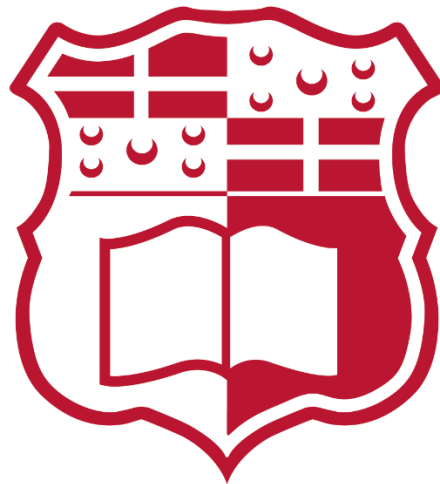


Automating the New Programmes of Study – Stage 1 Form

Ethical Submission



Andrea Naudi - 29698M

Kurt Camilleri - 145498M

Nathan Galea - 265298M

Nigel Alfino - 446998M

Contents

1. Introduction to the general domain where work will be carried out ...	2
2. Task Definition	3
3. Research into the matter(s)/domain(s) relating to task(s)	6
4. Overview of any similar and/or existing solutions	8
5. Proposed Solution	10
6. Ethical Considerations	11

Chapter 1: Introduction to the general domain where work will be carried out

Academic reputation is one of the main factors that deem a University successful. A University must have a reliable and convenient way of coming up with new, innovative, quality and professional programmes of study to be offered to its students. Courses must be designed to accommodate the needs and demands of the evolving market, and it is of vital importance to include (and get help from) any necessary professionals in the process of designing a course. In this way, the students taking the course can be given the necessary skills and dynamics required in the outside world. The process through which academics propose new courses has to be relatively easy and straightforward as many people are involved.

The University of Malta (UoM) enables academics to propose new areas of study, so that it can move forward in this progressing world and keep up with the demands of the Maltese and foreign markets. However the process of creating new proposals for new areas of studies has some problems to it. This process revolves around a relatively old PDF-based system. The form (which will be discussed in more detail further on) is passed around to all the people involved, in order to obtain the necessary data and validation involved.

The Academic Programmes Quality and Resources Unit (APQRU) is to provide administrative support to academic staff in the planning stages of new and updated programmes of study in order to ensure that the processes (which ensure quality outcomes) are followed. All new taught programmes must be validated, using the validation process set out by the University itself.

Throughout the march of technology, the process of transforming a PDF or paper-based system into an online system was (and still is) a very common practice. Some companies and organisations are still using old systems; maybe because they are afraid of change, maybe because they are afraid of putting their information online in fear of security. Whatever the reason, it shouldn't stop them from changing to better and modern practices. In fact many organisations (even in Malta) have started taking on the challenge of adopting these better practices. Some examples of such Maltese systems will be given later on.

With the work we will be carrying out, we will be helping APQRU and the University of Malta in improving the Programme of Study process.

Chapter 2: Task Definition

In order to plan a new academic programme, the process is divided into two main stages:

- Stage 1 concentrates on the practicality and feasibility of the idea generated within the overall vision and strategy of the University.
- Stage 2 focuses on the design and detailing of the academic programme given that the original idea has been approved in principle by Senate (and Council if applicable).

To propose a new Programme of Study, Programme Originators (academics) have to fill in the Stage 1 Proposal form. This form is then submitted to APQRU, who ensure that the form filled in is of standard quality. Then the form is checked further with the Programme Validation Committee (PVC) and the Senate. This form is currently in PDF format which makes it hard to track changes and makes collaboration very difficult. This system is currently presenting a number of problems such as:

- Losing track of changes
- Leaving important things out
- Forgetting some details

These factors all contribute in making this process a very long and bureaucratic one. Collaboration and teamwork is important in this form since a small group of people can come up with a proposed area of study together and need to work and collaborate together in filling up this form.

