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Looma Lesson Planner

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Looma Lesson Planner

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BACHELOR OF SCIENCE IN COMPUTER SCIENCE AND ENGINEERING
BACHELOR OF SCIENCE IN WEB DESIGN AND ENGINEERING

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Looma Lesson Planner

by

Elise Herrmannsfeldt
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Submitted in partial fulfillment of the requirements
for the degrees of
Bachelor of Science in Computer Science and Engineering
Bachelor of Science in Web Design and Engineering
School of Engineering
Santa Clara University

Santa Clara, California
June 11, 2016
0.1 Abstract

Looma Lesson Planner is a web application that allows its users, experienced educators, to select, organize, and present existing classroom materials and educational content in the format of a custom-made lesson plan. Looma, an all-in-one computer developed by non-profit organization VillageTech Solutions, is designed for school teachers in rural Nepal, India. It provides them with basic access to textbooks, activities, and digital media that may be relevant in meeting Nepal's curriculum requirements. However, Looma did not initially include a simple interface for teachers to connect many different forms of content together into cohesive, custom lesson plans.

Our application presents and organizes Looma's existing content in an accessible, user-friendly manner, and allows the teacher to create reusable lesson plans from this content. The application utilizes HTML5, CSS3, PHP, MongoDB, and JavaScript to create a simple, user-friendly, WYSIWYG design. The application's goal is to remove a key technical barrier that Looma currently poses on teachers, and to create a seamless classroom experience for the teachers and their students.

Going forward, we plan on working with VillageTech Solutions to integrate our application with Looma's operating system. Once we have completed this task, VillageTech Solutions will use Looma and our web application to conduct user testing with teachers in Nepal. We are also finalizing both a technical guide and a user manual for VillageTech Solutions that will outline our code structure and illustrate how to use the web application, respectively.
0.2 Acknowledgments

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Dr. Silvia Figueira of Santa Clara University, for advising and guidance throughout the project.

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Chapter 1

Introduction

1.1 Problem Statement

Schools in under-resourced areas suffer from a host of issues, like missing or damaged textbooks, untrained teachers, and an overcrowded and under-served student population. Most traditional attempts at remedying even one of these issues are prohibitively expensive, particularly in rural areas and last-mile locations. In recent years, however, technology has become available that can affordably augment or replace critical school resources.

1.2 Background or Related Work

VillageTech Solutions is a social enterprise that specializes in creating frugal, dynamic technology solutions for under-resourced, low-income, or last-mile communities, starting in rural Nepal, India. VillageTech Solutions has developed Looma, an all-in-one computer and projector designed for use by school teachers during classroom lessons.

Looma stores and displays digital textbooks, activities, and other educational content that follow the Nepal curriculum for grades 1 through 8. The user can access this content through the Looma computer and display selected content through the projector; it can also be used with a keyboard and mouse. Looma also comes with an infrared wand which the teacher can both point at the wall-projected Looma image, similarly to a television remote, and click screen elements, similarly to a mouse.

Looma’s initial interface held three key technical barriers for the user.

1. The user could only view one piece of Looma’s content at a time. Looma provided such a wide range of content that finding and viewing content was extremely tedious for any user. The device needed a way to view this content easily and accessibly.

2. Looma’s interface had no way to connect individual pieces of content together to present in a classroom. For instance, if a teacher wanted to show two pages from the textbook as well as a relevant game or video, the process of doing so required more technical expertise than the teacher was likely to have.

3. Alternative lesson-planning interfaces for Looma were limited. U.S.-based websites such as Planboard and Blendspace are very popular and successful among American educators, but these applications required capabilities and resources such as universal Internet access, generous funding, and access to open-source tools.
Looma Lesson Planner provides Looma with a simple, frugal, user-friendly interface that allows the user to select and arrange different pieces of media and content into custom, reusable lesson plans. It enhances the user’s experience of Looma and aims to create a more seamless classroom experience for the teachers and their students.

1.3 Objectives

The following table details the major milestones and steps we took to achieve our project goals. Looma was a year-long project organized as shown in Table 1.1 below.

