**III. Test Plans**

This section will describe in detail our current strategy and future plans for validation solutions. It will cover our strategy, environment requirements, and test plan for testing and creating test materials for the Psych Web application, including various types of tests.

**III.1. Unit Testing**

The team will use the Python testing framework for unit testing. Each class and method will be unit tested to ensure that it works properly. We will first unit test each new feature and then move on to integration testing. For this project, unit testing may include but is not limited to:

-Test that the modules that generate reports can correctly process inputs and generate expected outputs.

-Test that the chart generator can display data correctly.

-Verify that the data collection and PDF generation modules work together properly.

-Check that the automatic email sending function can be triggered and send reports correctly.

**III.2. Integration Testing**

We will perform these tests manually or automatically using continuous integration tools. We will prioritize integration testing for the most important features and then expand to other features. For this project, integration testing may include but is not limited to:

-Confirm that the application can correctly handle and respond to user input.

-Test whether the report generation module can be seamlessly integrated with other functional modules.

-Check whether the system can provide a consistent user experience in different environments.

**III.3. System Testing**

To ensure that programs and applications run smoothly, we need to test the entire code as a whole, looking for various possible interruptions and problems. System testing may evolve as new components are added, but overall system testing will be an iterative process to ensure that the application functions smoothly. System testing will include functional testing, performance testing, and user acceptance testing to ensure that user needs are met under various requirements.

**III.3.1. Functional testing:**

Within the scope of functional testing, we will check the overall progress and usage of the application. For this application, validating that participants complete the survey and successfully generating and sending the report are important functional testing aspects. In addition, checking the accuracy of charts and data in the generated PDF file, the validity of user input, etc. are also key testing elements.

**III.3.2. Performance testing:**

To ensure optimal performance and optimization of the application, we will test aspects such as data storage methods, efficiency, and data structures. Performance testing will process large amounts of user data to ensure that data is stored in an optimal manner and retrieved efficiently when requested by users. In addition, we will conduct stress testing to verify that the system remains stable under high load.

**III.3.3. User Acceptance Testing:**

User acceptance testing will ensure that the application is ready for user usage. This testing will verify whether the application interface is easy to use, backend tasks are performed without errors, user requirements are met, and the system can be deployed and run successfully.