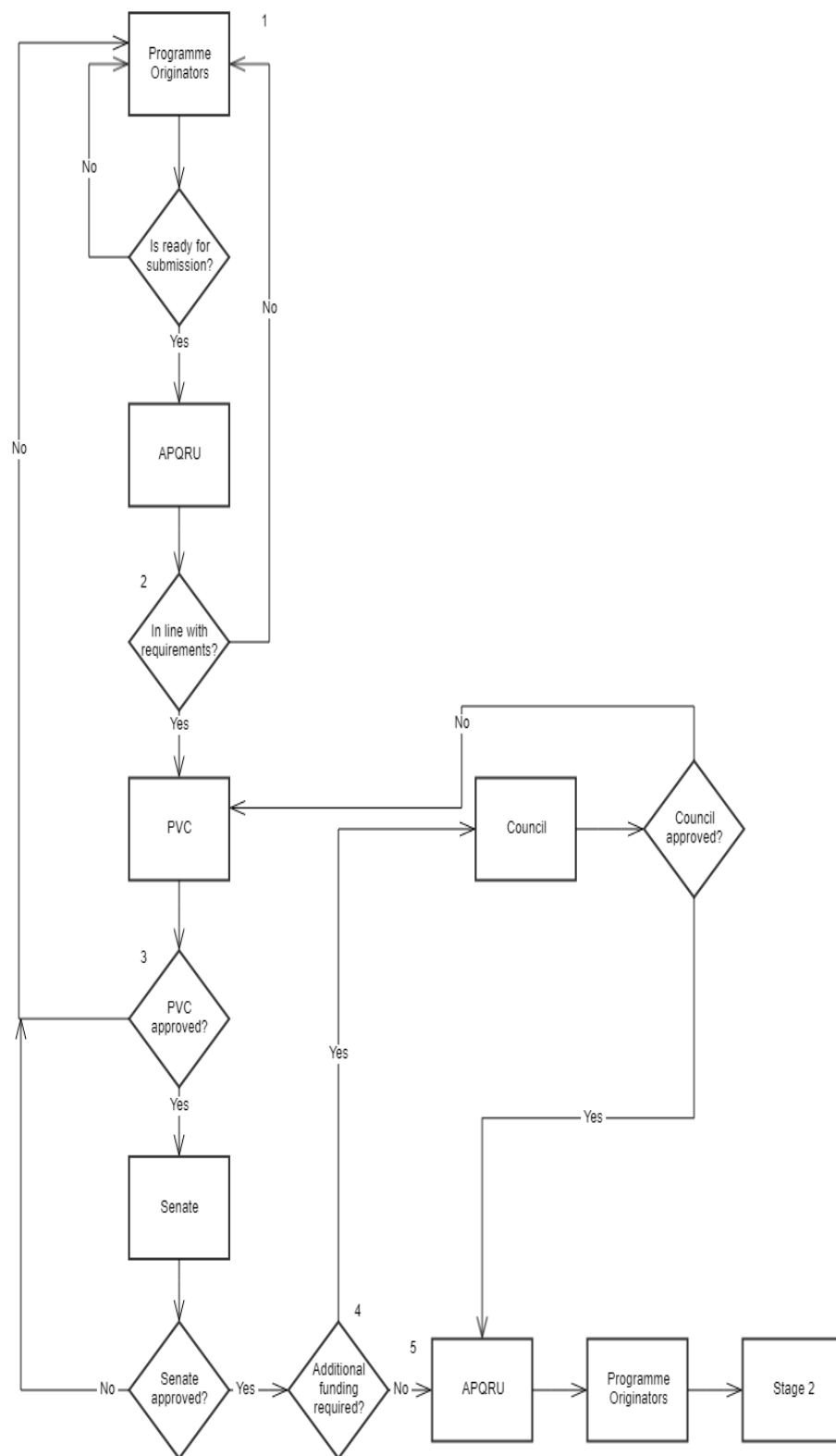
Compatibility of devices is also an issue, since the form may work properly on a user's laptop since s/he is using windows, but on the other hand a Mac user may have issues in filling in the form. APQRU receives plenty of complaints on these issues and something has to be done, in order to solve these problems. The University feels these could be addressed if a web application is used.

Therefore, the task at hand involves creating a real-time and collaborative web based application to replace the Stage 1 PDF-based form. We are required to design a system which allows academics to propose new Programmes of Study. Apart from proposing a new course, the system must allow the academic to share (and invite) the proposal with all the required people so they can work on and design the course in collaboration with each other. Furthermore, the system must allow the Senate, Council and the involved faculties, departments, and committees to either accept or reject the proposed course.

In simple terms, we must automate the Programme of Study Stage 1 form and make the Programme of Study proposal process as highly available, efficient and collaborative as possible.