Table 1.1: Development Timeline

<table>
<thead>
<tr>
<th>Project Milestone</th>
<th>Date of Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Report</td>
<td>Fall, Week 10</td>
</tr>
<tr>
<td>Create front end structure</td>
<td>Winter, Week 5</td>
</tr>
<tr>
<td>Operational System</td>
<td>Spring, Week 3</td>
</tr>
<tr>
<td>Design Conference</td>
<td>Spring, Week 7</td>
</tr>
<tr>
<td>Comprehensive Project Report</td>
<td>Spring, Week 10</td>
</tr>
<tr>
<td>Complete Implementation</td>
<td>Spring, Week 10</td>
</tr>
</tbody>
</table>
Chapter 2

Societal Issues

2.1 Ethical

When building Looma Lesson Planner, our primary goal was to help others by providing a more engaging educational experience through the use of our application. The stakeholders are the Nepali teachers, students, and the students’ families.

Table 2.1: Stakeholders

<table>
<thead>
<tr>
<th>Who are the stakeholders?</th>
<th>How are they affected?</th>
<th>How will our project empower people?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers in Nepal and other under-served areas</td>
<td>Vulnerable: supplied with limited resources with which they try to effectively teach children</td>
<td>Gives teachers the ability to plan lesson materials and fun activities to engage the children</td>
</tr>
</tbody>
</table>
| Children in Nepal and other under-served areas | Vulnerable:  
- do not have access to proper course materials  
- do not get support/ attention from teachers  
- sometimes are not allowed to go to school | Engages children, allows them to learn more effectively through activities, eventually inspires more agency to pursue higher education and rise out of poverty in the long term |
| Students’ families                   | Vulnerable: due to financial reasons, do not see the value of sending children to school when the system does not benefit them | In the long term, if children gain better jobs through pursuing education, they could financially support their families |

After analyzing the vulnerable stakeholders and the potential good of this project, we determined that our project is ethical. In areas where limited resources are such a hindrance, we determined that Looma’s ability to engage students combined with the vast amounts of content provided has the ability to empower not every stakeholder.

2.2 Social

Looma Lesson Planner has potential to greatly affect the educational experience for students and teachers in rural areas, but there are potential negative consequences. In the best case scenario, our lesson planning application eliminates the need for other educational resources, makes teachers able to teach more material easily and efficiently, and engages and motivates students to further their education.
However, there is a chance that our application would not be user-friendly enough to get teachers to transition from their current teaching methods. Even though research by VillageTech Solutions shows that the teachers want the Looma and its software in their classrooms, if the technology is too difficult or bothersome to understand, our project will not succeed. Hopefully in schools that already utilize Looma, our application will be able to increase the functionality of the device. However, we must acknowledge that there is a chance that the teachers may not want to adopt technology into their teaching methods.

2.3 Political

VillageTech Solutions has conducted a lot of research to cover the possible political ramifications of this project. In under-resourced areas, politics can have an effect in that the resources may go to more affluent areas, and we have taken this into account. The only way that this affects the concerns of Looma Lesson Planner is that the application had to be accessible with the content that uses the Nepali curriculum.

2.4 Economic

This project is economically very frugal and little to nothing to make, as VillageTech Solutions outsourced talent with us at no cost. Selling the product is out of the scope of our project, as VillageTech Solutions is handling how the Looma itself will be distributed. Transporting the Loomas themselves from here to rural Nepal does cost money and energy, but again, that is outside the scope of our project.

2.5 Health and Safety

The health and safety concerns are the same for people using Looma before and after our application is implemented. Use of Looma Lesson Planner itself does not have any health and safety concerns.

2.6 Manufacturability

Some of the manufacturability of our lesson planner could have been compromised because much of the functionality of our device was written in languages unfamiliar to us. We acknowledge that there may have been more efficient ways to solve some of the issues we faced, but we were able to accomplish our goals and structure our project in a way that can be expanded and built upon later.

2.7 Sustainability

Our lesson planning application’s sustainability depended on both the resilience of Looma itself and the computer’s ability to work in rural areas where the local knowledge of technology is relatively low. Our application makes Looma no less sustainable, but our application is limited to the device’s lifetime. However, as mentioned in the previous section, Looma Lesson Planner was structured in a way that can be built and expanded upon, and is thus a sustainable design.
2.8 Environmental Impact

Looma Lesson Planner is environmentally sustainable because it provides an alternative to textbooks, which reduces paper consumption, saves trees, and eliminates all the energy and costs put into producing and shipping books. Although the application does not have many negative environmental ramifications, the increased use and demand for Looma devices would have a slight impact on the environment, mainly from the resources required to build the computer. Otherwise the environmental impact is negligible.

