



REQUIREMENTS DOCUMENT

LEARNING ASSET TECHNOLOGY INTEGRATION SUPPORT TOOL (LATIST)

**GMU Immersion Team
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I. INTRODUCTION

The George Mason University (GMU) Immersion team conducted a thorough performance analysis in the fall semester which included a Front End Analysis report, a Briefing Report, and a Needs Assessment report. This analysis included a series of meetings and interviews with Defense Acquisition University (DAU) faculty and staff as well as a survey about DAU learning assets and course design and development processes. The results indicated a need for DAU to identify processes and methods for integrating Advanced Learning Technologies (ALT) into DAU learning assets. Based on these results, the GMU Immersion team proposed an online support tool to aid DAU faculty and staff in making decisions regarding the integration of ALT into their learning assets development process. During a meeting with DAU stakeholders on January 12, 2010, it was agreed to name this online support tool the Learning Asset Technology Integration Support Tool (LATIST). This performance support tool will provide: research to support informed decisions regarding ALT, a decision-making guide for ALT selection based on learning objectives, a review of factors influencing ALT selection, and tutorials and examples of pedagogically sound use of ALT within the DAU learning environments.

II. LATIST DESCRIPTION

Based on the needs assessment results, three main LATIST tasks were identified to support the user needs: Explore, Select, and Apply. These main tasks are congruent with Merrill's component display theory; in particular the instructional transactions identify, interpret, and execute (Jonassen, Tessmer, and Hannum, 1999). In accordance with the usage-centered design approach recommended by Constantine and Lockwood (1999), scenarios and use case histories were then developed to identify the subtasks associated within each main LATIST task as well as LATIST system response requirements. These subtasks were categorized to identify the type of performance support and training needed to meet the user needs. The main tasks of LATIST (Explore, Select, and Apply) are subsequently referred to as components. The following summarizes the objective of each LATIST component

The Explore component of LATIST is a research-based body of knowledge on the subject of ALT. Specifically, three broad categories of ALT are addressed in the Explore component of LATIST: (1) Social Media, (2) Virtual Worlds, Games, and Simulations, and (3) Mobile Technologies. DAU users will enter the Explore component to access research information related to these three ALT categories. One user may be satisfied with a brief summary or quick overview such as reviewing advantages, disadvantages, and best practices of a specific ALT or a category of ALT. Another user might want to pursue more in-depth research by applying certain filters, for example, technology topic, type of resource (i.e., video or mp3), or most highly rated technologies. Users will be able to easily and intuitively move within different sections or views of the Explore component and between the Explore, Select, and Apply components of LATIST. While in the Explore component, DAU faculty and staff will be able to print, share, add, upload, mark their favorites, and rate research resources. The system will provide "Amazon-type" recommendations based on tagging or other such classification type metadata.

The Select component of LATIST allows the users to make informed decisions about which technologies to integrate into their courses or learning assets development. Through the use of the Decision Widget, which walks users through a series of questions about their learning objectives and strategies, users will be able choose a technology that is most suitable to their instructional need. Through the Factors Matrix of the Select component, users will be able to explore more information about DAU-specific factors such as budget, bandwidth, through-put, and maintenance in relation to technologies. Using both of these tools, users will be able to make the most appropriate choice of technology to use in their courses.

The Apply component of LATIST allows the user to interact with several technologies via tutorials prior to the integration of these technologies into DAU's learning environment. The Apply component specifically provides the user with the opportunity to learn how to apply a specific technology by

providing options to identify and explain what the technology is; how to implement them; real world examples of use in a DAU context, and hands on practice. The user can access the information through a combination of embedded or hyperlinked videos, text documents or URLs to external website. The information provided in the Apply component will allow the user to incorporate a selected technology suitable for the learning asset.

III. DESIGN REQUIREMENTS

The design requirements for LATIST are described by system and user requirements.

LATIST System Requirements

The LATIST tool will be implemented utilizing a WordPress platform with MySQL as the database. Also the LATIST system must effectively work with Internet Explorer versions 7.0 and above in a Windows 2003 .Net Framework. Additionally, the system should be built cognizant of Section 508 requirements, however full 508 compliance can be incorporated after the prototype has been approved by DAU. DAU prefers SQLServer 2005 but will accept MySQL.

When designing the LATIST system there are several considerations which must be accounted for in the working prototype. These include:

- DAU logo (Link for instructions: <http://www.dau.mil/pubscats/Pages/MediaKit.aspx>)
- GMU logo (Link for instructions: <http://logo.gmu.edu/webguide/>)
- Users must be able to access the desired information or component within three clicks.
- Download and navigation response time should be as fast as possible, with a goal not to exceed 10 seconds for downloads. (Note: This assumes high speed internet)
- The development platform consisting of hardware and software requirements will conform to DAU standards.
- Design factors must include use of the tool on mobile devices.
- LATIST will support multiple navigation points. Users can navigate and search by component or by technology.
- LATIST will be linked to DAU.mil and should follow the www.dau.mil color schemes.
- Screen Resolution for PC's and mobile devices must meet standards for maximum usability.

LATIST User Requirements

This section summarizes the user requirements, flowchart, and wireframe for LATIST from a global perspective. The user requirements and flowchart for each LATIST component, Explore, Select, and Apply, are located in Appendix A, B, and C, respectively.

Global User Requirements

Print	The user shall be able to: <ul style="list-style-type: none"> • print documents in their native format • print screen in a print friendly version • print text versions of all audio
Save	The user shall be able to save: <ul style="list-style-type: none"> • information in its native format to a user specified location • a report • a webpage • a media file

Navigate	The user shall be able to seamlessly navigate to any component within LATIST.
Search	The user shall be able to: <ul style="list-style-type: none"> • search across LATIST • search by keyword
Dictionary	The user shall be able to : <ul style="list-style-type: none"> • Interactively search for term definitions related to LATIST and technologies
Login	The user shall login in to modify LATIST content: <ul style="list-style-type: none"> • to add, upload, take notes, mark as favorite, rate, view favorites, save
Help	The user shall be able to request help.

Flowchart

This represents the overall global LATIST flowchart.

