DMK Final Project Proposal

MSc Game Development (Programming)

Course Director:

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Student Name:

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Project Title:

Virtual University

Allocated supervisor:

Vasileios Argyriou

This proposal has been developed in consultation with the above supervisor, and he is happy to supervise this project.

The type of project proposed is a BODY of WORK

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Abstract

This project will be to create a Virtual University game, incorporating features from the Role-Playing Game genre, based on previous research conducted by (Argyriou et al., 2010). This will be a Massive Multiplayer Online game, allowing many students and academics to simultaneously be immersed within the world. The initial purpose of this Virtual University will be to provide online Lectures, Workshops, Tests and Report Submissions, within a fun and exciting environment. The artefact will be developed at a high-level, utilising existing libraries and assets where possible.

Introduction and Background

This proposal, inspired by the research conducted by (Argyriou et al., 2010), aims to apply the concept of a Virtual University as a Role-Playing Game. Since this paper was presented back in 2010, technology has moved on considerably, which now makes this concept far more feasible as an implementation.

This is an exciting concept, as it could provide access for those unable, for whatever reason, to physically attend their desired university. Also, students that do regularly attend, but due to situations beyond their control, miss a lecture or workshop, could utilise this system to still interact and obtain the missed learning experience.

The Virtual University, would predominantly be used by University Academics and Students, making these the two predominant profiles that can access the system. Each profile type would have different needs and access requirements, for example an Academic will require administrative tools, whereas a student profile would require participation access.

A Virtual University implementation would provide huge benefits to Kingston University, for both its academics and students. For Kingston University, they could expand their geographical reach for potential student enrolment. Academics will be able to virtually contribute to lectures, workshops and assignments, on a streamlined, ground-breaking system. Students will be able to participate in an exciting, social and interactive environment, within a gamified learning experience, regardless of their physical location.

Similar work in Virtual Learning includes 'Frog Play', aimed at a younger audience (High School Students). It provides a fun learning environment, where students can make an avatar and perform activities. The results of the activities, including 'quizzes, games, and reports', are ranked on a leaderboard, adding a competitive element and encouraging repeat use (Frog Play, 2018).

Aims and Objectives

The aim is to develop a Massive Multiplayer Online game, within a Virtual University environment. The genre will be a Role-Playing Game, with the target audience being University Academics and Students.

The implementation process will be high level, utilising tools and libraries where appropriate. Initially mobile will be targeted, but consideration will be given to also include access via desktop devices.

The locations within the Virtual World, will include Academic Offices, Lecture Theatres and Workshop Labs. These will form the primary locations within the virtual world. Future expansions could include social, entertainment and learning resource environments.

Academic Offices will be used to provide a location, where an academic user will spawn and provide the setting for administrative activities. For example, the administrative features will include, preparing a lecture, setting up a workshop lab, preparing quizzes, and reviewing student submissions e.g. reports. The location, should also be the go to place, should a student need to interact with that academic user.

A Lecture Theatre will be the location, that the student will attend to view lectures. These lectures can be built within the environment, by an academic user uploading them as a MP4, AVI, PDF, JPEG or WAV files, as well as including mid lecture quizzes or one-off questions. These quizzes or questions can break up a continuous lecture, deterring students from clicking play and walking away.

Workshop Labs, which students can visit and perform lab activities, will be interactive. The academic user will be able to choose the type of activity to prepare. A relevant toolkit interface, will allow the user to craft a lab, based on the setting of conditions that will lead to the correct solution. When the student performs the task, immediate feedback should be presented, based on the current attempt.

The following is a non-exhaustive list of potential features by user type:

Academic User	Student User
• Create avatar	• Create avatar
• Update profile details	• Update profile details
• Create lectures	• View lectures
• Create quiz	• Complete quiz
• Create quests	• Participate in quests
• Create assignments	• Upload assignments
• Create lab	• Participate in labs
• View submissions	• View feedback
• Feedback submissions	

Additional gamification should be considered for the student user, such as skills, attendance, achievement and leaderboard.

Technologies and Resources

Game Engine

The game engine to be utilised for this project, will be the Unity 3D engine. This is due to familiarity with the engine and the belief that this engine will serve this type of project best. There are currently two versions of Unity that are being considered, these are Unity 2018.1.0f2 and 2017.4.2f2 LTS. The 2018 version has current, cutting edge features, which can be found at (Unity Blog, 2018). The final version of 2017 provides LTS (Long Term Support), which means this version in its current form, will receive continued support for two years (Unity, 2018), the downside of this is the lack of cutting edge features. Once implementation starts, no future Unity patches will be applied, unless they fix an issue causing problems during development. This is due to patch updates losing Web Build support, eliminating a potential target platform that could potentially be deployed to. Due to potential incompatibility with the third-party tools that will be utilised in this project, both Unity versions will remain in consideration until development.