2.9 Usability

Usability is one of the most crucial aspects of our project because it makes all the difference between our application being utilized or disregarded. Our primary users are teachers in rural Nepal who have little to no technological experience. As a result, even though Looma is a great resource with vast amounts of content, it needs to be extremely user-friendly and as intuitive as possible. Many of our design choices intended to make the application highly usable will be expanded on in this report. These choices include the system using a WYSIWYG format, or what you see is what you get, and making buttons larger so that they are easy to access and press via the infrared wand that acts as a point-and-click remote control. The usability testing and future plans for testing of the application will also be expanded upon in this report.

2.10 Lifelong Learning

The completion of this project held many learning curves and obstacles for our team, including expanding and stretching our coding knowledge for the Back and Front End of the web application. We used numerous tutorials on "Team Treehouse," which were helpful not only for learning PHP and AJAX, but also for getting a more in-depth understanding of the capabilities of Javascript and JQuery, and for brushing up on HTML and CSS.

2.11 Compassion

Our team wanted to spend our year on a senior design project that would be meaningful and be a true contribution to the betterment of our world, and we feel very grateful that we were able to work on this education project with VillageTech Solutions. Looma Lesson Planner seeks to bring a more engaging and cohesive educational experience to students in rural areas where often the resources are incredibly limited, and students suffer as a result. We understand that it is communities like rural Nepal, an under-resourced and last-mile community, who are often left out of the digital age, so addressing the digital divide was a huge part of our project.
Chapter 3

Conceptual Outline

3.1 Use Cases

Different users interacting with Looma will have different goals and technological experience. The following cases, called use cases, outline the goals of specific users and the actions they would take to achieve their goals within the technology.

3.1.1 Use Case #1

**Name**: Create Lesson Plan  
**Goal**: User creates a new lesson plan  
**Actors**: Nepali teachers, Educators, VTS employees  
**Pre-conditions**: N/A  
**Post-conditions**: A lesson plan has been given a title and saved  
**Steps**: 

![Figure 3.1: Use cases of Lesson Planning Application](image)
1. Select button labeled "Create New Lesson Plan"

2. Type lesson plan title in title text box

3. Select "Save"

### 3.1.2 Use Case #2

**Name:** Add to Lesson Plan  
**Goal:** User adds content to existing lesson plan  
**Actors:** Nepali teachers, Educators, VTS employees  
**Pre-condition:** There is content available in the "listed content" area  
**Post-condition:** Piece of content has been moved from the "listed content" area to the "timeline"

**Steps:**

1. Find content by searching the Looma (by scrolling, using the search bar, or filtering)
2. Drag the content from the "listed content" area, drop to a point in the timeline
3. Select "Save"

### 3.1.3 Use Case #3

**Name:** Edit Lesson Plan  
**Goal:** User edits the lesson plan by rearranging the order of the content  
**Actors:** Nepali teachers, Educators, VTS employees  
**Pre-condition:** The existing lesson plan already contains two pieces of content  
**Post-condition:** The order of the content in the lesson plan has been rearranged

**Steps:**

1. Select button labeled "Edit"
2. Drag content from one point in the timeline, drop on another point in the timeline
3. Select "Save"

### 3.1.4 Use Case #4

**Name:** Delete from Lesson Plan  
**Goal:** User removes content from the lesson plan  
**Actors:** Nepali teachers, Educators, VTS employees  
**Pre-condition:** There is at least one specific piece of content in the lesson plan  
**Post-condition:** The specific piece of content is removed from the lesson plan and its timeline

**Steps:**

1. Select button labeled "Edit"
2. Drag specific piece of content from the timeline, drop on the trash bin icon
3. Select "Save"
### 3.1.5 Use Case #5

**Name:** View Lessons  
**Goal:** User views lesson plan in presentation mode  
**Actors:** Nepali teachers, Educators, VTS employees, students in Nepal  
**Pre-condition:** There is at least one piece of content loaded into lesson plan timeline  
**Post-condition:** Lesson plan is viewable in presentation mode  
**Steps:**

1. Select button labeled "Present"
2. Traverse the timeline using the "Next" or "Previous" buttons, or by selecting any piece of content from the timeline  
3. Enter full screen mode by pressing the arrow icon in the top right corner of the presentation area

### 3.2 Conceptual Model

After gathering the requirements, we created a basic wireframe, showing the main interfaces and available buttons and inputs. The figures below detail the flow of the user’s actions within the interface.