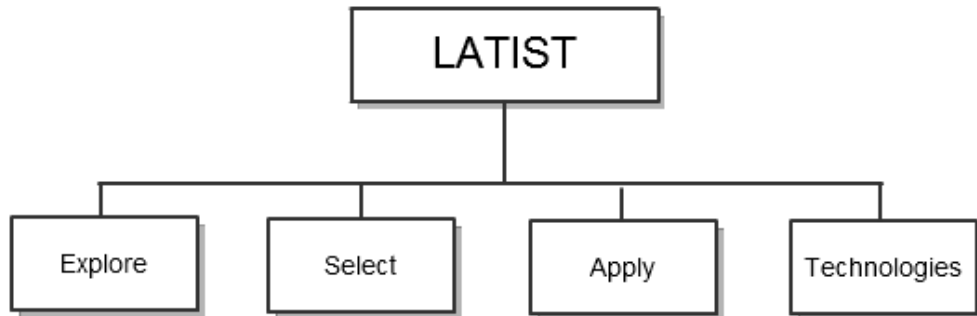


Figure 1 Overall Global LATIST Flowchart

Wireframe

LATIST navigation is designed to address these focal use cases:

- (1) a user who is not familiar with what technology can do in a teaching and learning context and wants to learn about technology (Explore component)
- (2) a user who has a known learning outcome and wants to see what technologies might be beneficial for that instance (Select component)
- (3) a user who wants to see how to apply a technology and practice those steps (Apply component)
- (4) a user has been directed to use a particular technology and wants to learn all about what the research says about the technology, the factors associated with it, the types of learning outcomes appropriate for its use, and how to apply it (technology)

As such, the primary navigation will support an instructional approach, that is, the sequence of Explore, Select, and Apply knowledge. Additionally, the navigation will support the ability to immediately drill down to all LATIST resources related to a particular technology. The purpose behind our wireframes is to provide the developer with a graphical representation of the current vision for LATIST by the GMU Immersion team. It is important to note that these wireframes are just a draft version and do not necessarily reflect the best design for the user. These wireframes are subject to change and the GMU Immersion team is open to any changes or recommendations provided by Bean Creative.

In the wireframes depicted below, the GMU Immersion team envisions having a sidebar capable of housing dynamically loaded content. While the team has yet to define the specific content, space holders are represented on the wireframes by elongated rectangles with the text "Resources from (Explore or Apply)." Depending on where the user may be within the tool will determine what type of content is populated in the sidebar; possible content options are a hyperlinked list of top ten rated items, links to the most recent uploads/updates for each component, and a list of hyperlinked resources from an adjacent component determined by the specific technology the user is currently viewing.

