Investigation Section

**Introduction**

In this section I will describe all of the methods that I will use to understand how the current system works with a view to design and create a system that delivers the prescribed user requirements, this will be done thoroughly in order to gather more insight on how it works in more detail and if there is anything else that may need to be implemented to the proposed system in order to provide a system that meets the client’s requirements. During my investigation I will use multiple data gathering techniques such as questionnaires, observation and interviews. I have also briefly used document analysis which required me to physically examine existing documents. Furthermore I will also examine how the current system processes data.

Described below are the methods that I will consider using in investigating the current system.

Observation

Observation is a data gathering technique which involves inspecting staff members using the current system to be able to gain an insight as to what areas need to be improved or not, it  is a very useful technique to help gather data about how the current system operates. Moreover, in the process, it will also show if there are any recurring issues that need to be investigated further.

The interviewing and questionnaires play a vibrant role in making valuable feedback available from the user based on the questions asked of them. However, there are times when these techniques may be limited in gathering useful observable scenarios such as observing a user interacting with the current system. Hence the observation technique is better suited in gathering observable features which are useful in helping me develop a full grasp of how the current system works and how the surroundings affect the user interaction with the current system.

On the contrary, observation is a very lengthy process which in turn delays the data collection process and there is also a high chance that the store might operate differently knowing that their every move will be registered which could cause some issues to not be brought to my attention.

**How I used this method:** When observing the store, it was clear that the notepads that were being used were sometimes inaccurate and at times there was confusion by members of staff as to which notepad they should write in. I have taken note of this while observing and will be designing the new system to ensure that this issue will not persist.

Questionnaires:

This method allows me to collect information from many people in a relatively short amount of time. As the store has around 500 customers this would be a lot of information to process if everybody filled out and responded to the questionnaire. Moreover, questionnaires can only provide a limited amount of information, especially when the questionnaire is comprised of close ended questions e.g. *“Do you like the current system”* which could only produce a yes or no answer whereas questions such as *“What current features of the current system do you enjoy”* which would allow for a possible range of answers. Questionnaires can be answered by customers at a time that is convenient to them which will make them more likely not to rush it as they won’t feel pressured for time due to having other commitments. In addition, customers are more likely to give an honest opinion due to their anonymity. However, due to the inability to ask customers to elaborate on their answers, and their ability to skip questions, despite the sample size, detailed responses won’t be achieved.

**How I used this method:** I created a questionnaire and gave it out to Mongoose Games customers who were buying/selling a game(s). This has allowed me to gather an array of customer’s views about the store and how it currently works. This information will be helpful to me as it can be used when thinking of designs and features for the system.

Interviews:

Unlike questionnaires, interviews involve having a formal meeting with a customer in order to ask them a range of questions in search for detailed responses. Furthermore, during interviews it will be possible to ask different questions depending on what the customer answers to the previous ones, to be able to get an even deeper insight into their opinion on the system. However, the weaknesses of interviews are that it’s a very time consuming process and so therefore only a select few of customers can be interviewed. Moreover, as interviews are formal meetings, time, location and date will have to be arranged prior to the interview which suits both the interviewer and the interviewee. This further prolongs the process of the data collection. Unlike questionnaires, there is no anonymity and so this could lead to the interviewee not giving their honest opinion on the current system and only saying what they think the interviewer wants to hear, which will lead to biased results. However, if the interviewee maintains sincerity, then the results will be high quality and new recommendations to the system may also be mentioned.

**How I used this method:** I conducted an interview with my client (as although is not the only stakeholder, has the highest interest in the success of the proposed system) to ask them certain questions and also to hear feedback about what they would like to be included in the project. Being able to speak formally with the client was useful as it gave me a first person insight into how the client feels about the way the store is currently run. From this I could foresee system features that may make the store more efficient and give a better service for the customers.

Document analysis

Document sampling will show me how a single document can represent the whole population of data in the system. Due to the lack of time available to examine all documents it’s more realistic to pick out one document from a sampled population to represent the whole system. For example, from a pile of 250 documents only one or 2 would be picked for convenience. The advantages are that the documents can be examined in detail within a short time frame and this will give enough of an indication as to how the current system functions and what can be done to improve efficiency.

However, the problem with document analysis is that it doesn’t show how the data is used by the members of staff either looking to find or input a record. Moreover, not all areas of the documents can be examined. For example, if staff members make hidden notes to help them process data which if they would not be able to be retrieved for the document analysis, it would result in a less accurate indication as to how the current system processes data.