![Select your saved lesson plan:](image)

Figure 3.2: The application’s landing page. This interface allows the user to create a new lesson plan or open an existing, previously saved lesson plan. The user can edit, present or delete these saved lesson plans from this page.
Figure 3.3: The lesson plan edit mode. This mode shows the screen that the user interacts with when creating a lesson plan.

The user first chooses what he or she wants to include in the lesson plan from all existing Looma content by browsing, searching or filtering the listed content, with the results of the query appearing in the file browser shown in (Figure 3.4).
Figure 3.4: The file browser. The user can browse through the results of his or her search. From here, the user can also either add the content to the lesson plan or preview the content (Figure 3.5).

Figure 3.5: The content preview area. The user can click on any piece of content in the file browser to preview the content before dropping it to a chosen point in the timeline.

From there, the user can take this chosen content and insert it into the timeline in the order that he or she prefers, and then save the lesson plan and continue to presentation mode if desired by using the buttons shown below in Figure 3.6.
Figure 3.6: The presentation buttons. At any point the user can save his or her work or switch to presentation mode (Figure 3.7).

Figure 3.7: Presentation mode. This figure shows the screen mode in which the teacher will present his/her lesson plan to students. The user can view pieces of content on a wide screen and traverse through the content using the timeline at the bottom (Fig. 3.8). The user can easily and readily access the edit mode as well from this screen.

Figure 3.8: The timeline. The teacher/presenter can traverse through the timeline by scrolling or by pressing the arrow keys.

Figure 3.9: Edit button. The user can return to the edit mode screen (Figure 3.3) at any time.
3.3 List of Requirements

In order to ensure that our software meets the specific needs of the user and the Looma system, we made a list of functional and non-functional requirements and design constraints. This provided us with direction and constraints under which we knew we could develop the software.

3.3.1 Functional Requirements

1. The application must run on Looma hardware
2. The application must have a WYSIWYG format
3. The application must visually display all existing Looma content
4. User must be able to organize Looma’s existing pieces of content into a custom order
5. User must be able to create and save templates from their custom organized content
6. The application must be accessible for both teachers and VillageTech administrators

3.3.2 Non-Functional Requirements

1. The interface must be simple and easily interpreted across cultures
2. The application must be frugal and must use Looma’s resources efficiently

3.3.3 Recommended Requirements

1. The interface must be accessible via infrared wand
2. The interface must allow the creation of an editable text slide
3. The application must be available in both English and Nepali

3.3.4 Design Constraints

1. The interface will access data using MongoDB
2. The interface design must tightly align with Looma’s existing design guidelines
3.4 System Sequence Diagram/Flow Chart

Figure 3.10: How the user interacts with the interface from start to finish.
3.5 Design Rationale

Looma Lesson Planner is designed primarily for use by experienced educators and Nepali teachers. The application was designed to be largely accessible via the infrared peripheral that comes with Looma. This is why a major part of our design focuses on large, accessible buttons and WYSIWYG design.

After discussing the design with VillageTech Solutions, we decided to avoid using a framework or a newer web technology specifically because Looma is a constrained device and would not necessarily have the resources to work with frameworks that may change in a dramatic way in the future. Frameworks are often evolving and unwieldy. Applications developed from these frameworks need to be maintained far more often than VillageTech Solutions can handle. So instead, we derived our back-end technology stack from VillageTech Solutions' own system. Most of Looma’s current design relied on PHP and MongoDB, so trading out these technologies for some other server-side model would have simply not been a scalable option.