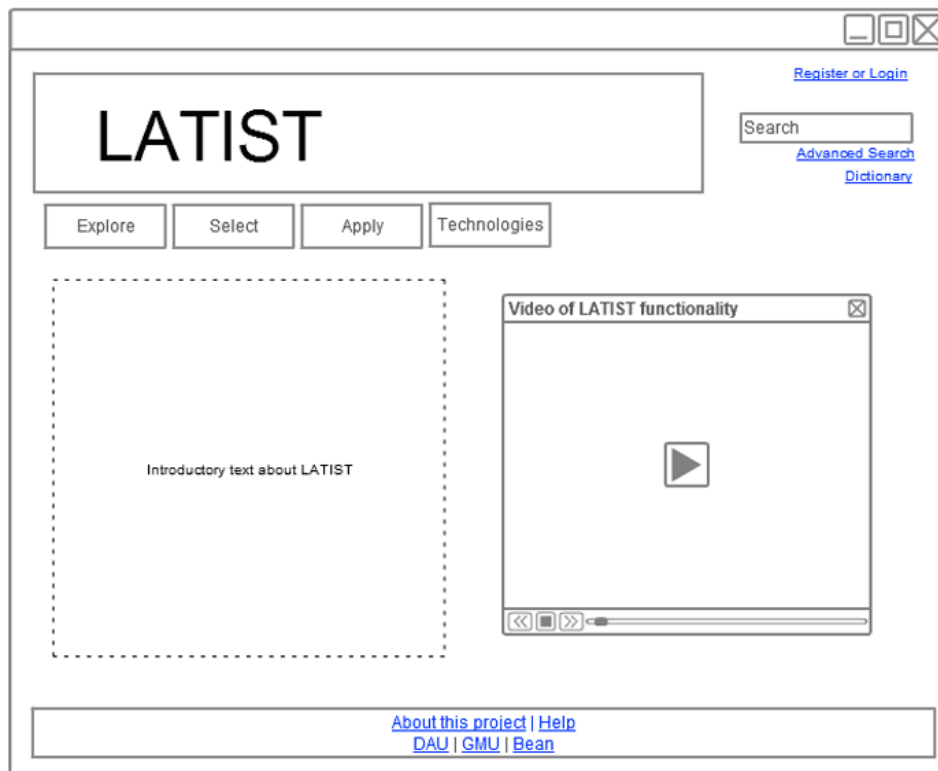


Figure 2 LATIST Home Page

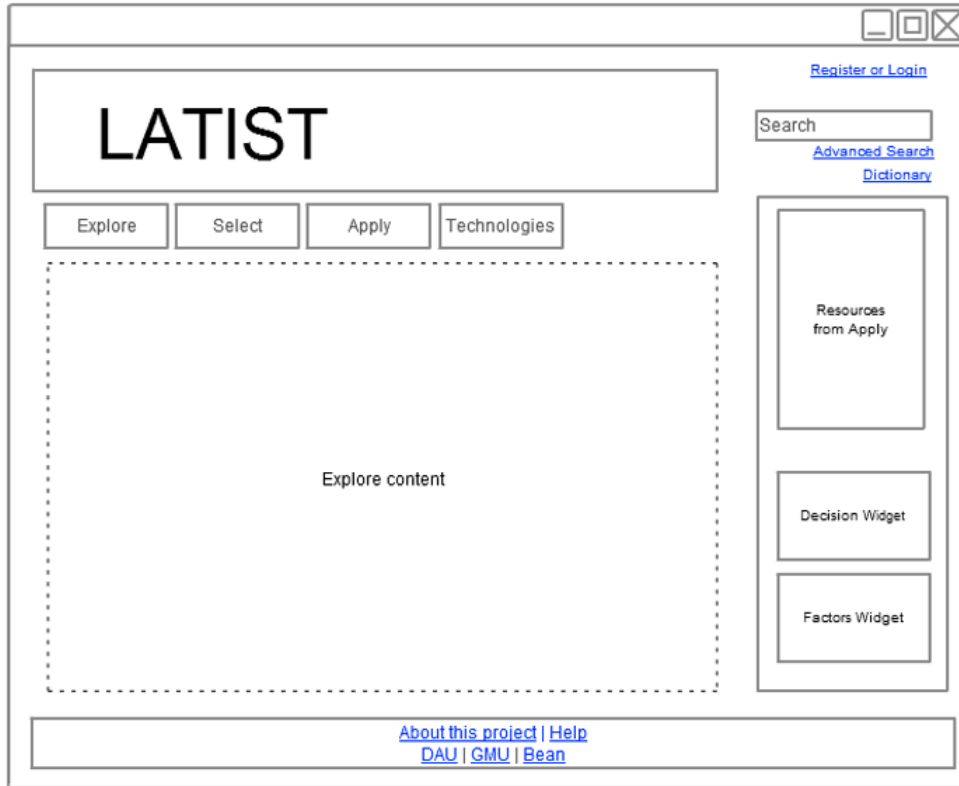


Figure 3 Explore Home Page

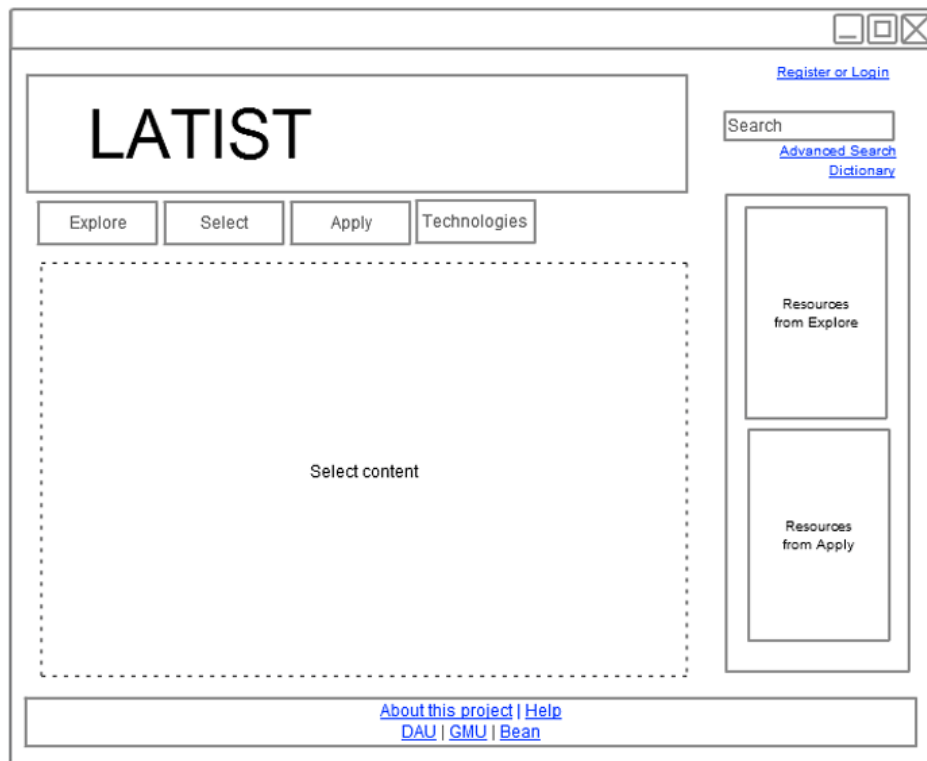


Figure 4 Select Home Page

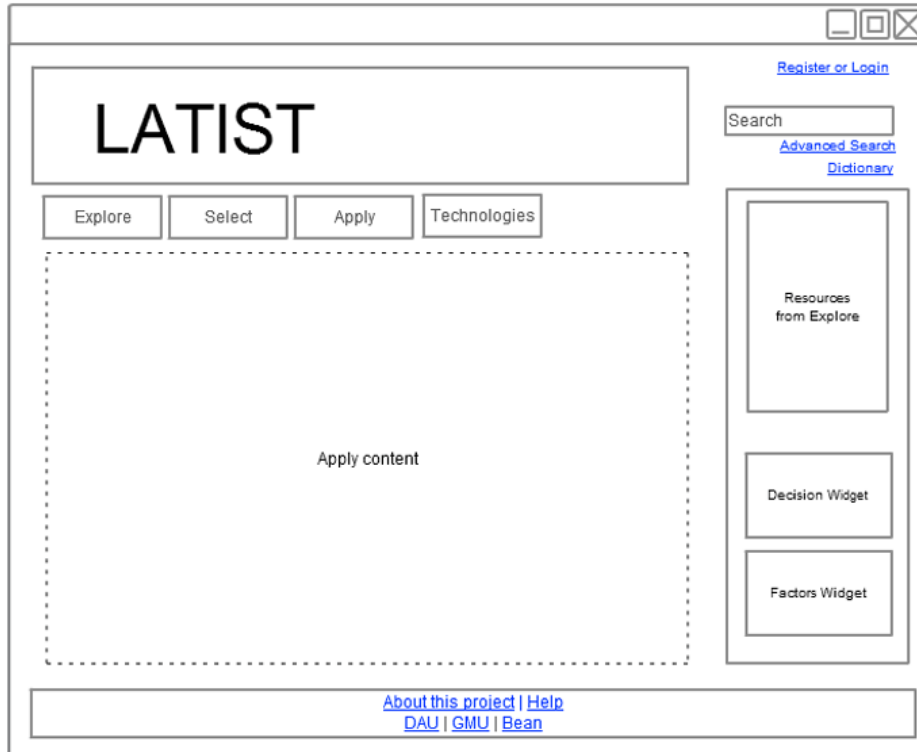


Figure 5 Apply Home Page

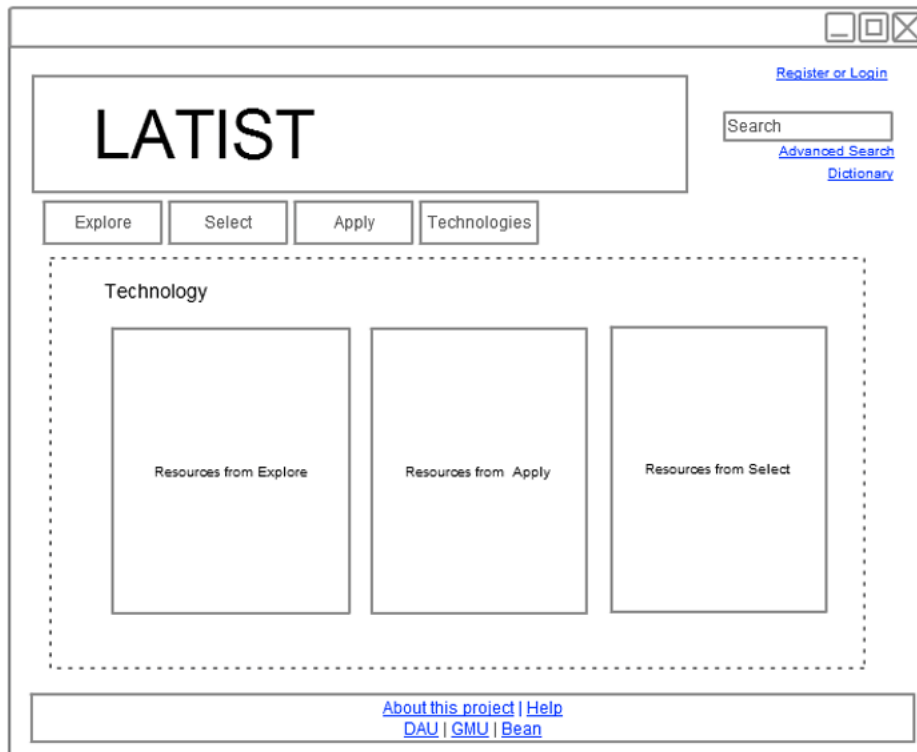


Figure 6 Technology Page

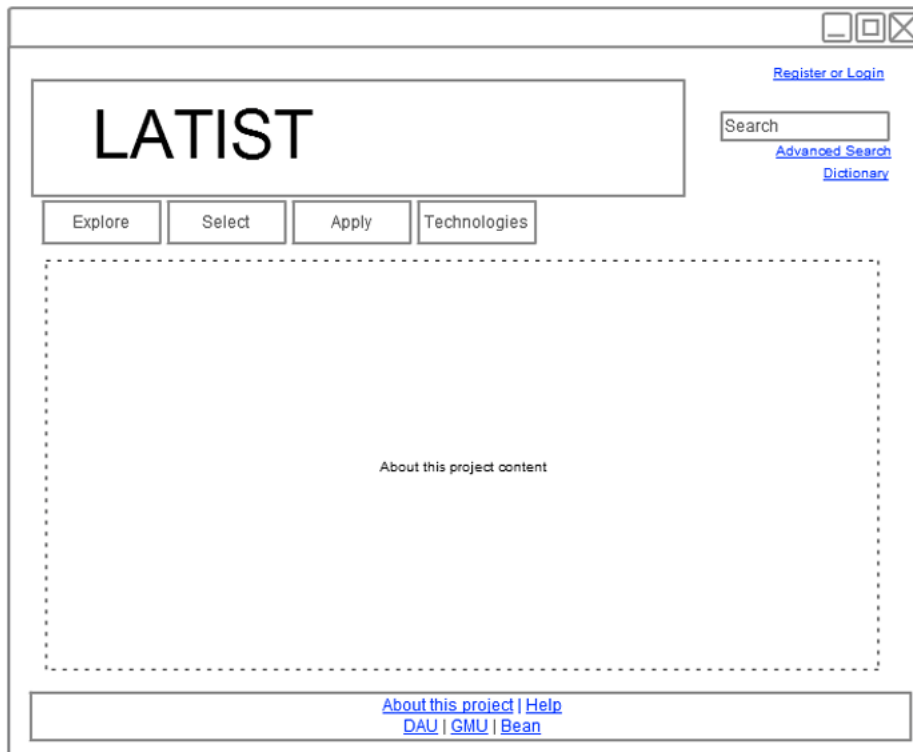


Figure 7 About this project Page

IV. SITE ARCHITECTURE

LATIST is a performance support tool housed in a Content Management System (CMS) and not a standard website following a navigation priority. LATIST will have an initial page from which the user can choose to enter the Explore, Select, or Apply components. Additionally, from the LATIST splash page, users will have the ability to select a technology and receive a list of all aggregated information pertaining to the selected technology from throughout LATIST. The following outlines the site content for LATIST; however, these outlines do not indicate a prioritized navigation of web-pages. The specific content in the outlines should remain scalable as new technologies will be added as they emerge.

LATIST Splash Page

- **About this project**
- **Help**
- **Technologies**
- **Explore Home**
 - Select technology for Advantages, Disadvantages, Best Practices
 - Research to use a search engine, upload a resource, and view search results
 - Personal supports Mark as Favorite, Upload to personal area, Take Notes into personal space, and Subscribe / Receive RSS Feeds

➤ **Select Home**

- Decision Widget
 - View generated report
- Factors Matrix
 - View generated report

➤ **Apply Home**

- Select technology for tutorial and practice

V. STORYBOARDS AND WIREFRAMES

To be submitted to the developers by March 31, 2010

VI. LOGICAL DATA MODEL

LATIST will contain various resources. A resource could be associated with the Explore, Select, or Apply component. The types of resources could be word documents, pdf, html, video, or audio files. Each resource is associated with a technology class and a technology. Technology classes are: social media, mobile technology, virtual worlds/games and simulations. Technologies will be: social networks, wikis, microblogging/blogging, podcast, vodcast/webcast, smartphone, augmented reality, games, and virtual worlds. Each resource will be identified by several attributes as indicated in the table below.