IDE and Development Tools

C# will be the programming language implemented. Any coding required, will utilise the Visual Studio Enterprise 2017 IDE (Integrated Development Environment), the most recent version is 15.6.7 (Microsoft, 2018). Alongside Visual Studio, JetBrains ReSharper 2018.1 (JetBrains, 2018) which provides features such as, code editing helper for improved intellisense, auto include namespaces and quick refactoring. During development, regular commits will be performed to a private Git repository, which will be accessible to both student and supervisor. GitHub will manage the repository, every commit will contain a heading message with comments, defining what has changed since the last commit, only compiling code will be committed. This Git facility is also very useful for keeping an accurate account of the development history.

Third Party Tools and Assets

As this is a high-level development project, the use and selection of third party tools will be key to the successful completion. The first tool that will need investigation, testing and implementation is uMMORPG, which "is a simple and powerful, Unity MMORPG Solution that contains all the Massive Multiplayer Online Role-Playing Game core features" (uMMORPG, 2018). uMMORPG and the environment asset which provides a University / School environment by (Tirgames, 2018) have been obtained by the project supervisor. Further tools and assets may be applied to this project throughout its lifecycle, if necessary this will be discussed in detail with the supervisor, prior to implementation.

Method and Workplan

Project Management

Once the proposal has been accepted, the workflow will follow through the following stages, some iteration across several phases will occur, as is normal for an Agile ideal. The work methodology will encapsulate some of the key features of the Scrum and Kanban, such as Sprints, Backlog and User Stories to define, plan and implement the project. (Taiga, 2018) is the management tool that will be used, as it is lightweight and distraction free whilst still containing the necessary tools, such as those needed to create a Kanban board, which will be used to maintain the project workflow.
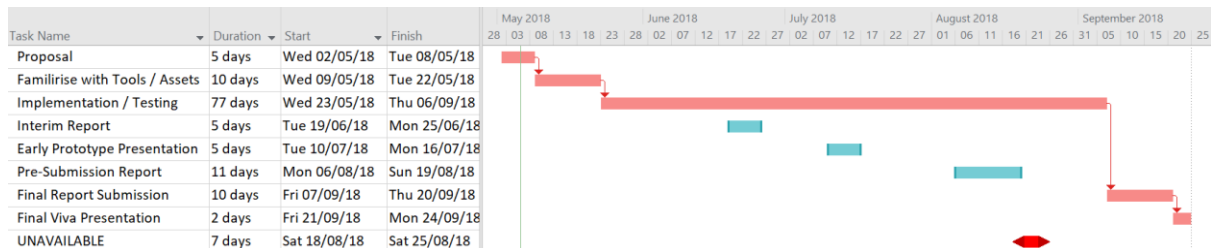
Milestones

The main milestones for this project:

1.   Proposal Submission (08/05/18)
2.   Interim Report (25/06/18)
3.   Early Prototype Presentation (16/07/18)
4.   Pre-Submission Report (19/08/18)
5.   Final Report Submission (20/09/18)
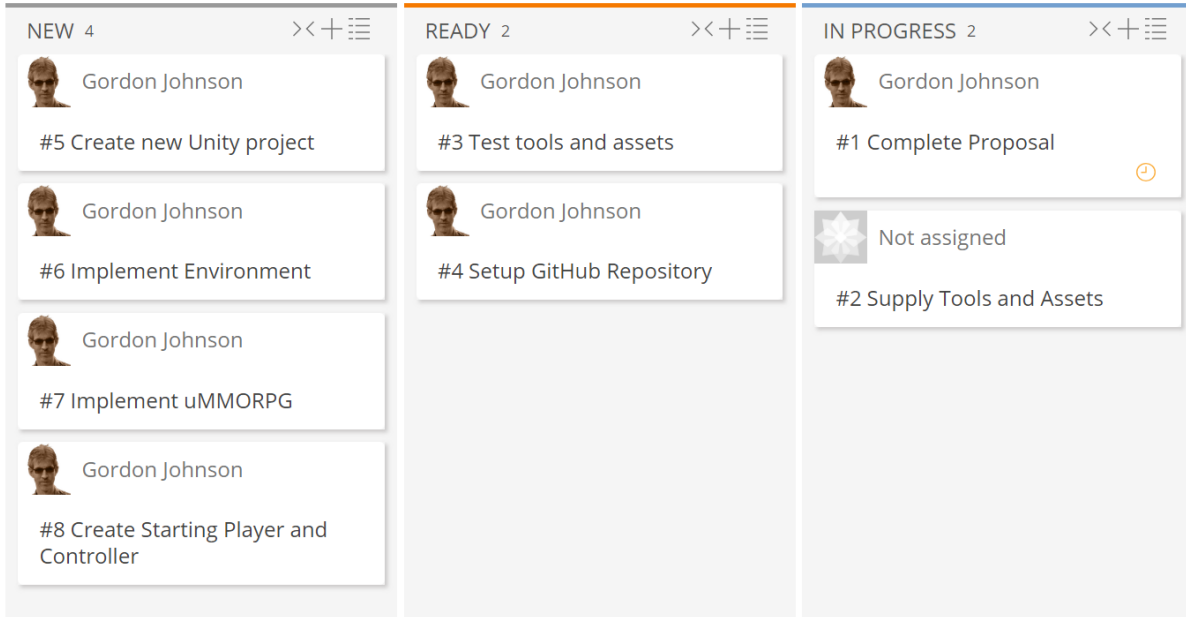6.   Final Viva Presentation (24/09/18)