3.6 Technologies Used

For our web application, we decided to maintain a very minimal technology stack. Our front-end technology stack consisted of the following:

- HTML5/CSS3 provide the fundamental layout and aesthetic design of the application
- JavaScript and jQuery allow the application to be dynamic and provide a level of interactivity

Our back-end technology stack consists of the following:

- PHP provides the back-end application logic
- MongoDB maintains and accesses the database with all relevant class information
Chapter 4

Delivery

4.1 Test Plan

After we designed and developed Looma Lesson Planner, we tested it to identify correct functionality and bugs. On our local machine, we tested the software’s ability to accommodate the display of Looma’s existing content, the arrangement of many different kinds of content in the timeline module, and the software’s ability to present the user’s lesson plan. These pieces of content may include plain text, an image, a video, a textbook chapter, a game, and so on.

Once creation of a working prototype was completed, we began to perform black box testing with our peers at our university. We asked them to perform certain tasks with the software, which are outlined in the Test Cases subsection, and observed how they attempted to complete the task.

Once we identified major usability errors and patterns in our basic user tests, we then performed white box testing on our own team to test the efficiency of the code.

Going forward, in order to further measure the resiliency accommodate for unforeseen cultural barriers and to address problems that Nepali users may face when using the system, VillageTech Solutions suggests holding a small local event to do user testing with Nepalese in the area.

4.1.1 Test Cases

As mentioned above, when performing black box testing on our peers, we had them complete the following list of tasks, and rate the difficulty of performing each task.

1. Create a new lesson.

2. Browse through the content available by submitting a search.

3. Preview one piece of content.

4. Add two pieces of content to your lesson plan.

5. Move the last piece of content in your lesson plan to the beginning of the lesson plan.

6. Save your lesson.

7. Go back to the Open page.

8. Present the lesson plan that you just created.
4.1.2 Test Results

We completed a portion of our testing plan, and we are in the process of modifying our product in response to several testers’ feedback.

In terms of white box testing, we have tested the Looma Lesson Planner on each other, and our product is functioning correctly with minimal bugs. The functionality of each of our web pages are cohesively connected to one another and run smoothly.

In terms of black box testing, the testers were able to complete the majority of the tasks we assigned with ease. However, multiple testers found the filter module of the edit mode of our product to be unclear, as they falsely assumed that they were required to select all of the filter fields (grade, subject and media type) before submitting a search. As such, we have implemented changes to make it clear to the users that they need to select at least one filter field, but need not select all of them to submit a search. Our testers also found the results navigation menu at the top of the results module to be confusing. This feature allows users navigate to the exact type of result they are looking for (textbook, chapter, activity or dictionary), but testers did not understand the purpose of this menu and were confused by the fact that the menu did not match the specific filter fields that they selected in their search. VillageTech Solutions will implement changes to our product to address this user feedback.
4.2 User Manual

How to create a new lesson plan

Figure 4.1: The Create New button redirects the user to edit mode, where they will be able to add content to the lesson plan.

How to edit an existing lesson plan

Figure 4.2: This will redirect the user to edit mode. The saved lesson plans content will be in the timeline at the bottom of the page.
How to present an existing lesson plan

Figure 4.3: This button redirects the user to present mode. There, they will be able to display the saved lesson plan content full screen.

How to delete an existing lesson plan

Figure 4.4: This deletes the corresponding saved lesson. Once deleted, the content in that lesson plan will no longer be available.
How to filter through Looma content

Figure 4.5: The query bar (circled in red above) is used to view filtered content.

Figure 4.6: The user can select the grade or subject by selecting from drop down menus.

Figure 4.7: The user can also filter the types of media they would like to see in the results area: images, videos, audio clips, or miscellaneous. Once the user has filled out his or her selected queries, he or she selects the Search button to populate the results field.

How to navigate to specific media results

Figure 4.8: The user can jump straight to the sections within results that contain each type of content. The sections are textbooks, chapters, activities, and dictionary entries.
How to preview content

Figure 4.9: The user can view the content by selecting the Preview button that is part of each piece of content. It can be previewed before or after being added to the timeline.

How to add content to a lesson plan

Figure 4.10: Each piece of content that populates the results section has an add button, which adds it to the end of the timeline.

How to rearrange content within a lesson plan

Figure 4.11: Once there are multiple pieces of content in the timeline, the user can rearrange their order by dragging them and dropping them in the desired place.
How to remove content from a lesson plan

Figure 4.12: The user can remove pieces of content from the timeline by selecting the Remove button on the corresponding piece of content.

