meet the specified user requirements, Shelly (2000), is the last phase in the system's development. This phase covenants with reviewing of the new system to ascertain any changes that needs to be done. Use of a system in the actual world stretches it to its limits (system stress). At times this unearths undiscovered bugs. Changes in the environment need also to be adopted. These cases thus need to be planned for. Therefore, a Maintenance Plan will be drawn, one that will include the following:

Annual System Review

Maintenance Activities

System Back-Up

Annual Review

This is a process that is done on a regular basis to ensure that the newly implemented system meets the objectives for which it was developed to address, Sommerville (2000). Periodic review or audit or monitoring of the system will be held with users or representatives of the development so as to ensure that the system is operating properly and meets the organization's objectives.

Maintenance Activities

The fundamental objectives of system maintenance are:

To make predictable changes to the existing programs to correct errors that were made during system design or implementation

To avoid, as much as possible, degradation of system performance. This is usually a result of poor system maintenance which gradually erodes system throughput and response time.

To complete the task as quickly as possible without sacrificing quality and reliability.

Maintenance activities were planned to have the following activities which were intended to reduce chances of system failure and/or extends the capacity of the current system's useful life:

Corrective Maintenance

Adaptive Maintenance

Perfective Maintenance

Preventative Maintenance

Corrective Maintenance

Corrective maintenance diagnoses and corrects errors in an operational system, Cashman (2011). To avoid introducing new problems, all maintenance work requires careful analysis before making changes. The best maintenance approach is a scaled-down version of the System Development Life Cycle (S.D.L.C) itself, where investigation, analysis, design, and testing are performed before implementing. Basically, Corrective Maintenance includes the following:

Diagnose and fix errors

Replace defective network cabling

Restore proper configuration settings

Debug program code

Update software and hardware drivers

Adaptive Maintenance

Adaptive maintenance adds enhancements to an operational system and makes the system easier to use, Cashman (2011). An enhancement is a new feature or capability. The need for adaptive maintenance usually arises from business environment changes such as new products or services, new manufacturing technology, or support for a new Web-based operation. The procedure for minor adaptive maintenance is similar to routine corrective maintenance. A user submits a systems request that is evaluated and prioritized by the systems review committee. A maintenance team then analyzes, designs, tests, and implements the enhancement. Although the procedures for the two types of maintenance are alike, adaptive maintenance requires more IT department resources than minor corrective maintenance. A major adaptive maintenance project

is like a small-scale SDLC project because the development procedure is similar. Adaptive maintenance can be more difficult than new systems development because the enhancements must work within the constraints of an existing system. Adaptive maintenance basically includes the following:

Creation of new reports

Adding of new entry fields to input screen

Establishment of new links to website

Creation of employee portal

Perfective Maintenance

Perfective maintenance involves changing an operational system to make it more efficient, reliable, or maintainable, Shelly (2000). Requests for corrective and adaptive maintenance normally come from users, while the IT department usually initiates perfective maintenance. During system operation, changes in user activity or data patterns can cause a decline in efficiency, and perfective maintenance might be needed to restore performance. When users are concerned about performance, it should be determined whether a perfective maintenance project could improve response time and system efficiency. Perfective maintenance also can improve system reliability. For example, input problems might cause a program to terminate abnormally. By modifying the data entry process, you can highlight errors and notify the users that they must enter proper data. When a system is easier to maintain, support is less costly and less risky. In summary, Perfective Maintenance includes:

Installation of additional memory

Writing of code macros to handle repetitive tasks

Compression of system files

Installation of a more powerful network server

Preventative Maintenance

To avoid problems, preventive maintenance requires analysis of areas where trouble is likely to occur. Like perfective maintenance, the IT department normally initiates preventive maintenance. Preventive maintenance often results in increased user satisfaction, decreased downtime, and reduced total costs. Preventive maintenance competes for IT resources along with other projects, and sometimes does not receive the high priority that it deserves. Regardless of the type of maintenance, computer systems must be supported by trained professionals. Preventative maintenance entails:

Installation of better antivirus software

Development a standard backup schedule

Implementation of regular defragmentation

Tightening of all cable connections

Recommendation

From the above discussion of installation, it is clear that file conversion and direct changeover are not suitable for the e-media operations control system because of drawbacks like high risk and high costs, but the combination of both approaches namely conversion parallel and phased conversion more fruitful. Parallel conversion is the most recommended installation method for the e-media operations control system.

5.8 Conclusion

This chapter has focused on, extensively, Systems Implementation, which also included coding, testing and the various testing techniques, system installation and system maintenance. The chapter concluded the research documentation. Research can however be carried on as the maintenance phase is an on-going procedure which also requires adequate documentation. The System Implementation was successful, hence so was the research at large.

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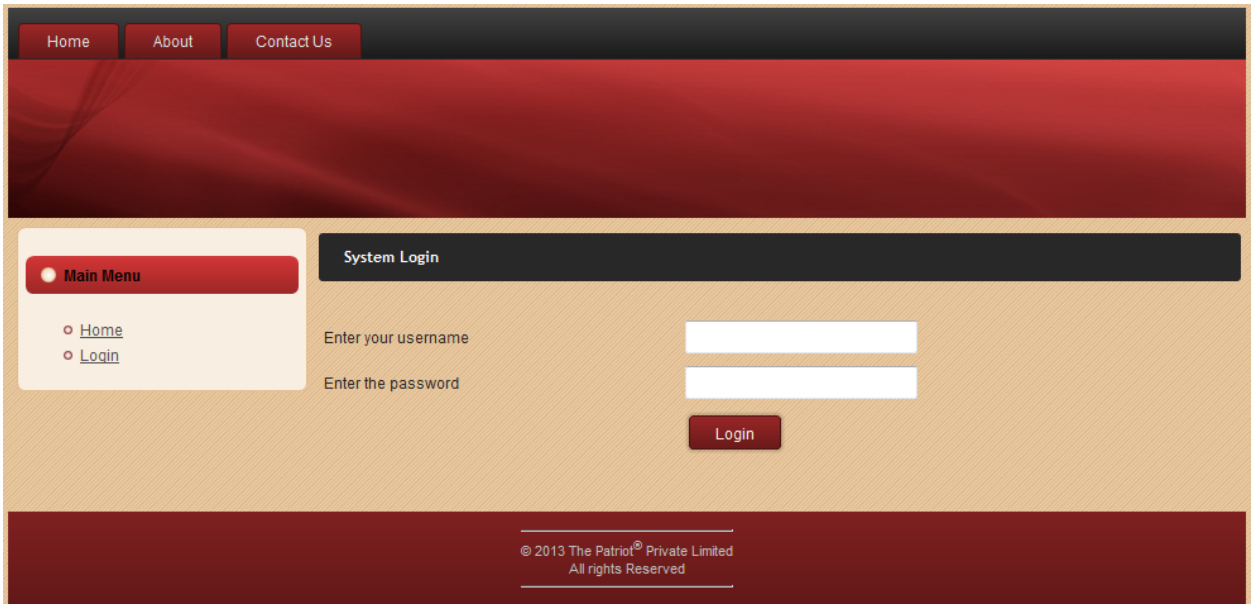
APPENDIX A: User manual
Getting started

The user manual will aid users in using the E-media operations control System. It will show the basic navigations through the system. With the help of labeled screen shots, it is the best way to get started with the system.