**How I used this method:** I looked through all the documents that the store has been using to store and process all of their current games and customer information (included on the notepads). From looking at the documents it allowed me to further understand the way in which the current system is working and also ideas on how to make the system more secure and speed up the process of selling and buying games.

Given the analysis of the pros and cons of the data collection techniques discussed in this section I have decided that I will continue with the following techniques; Observation, interviews and questionnaires to examine in detail how the current system works with a view to identify areas of improvement. In my opinion, these three techniques will yield sufficiently reliable and accurate data to enable me to see all of the current faults, inefficiencies and limiations of the system, some of which will have not been aware to me, and to be able to witness first-hand the operations of the system.

Investigation of the Current System

Observation:

The current system is paper based and uses notepads for the staff to note down when people have bought and sold games.

This system could be seen as unreliable as certain staff members could have hard to understand handwriting causes problems when another member of staff wants to update a record as they might not know what the previous staff member wrote. This issue is also present when staff members come up with a price to buy a game from a customer for, they often check back in the notes of when the same or similar game was bought to be able to get an idea of how much they should offer the customer yet if they won’t be able to know the price from the previous game sold, they will have to go off their own opinion. Moreover, another issue with a paper based system is that the current system takes up a lot of space over time when the notepads become full and with hundreds of customer numbers this could prove to be a large issue. Accessing records from a while back is also a very time consuming process as a member of staff would have to look back note by note to find, input or read data. This is very harmful to the business as customers could be put off from coming to the store due to long waiting times, especially if they’re in a rush.

**Questionnaire that was issued to customers as they were waiting to buy/sell a game:**

Question 1: Would you like to be able to view all available games from home?

**Answer 1:** I guess it would be a good idea, however for me I don’t really mind to pop in to question a game’s availability as I live 5 minutes away.

**Answer 2:** Yes

**Answer 3:** It would be good if I were able to receive alerts when games are put in stock so I don’t miss out on new releases or cheap deals for older games.

**Answer 4:** Yes as it would save me the disappointment of visiting the store to then find out the game I want isn’t in stock.

**Answer 5:** Yes I think this feature would be very helpful as it would save me a trip to the store.

**Overall response:** In conclusion, it has been seen in good light the possibility of carrying out this function from home. Moreover, an idea has been brought to my attention that I had previously not thought about, the idea of issuing alerts to customers when a game is introduced into the database. I will consider these ideas when designing the system.

Question 2: Are there any areas you think that Mongoose Games could improve on?

**Answer 1:** The time it takes for members of staff to process games is very time consuming and I usually have to wait at least 5 minutes to buy/sell a game.

**Answer 2:** The possibility of ordering the next game in the series if I enjoyed the game should be added (if there is a sequel of course). For example, if I enjoyed the first Call Of Duty game, I could pre-order the next game from home. This would be convenient for me and save me a trip to the store.

**Answer 3:** I would like to be able to send a pre order request for games that aren’t yet available in store so that the game can be bought by Mongoose Games and delivered to the store. Then I could be contacted saying that the game is ready for collection by email.

**Answer 4:** I think that the consistency of the business should be improved. For example, my friend sold his game to Mongoose Games for £25 and told me about it, as I owned the same game I came into store to sell it and I was only offered £17 for it. This could be due to the fact that the quotes offered to the customers are just made up by the staff members which I believe to be unacceptable and extremely unprofessional.

**Answer 5:** Speed of service, especially when selling games to the store.

**Overall response:** A few features identified that I will consider when designing the system some of which I had already considered however answer 3 could be quite farfetched to implement as complex validation will have to be utilised.

Question 3 - Would you like to be able to receive a quote for a game(s) you wish to sell from home?

**Answer 1:** Yes, I would as although I normally call them to receive a quote, the amount I get offered for the same game varies due to different staff members picking up the phone at different times which all have distinct opinions on the value of the game which makes this method unreliable.

**Answer 2:** I am always using my computer for work purposes and so having this feature will allow me to quickly get a quote on my game and then continue working.

**Answer 3:** Yes I would very much enjoy this feature as it’s very often that I come to the store and get a disappointing quote for a game and then have to go home empty handed as well as having wasted a considerable amount of time.

**Answer 4:**  I usually call Mongoose Games in order to receive a quote from the staff member that picks up the phone which is a generally fast process.

**Answer 5:** Yes this will be a good feature as I would not have to visit the store in order to ask how much they would give me for a game.

**Overall response:** The majority of the customers questioned said that they liked the ability of being able to receive a quote of a game from home and would be used often to allow the customer to decide if they want to come into the store to sell it.

Question 4 - On a scale of 1 to 10, how satisfied are you with the efficiency of the current system?