The full steps, per <https://www.um.edu.mt/apqru/programmevalidation> are the following:

- Step 1: Programme Originators/Departmental Boards submit to APQRU the Stage 1 Proposal Form, which is intended to provide preliminary details of the proposed programme. The Stage 1 Proposal Form must be submitted through the Board of the F/I/C/S not less than 12 months prior to the intended commencement of the proposed programme. Stage 1 Proposals which are not recommended by the Board should be submitted to the PVC accompanied by an explanation why the proposal does not have the support of the Board
- Step 2: APQRU refers the Stage 1 Proposal Form to the PVC for preliminary approval, if in line with requirements; or to the programme originators for amendment as necessary
- Step 3: PVC refers to Senate for “In-principle” approval or returns the proposal to the originators. Recommendations of the PVC are expected to be discussed at Senate only if there is advice against the recommendation
- Step 4: If additional funds are required to run the proposed programme of study, programme development can continue subject to Council approval for additional funding
- Step 5: If “In-principle” approval is given by Senate, and no significant additional funds are required, Senate advises APQRU to inform programme originators to move on to the Stage 2 Approval phase



Chapter 3: Research into the matter(s)/domain(s) relating to task(s)

In order to understand better what is expected of us, we scheduled some meetings with our client, APQRU. Requirements elicitation was the main focus of this meeting. We were proactive in gathering the requirements, we asked questions and took notes of what needs to be done. We were able to understand their needs and the problems that they are faced with daily in order to be able to put ourselves in their situation. APQRU were very helpful in describing their requirements clearly and gave us some links for more information.

To further understand how the Programme of Study proposal process works we followed the given links which led to their page in the University Of Malta website: <https://www.um.edu.mt/apqru> which had information on the steps that a proposal goes through in order to be accepted as a new area of study. In the website we found out many helpful things, and we could understand APQRU even more because we had a better understanding of the whole process. The website had information on:

- The different roles of all the people involved
- An overview of the process
- Issues that must be considered when planning and designing a new Programme of Study
- Information on the Programme Validation Committee (PVC)

After designing some prototypes of the system, we scheduled another meeting with APQRU in order to obtain some much needed feedback from them. Most of our ideas were liked and accepted. Together we came up with even more features and amendments for the system. New ideas also helped raise discussion which helped us gain an even better understanding of the current process.

We then started to research different technologies available to be able to do what is required. We researched different web frameworks and APIs until we eventually settled on ASP.Net MVC and the Google Realtime API (which we set out to learn about shortly after). We also researched about what back-end technologies and databases we should use and how to handle and store the data that we will have safely and securely. We conducted research on Entity Framework, database-first and code-first approaches.

The members of our team did research on different areas and then we would discuss what we found and learned from the research we had done. Team members specialised in different areas, some members were more oriented to learning the ASP.Net MVC framework, while some focused most of their research on the Google Realtime API. This helped in making a more thorough and complete research. Through frequent updates and discussion, every team member knew what was being researched at all times during the process.

As a team, we also researched some existing online forms (examples in Chapter 5) to get a good idea of how an online form should be structured, validated and navigated through. Research was also carried out by creating various code prototypes of different aspects of the system. An example of such a prototype was a test project to learn about Google Oauth and how it could be used in conjunction with ASP.Net MVC. This testing prototype included:

- Validating an email address to only allow UoM addresses
- Styling the login button appropriately with Google's standard colours

Another test prototype was developed to learn more about forms, navigation, creation and linking of objects, and eventually storing the data correctly in a database.

The final code prototype was developed to learn about Google's Realtime API and how it works on web forms.

Such prototypes will have vital importance at later stages as we would already know a lot before even starting to code; allowing us to predict code behaviour, prevent certain problems and avoid certain mistakes.

Since most members of the team had little or no experience using Git and/or Github research had to also be carried out about them.

Chapter 4: Overview of any similar and/or existing solutions

Being that the task is to change a PDF-based system to a web-based one, many similar solutions exist. Our application is very similar to a lot of application forms available online, some good examples being:

- Maintenance grants and stipend applications
- The University Course enrollment application
- Mita's Student Placement Programme application
- Various government applications

These forms are all similar to ours as most of them require logging in with one's electronic ID account, filling in the data, which is then validated and finally submitted. At a point in time, most of these systems were all paper or PDF-based until they were eventually transformed to become available online as web applications. Like these online forms, our form will have a sequential flow with validations at each stage. A huge advantage of these forms (and ours) is that they are highly available anytime anywhere since they are online. One major disadvantage of paper/PDF-based forms is that only one person has the updated form after an edit. This has to be emailed or sent to the rest of the team after each change. Obviously our form eliminates this setback as everyone (granted they have access) will have updated data.