Home Page

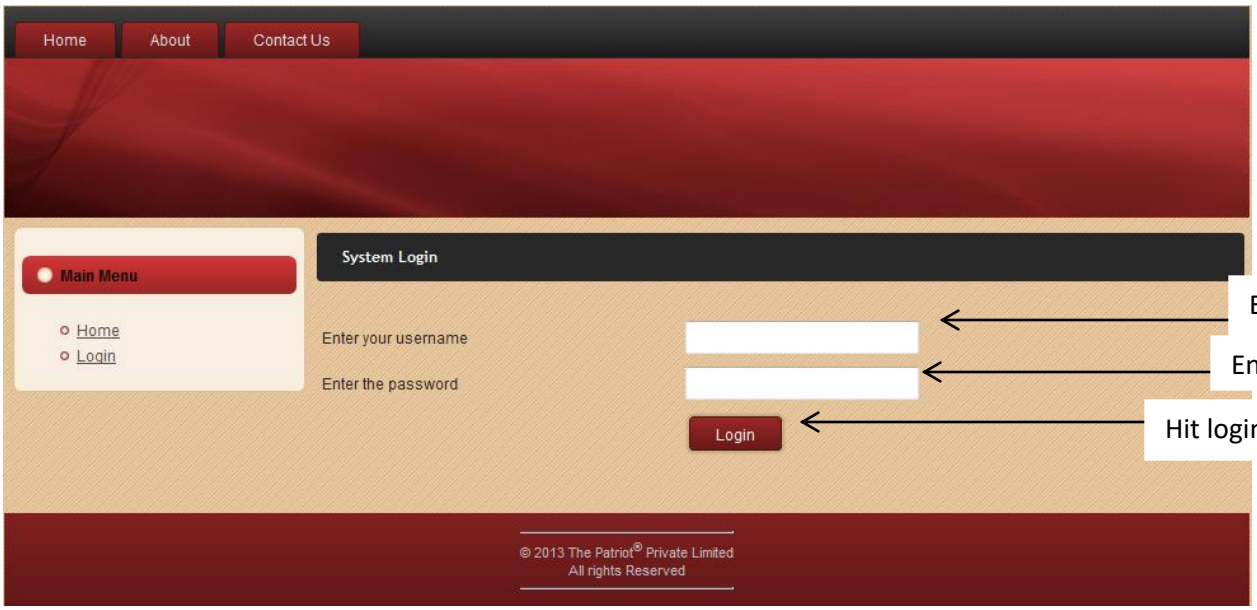


For the user to access the homepage he or she must type “localhost/patriot/” address in the address bar. Menus on the home page are user friendly.

Logging In

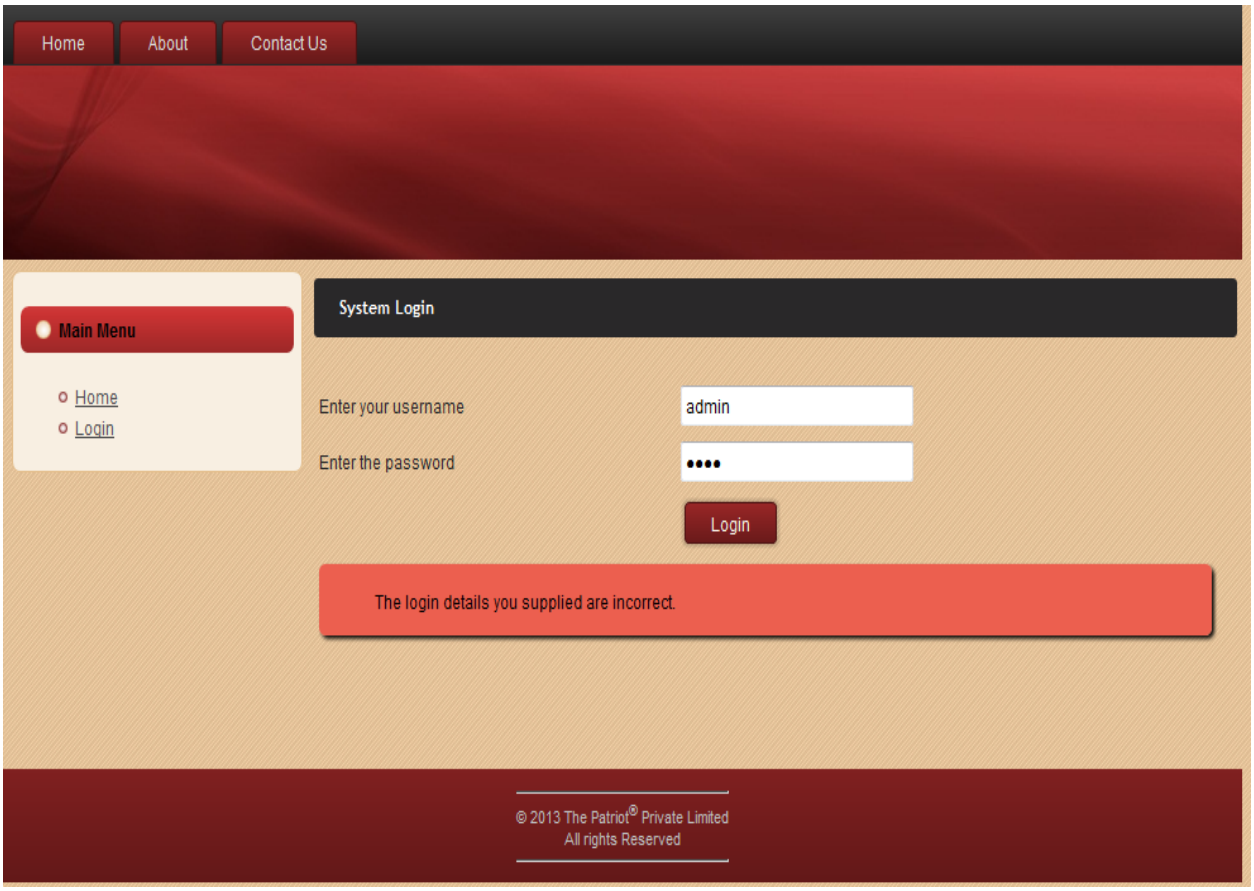
In this system every user logs in at the same page, the difference in levels is hence made different by the user credentials. The screen shot below illustrates the logging in.

