Information Processes & Technology

Major Project

Requirements Report

SPX StudyCities

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Date of Publication: Term 2 2020
Version : 1.0

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[x] Introduction

The following report documents the requirements of the SPX StudyCities product, a digital multimedia learning and teaching tool for Staff and Students at St Pius X College. Through the use of hypermedia, quizzes and interactive examples, this product will help teaching and learning high order concepts and skills, focusing on Mathematics.

The Requirements Report states the system's purpose, all objectives and requirements needed to achieve the system's purpose, and a list of features of this product. Following this, the Design Report details each stage and the objectives it will deliver on.

[x] Requirements Report

[x] System Purpose

The SPX StudyCities system will provide digital multimedia content, and a platform for it, for staff and students of St Pius X College. It will support and encourage effective teaching and learning, enhancing the delivery of higher order concepts and skills.

This two stage project will deliver content and tools for teaching Mathematics; specifically in the areas of Vectors and Projectile Motion.

[x] System Objectives / Requirements of System

To meet the System Purpose, the following requirements and objectives will be met:

- Modular articles/pages for each topic area and sub-topic. (Intervals and Vectors, Component and Column Vectors, Dot Product, Geometry and Vectors, Projections, Physical Applications, Projectile Motion Time Equations, Projectile Motion Path Equations)
    - These provide a fundamental understanding using Mathematical terms.
    - Inclusion of relevant images to enhance understanding of the topic.
- YouTube videos providing introduction to Vectors and Projectile Motion.
- Interactive Examples of vectors (sums, products), and of projectile motion (audio representing height/speed in a cartoon like manner). A very basic graphical calculator.
- An article describing the real world applications of Vectors and of Projectile Motion
- Topic quizzes to reinforce knowledge learnt, and “Chapter Reviews” that pick random questions from topic quizzes.

[x] Design Report

[x] Development Methodology

The system will be delivered using an Agile Methodology, in a two-stage approach.

Stage One will deliver the System Requirements through the following:

- A Database Design that holds the questions and answers to the quizzes.
- A custom web server to serve content over HTTP.
- A page templating system to provide a consistent UI.
- The Website with homepage, topic selection, stylesheet.
- The Articles for all topics in Vectors and Projectile Motion.
- KaTeX Mathematics rendering, for examples of maths theorems and equations.
- The YouTube videos that will provide an introduction to the topics.
- The articles describing real world applications of the topics.
- Test Plan for navigating the site, and for accessing all paths on the HTTP server.
- Summary of test results to improve or add features for the release candidate.

Stage Two will deliver the System Requirements through the following:

- Fixes and Enhancements raised from testing Stage One,
- Interactive examples with mathematical graphs (rendered using html canvas or svg) and sliders and input fields to modify variables.
- Audio generation that can produce a frequency from a mathematical function's output.
- Topic quizzes for all of Vectors / Projectile Motion that pull from the database to generate and mark questions.
- Final testing report.
- A final release candidate.

[x] Testing

The following is a copy of the Test plan that will be issued to each System Tester

Stage One Testing

Test #	Feature to be tested	Action Taken	Expected Results	Actual Results
1.1	HTTP Server	Load webpage.	Favicon, Styles, and Scripts all loaded correctly.	
2.1	Web Page Template	Open a few Topic Articles	Each page should present with the same formatting and styling.	
3.1	Page Navigation	Go to a topic page from the homepage navigation menu.	Navigates correctly to the chosen topic.	
3.2	Page Navigation	Follow a link appearing in the text of an article.	Navigates correctly to the expected page.	
3.3	Page Navigation	Navigate to any page the tester feels like.	The tester should be able to intuitively reach the page where they intend to go.	
4.1	Page Hypermedia	View Math examples rendered with KaTex.	Complex mathematical writing should appear formally as it would in a research paper.	
4.2	Page Hypermedia	Watch an embedded video in an article.	The video loads, and plays, with audio.	

Stage Two Testing

Test #	Feature to be tested	Action Taken	Expected Results	Actual Results
X	Any features that were modified or changed from Stage One must be re-tested.	Repeat testing from Stage One		
5.1	Interactive Examples	Move Slider	The example should update immediately with the value from the slider.	
5.2	Interactive Examples	Enter a Number	The example should update immediately with the value from the number field.	
5.3	Interactive Examples	Select graphs from the checkboxes to be overlayed onto the coordinate plane.	Graphs are immediately displayed accurately with their representative colours.	
5.4	Interactive Examples	Play an animated projectile motion example.	The “projectile” should move along the path, and a tone should be played representing its height.	
6.1	Topic Quiz	Select an option from a radio checkbox on a topic quiz.	Only one answer per question should be able to be selected at any one time.	
6.2	Topic Quiz	Submit Quiz	The quiz will present a “marking” waiting screen and upon a response from the server, will display a screen showing correct and incorrect answers with their correct answers and working out shown.	
7.1	Topic Quiz	Start a Topic Review Quiz	The quiz should display questions only from the related topics (currently selected or previously completed), and not from anywhere else.	