**Answer 1:** 3

**Answer 2:** 6

**Answer 3:** 5

**Answer 4:** 2

**Answer 5:** 3

**Overall response:** The overall response was negative which implies the speed of service is very slow, this is definitely due to the fact that the system is paper based which increases the waiting times for the customers, negatively affecting their satisfaction.

Question 5 - Would you like to be able to reserve a game to then later collect in store?

**Answer 1:** Yes I would like this feature as it would allow me to take my time to get a game by being able to pop in another day to calmly collect it without having to rush to the store to buy it before it goes.

**Answer 2:** No, I think it wouldn’t be necessary, it’s a lot more simple to just go into the store and buy the game, I think that the whole process is just time consuming.

**Answer 3:** Yes I would very much enjoy this feature as I get paid monthly and if a new game gets released near the end of the month and I don’t have the funds to buy it, this will allow me to reserve it for when after I get paid.

**Answer 4:** Yes I would appreciate this feature as when new games come out, the store is usually packed with people wanting to buy it but this will allow me to calmly reserve the game from home to come in to collect it.

**Answer 5:** Yes, and I think that it will tie in very well with the proposed feature of being able to view all available games, it’ll make for an excellent system!

**Overall response:** Many customers liked the idea of being able to reserve a game from home due to the convenience it would bring. I have gathered that this is a feature that would be desired by many of the customers.

Interview:

I decided to carry out an interview with my client to help me further understand the current system. I had to create an appointment with the client at a date and time that suited us and on said day I attended the store in order to interview him. I made sure that it was very detailed to ensure that I wouldn’t miss out any possible system requirements and also for the client to provide me with any others.

I started the interview by asking: Apart from the issues that I have identified and decided to solve in the proposed solution, do you think there are any more that need to be addressed? The response I received from the client was that there was nothing that I have missed out from what he’s previously mentioned and that he’s looking forward to the new system. However, he did comment that I should ensure that the proposed system will be user-friendly as it will be a big shock for the staff and certain customers to suddenly switch to a computer based system after more than a decade using a paper based one. We later discussed how the proposed system should look like and the different user interfaces I will have to design. The presence of a registration screen for new customers, login screen for staff and customers as well as how the actual system will look like were all identified. Furthermore, we talked about what information will be inputted and outputted from the proposed system which included: customer name, customer ID, game title, publisher, bought price and sold price. This is the data that will be entered into the system by the staff members when games are being sold or bought.

Another important topic that was discussed was security. The client expressed how he would like each member of staff to have preset logins to ensure that their credentials are sophisticated and secure. He also commented that as customers will be creating their own credentials, that validation should be implemented to ensure that their passwords will be advanced and less prone to brute force attacks. These features will ensure that high security standards are set for the system which is important as the system will be storing personal information of the customers such as address and name and therefore the store should comply with the Data Protection Act 1998 to prevent legal action being taken in the case that they were to lose customer information if the system would get leaked.

This implementation that the client has outlined and that the current system is lacking which will be changed in the proposed system and will help the client keep their customer’s information secure.

Stakeholders:

The owner of Mongoose Games is called Mongoose Hanks (not a real name) and he is responsible for managing the members of staff within the store. Hanks’ priority is to increase the efficiency of the store which will give the customers a better service which will lead to an increased popularity of the store and will attract more customers.

The second most important stakeholder is the members of staff. The proposed system will allow them to quickly process game transactions which is currently time consuming and hand-operated. Staff members will be able to type the record regarding each transaction into the system instead of having to write down each game that has been sold/bought onto paper. The new system will facilitate their jobs which will in turn increase productivity. The time saved can then be spent completing other tasks to improve the business.

Lastly, the customers also have a great interest in the store as it’s a place they can use to get money for their unwanted games or to buy new ones.

The new system will benefit impatient/busy customers that normally have to wait a while for the members of staff to find their records due to the quicker and more secure method that will be used that processes games when they are being bought or sold.

Existing solutions to similar problems:

**Existing solution to similar problem 1**

My local newsagents has recently changed from a paper-based system to maintain stock held in the store to a computer-based system. Before the change, the store owner had to physically write each item of stock down on a piece of paper to acknowledge that it had been received. Now this process is much simpler as the new system they have bought (FRESH4US) allows the shop owner to scan the barcode on a product which automatically counts how many have been received into the shop. This saves a lot of time and money less time is wasted performing this daily task, which in turn increases the efficiency of the business.