System Log In



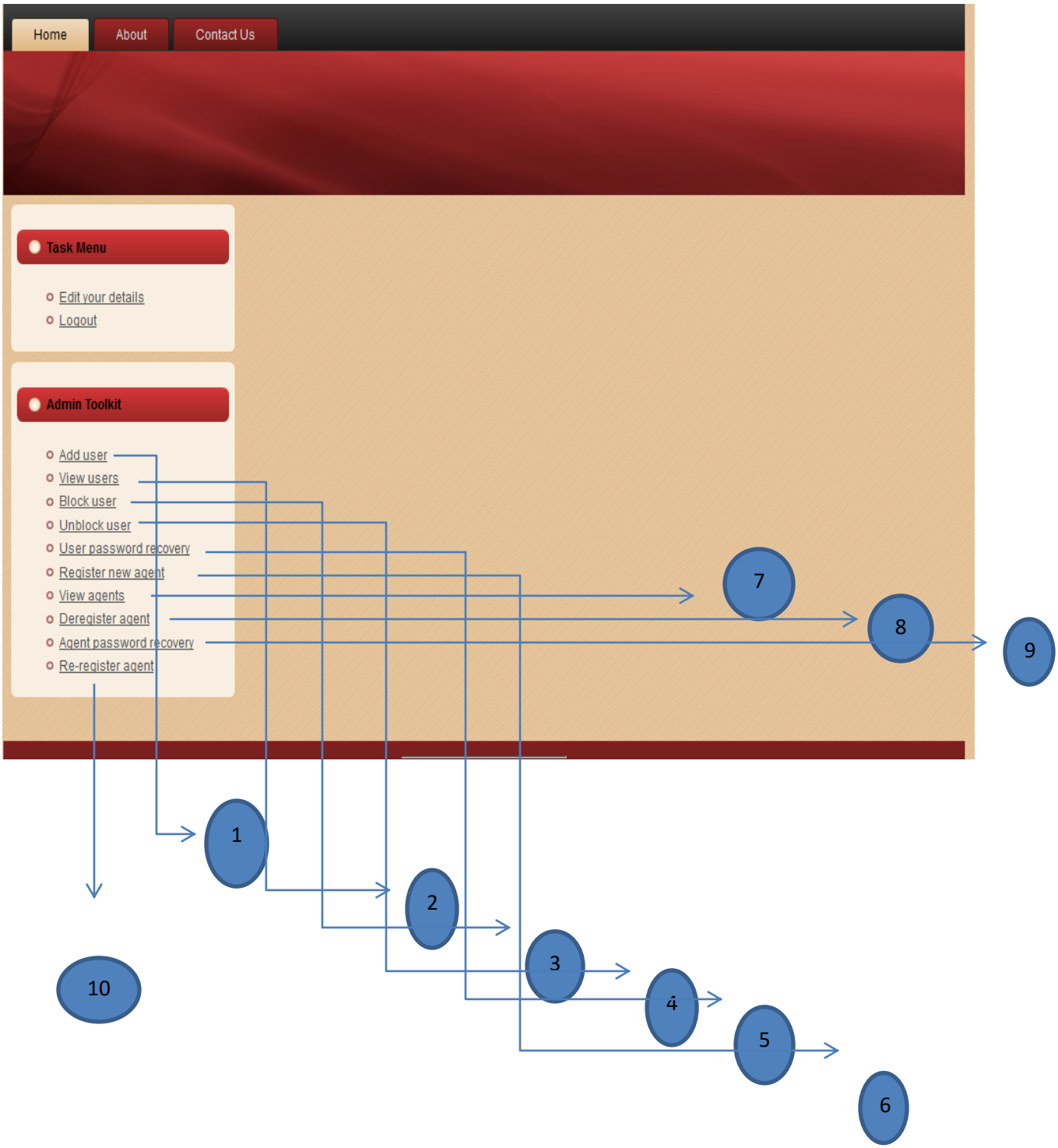
The user must in the first text box (labelled enter your Username),type in his or her name then the password in the text field labelled enter your Password . After completing both fields correctly, he or she can now hit the login button or simply the enter key on the keyboard

Incorrect Login



When the user enters in some invalid login details the system prompts in some information as above.

