Guidelines for Development and Documentation of Courseware using Animations/Simulations

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1. Concept Analysis


1.2 Selection of a concept - (Suggested approach - Analyze the properties of a concept/s. Understand the concept. Discuss with an area expert. Take notes while you are understanding, discussing/analyzing the concept/s). Consider the following while selecting a particular concept for animation/simulation:
   ● How is it better explained using animations/simulations?
   ● How does it assist an instructor in classroom/distance teaching?
   ● Is it stand-alone or part of a full module for independent learning?
   ● any others.

   Section details: Your report of this section should contain concept analysis, discussions with experts (this could be a consolidated report of the notes taken during the selection of the concept/s). Report conclusions and justification for selecting the concept.

1.3 Introduction to Selected concept/s:
   ● A problem statement (Brief concept introduction)
   ● concept level - (Ex: school/undergraduate/graduate/others)
   ● prerequisites, assumptions made - related to user understanding of the concept. (Ex: User is expected to be conversant with a certain concept before attempting to take up this topic).

   Section details: In this section provide an introduction to the concept that you have selected with other details as mentioned above.

1.4 How - Brief introduction to the number of animations/simulation you plan and a brief description of the same.
   Section details: This section would give overview of the concept along
with the approach that will be taken to explain the concept, the total number of animations/simulations planned and a brief description of each.

2. Requirement Specification of the Animations

2.1 Concept demo specification – Demo of a concept explains the concept to the user. Prepare a slides presentation (using open office impress or any tool which can save presentations in a platform independent format) of the demo.

Section details: Each slide should be provided with notes which would explain the functionality of the content represented in that particular slide. The prototype basically should unfurl the concept to the user.

2.2 Animations/simulations with user interaction – Through a slide presentation (using open office impress or any tool which can save presentations in a platform independent format) build a work flow of each and every event that follows an interaction that you intend to provide on the template.

   Section details: Each slide should be provided with notes that explain how the proposed Animation will add interactivity not supported by the power point animations.

2.3 Experiments/Assignments – Provide a design and description of the experiments that you would like the user to perform with your Animation in order to understand the concept.

   Section details: A document (or power point presentation) for this section should also be provided.

3. Design of the animation/s

3.1 Template design

   Applet interface design for the animation/simulation which should
include the following:

- Title of the animation
- the radio buttons for
  - demo
  - instructions to run the animation
  - concept description
  - user interaction (can be more than one as per requirement)
    {We should standardize the names for the buttons to be provided which occur commonly.}

- Applet template should provide a section on the template for a brief verbose explanation describing the animation event/display etc., at any instant while running the applet.
  {Should this be another button – What to observe in this applet or what does this applet mean} 

- Consider all aspects of the animation while designing the template including stop/continue/clear/previous/next etc., functionalities that may be required.

Section details: Consider the applet specifications while designing the template. Provide details of the function of each and every item that is provided on the applet interface template.

3.2 Applet/s Design

Use the following guidelines while designing the applet:

- The designed template (finalized in the previous section) should be consistently used throughout the applet. (Note-The number of buttons and number of inputs from user can vary from applet to applet.)
- As far as possible, applet/s should provide interactivity, such as taking values of some parameters from the user or modifying in-built values based on mouse movement. (If necessary redesign the
• Each applet should have associated instructions which would help the user to understand the functionality and working of applets.
• Each applet should be associated with a set of exercises/tutorials that a user can try out once he/she has gone through the demo applet. (specially applets built for independent/distance learning).
• User inputs should be validated and boundary conditions should be mentioned through a mouse over or as a static text along with input box.

Section details: For each slide presentation in the requirement specification provide a second version using the template design and the other design aspects that are finalized. Build a prototype of the animation using slide presentations. This should include each and every work flow of the applet interface template. It is more or less like a sequence diagram represented through one or more power point presentations.

Each item on the template should have a mouse over help. Prepare the help contents and provide in the slide presentation.
Applet Implementation - Specification And Design Document

4. Software Analysis

4.1 Analysis of available tools for the selected concept
4.2 Selection of tool/language for building the animation/simulation (why and advantages – platform independent, web hosting, open source etc.,).
4.3 Any specific mathematical/analytical algorithms proposed to be used for implementation.

Section details: A list of tools available in open source will be provided with links to documentation/tutorials and animations built using the tools. A survey should be conducted to find out if the concept design could be implemented using one of the tools. Prepare a report of the survey with conclusions/results.

Include other details like proposed mathematical/analytical etc., algorithms to be used for implementation.

{For example, if you are building an Applet on Matrix manipulation you may need to use a library call to functions such as Matrix multiplication}

5. Software Design

5.1 Implementation using Existing open source tool

- For each workflow specified in the Power Point presentation provide the corresponding detailed design with
  - existing classes or objects to be invoked
  - pseudo-code and interaction diagram for your additional code
  - sequence diagram giving the flow through all the objects.

5.2 Implementation using Core Java

- For each workflow specified in the Power Point presentation provide the corresponding detailed design with
  - Use cases
  - Object Interaction diagram
  - sequence diagram giving the complete flow and
➢ data dictionary (if database is used).

6. Software Documentation

6.1 Applet installation details. Provide an self-extracting installation tool.
6.2 A listing of code files with purpose of contents of the file.
6.3 If database has been used – data dictionary details.
6.4 References
6.5 Provide an experience report which would help future implementors.