Technology Class	Technology	Resources per Technology	Attributes per each Resource
Social Media	Social networks	Advantages Table Disadvantages Table Best Practices Table Factors Table Learning Strategies Research Papers Tutorial Video More...	Resource # Author Date URL (see table below)
	Wikis		
	Microblogging/blogging		
Mobile Technology	Podcast		
	Vodcast/webcast		
	Smartphone		
Virtual Worlds/Games and Simulations	Augmented reality		
	Games		
	Virtual Worlds		

The Explore, Select, and Apply components will require a backend database to maintain resource data element relationships. The Apply component will use the same database as the Explore component; all videos, text and documents will be uploaded as a resource to this database. The following provides the information to support the Explore and Select component database development. The database relationships are not indicative of navigation.

Explore and Apply Component

The purpose of the LATIST Explore and Apply component database is to organize resources so they are searchable and can be personalized, such as by marking as a favorite. The Explore component will be able to search across all resources within LATIST to include Select and Apply component resources. Each user will be able to personalize each resource by annotating it as their favorite, rating it, and adding notes associated with each resource (separate from the resource). The user will also be able to take notes not associated with a particular resource.

Some resources will not have all data elements populated, such as an internally developed podcast may not have an author or date but will have a title, keywords, rating, file name, file type. An RSS will be developed that notifies users to resources uploaded to LATIST.

Resource Attributes. Each resource may contain the following data:

- Technology Category: Social Media, Mobile Technology, Virtual Worlds/Games and Simulations
- Technology: social networks, wikis, microblogging/bloggging, podcast, vodcast/webcast, smartphone, augmented reality, games, virtual worlds
- Author: Last name of first author, if more than one author, add et al (e.g. Mimirinis et al)
- Date: YYYY (e.g. 2008)
- Title: complete title
- Keywords: or tags: are open entries, such as Twitter, case history, military, etc
- Citation: full APA style citation
- Rating: numeric 1 – 4, average of all users
- URL: link to documents external to LATIST (opens in a new window)
- File name: of those media files housed internal to LATIST (audio, video, documents, etc)
- File type: indicates to user what file type they are accessing (note LIB: links DAU library)
- Date Uploaded: date when the resource was uploaded to LATIST (DDMMMYY: 03Mar10)
- Resource type: the type of information (book, journal, research, white paper, etc)

Resource Attributes		
	Resource A (example)	Resource B (example)
Resource #	1	49
Technology Category	Social Media	Mobile Technology
Technology	Wiki	Podcast
Author	Jones, M.J.	Turner, J.
Date	2010	1999
Title	How to Create a Wiki	Podcasting in e-learning
Keyword	demonstrate	Blackboard LMS
Citation	Jones, M.J. (2010, February 20). <i>How to create a wiki</i> . Retrieved March 4, 2010, from Mary Jane's website: http://www.maryjane.com/wiki	Turner, J. (1999). <i>Podcasting in e-learning</i> . New York, NY: Pocket Books.
Rating	3	4
URL	http://www.maryjane.com/wiki	null*
File name	null	null
File Type	html	null
Date Uploaded	04Mar10	null
Resource Type	website	book

*null in this table implies an empty field

Personal Attributes. For each resource, a user has the option to identify:

- Favorite: user marks a resource as a personal favorite
- Rate: user rates the resource as 1 – 4 which is tallied into the overall rating of the resource
- Notes: user can make notes associated with a resource
- RSS: subscribe and receive RSS feeds (LATIST will have one)

Personal Attributes				
Resource #	Favorite	Rate	RSS	Notes
1				
2				
null				

*null in this table means personal attributes (RSS and some notes) are not associated with any resource

Future development would support an Amazon-style recommended reading based tracking the resource selection of all users to produce the recommended reading. Recommended reading might say something similar to: 'others who have reviewed this, have also reviewed this...'

Select Component

The Select component of LATIST is used to assist DAU in making decisions when implementing technology into their learning assets. The Select component consists of two sections: the Decision Widget and the Factor Matrix. The Decision Widget starts with the learning objective type (based on Bloom's taxonomy), and generates strategies. Technology recommendations are generated based on the selected learning objective, to include a description on how that technology can support the corresponding learning strategy. **Note: All associated data is subject to change and needs to be updatable.**

Decision Widget: Data Items

Entity	Associated Data
Learning Objective Class	Knowledge Comprehension Application Analysis Synthesis Evaluation

Entity	Associated Data
Learning Objective Type	Identify Contrast Evaluate Understand Defend

Entity	Associated Data
Learning Strategy	Identify patterns Elicit recall Promote practice Formulate hypotheses Model skills

Entity	Associated Data
Technology	Social network Wikis Blogging /Microblogging Podcasts Vodcasts/webcasts Smartphone Augmented reality Games Virtual Worlds

Decision Widget: Entity Relationships

- One learning objective type relates to one learning objective class.
- One learning objective class can relate to multiple learning objective types .
- One learning objective class can relate to multiple learning strategies.
- One learning strategy can relate to multiple learning objectives.
- One learning strategy can relate to none, one, or many technologies.

Considerations

- Each technology recommendation will need a text field, describing how that technology can support the selected learning strategy

Factors Matrix

The content from the factors matrix is DAU specific. Here is a link to a very basic html example of what we envision conceptually: <http://sallybyrdweb.com/immersion/factorsmatrix/>

Factors	Parameters	Technology
Content Stability	Daily-Monthly	All Social Media
	Monthly-Annually	Virtual Worlds
	Yearly-Never	Games/Augmented Reality
Bandwidth/Connectivity	High	Virtual Worlds/Games
	Low	All Social Media
	Intermittent Bandwidth	Mobile Technology
Development Cost	Low Budget (>25K)	All Social Media
	Mid Budget (25K-100K)	Games, Virtual Worlds
	High Budget (100K+)	Augmented Reality
Maintenance Cost	Low Budget (>10K)	All Social Media
	Mid Budget (10K-100K)	Games/Virtual Worlds
	High Budget (100K+)	Augmented Reality
Speed to Market	ASAP	All Social Media
	1-6 Months	Virtual Worlds
	Over 6 Months	Games/Augmented Reality

Entity Relationships: Factors Matrix

- Every factor must relate to every technology types.
- Every technology must relate to every factor.