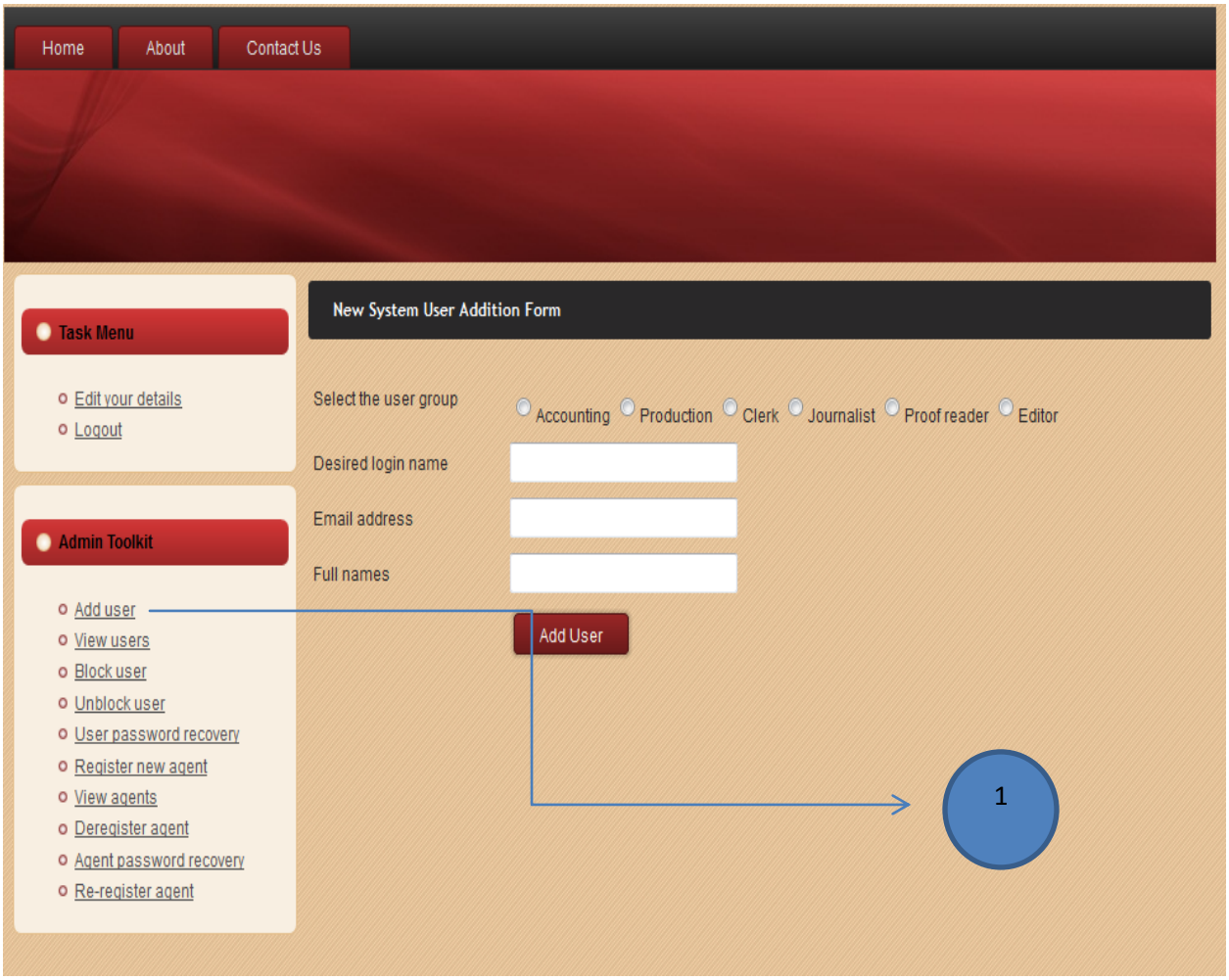
Administrator login



When the administrator logs in an interface of this nature shows up, thus giving him the privileges of an administrator to the system. Numbers 1, 2,3,4,5 deal with the welfare of the users of the system that is the addition, blocking and deregistration as will be highlighted on each option.

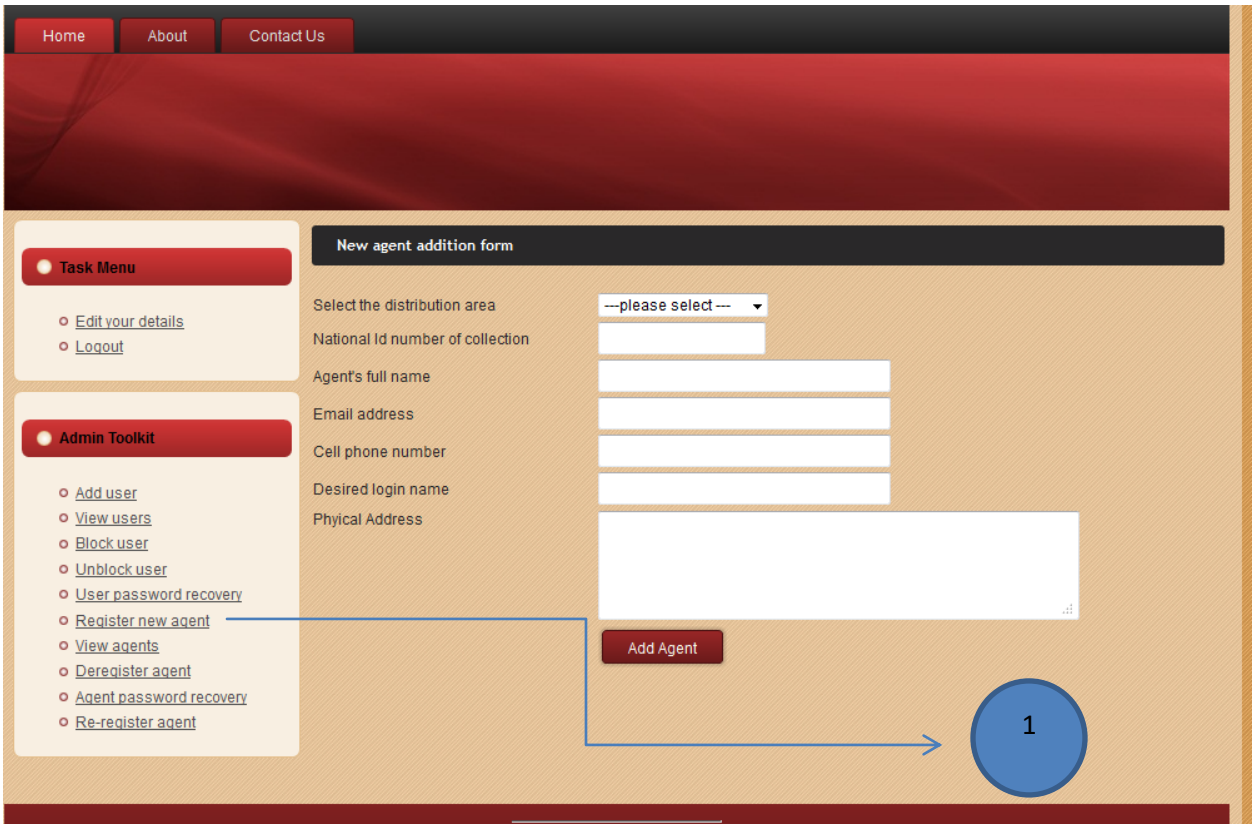
Numbers 5 to 10 deals with the agents as will be highlighted by the option.

Adding a user



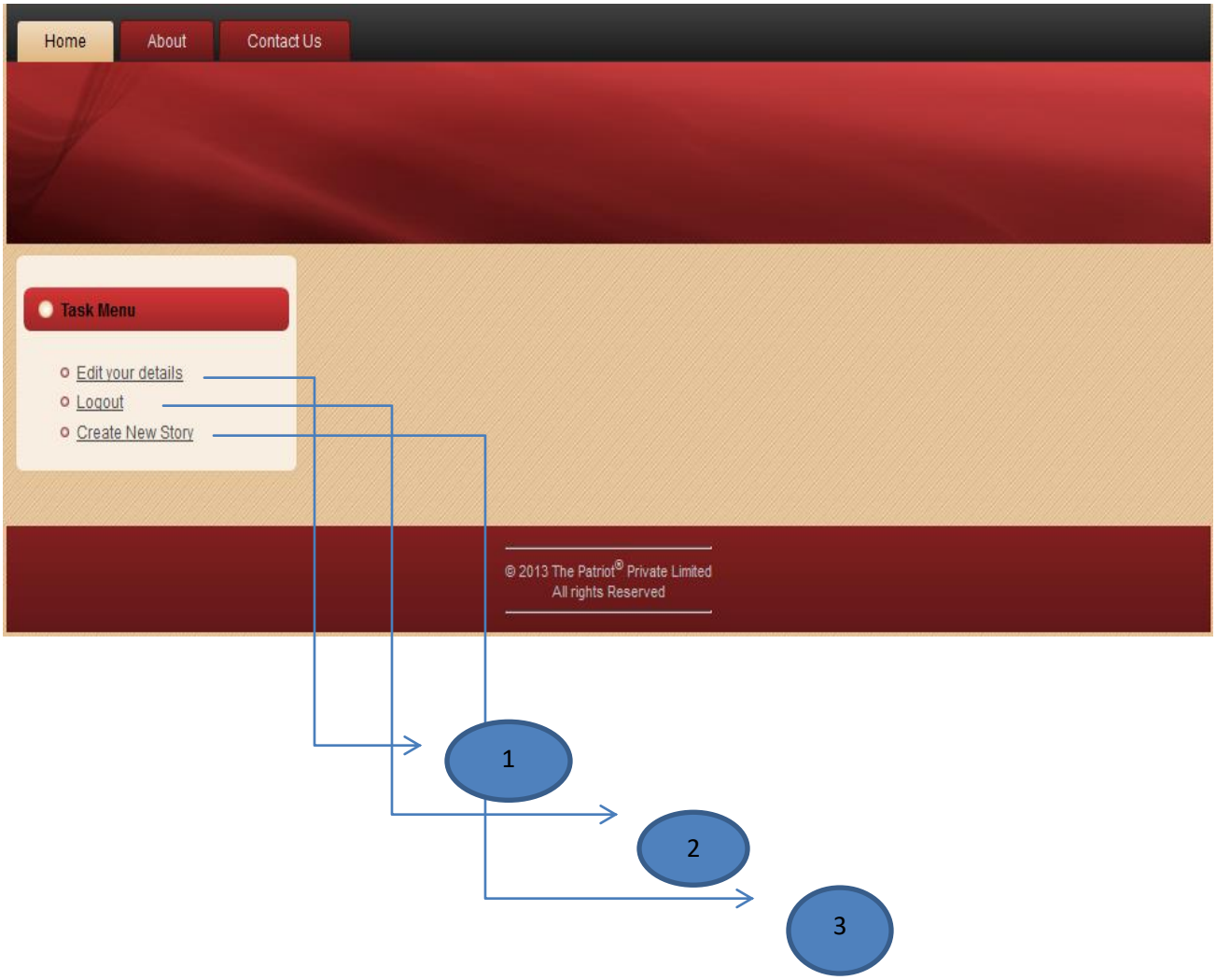
The administrator can login the new users on the above form by just following the links named on the forms