The system can also show the owner if there are any food products in the store that are past their sell by date as well as if a new edition in a magazine comes out. When stock arrives it gets scanned into the system and as it scans it prompts the store owner to enter the sell by date of the food product/edition number of a magazine. When the sell by date is nearing, it prompts the store owner and the price of said item is then reduced subsequently and when an edition of a magazine gets surpassed, they are also notified and in turn, the new edition is automatically ordered. Finally, when a food product reaches its sell by date, it’s then thrown out.

Similarly, in my proposed system I will implement a similar way of entering customer information so that it won’t have to be done by hand and instead be typed in. This method has shown to increase efficiency and convenience as well as accuracy and thus will be used in the system.

This could also be developed on in the future so that the system would be connected to a scanning device which would scan the barcodes of games similar to how the shop owner scans their products which would be a much more rapid method than entering the game ID manually.

**Existing solution to similar problem 2**

My local game shop has also changed from a paper-based game database system to a computer based system. Before the change, staff m embers had to manually write down all of the games that were held in the store, to be able to keep track of stock and reply to queries on game availability. Moreover, customers were not given any information or control over their registered account nor where able to carry out any actions regarding game viewing or searching without talking to staff.

Now, the game shop has bought a commercially available system called QEX which enables all of the old processes that were previously carried out using a pen and paper to now be carried out electronically such as selling/buying games, viewing games, searching games, calcuating buy prices etc. QEX also has a functionality which enables the customers for this game shop to access it from home using their account created by them, allowing them to view all games, search games, send requests and much more from the comfort of their home. This really capitalizes on the electronicization of the system and is overall an exceptional feature that customers enjoy and make use of daily.

Data collected by the current system:

Data in the current system:

Shown below is an example of an entry that may be entered by a member of staff

It would be written onto paper to then be put aside until the record needs to be looked at again.

Below is shown that the Game ID 73 has been bought from William Mireles for £12. The price would have been devised by the employee.

**Member name:** William Mireles **Customer ID:** 1337 **Game ID:** 35 **TransactionType:** Bought **Price:** £22

This would then be written on a page of a notepad and it would then be put in a pile of similar records.

Outputs from the current system:

When a record has to be retrieved, a member of staff would then have to look back into the notepad and find the correct record. This would be a significantly time-consuming process and the customer would have to wait in the meantime. This is very poor customer service as if a possible customer would be in a rush, they would be deterred from going to the store due to the assumed delay the transaction would cause them. Moreover, this loses potential business which is a serious issue as it affects the success of the store.

After a different member of staff has accessed it could also be retrieved incorrectly e.g.

**Member name:** William Mireles **Customer ID:** 1337 **Game ID:** 36 **TransactionType:** Sold

**Price:** £8

In this case, the number of the Game ID has been read incorrectly by the other member of staff and the wrong game would have been marked as sold to a customer. This would cause problems for the store to keep track of sold games.

Another problem with retrieval of data from the current system is that for example if an employee has to devise a price for a game brought in by a customer, he would try to go off the price a similar/same game was sold for. If the last time the same/similar game was sold 4 months ago, it would be a very complicated process in order to retrieve the record to see the previous price. This is caused because the store would have moved onto multiple new notepads within the time causing the original one to be lost in a pile.

Currently in the system to check what games are overstocked and therefore shouldn’t be bought from customers is a prolonged process due to the fact that the staff member would have to search the notepads with data stored in to take down a tally of the quantity of each game.

In order to give a customer a quote for their game, if the same/similar game would have not been sold previously, the employee would have to devise the price from their own opinion. This method can be inaccurate and could result in the customer being given more or less than what they should receive which affects business. The new system will have a built in algorithm which enables the employee to reliably and efficiently calculate the suggested price.

**Receipt given to customer when they buy/sell game**

Limitations of the current system:

A main limitation of the current system is that the store relies on the employees to devise sensible quotes for games brought in by customers. There is no current system in place with a functionality of calculating this for them. This costs the store a lot of money each year as with hundreds of customers there is bound to be people that will take advantage of the lack of this function and try to lie to or persuade the employee to get a better deal for their game.

Purpose of the Project:

The main purpose of this project is to create a system for Mongoose Games which will help them become more organised as well as more efficient. The system will help sort the day to day time consuming processes of using notepads in order to store customer information and game details.

The new system will be entirely electronic and there will no longer be a need to store a pile of notepads which is a security risk as it’s very insecure and could lead to a breach in the Data Protection Act 1998 if customer details are leaked in any way.

Human error will also be reduced by using the new system as it will no longer be possible for a staff member to make a mistake due to bad handwriting and this will keep the business’ database accurate. It will also be further reduced via the implementation of the algorithms which will calculate responsible prices for games that are bought from customers. The business would benefit from this as profitability will be increased which will help them buy new games etc.