Considerations

- Each of the factors will need a field for a description.
- Each of these parameters and factor categories will need to be updatable (the technologies in the development and maintenance cost categories are placeholders)

REFERENCES

Constantine, L. L., & Lockwood, L. A. D. (1999). *Software For Use: A Practical Guide to the Models and Methods of Usage-Centered Design*. New York: ACM Press.

Jonassen, D., Tessmer, M., & Hannum, W. (1999). *Task Analysis Methods For Instructional Design*. Mahwah: Lawrence Erlbaum Associates, Inc.

APPENDIX A

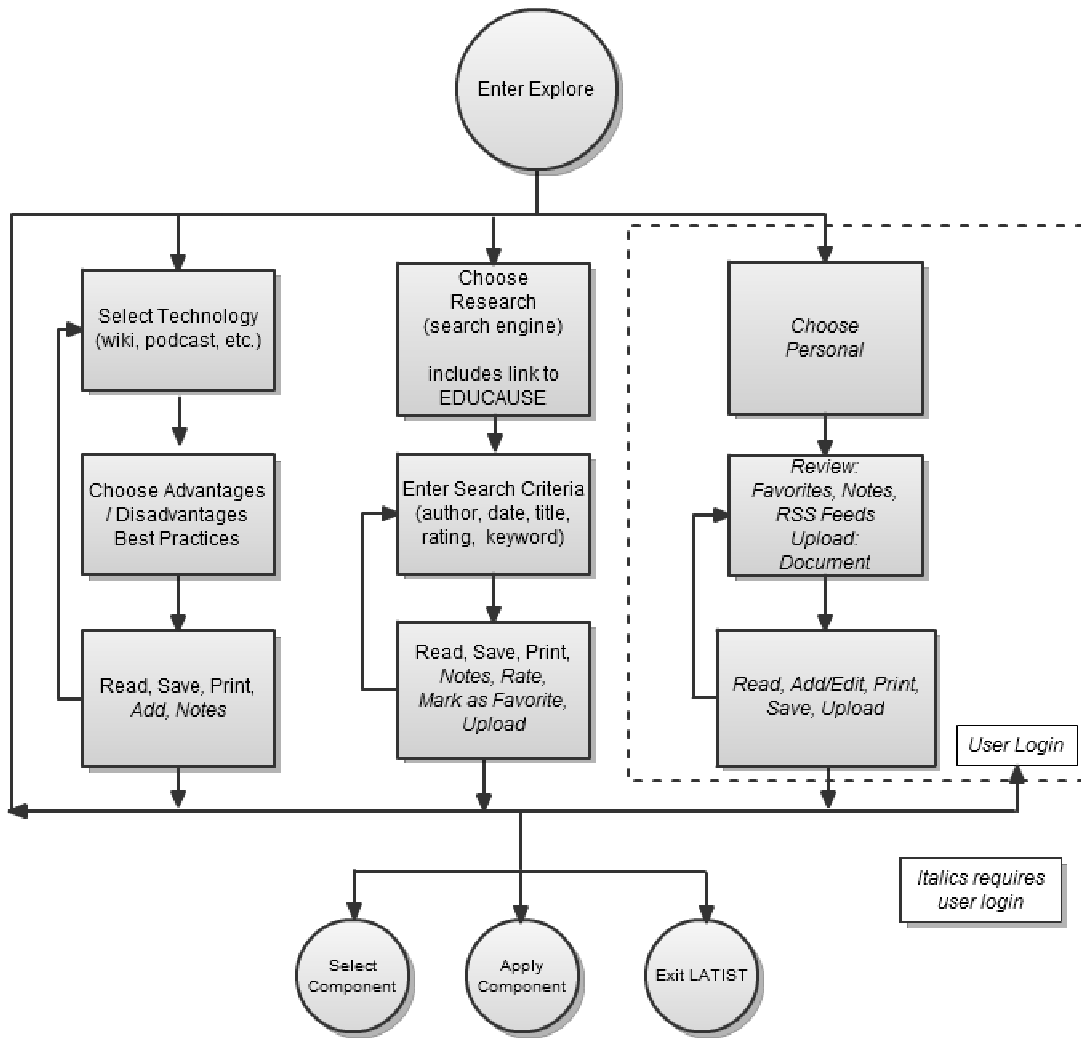
EXPLORE COMPONENT USER REQUIREMENTS and FLOWCHART

EXPLORE FLOWCHART

The primary navigation for LATIST will be by component (Explore, Select, Apply) while a secondary navigation by technology will be supported. Having selected Explore from the primary navigation, the following describes the layout of the Explore component. The primary navigation for the Explore component will be by subcomponent. There are three subcomponents offering different capabilities:

1. **Select Technology:** The user shall be able to access content based on technology type. The content is in tabular format addressing: advantages, disadvantages, and best practices. Each table will be a bullet list and is considered to be a LATIST resource.
2. **Research Subcomponent:** In this area, the user could choose to upload a resource or search LATIST resources. A resource could be anything associated with Explore, Select, or Apply component. This means for example a video demonstration in the Apply component would appear in the results of the search. This search engine functionality could become a 'widget' for all LATIST pages. Note that a link to the EDUCAUSE 7 things web site will be provided on the page.
3. **Personal Subcomponent:** This area is a private space for each user. As such, the area will require login. The user can create notes (associated with a particular resource or as a separate document), review a listing of resources marked as their favorite, review RSS feeds, and upload documents.

After the user has selected a technology and reviewed the advantages, disadvantages, or best practices or conducted research on that technology, the user can move to another component based on that technology. For example the user can seamlessly navigate to the factors matrix in the Select component or to the Apply component (tutorial or practice) with the technology already selected. These relationships are indicated in the flowchart.



Explore Flowchart

EXPLORE USER REQUIREMENTS

The following outlines the requirements for the prototype. Each requirement is noted as 'must have,' mock-up, or later development; 'must have' items are intended to be programmed; mock-up items need only have the appearance of functionality; and later development items do not need to be addressed unless it impacts the required and mock-up functionality.

While in the Explore component, the user shall be able to navigate to any other Explore subcomponent or the Select component or the Apply component or exit LATIST. The user should be able to add, upload, search, take notes, rate resources, mark as favorite, print, and subscribe/receive RSS feeds, and print. Note that *any modification to LATIST content will require user login*. These functionalities are defined below.