Adding an Agent



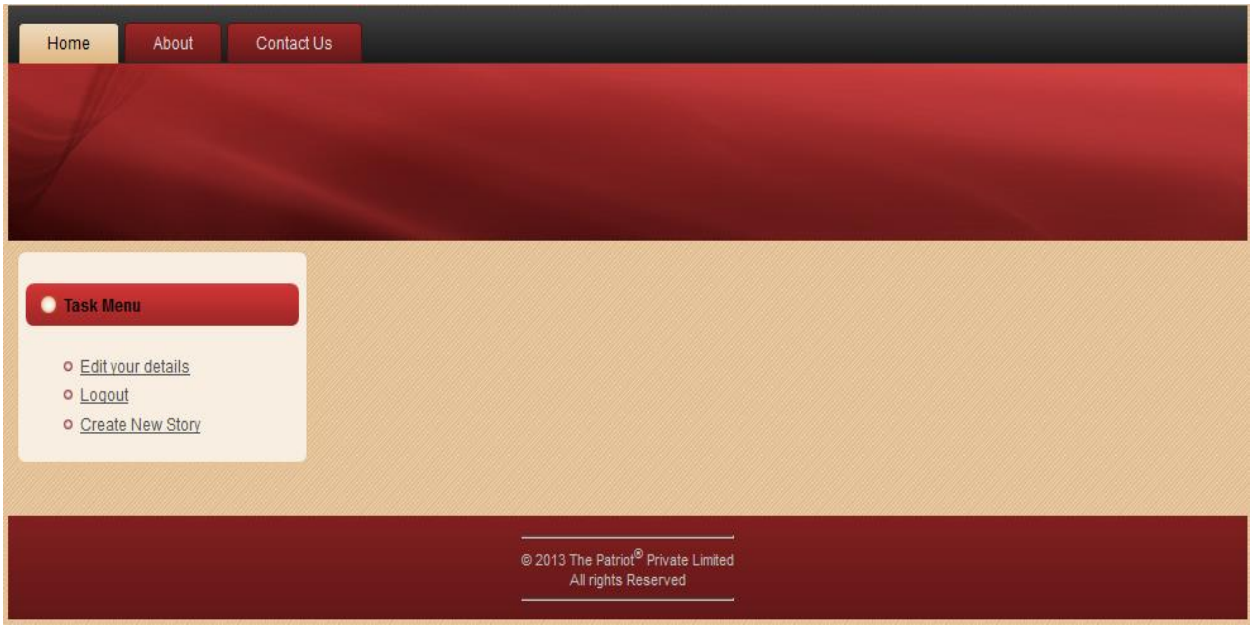
The administrator adds an agent on this form and this is in his privileges

User login



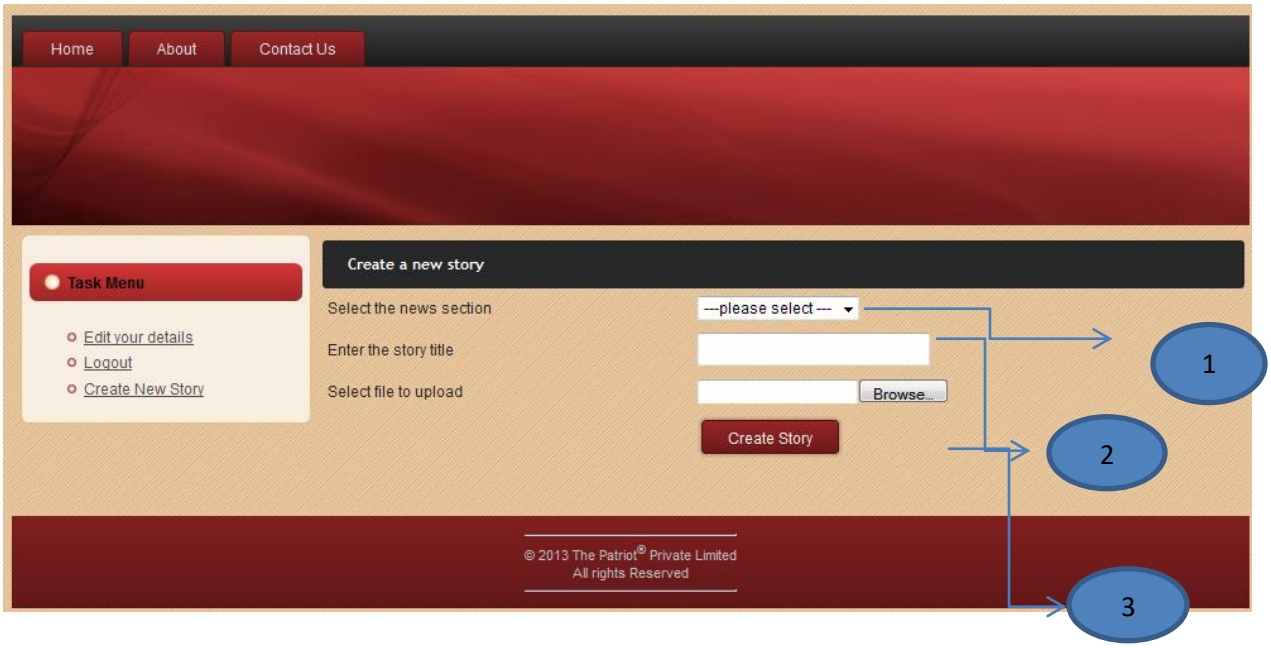
When the user logs in the above screen pops out prompting the user to do the actions highlighted by the numbered items 1, 2, 3. Where 1 is to edit his or her details thus might be login details, 2 will prompt the user to logout when he or she would have completed his actions and finally 3 thus the main action that the user would have logged in for (the users are journalists in this area), the uploading of the story is done by this link.