Gantt Chart

The following Gantt chart contains the visualises of the main workflow, through to completion of the project. Specific user stories for the implementation and testing, will be added to the Taiga project management tool.

Task Name	Duration	Start	Finish
Proposal	5 days	Wed 02/05/18	Tue 08/05/18
Familirise with Tools / Assets	10 days	Wed 09/05/18	Tue 22/05/18
Implementation / Testing	77 days	Wed 23/05/18	Thu 06/09/18
Interim Report	5 days	Tue 19/06/18	Mon 25/06/18
Early Prototype Presentation	5 days	Tue 10/07/18	Mon 16/07/18
Pre-Submission Report	11 days	Mon 06/08/18	Sun 19/08/18
Final Report Submission	10 days	Fri 07/09/18	Thu 20/09/18
Final Viva Presentation	2 days	Fri 21/09/18	Mon 24/09/18
UNAVAILABLE	7 days	Sat 18/08/18	Sat 25/08/18

Kanban Board

The following image is taken from the Taiga project management tool, for which some starting tasks have been applied.

VIRTUAL UNIVERSITY KANBAN

NEW 4

- Gordon Johnson — #5 Create new Unity project
- Gordon Johnson — #6 Implement Environment
- Gordon Johnson — #7 Implement uMMORPG
- Gordon Johnson — #8 Create Starting Player and Controller

READY 2

- Gordon Johnson — #3 Test tools and assets
- Gordon Johnson — #4 Setup GitHub Repository

IN PROGRESS 2

- Gordon Johnson — #1 Complete Proposal
- Not assigned — #2 Supply Tools and Assets

Contingency and Risk Planning

Description	Likely	Severity	Contingency
Project is not feasible	Low	High	Reduce the scope of the project, remove elements that are no longer feasible.
Tools are not compatible	Medium	Low	Revert to earlier software, where compatibility is met.
Database integration not suitable for project	Medium	Medium	Design and develop own SQL database.
Implementation Issues	High	Medium	Utilise resources and peers to overcome issues.

Ethics and Security

EU General Data Protection Regulation (GDPR), would need to be taken in consideration for any data held on users, from testing through to deployment. This data could include email addresses and passwords but will not be limited to this and additional details maybe stored. Some of the key changes to consider from the (EUGDPR, 2018), include when a user is giving consent, it must clear and to the point. Another point is the privacy by design concept, only information that is truly required by the application, should be stored. For example, there is no need to store a date of birth unless the game gives them a birthday gift, even then the year of birth be irrelevant to perform such a function.

Further investigation should take place, into the type of database and security features that will utilise user data. There are currently a few options, Unity Network, SQLite and MySQL are supported by uMMORPG. Once testing the tool has begun, it will be decided which route to take and what security features will be available, depending on the hosting provider.

If not already build into the tool, two types of encryption should be a key factor to implement. There should be a single direction encryption method, for passwords with salting methods implemented, to prevent password dictionaries easily attacking accounts. Any data that is deemed a good idea to encrypt but is still required, will need a two-way encryption method, which with the correct seed value, will allow for the data to be decrypted and used with the application.

IPR and Confidentiality

The copyright and property rights to this work are shared between the student (Gordon Johnson) and the supervisor (Vasileios Argyriou), since this project idea and concept are part of an existing research project and related work previously undertaken.

Plans for supervision and assessment.

Under current circumstance, at a minimum student and supervisor should meet once a fortnight to discuss what has been completed since the last meeting, issues arising, priority changes and progression. If either student or supervisor are unable to meet an arranged meeting, either a video or telephone call will suffice. To note, the student will be unavailable between the 18th and 26th August 2018.

Project Links

These items are set to private, and the supervisor will be invited to them in our first meeting

GitHub: https://github.com/LordGee/VirtualUniversity

Taiga: https://tree.taiga.io/project/lordgee-virtual-university/

References

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JetBrains (2018) *ReSharper - Visual Studio Extension for .NET Developers.* Available at: https://www.jetbrains.com/dotnet/ (Accessed 06 May 2018)

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