The form itself is quite innovative and customised for APQRU and UoM. As a group we did not contact any other universities to guide us by showing us their proposal process, as APQRU were very helpful themselves and this project is tailor-made for them. This means that the form is similar in function (to other online forms), but innovative in concept as this will be the first of its kind for APQRU and UoM.

However this does not mean that all the aspects of our system are brand new. The real-time aspect will use the Google Realtime API, making the application similar to Google Docs, Google Slides and Google Sheets. The mentioned applications allow a user to create documents, presentations and spreadsheets and store them on the cloud. The user can then share his/her work by inviting other users, allowing them to work in collaboration. Our system will work in a very similar manner to this concept. These types of applications are widely used and effective in reducing the workload and hassles of doing it all in paper or PDFs which can result in loss of data or more cases of human errors. We will be using these best practices to ensure a well built application is delivered to our client.

Another aspect which can be compared to other systems is the form itself. The form will use Bootstrap components, making it work in a very similar manner to most online forms one can find on most websites. On top of this, the form also contains specialised components, such as date pickers and multiple-selection dropdowns. Such

components can be considered as existing solutions as we are not going to create them ourselves.

Since our clients are APQRU and UoM, users will login with their personal UoM account, making the login process similar to that of the VLE, esims and the UoM website. Like most sites on the web, different users will be able to do (and see) different things on the application; i.e. different permissions. For example an academic will be able to create a new proposal, however only a Dean, Director or a Head of Department will be able to sign one.

Finally, the visual aspect of our application can be compared to that of the UoM site as we are required to use the same color scheme, logos, layout, etc. Since UoM have recently updated their website, we had to look into it to design our application in a similar manner.

Chapter 5: Proposed Solution

The Stage 1 Proposal form has to be transformed from a PDF-based one to an online form, which will allow multiple users to collaborate together in real time. Being on the web, it will be compatible with different devices and operating systems. By doing so many problems with this form would be solved and so the process of creating a new proposed area of study would be much more efficient and convenient.

The solution we are proposing is a very structured one, since we are required to replicate the PDF-form and not start from scratch. Users (apart from external reviewers) will be required to login using their UoM account credentials. Views are then dependent on the permissions the logged in user has. The fillable form will be available to academics. This process is identical to the PDF Stage 1 form itself, having the same sections and fields. A good feature about our solution is that the user can skip through different sections of the form at any time, without needing all the required data to continue. This check will then be done prior to submission. Deans will then be allowed to accept or reject a proposal by pressing a 'Sign' button.

An academic can give permission to others at any point in the process, allowing them to work in collaboration. Since many people will have access to the form, we propose keeping a track (history) of all the changes being made at any point in time. This will take our application up a notch by making it more secure and protected as well as giving it a version control aspect.

APQRU members will be able to view the areas of study being proposed and also create comments, which will be visible to academics. This feature will make the form even more collaborative than it will already be. Comment fields will be available in different sections of the form allowing comments to be aimed at specific sections or fields. The form will then be further checked by the PVC and the Senate.

If the proposal will be accepted it can move to the Stage 2 form which we will not be going into.

Apart from building this process correctly we are also proposing additional features to the system. Firstly we are planning to use a dashboard layout. On login users will be presented with multiple dashboards making the system more pleasant to use. Proposals will be classified into different sections such as:

- My Proposals (those created by the logged in user)
- All Proposals (those shared with and created by the logged in user)
- In progress
- Submitted

Another additional feature we would like to include is allowing users to generate a PDF with the details of the proposed area of study.

Chapter 6: Ethical Considerations

Ethics can be defined as *“a code or set of principles by which people live and [that] involves a process of self-reflection”* -Kesar and Rogerson 1998

We will need to take some ethics into consideration; the reason for this being that the ICT field is changing exponentially. Therefore there are some policies and laws that we need to adhere. Also, we need to consider ethics because ICT is a profession which fits in practically with all the domains one can think of.