Creating a story (journalist)



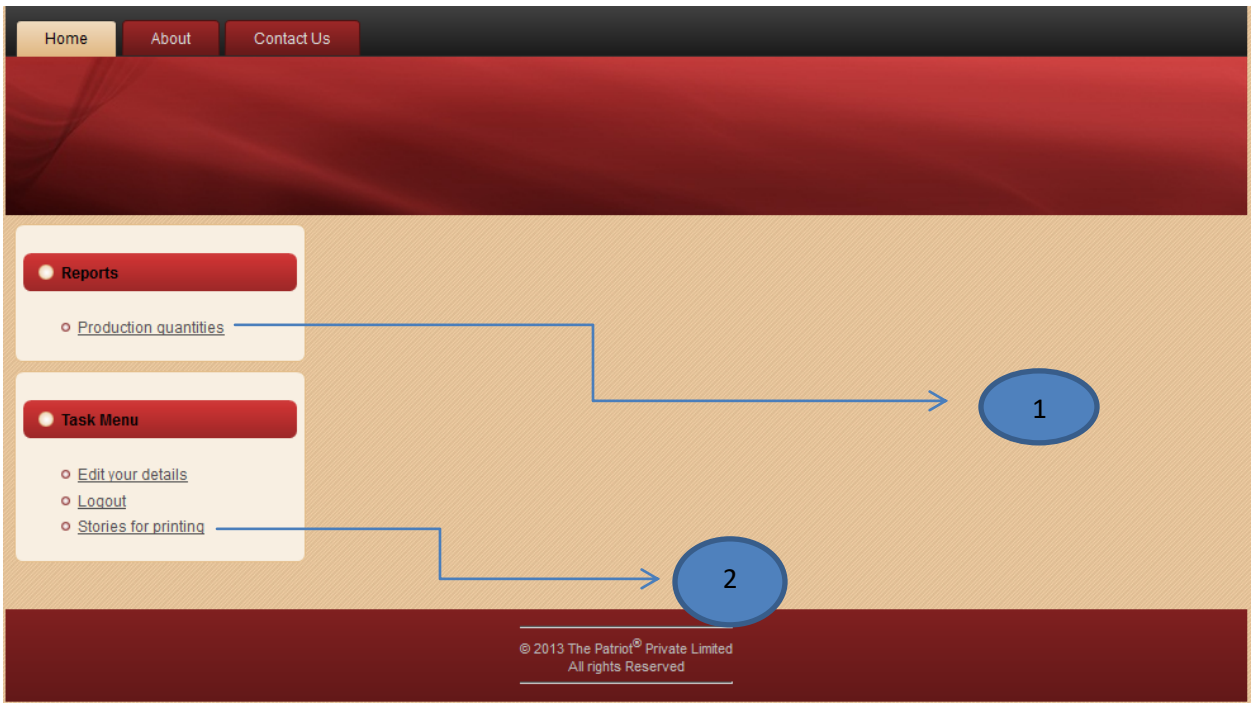
This is whereby the user logs in as a journalist and wants to create a story

Uploading a story



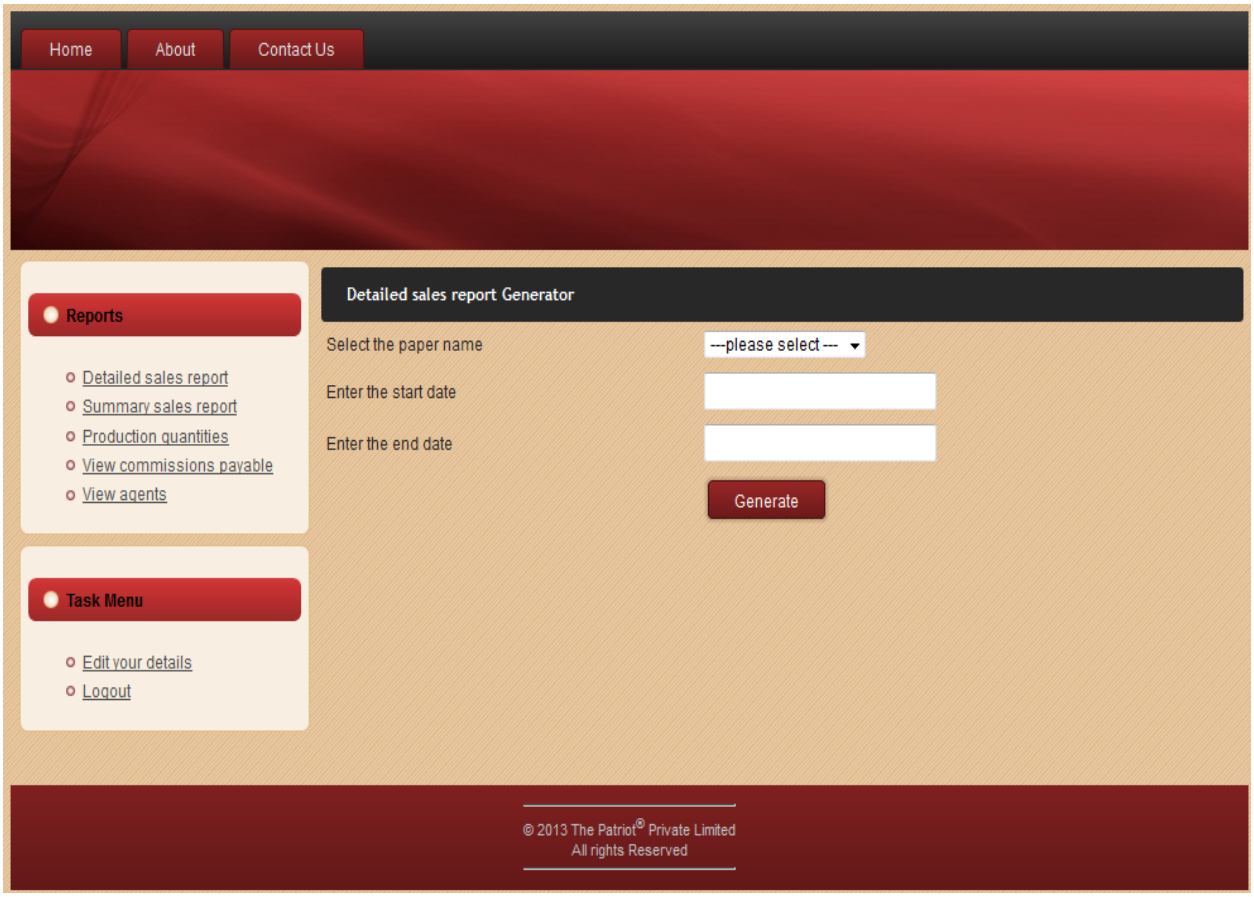
This is where the journalist is to upload his or her story by browsing /searching it where he saved it and then uploads it for editing.

