**BSc Computing Systems**

**COM547 Computing System Project**

**e-Portfolio**

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# Process Area

## Requirements Development and Management

In my personal development, the experience in the *Management and Requirements Development* field has been gathered during the time spent at Ulster University. Most of the experience has been accumulated in the 3rd and final year of the *Computing System* course in *Organisational Process Focus* module.

One of the tasks in the module has been to complete an assignment that describes one of the five development process areas of CMMI-Dev 1.3 regarding a project where I have been involved. The paper had to highlight the activities and practices of the project and identify different progress methods that could be beneficial for project development. The project chosen for the assignment was pending, as it was my final year project, and the most important one. The assignment has helped me enhance my understanding about the requirements development process of the project and how to best understand them. At the end of the assignment it become clear that everyday actions are pushing one individual to develop and manage requirements.

As an example, my field of work has been *medical equipment service engineering*. It involved maintenance, service and personnel training in equipment usage. As a service process, I had to enquire, from the users, what are the issues with the equipment, what are the functionalities that the equipment does not provide and how it happened or when. Technically, I was gathering information to narrow down the service process to the exact fault of the equipment thus gaining time and saving effort in finding out the technical problem. In the process of gathering information it is vital to establish the correct requirement and establish the exact development process to be followed for the customers satisfaction and contempt.

My final year project aims refers to major enhancements in the game development environment. As I do not have any background experience in the game development environment and my IT experience is mild, this assignment has offered the possibility of gaining understanding in requirements gathering, project stage development and resource management in IT development. I have understood that in IT the requirements gathering process and managing project requirements, resources is critical for the stakeholder’s approval.

At this stage of my project, I am in constant contact with the stakeholder to manage the requirements and confirm that they are precise and effective. Have spent several hours to this point to establish the stakeholder’s needs and what are his expectations from the project.

The time allocated for the final year project, up to this development point, has not been sufficient due to several assignments that had to be completed at specific dates of the semester which leave little room for time management, but I have allocated extra time for this development part of my project with the general idea that a good implementation of this stage will lead to the development of an end product with minor requirement changes.

## Project Management

I have gained experience in project management only from attending the courses of Ulster University. The experience grew with the *Project Management* module, described as an application of techniques, tools and knowledge on the activities of a project in order to meet the requirements.

During the module one of the assignments has been to create a work plan for the final year project. The proposed project chosen is created in a game development environment where unfortunately the experience that I have is not significant but by developing the project plan I have been able to understand the necessities and stages to be followed for project development and acquire knowledge about establishing the requirements and time frame for different stages in the process.

The project plan has been divided in four different stages to be completed:

* Develop a *Project Charter;*
* Create and display a *Work Breakdown Structure;*
* Develop a *Gantt Chart;*
* Present the four larger task and explain the allotted time frame.

During the assignment I have gained knowledge constructing a Gantt chart and developed insights about the amount of work required to complete the development process and calculate the time estimate required for each individual project task. The issue that I have encountered is that a Gantt chart has been produced until a certain point by a specific free software called *MS Project* which has been deprecated and removed from use and the software in place to produce Gant chart at present comes at a very high cost, reason that pushed me to research free techniques of building a fully functional software. This experience has increased my confidence in my abilities to produce a final year project and use the skill gained from previous experience to aid in the development process of my project.

In the assignment I had to identify the exact tasks and establish with the stakeholders the precise scope of the project to develop manageable requirements. Being the first project of this nature, I have realised that I will need to put development plans in place to meet the project requirements and project deadlines. The experience has given me confidence that I will be capable to develop the proposed project.

# Communication

## Confident in Writing

Before attending the courses of Ulster University, I did not have much experience in writing. Writing an email or a report seemed as a common thing, just through in the main things, explain roughly the point that you want to present and click the send button considering that whatever was written in the email would be sufficient for the receiver to understand its purpose.

Since attending the universities’ courses my experience enhanced through practice and feedback. A number of assignments had to be produced during the school year, assignments that have been different that I all that I have written before. The feedback received on the first assignments has helped me understand the steps required and the research to be conducted to produce a valuable paper. The presentation and the construction of an assignment can make the difference between a pass or a fail grade.