- Add: The user shall be able to add content to the advantages, disadvantages, and best practices tables. (mock-up)
- Search: The user shall be able to search for resources across LATIST by author, date, title, technology, sub-technology, keyword, rating, and marked as personal favorites. (must have)

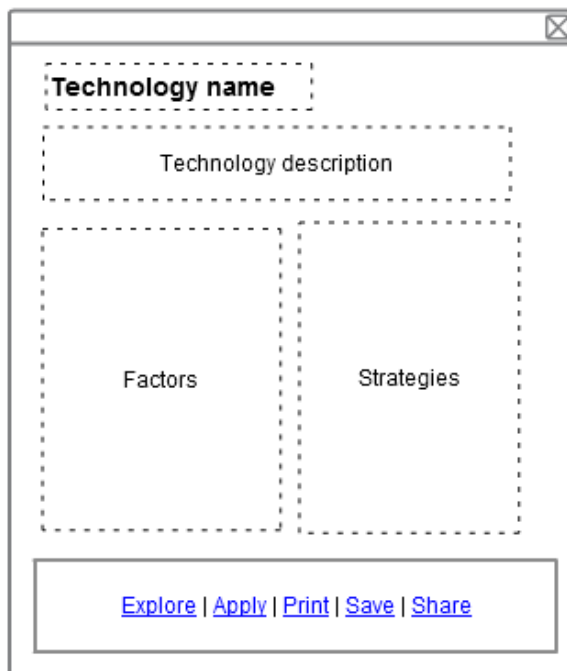
Search Results – The search results include the author, date, title, average rating, access the full citation, link to the resource, link to the user's personal notes associated with the resource and if the user has previously marked the resource as a favorite. The user shall be able to sort search results by author, date, and rating. Note that not all fields may be populated for all resources. The user shall be able to view / read selected resource in its native format (pdf, excel, wmv, etc).
- Upload: The user shall be able to upload resources and provide database elements (author, date, title, author, rate, file name; see data element model). Add a check box reflecting user has reviewed copyright permission. (mock-up)
- Notes: The user shall be able to create personal notes for each resource and as independent files. The notes can be edited, saved, and printed. (mock-up)
- Rate: The user shall be able to enter a rating for any resource; an average for all users will be displayed visually with an iconic rating of 1 – 4. (mock-up)
- Mark as Favorite: The user shall be able to mark as favorite any resource from the search results list. (mock-up)
- Review Favorites: The user shall be able to view their list of personal favorites. The list can be presented similar to the search results and with the same functionality. (mock-up)
- Print: The user shall be able to print resources in its native format and print screen in printer friendly format, such as the results from the search function. ('must have')
- RSS Feeds: The user shall be able to subscribe to and receive RSS feeds. An RSS will be developed that notifies users to resources uploaded to LATIST. (mock-up)
- Save: The user shall be able to save selected resources to a user specified location. ('must have')
- Recommended Reading: The user shall be able to view a recommended reading list based on prior resource selection. (later development/mock-up)

APPENDIX B

SELECT COMPONENT USER REQUIREMENTS and FLOWCHART

Generate report: Through both the Decision Widget and the Factors Matrix, users shall be able to generate a report about a specific technology. This report will include:

- Short description of technology
- List of strategies supported by technology
- Factors mapped to technology
- Links to technology sections of Explore and Apply components
- Links to print, save, and share



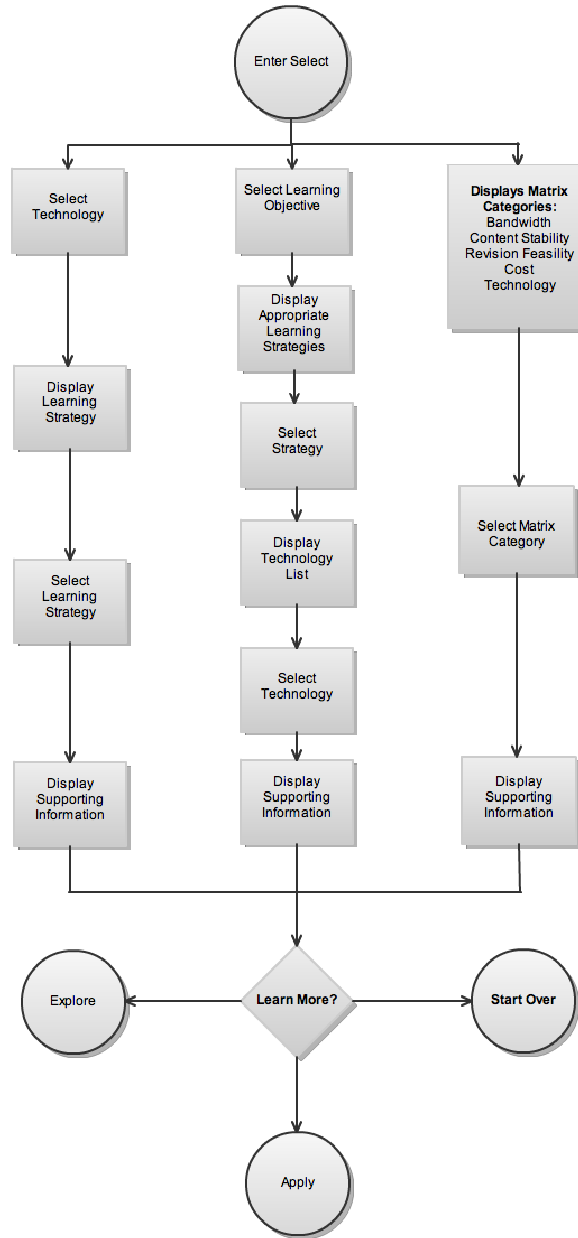
Print report: The user shall be able to print the report in a print-friendly format.

Save report: The user shall be able to save the report to a user specified location.

Share report: The user shall be able to share the report through email.

Browse factors: The user shall be able to browse information in the factors matrix by technology or by factor.

Navigate: The user shall be able to navigate to the other components of LATIST that are related to a specific technology.