Production statistics



All the production statistics (1) can be viewed here by the production department thus the orders for the day following and the stories to be printed (2) for the days in question

Report Generator



The production department when in need of reports the above screen highlights how the format would be.

please note that it is advised that you should log out each time you finish whatever you are doing in the system

ANYTIME YOU HAVE CHALLENGES IN USING THIS E-MEDIA OPERATION CONTROL SYSTEM REFER TO THIS MANUAL

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Appendix B: Interview
INTERVIEW FORM FOR E-MEDIA OPERATION CONTROL SYSTEM

Date……

The following is an extract from some of the interviews that were conducted at The Patriot.

How best can you describe the operations that take place within your company?

……
……

Can it be said that you provide excellent reader service?

……
……

What do you think are the loopholes in the current system?

……
……
……..

How best do you handle queries be it internal or external?

……
……

How do you feel about introducing the e-media operations control system as a way of providing a customized service?

……
……
……

Do you think that this will affect the way you produce your paper? If yes how?

……
……

What controls do you think are important if we are to implement this kind of system?

……
……
……

Appendix C: Observation sheet
Observation score sheet

Date: …….

Time: ……

Department: ……

Observation……
……
……
……
……
……

Conclusion……
……
……
……

Appendix D: Questionnaire
Questionnaire for e-media operation control system

(NB. Do not write your name on the questionnaire)

Answer all the questions.

Give accurate details on all answers and be open to express your views.

Please tick where applicable.

How best can you describe the operations of the current system?

Satisfactory ☐ Excellent ☐ Poor ☐

Do you think there is need for an evolution in the current system?

No ☐ Yes ☐

What are your views on the current system as a way of conducting business taking into consideration the competitive environment?

……
……

Do you manage to meet your deadlines on time with the current system?

……
……
……

How long does it take to compile a report/accessing past produced material?

……
……
…….....

What changes would you like to see taking place within your work routine?

……
……
……

What do you recommend as solutions to the problems?

……
…….....
.....

