One Semester Individual Project

CM3203

Initial Report

Training and Recruitment Assessment System for South Wales Police

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Project Description

South Wales Police currently assess and evaluate large volumes of written exams, application forms and performance appraisals in training and recruitment. These processes are very time consuming and have to be restarted with each new intake. The system I propose to design and implement will help ease this difficulty by fulfilling bespoke requirements laid out by the client enabling them to set questions that can be marked automatically.

It is often difficult to construct assessments using off the shelf systems and maintaining data integrity and confidentiality can be a tricky issue with vendors who offer to “take care of all the back-end work”. This system will be bespoke to South Wales Police and realistically hosted and undertaken internally to satisfy security requirements. For the purpose of this project the system will be created and tested against dummy data some of which is already available from the client.

The system will have two types of users:

- Administrators who will have access to results, statistics and an assessment creation facility.
- Users who can take the assessment who will answer varying question types before submission of their assessments.

The same systematic assessment approach will be taken (in assessment conditions) only the system will now:

- Store user answers in a database only accessible by an administrator.
- Mark the answers automatically and provide a score for performance.
- Provide instant feedback (in some cases) and report generation.

The system will be unique in the way it acts as an assessment system as it will allow for multiple custom and dynamic question & answer types, generated reports for examiner and exam taker, archiving and version control capabilities and other features that will allow the system to display exam taking statistics.

Project Aims and Objectives

This project can be divided up into a series of aims and objectives:

1. Software Development Methodology
    - To ensure the project requirements are delivered on time and reliably I will need to work to a development framework (based on the type of this project). As already mentioned in the proposal, an agile project approach to this project would ensure iterative cycles with frequent face-to-face meetings with the client.

2. Question Types
    - It has been agreed that multiple question types will be on option to satisfy the assessments – there will be (at minimum) two types of questions for a tester to submit for an assessment:
        - Multiple Choice
        - Free-text
            - Decisions on marking parameters for this type of question but may be as simple as word searches.

3. Automatic Free-Text Marking Capability
    - Some parameters will be offered for automatic free text marking – a scheduled meeting with the client will be used to agree on the type of implementation for this feature.

4. Application Design
    - The project has multiple open issues that can be solved in a number of ways – I must research what types of application it could be (e.g. application client based or browser/web based) and this will involve decisions surrounding user preferences, available deployment options and the current setup of internal systems at South Wales Police. This aim will need to answer questions like:
        - If I create a C#/Java application, do I need a server at all?
        - What aspects of security do I need to be concerned with using found methods?
5. UI Design
    - To maximise the usability of the system I will partner visual testing with HCI elements.

6. Database Design
    - The dynamic nature of the custom questions and answers available to a tester and archived tests for each intake will also create a potentially complex data schema so I will need to thoroughly investigate various database systems to accommodate for this.

7. Administrator Authentication
    - An administrator will need to have some way of authenticating themselves with the system to ensure data authorisation takes place and data confidentiality is maintained.

8. Service Layer Design & Implementation
    - The importance of architecture when creating any network services that may be required for the project must be considered to increase extensibility, accessibility and efficiency. Different methods must also be explored and then implemented (e.g. RESTful services for improved database access).

9. User Interface Interactions & Control Implementation
    - Proposed designed UI will be implemented along with any of the control features and data interactions that will be required.

10. Box Testing
    - Testing code modules and packages will help maintain reliability and confident extensibility across the system. Unit, integration and system testing will all need to be considered when developing software components.

11. Visual Testing
    - The UI for the application will be quite extensive so user testing will take place to ensure HCI elements are well thought out and various application elements work as expected.

Work Plan

It has been agreed with my Supervisor to have weekly and fortnightly meetings depending on the stage of the project (varying depending on project status). I have also arranged to have weekly meetings with the client at South Wales Police. To limit repetition I have omitted non-essential client and supervisor meetings from the work plan below but will still take place.

The work plan also holds a very helpful potential contingency time which is the Easter recess between 28th March and 19th April (Between week 9 & 10).

Bold text refers to project aims and objectives mentioned in the previous section of this report.

Week	Tasks	Deliverables (Milestones)	Potential Obstacles
1	Write Initial Project Plan Meet with Supervisor to discuss meeting scheduling & initial plan report.	Initial Project Plan report	-
2	Research **software development methodologies** and write one into the work plan. Discuss what **question types** will be implemented and research the scope of **automatic free-text marking capabilities** for free text answers. System requirements will also be discussed in this meeting.	An updated work plan with the chosen methodology A clear set of questions that can be used for implementation and another set of parameters for the free-text marking system. A clear set of system requirements.	The potential complexity behind automatic free-text marking may affect the type of implementation for free-text answers.
3	Important system design aims will be worked on from this week onwards. **Application design** – Decide on an application type to implement and design the architecture accordingly. (Paired with **service layer design** if necessary) **Database design** - Decide on a database system based on the application data required and design a schema accordingly. **UI design** – paired with **visual testing**, I will look at various	ERD/UML diagrams and an explicit choice of both application type & database system Application layer diagram Design layouts, known components and a set of potentially utilisable existing design libraries.	-

	interaction and usability features the system must have and how components are laid out (Will also look into existing design libraries that could be utilised).		-
4-9	This period will focus on the implementation phase of the project and may involve some development iterations. Set up database and development environment (including TDD features) based on implementation choices. Write **service layer** if necessary (for database interaction) Implement **administrator authentication** into currently set up project. **User interface interactions & control Implementation** Carry out **box tests** to ensure code modules and system works as expected. Carry out **visual tests** to ensure system is usable (not just to the developer).	Project (for demo): • A database (local or remote) will be set up ready to use. • A development environment with testing capabilities etc. • Service layer for interactions with a database • Functional UI (including testing features and admin section) • Active testing • Admin authentication • Functional features derived from requirements (report generation/system feedback etc.)	-
Easter Recess	Three week opportunity for any further implementations/testing. Use friends/family to conduct usability tests on (**visual testing**) Begin writing Final Report Exam preparation.	A well structured final report document with a good percentage completed.	-
10-11	Two weeks focused on the report making references to all documented features throughout the project.	Completed final report	-
12	Submit final report		-