Select Component

APPENDIX C

APPLY COMPONENT

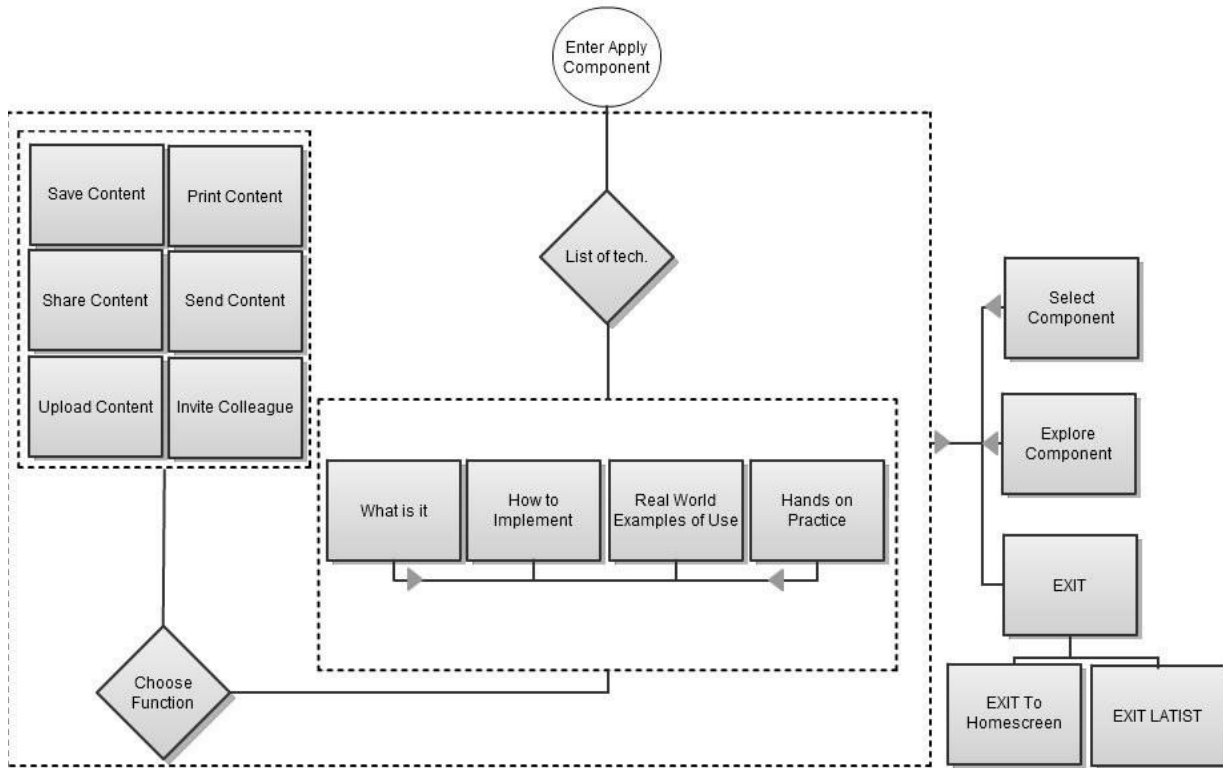
USER REQUIREMENTS and FLOWCHART

APPLY FLOWCHART

The primary navigation for LATIST will be by component (Explore, Select, Apply) while a secondary navigation by technology will be supported. Having selected Apply from the primary navigation, the following describes the layout of the Apply component. The primary navigation for the Apply component will be by technology. The one subcomponent offers different technology classes to choose from; 1) Social Media, 2) Mobile Technology, and 3) Virtual Worlds/Games and Simulation. Each technology class will have specific technologies listed within that category. Each technology will have the following functions:

1. What is it explanation subcomponent: The user shall be able to access content based on technology type. The subcomponent will contain Flash/video/text/text document/URL files as required to access the explanation of each technology.
2. How to implement subcomponent: In this area, the user could read, view or link to an explanation of how to implement a specific technology contextualized to their content. The subcomponent will contain Flash/video/text/text document/URL files as required to access the how to develop explanation.
3. Real world examples subcomponent: In this area the user will be provided with a URL to an external website which will allow them to get an opportunity to see how a specific technology is being used in a real world context.
4. Practice subcomponent: This area will provide the user a URL to an external website which will allow them to get an opportunity to experiment using a specific technology.

These relationships are indicated in the flowchart.



Apply Flowchart

APPLY USER REQUIREMENTS

The following outlines the requirements for the prototype. Each requirement is noted as 'must have,' mock-up, or later development; required items are intended to be programmed; mock-up items need only have the appearance of functionality; and later development items do not need to be addressed unless it impacts the 'must have' and mock-up functionality.

While in the Apply component, the user shall be able to navigate to any other Apply subcomponent or the Select component or the Explore component or exit LATIST. The user should be able to add, upload, search, print, send, and login. Note that *any modification to LATIST content will require user login*. These functionalities are defined below.

- Add: The users shall be able to add content to any of the subcomponents within the Apply component. (mock-up)
- Search: The user shall be able to search for resources across LATIST by author, date, title, technology, sub-technology, keyword, rating, and marked as personal favorites. ('must have')
- Upload: The users shall be able to upload resources and provide database elements (author, date, title, author, rate, file name; see data element model). (mock-up)
- Print: The users shall be able to print resources in its native format and print screen in printer friendly format, such as the results from the search function. ('must have')
- Save: The users shall be able to save selected resources to a user specified location, in any specified format and file type. ('must have')
- Navigate: The users shall be able to navigate anywhere within LATIST within 3 clicks or less; users shall be able to seamlessly navigate to subcomponents within the Apply component as well as to related content within other components/subcomponents. ('must have')
- Send: The users shall be able to send from the Apply component. Users will need the ability to send media files, emails, and links to pages and print friendly versions of text from the Apply component. (mock-up)
- Open Content: The users shall be able to easily open all content in the Apply component. Users shall be able to open all content using double right clicks in standard windows format with the option of opening material in a separate window. ('must have')
- Login: The users shall be able to login prior to adding or uploading content into the Apply. Users will be able to login using an ID and password, through creating an ID and password for the first time, and shall be able to access all secure elements of LATIST once logged in. (mock-up)