Appendix E: SNIPPET OF CODE

```
<?php

/**

* @version              $Id: helper.php 14401 2010-01-26 14:10:00Z louis $

* @package

* @copyright  Copyright (C) 2005 - 2010 Open Source Matters. All rights reserved.

*/

// no direct access

defined('_JEXEC') or die('Restricted access');

jimport('.base.tree');

jimport('.utilities.simplexml');

/**

 * mod_mainmenu Helper class

 *

 * @static

 * @package

 * @subpackage        Menus

 * @since             1.5

 */

class modMainMenuHelper

{
```

```
	function buildXML($params)
	{
		$menu = new JMenuTree($params);
		$items = &JSite::getMenu();

		// Get Menu Items
		$rows = $items->getItems('menutype', $params->get('menutype'));
		$maxdepth = $params->get('maxdepth',10);

		// Build Menu Tree root down (orphan proof - child might have lower id than
parent)
		$user =& JFactory::getUser();
		$ids = array();
		$ids[0] = true;
		$last = null;
		$unresolved = array();
		// pop the first item until the array is empty if there is any item
		if ( is_array($rows)) {
			while (count($rows) && !is_null($row = array_shift($rows)))
			{
				if (array_key_exists($row->parent, $ids)) {
```

```
                        $row->ionly = $params->get('menu_images_link');
                        $menu->addNode($params, $row);


                        // record loaded parents
                        $ids[$row->id] = true;
                    } else {
                        // no parent yet so push item to back of list
                        // SAM: But if the key isn't in the list and we dont _add_ this is infinite, so check the unresolved queue
                        if(!array_key_exists($row->id, $unresolved) || $unresolved[$row->id] < $maxdepth) {
                            array_push($rows, $row);
                            // so let us do max $maxdepth passes
                            // TODO: Put a time check in this loop in case we get too close to the PHP timeout
                            if(!isset($unresolved[$row->id])) $unresolved[$row->id] = 1;
                            else $unresolved[$row->id]++;
                        }
                    }
                }
            }
```

```
		return $menu->toXML();
	}

	function &getXML($type, &$params, $decorator)
	{
		static $xmls;

		if (!isset($xmls[$type])) {
			$cache =& JFactory::getCache('mod_mainmenu');
			$string = $cache->call(array('modMainMenuHelper', 'buildXML'),
$params);
			$xmls[$type] = $string;
		}

		// Get document
		$xml = JFactory::getXMLParser('Simple');
		$xml->loadString($xmls[$type]);
		$doc = &$xml->document;

		$menu = &JSite::getMenu();
		$active= $menu->getActive();
```

```
$start   = $params->get('startLevel');
$end     = $params->get('endLevel');
$sChild          = $params->get('showAllChildren');
$path    = array();

// Get subtree
if ($start)
{
        $found = false;
        $root = true;
        if(!isset($active)){
                $doc = false;
        }
        else{
                $path = $active->tree;
                for ($i=0,$n=count($path);$i<$n;$i++)
                {
                        foreach ($doc->children() as $child)
                        {
                                if ($child->attributes('id') == $path[$i]) {
                                        $doc = &$child->ul[0];
```

```
                                        $root = false;
                                        break;
                                }
                        }

                        if ($i == $start-1) {
                                $found = true;
                                break;
                        }
                }
                if ((!is_a($doc, 'JSimpleXMLElement')) || (!$found) || ($root)) {
                        $doc = false;
                }
        }
}

if ($doc && is_callable($decorator)) {
        $doc->map($decorator, array('end'=>$end, 'children'=>$sChild));
}
return $doc;
}
```

```
function render(&$params, $callback)
{
	switch ( $params->get( 'menu_style', 'list' ) )
	{
		case 'list_flat' :
			// Include the legacy library file
			require_once(dirname(__FILE__).DS.'legacy.php');
			mosShowHFMenu($params, 1);
			break;

		case 'horiz_flat' :
			// Include the legacy library file
			require_once(dirname(__FILE__).DS.'legacy.php');
			mosShowHFMenu($params, 0);
			break;

		case 'vert_indent' :
			// Include the legacy library file
			require_once(dirname(__FILE__).DS.'legacy.php');
			mosShowVIMenu($params);
```

```
                        break;


                default :
                        // Include the new menu class
                        $xml = modMainMenuHelper::getXML($params->get('menutype'), $params, $callback);
                        if ($xml) {
                                $class = $params->get('class_sfx');
                                $xml->addAttribute('class', 'menu'.$class);
                                if ($tagId = $params->get('tag_id')) {
                                        $xml->addAttribute('id', $tagId);
                                }

                                $result = JFilterOutput::ampReplace($xml->toString((bool)$params->get('show_whitespace')));
                                $result = str_replace(array('<ul/>', '<ul />'), '', $result);
                                echo $result;
                        }
                        break;
        }
    }
}
```

```
/**
 * Main Menu Tree Class.
 *
 * @package
 * @subpackage		Menus
 * @since		1.5
 */
class JMenuTree extends JTree
{
	/**
	 * Node/Id Hash for quickly handling node additions to the tree.
	 */
	var $_nodeHash = array();

	/**
	 * Menu parameters
	 */
	var $_params = null;

	/**
```

```
 * Menu parameters
 */
var $_buffer = null;

function __construct(&$params)
{
	$this->_params		=& $params;
	$this->_root		= new JMenuNode(0, 'ROOT');
	$this->_nodeHash[0]	=& $this->_root;
	$this->_current		=& $this->_root;
}

function addNode(&$params, $item)
{
	// Get menu item data
	$data = $this->_getItemData($params, $item);

	// Create the node and add it
	$node = new JMenuNode($item->id, $item->name, $item->access, $data);

	if (isset($item->mid)) {
```

```
                $nid = $item->mid;
            } else {
                $nid = $item->id;
            }
            $this->_nodeHash[$nid] =& $node;
            $this->_current =& $this->_nodeHash[$item->parent];

            if ($item->type == 'menulink' && !empty($item->query['Itemid'])) {
                $node->mid = $item->query['Itemid'];
            }

            if ($this->_current) {
                $this->addChild($node, true);
            } else {
                // sanity check
                JError::raiseError( 500, 'Orphan Error. Could not find parent for Item
'.$item->id );
            }
        }

        function toXML()
```

```
{
        // Initialize variables
        $this->_current =& $this->_root;

        // Recurse through children if they exist
        while ($this->_current->hasChildren())
        {
                $this->_buffer .= '<ul>';
                foreach ($this->_current->getChildren() as $child)
                {
                        $this->_current = & $child;
                        $this->_getLevelXML(0);
                }
                $this->_buffer .= '</ul>';
        }
        if($this->_buffer == '') { $this->_buffer = '<ul />'; }
        return $this->_buffer;
}

function _getLevelXML($depth)
{
```

```
		$depth++;

		// Start the item
		$rel = (!empty($this->_current->mid)) ? ' rel="'.$this->_current->mid.'"' : '';
		$this->_buffer .= '<li access="'.$this->_current->access.'" level="'.$depth.'"
id="'.$this->_current->id.'"'.$rel.'>';

		// Append item data
		$this->_buffer .= $this->_current->link;

		// Recurse through item's children if they exist
		while ($this->_current->hasChildren())
		{
			$this->_buffer .= '<ul>';
			foreach ($this->_current->getChildren() as $child)
			{
				$this->_current = & $child;
				$this->_getLevelXML($depth);
			}
			$this->_buffer .= '</ul>';
		}
```

```
        // Finish the item
        $this->_buffer .= '</li>';
}

function _getItemData(&$params, $item)
{
        $data = null;

        // Menu Link is a special type that is a link to another item
        if ($item->type == 'menulink')
        {
                $menu = &JSite::getMenu();
                if ($newItem = $menu->getItem($item->query['Itemid'])) {
                $tmp = clone($newItem);
                        $tmp->name     = '<span><![CDATA['.$item->name.']]></span>';
                        $tmp->mid      = $item->id;
                        $tmp->parent = $item->parent;
                } else {
                        return false;
                }
```

```
		} else {
			$tmp = clone($item);
			$tmp->name = '<span><![CDATA['.$item->name.']]></span>';
		}

		$iParams = new JParameter($tmp->params);
		if ($params->get('menu_images') && $iParams->get('menu_image') &&
$iParams->get('menu_image') != -1) {
			switch ($params->get('menu_images_align', 0)){
				case 0 :
				$imgalign='align="left"';
				break;

				case 1 :
				$imgalign='align="right"';
				break;

				default :
				$imgalign='';
				break;
			}
```

```
                $image = '<img src="'.JURI::base(true).'/images/stories/'.$iParams->get('menu_image').'" '.$imgalign.' alt="'.$item->alias.'" />';
                if($tmp->ionly){
                    $tmp->name = null;
                }
            } else {
                $image = null;
            }
            switch ($tmp->type)
            {
                case 'separator' :
                    return '<span class="separator">'.$image.$tmp->name.'</span>';
                    break;

                case 'url' :
                    if ((strpos($tmp->link, 'index.php?') === 0) && (strpos($tmp->link, 'Itemid=') === false)) {
                        $tmp->url = $tmp->link.'&amp;Itemid='.$tmp->id;
                    } else {
                        $tmp->url = $tmp->link;
```

```
                }

                break;


            default :

                $router = JSite::getRouter();

                $tmp->url = $router->getMode() == JROUTER_MODE_SEF ?
'index.php?Itemid='.$tmp->id : $tmp->link.'&Itemid='.$tmp->id;

                break;

        }


        // Print a link if it exists

        if ($tmp->url != null)

        {

            // Handle SSL links

            $iSecure = $iParams->def('secure', 0);

            if ($tmp->home == 1) {

                $tmp->url = JURI::base();

            } elseif (strcasecmp(substr($tmp->url, 0, 4), 'http') && (strpos($tmp->link,
'index.php?') !== false)) {

                $tmp->url = JRoute::_($tmp->url, true, $iSecure);

            } else {

                $tmp->url = str_replace('&', '&amp;', $tmp->url);
```

```
                }

                switch ($tmp->browserNav)
                {
                        default:
                        case 0:
                                // _top
                                $data = '<a href="'.$tmp->url.'">'.$image.$tmp->name.'</a>';
                                break;
                        case 1:
                                // _blank
                                $data = '<a href="'.$tmp->url.'" target="_blank">'.$image.$tmp->name.'</a>';
                                break;
                        case 2:
                                // window.open
                                $attribs = 'toolbar=no,location=no,status=no,menubar=no,scrollbars=yes,resizable=yes,'.$this->_params->get('window_open');

                                // hrm...this is a bit dickey
```

```
                                        $link = str_replace('index.php', 'index2.php', $tmp->url);
                                        $data = '<a href="'.$link.'"
onclick="window.open(this.href,\'targetWindow\',\''.$attribs.'\');return false;">'.$image.$tmp->name.'</a>';
                                        break;
                        }
                } else {
                        $data = '<a>'.$image.$tmp->name.'</a>';
                }

                return $data;
        }
}

class JMenuNode extends JNode
{
        /**
         * Node Title
         */
        var $title = null;

        /**
```

```
 * Node Link
 */
var $link = null;


/**
 * CSS Class for node
 */
var $class = null;


function __construct($id, $title, $access = null, $link = null, $class = null)
{
	$this->id		= $id;
	$this->title	= $title;
	$this->access	= $access;
	$this->link		= $link;
	$this->class	= $class;
}}
```