At the beginning, I have not been very comfortable with writing school papers as it seemed a tedious process compared to the methodology that I have used until that point, but the results that I have managed to produce after the initial feedback have been very promising from my point of view and I became very keen in developing writing skills to help me produce valuable work. I have developed research and presentation skills that are constantly pushing to increase the quality of the final product and making the process more pleasant. If you are aware of what you need to produce and have the main ideas of how to develop the product, the end result will be satisfying.

The improvement that I have made during my time at the university can be measured from the marks received on my first assignments in the first year and the ones from my last assignments over a duration of two university years. If I have started with marks of 60 points out of 100, I have reached at this point marks of 87 out of 100 and a very satisfying feedback.

## Understand Other’s Point of View, Listen Actively

As a medical equipment engineer, the business of the company I was working for was also selling medical equipment at request. According to my job description, when a purchasing request had come in for the company, I was in charge of managing the sale. It involved several discussions establishing the requirements of the equipment, the capabilities and the most important feature of all, the price. The first meetings to attend to where the ones with the doctors, the end users of the equipment, to understand what exactly they need or what needs replacing. It was quite important to listen to the requirements as medical equipment comes at high cost and it is very important to suit the needs of the end users regardless of price aspects and capabilities. The equipment to be sold had to be exactly as the established requirements and most importantly to have similar usage functionality as the ones that the end users were familiar with, to skip the dull process of intensive training. Most end users will not allocate much time to this process as they have requested equipment that they are familiar with, sometimes not considering the fact that what they have been using has already been deprecated.

Through extensive research I have always managed to suit the needs of the end users and deliver a top of the range equipment that would suit its purpose and include extra functionality that will enhance the satisfaction of the end users. Unfortunately, this came at a high cost generating discussion with the end user’s marketing team but at the end of the day in the medical equipment field, the end-user is always right.

I have also enhanced my experience in the various group projects that had to be completed as a student at Ulster university. Long discussion had to be carried out to establish the best developing approach and divide the work between the group members. During group projects, several problems have arisen, and some members of the group needed to pull the weight of others but by discussions and listening to their point of view we managed to get the project completed on time and keep everyone happy.

# Improving Performance and Self-Learning

## Manage and Order Time to Meet Goals

When beginning the courses of Ulster University, my major problem to start with has been time management. Not being accustomed studying part time and keeping a job at the same time has proven to be a struggling point at first. Working full time, having a family and starting university brought major changes to my time management skills. At first, I found myself leaving everything to the last moment as I was not aware of the time required to complete a task at a university level.

To manage the future situations, I have started planning the assignments in advanced as soon as they have been released, assigning time to task completion for each process to avoid the struggle before the handover date of the assignments.

Working full time as a builder during the days I didn’t attend the university, I did not have much time to manage. Not working the full week meant that I had to work for as long as possible adding hours to afford a certain life style, even though my wife had a full-time job. Time to study was limited and I had to use all the chances that I had to advance with assignments planning.

Studying, I have learned how to manage my priorities and realised the importance of knowing what they are and how to keep them on the right track. The most important one has been to finish the university and getting a degree.

The third year of the university has become more challenging as I have become a father, and further intensive time management was required as the new family member has needs that have to be fulfilled and extra work time was imperative. Fortunately, my job as a builder become easier as I am only required to train the new employees, the work that I have to do is quite mild, and the task would not bound me in certain days to the normal working hours as I would just pop down at work for a few hours to check the quality of the work done by the apprentices, give them some pointers on how to continue and spend the remaining time focusing on my priorities. The main drawback is that attention to details must be used at maximum capacity in assessing the capabilities of the new employees and assigning them their task, as one mistake on my behalf can have an expensive outcome for the company.

## Cooperative and Independent Learning

The concept of independent and cooperative learning has made an impact in the final year of the university. In one of the modules, *Mobile Technology,* as an assignment, we had to develop an application to track the day by day emotions of the user. The application would allow the users to log in and track their mood at a certain moment of the day according to their location and the triggers that have led to a specific emotion. The tutor stated that the application can be developed in any platform of our choice regardless of the IDE or programming language as long as the decision can be justified.