Since our web application's main aspect is data, our main ethical dilemma is related to data issues. We have to ensure that the data entered and used by the system and its' users will be used accordingly in alignment with all the stakeholders involved. The data will not be used in any way which breaches the Data Protection Act.

Since the application is web-based, the information of the system is obviously more at risk than if the system were offline. We have to ensure that the system is as secure as possible and that the data can only be accessed and modified by users with granted permission.

On another note, the application should in no way offend users emotionally, religiously or personally. The application should be generic in usability so users can get accustomed to using it. The solution should work exactly as promised to APQRU and all the requirements promised should be met. Also importantly the software will not be used in any way for malicious acts.

The application should be easy to use as software with a bad UI design will demotivate the user to even use the system. On the contrary having a good system will help the user get work done more efficiently. We must also cater for those users which are not very ICT-oriented.

After several meetings and discussions we identified the main stakeholders:

- APQRU
- The University of Malta and all its faculties, departments, institutes, boards and committees
- Senate and Council
- All the academic officers involved
- External reviewers
- Prospective students

APQRU is the body responsible for making sure that the justification for introducing the programme is valid. It is important to check at each stage of programme development that the proposals being made conform to the regulations of the University, applicable to all undergraduate and postgraduate courses. The regulations are the framework for course design, providing important guidance on such issues as levels of study-units, credit allocation, minimum credit requirements for different awards, etc.

The University of Malta and its entities are the sole owners of the data entered into the system. As previously stated this data should be only available to the allowed people at the right stages. Just because someone has editing rights to the proposal data before submission does not mean they have the same rights post-submission. University and its academic officers have to make sure that the study units offered are of the required standard and in no way offend any student.

Senate is responsible for approving academic programmes offered by the University. Council is responsible for approving additional funding for implementing programmes of study (if required).

Academics (programme initiators) should take into account all resources required to implement the programme of study, as well as the expected number of students to be admitted in considering the financial viability of the programme. Introducing a Programme of Study without the adequate funds and resources would be very unethical. Imagine signing up for a medical course at a University which doesn't have science laboratories. Furthermore, resources have to be available to all registered students.

Academics and the PVC may include external reviewers to evaluate certain programmes. These reviewers (and academics) should be ethical by keeping confidential data private. Furthermore their private data such as address, affiliation & position and contact information should only be accessible by the allowed users. This is the only personally sensitive data this system will be storing. This data is being collected for referral purposes by academics. On request, UoM has the duty to show the reviewer in question all personal data held, and even delete it; to adhere to the reform of the EU's data protection legislations.

From our part, an unethical action would obviously be breaching either the University's data, any financial data (the Income and Expenditure statements) and personal data belonging to external reviewers (see paragraph above) ourselves. It is also our duty to make this data secure and not vulnerable to hacks. Another unethical action would be designing the interface with only one user group in mind. Consequences could include many complaints and even removal of our application. Although unlikely to happen, there is always a small risk therefore we have to follow each piece of feedback given to us by our clients and our mentor.

We are well aware that maintaining accuracy and security will be one of our main responsibilities. The fact that we will have data in our hands implies that we too are subject to these rules. Apart from this, we need to make sure that the data the system collects is indeed necessary.

Some ethical principles that we will be practising:

- We shall accept full responsibility of our work.
- We will approve software only if we have a well founded belief that it is safe, meets specifications, passes appropriate tests, and does not lower privacy or harm the environment. The ultimate reflection of the work should be to the public good.
- We will not in any way use software that is obtained either illegally or unethically.
- We will ensure that any document upon which we rely on has been approved by someone authorized to do so.
- We will identify, document and report to the client in the case that a project is likely to fail or will not be able to meet the requirements within the set deadline
- We will disclose to all concerned parties those conflicts of interest that cannot reasonably be avoided or escaped
- We will ensure to give credit where it's due and will refrain from taking undue credit.

Regarding usability, although pleasing everybody is impossible, we will do our best to design the system in the best way possible. We have understood the needs and problems of the client, so now it is up to us to give them what they want. Another issue with ethics is that we have to be our own judge to what is right and what is wrong.

A real world ethical dilemma is that the situation may come to a point where doing something can be right and wrong at the same time. We have to act on our own morals and on our own beliefs on what is good and beneficial. Obviously no one should act on what s/he thinks is not right because that will only bring harm to oneself and the reputation of his/her colleagues.