Objectives of the project:

* Firstly, functionality to login with a username and password will be needed to be able to grant access to the system’s functionalities, there will also be a different login for customers and staff members to ensure that at the same time customers can make use of the system without having administrative features such as adding records and maintaining data.
* The new system will be able to solve the current issue of the time it takes to do basic tasks such as buying games from customers then adding them to the system and selling games to them. It will help to reduce the time the customer has to wait and it will help to provide improved customer service.
* When the system is fully implemented it will enable the staff members to check the quantity of each game in store which will help them to ensure that they don’t accept any more of the same game from customers once it’s overstocked enabling the supply and demand to be maintained.
* The proposed system also creates many more features that the store could not currently do. For example, a member of staff could not easily contact a customer to inform them of a new game released because they would have to look through a large amount of notepads in order to find that particular customer’s details. With the new system, this process can be carried out by typing in the customer ID number to then find all of their respective details.
* The proposed system will also make it easier to maintain data e.g. update prices by just searching the game and editing its information instead of having to go through the notepads to find that game’s details
* Moreover, deleting unwanted/obsolete data will also be facilitated as instead of having to search through the notepads and throwing out unneeded data, records can be searched and subsequent data can be deleted.
* The proposed system should also have intuitively simple user-friendly interfaces to ensure that the system can be navigated by all kinds of people with different levels of computer literacy

Success Criteria:

In this section I will be describing the success criteria that I will use to evaluate the proposed system. The criteria that I intend to employ to evaluate the finished system include:

Performance, suitability, usability, reliability and robustness.

**Performance:**

I plan to test the system’s performance by entering test data into the system to check if it can handle even the most complicated data. This process will come under the testing and evaluation section of the project and will test the functionality of the system to determine whether it works well before being implemented on the client’s computers.

**Suitability:**

When the system has been successfully designed and created it will be tested to check that it’s definitely suitable for the client’s store and its customers. I will compare the system to the aims and objectives that Mongoose Games have asked me to meet. If all of the aims and objectives have been met by the proposed system then this will confirm that the system is fully suitable for the store’s needs and ensure that they will be satisfied with their new system.

**Usability:**

It’s important to ensure that the new system will be easy for members of staff as well as the customers to get used to. If the system is laid out well and easy to navigate then this will make it comfortable to use by all the people who need to do so. In order to test the usability of the system I will ask friends and family to test it and ask for their feedback on various aspects of how they felt when using the system. For example, “Were instructions on how to use the system clear?”, “Did you feel confused at all when using the system?”

It’s best to ask people who have never used the system before in order to get a clear understanding of how they feel as it would be biased if I tested the system due to the fact that I know how it will work. I will lay the questionnaire out by putting boxes with varying levels of satisfaction e.g. Strongly Disagree, Disagree, Agree, Strongly Agree. In order to make the test a success I will say that an average of 85% of reviews to Agree or strongly agree in order to make the test a success.

**Reliability:**

In order to measure how reliable the new system is that I will put it through some tests that repeat general tasks and measure to see if the results of the test are the same each time. This is an important test as the system cannot produce varying outputs at different times or days it needs to be consistent. The system should be able to work 24 hours a day 7 days a week if it was needed to. It is unlikely that this would be the case as the store is only open for 9 hours a day however the security systems need to be running constantly to keep customer information safe and secure.

For example, I will sell 20 games one after the other to test accounts in order to check if the details are correct each time and the system is updated with the new game quantities available for sale each time. This will be a routine task and if the data is updated as expected then this test will be a pass and the system will be confirmed as reliable.

**Robustness:**

Robustness is an important feature of the system as it needs to be able to cope with incorrect data being entered into it and ensure that the correct error messages are displayed and it does not crash. If a member of staff were to enter a piece of information into the system incorrectly then the system should produce an error message to let the member of staff know what they have done wrong. This is essential as if the error message did not appear then the system could be said to not be functioning correctly and this could cause disruption in the store and therefore bad customer service.

I will test the security features incorporated on the proposed system to ensure that there are no security flaws and to check that no unauthorised person can access the system. I will do this by entering incorrect username and password combinations and then checking what the system will output. If no access is granted and error messages appear explaining that either the username or password is wrong then this would be a success. I will also carry out similar tests on different parts of the system such as buying games or selling games to be able to check if the correct error messages appear and that no incorrect data is entered into the database. If both of these tests are successful and produce the correct outputs then this will be a successful test and ensure the proposed system will not crash during normal and exceptional circumstances.