As stated earlier my experience in IT is mild and so far, the most interesting software that I have camo across in the university has been Android Studio. Upon further research, after realising that Android Studio was a software in continuous change, most of the libraries would get deprecated in only a few months, I have guided my attention to a different software capable to develop mobile applications, which was familiar from past experience, *Intellij Idea.* I had help from my tutor in developing a small part of the application and also got help from different forums specialised in android app development. As I progressed with my app development, I needed to implement location features for mobile apps which led to the crash of my development environment. The crash had such an extent that the development environment is not functional at this point and had to search for alternative platform to build my app in a very short time frame.

After some research, I had come across a developing platform with low code, *Outsystems,* easy to learn and developed for building apps in record time. I have started taking a crash course in *Outsystems mobile,* as the mobile platform would be more suitable for the application. The course was quite limited, but it did help me start on my app development as I only had two weeks until the deadline. Fortunately, the platform offers extensive help to developers, if anyone would encounter any issues, with the help of the developing team they would be guided on the right track. Due to my limited time frame, every time I have encountered a problem, I would be assisted by the developer team and they would help me stay on the right track. I have been guided to numerous tutorials where I could find the necessary explanations for the problems that I have encountered.

The application is still not completed, at this point there is still some time until deadline but learning independently and asking for help whenever needed assisted me in having the app 60% completed in just under three weeks of development, which is quite impressive.

# Problem Solving

## Generate New Ideas and Visualise Current Ideas in a New Mode

My final year project relates to a game development environment. With the advancement of technology, new and highly realistic games are being released every year. Unfortunately, with every game, the hardware components related to the rendering device need to be upgraded nearly every time a game is released.

In a game software, all the processes start from a single class, called the *Main Thread*. The more complex the system is, more processes will be deployed from the class taxing the rendering capabilities of the system due to a queue that is built by the main thread for all the processes to access the features of the CPU. The problem is that, all the processes must synchronise with the main thread at completion. The aim is to reduce the amount of processes deployed from the main thread and create individual processes that will begin outside the bonds of the main thread and only synchronise with it at task completion taking advantage of the architectural construction of the CPU in regard to resource sharing. By successfully completing this project the software developed could be implemented in game to improve the rendering capabilities of the software and with every new game release, device upgrades would no longer be necessary.

With the success of the project major improvements can be made in enhancing the environmental awareness capabilities of the AI game objects, upgrades that have not yet been done to avoid taxing the rendering capabilities of the CPU by the processes. The requirements of the project have already been set and the development process has been started for the main objectives.

Significant progress has already been made in upgrading the features of the AI game object and improvements have been added to the rendering capabilities of the software. The AI would benefit from improved programming software which will allow a dynamic game play development and enhance the AI’s programming to a level that it can make use of the surrounding environment for an improved game experience.

The meetings with the stakeholder have had a successful outcome due to progress made and improvements added. Research is still being conducted in regard to tempering with the multithreading process, as this is something that has not yet been done but its successful development would bring major benefits to the game development environment and users game experience.

## Systematic Sequence of Activities

The experience in this area has been developed while producing the project charter for the final year project. Until this point, I have not completed such a project and a plan was required to establish the precise development stages. A project charter has been developed to establish a development plan, which included a Gantt chart with the stages and the milestones dates of the project.

The Gantt chart has put in perspective the project scale and the amount of work required to complete all the stages until deadline. The chart has been made as accurate as possible using the PERT method as timescale estimate. The PERT method calculates the optimistic and pessimistic timescale for each task in an equation and produces the most likely time for task completion.

I have already started guiding the project according to the Gant chart to keep the project on the right track, complete the work on time and try to predict any problems that might arise during project development. It is important to highlight all the risks that can have a negative impact over the process development and have countermeasures in place to assure a progress development. As an example, a major risk is losing all the date gathered to this stage which can be a turning point for development, as I would have to repeat all the stages completed and have a huge impact on the time frame allocated to project development. To counter this risk, data backup is made frequently and kept on separate storage devices to have a starting point if data is lost.

Throughout the process I have acquired the ability to work after an establish plan and complete tasks in a methodical order.

# Working in a Team

## Team Performance

In my job description as a medical equipment service engineer the most important thing stated was teamwork. The maintenance and service process required a minimum of two individuals due to the nature of the environment. Often the company would require the personnel to evaluate one another from an employee perspective, to be able to tackle any issues that would arise from lack of training, workflow or determination. The company begun with five employees, me included, and along the way staff was hired due to continuous work flow increase. I have been trained by colleagues from the company with vast experience in the field and in short time I was appointed to be in charge of the sterilisation equipment, maintenance and service. Needless to say, that all the evaluations, while in a group of five, has been outstanding but things have changed soon enough with new employees.

It was important for the company to have well trained staff going through hospitals for service and maintenance and it was quite hard to have graduate students to work straight out of school without any experience whatsoever. All the older employees have been assigned to train new employees for a period of two weeks and do an evaluation at the and. The evaluation would decide if the apprentice would get hired or made redundant.

It was important to have a positive attitude when evaluating the performance of a team member and it is important to underline the positive aspect in a process even though the work carried out has not been satisfactory. During training, I have realised the reaction of different people to different approaches and that rewards will always lead to improved results.

From all the individuals that I have trained, I still keep in touch with one of my best trainees, who at this moment, through hard work and dedication, has its own medical equipment maintenance ltd, has a good turnover and always asks when will I return home to help him further build up his company.

## Work with Others to Achieve Results

As a medical equipment service engineer in the sterilisation equipment field, every year in a hospital extensive maintenance work was required to be carried out for all the sterilisation equipment. Every hospital has a floor allocated for the sterilisation equipment where all the gear, consumables and medical instruments are sterilised at least once a day. This process depends of the number of patients and medical cases in the hospitals. The maintenance work would consist in stripping down the whole steriliser and replace all the taps, electric wiring, pipes, resistors and any other worn out components.

It was a tedious process at first , and in a group of four the hole process would last up to a week and half. To acquire a new industrial steriliser would have been very taxing for a hospital and the maintenance process would have been five times cheaper. The cost of the whole maintenance process would get to around 12000 GBP (in 2006) and was quite profitable for the company even in the above-mentioned time frame.

I was asked to build my own team with company employees and start the maintenance process at the beginning of the year as the number of the medical sterilisers scheduled for maintenance was rising. As team leader I was in charge of the operational process and assigning tasks to different team members. It was important to keep focused on what any of the team members could do so that I could further advance the maintenance process. As the maintenance process would finish on one steriliser and start on another, more experience has been gained along the process and the time allocated for the task has decreased dramatically. Everyone became familiar with the process and the tasks assigned and the work flow was continuously improving. From a maintenance process that was programmed to last a week and half, my team has managed to complete the process, and keep the time frame in the future, of three and half days adding to the company’s turnover 12000 GBP every four days, money that have been used for training, improving the work conditions and providing new work equipment.

# Security and Ethics

## Security Threats and Countermeasures

The only experience I have in security has been accumulated attending the *Networking* course of the *Computing System* module. I have gained insights of computing systems threats and countermeasures. We were given the opportunity to test different applications and handle different security problems. In the laboratory sessions a special software had been used, *Wireshark*, an open-source packet analyser used for network analysis, communication protocol development and software development. It was a very interesting subject that has given me insights over the potential security impact over future software systems and scored an average of 68%.

## Legal and Social Considerations

In my personal opinion, social, ethical and legal considerations are terms which are taken in considerations by an individual on a daily basis.

In the medical industry field my team members became my friends but during work hours I was seen as the team leader. During work hours it is important to keep a professional attitude and even if one of the team members has a bad performance it’s mandatory not to cause any suspicions of favouritism.

With the medical business growing and slowly removing the competition from the market I was approached on several occasion by different companies of the same profile with profitable job offers in exchange for minimum information regarding the activity of the company. Needless to say, I have politely turned them down considering my current position at the time in the company and the fact that the company was continuously growing, offering new opportunities and development.