How to save a lesson plan

Figure 4.13: The Save button allows the user to edit or present it in the future by opening it in the open page. In order to save, the lesson plan requires a title. The user is alerted if he or she tries to save without giving the lesson plan a title.
Chapter 5

Conclusion

By completing this project, we successfully created a fully functioning product that will improve the educational experience of students in Nepal. We took into account rural Nepal’s societal context and its impact on the educational experience in order to design a product that addresses students’ needs and helps them utilize a variety of learning styles and materials. Throughout the development process, we learned how to effectively manage our project to create the highest quality web application possible. The sections below both reflect on our takeaways from the project, and describe the future of the project.

5.1 Project Management and Lessons Learned

Through this year long process, we learned many lessons about how to collaborate effectively to create a user-friendly product. The list below shows the issues we encountered and what we learned from them.

**Project and Task Management.** As a four person group, we consistently completed tasks by splitting our groups in two. While Suparna and Elise focused on front end tasks, Kate and Roshan focused on back end tasks.

**Testing finds flaws in usability.** Further testing must be done to find necessary changes in our interface.

**Working with our client.** We learned the importance of consistent communication to ensure we met the client’s expectations.

5.2 Further Testing

VillageTech Solutions plans on doing more extensive testing in the coming months, particularly by sending our web application to teachers in the U.S. to get their feedback. VillageTech Solutions will then test our application on Nepali teachers and students the next time they bring Looma to Nepal.

5.3 Future Enhancements

One future enhancement that the product may benefit from is the ability to create dynamic/new content from within the application. This would allow teachers and administrators to give context or a narrative to the lesson plan, further distinguishing lesson plans from a mere aggregation of content.
Another enhancement that would benefit our application would be an auto-translate button. Translating all the English content into another language (namely Nepali) would be extremely useful, expanding the userbase of the application from just VillageTech Solutions administrators.
Chapter 6

Appendix

6.1 Literature Review

Context on Nepal’s educational system: In order to create an effective web application for Nepalese teachers to use with students, it is paramount that our team understand the rural community and the features and issues involving Nepal’s educational system. Most rural areas rely on subsistence farming, and as such, many parents cannot justify educating their children because they need them to work on the farm.\(^1\) Girls especially do not benefit from this way of thinking, as they are typically given more consistent responsibilities on the farm, so parents are more hesitant to allow them to go to school, especially when most of them get married in their mid-teens.\(^2\) Sujaya Neupane explains that community members must have the ownership of any development program that is run. While the Looma takes the first step provides teachers with Nepal curriculum textbooks and related open source materials, our application will allow teachers to take ownership of this content and present it in ways that make the most sense for them and their students.

Goals for developing digital lesson planning tools: While lesson plans have been long used by teachers to organize their content and teach in the most effective way, the current problem is finding how to adequately present them in digital educational portals and resource repositories.\(^3\) The article Technology-Based Lesson Plans: Preparation and Description” outlines useful potential lesson plan characteristics that our project should include in our design. A successful lesson planning tool would encourage teachers to think of [the] specific needs of each student, easily share the lesson plans they create with their peers, and gain more confidence in their personal knowledge of the subject matter.\(^3\) Our application must take advantage of technological benefits that make it easy to provide teachers access to a variety of materials in one consolidated place, and share the resulting lesson plans with other teachers.

The article entitled Inspiring Educators as Contributors of Open Educational Resources inspired us by showing me the importance of having platforms to share open educational resources. Authors Soon Fook Fong and Fei Ping Por explain that with the Internet comes an overwhelming influx of educational information, but this information means nothing if it is not organized and consolidated for educators to easily find and


use. By providing Looma with a lesson planning tool, teachers and educators will be able to take this multimedia content, and make meaningful connections between them all in order to teach more effectively.

6.2 Annotated Bibliography


The article entitled The iLessonPlan: a lesson planning tool for the 21st century was obtained from the Australasian Society for Computers in Learning in Tertiary Education. It is about the development of an online lesson plan creation tool for teachers of ESOL (English to Speakers of Other Languages) in New Zealand to replace hard copy lesson plans presented to English Language trainee teachers in a list format. This article applies to our project because the website contains usability practices to make the lesson planning interface simple, accessible and easy to follow. The article is not useful for our project because it has a very specific audience English Language trainee teachers, whereas our project is for secondary school teachers in the developing world and educators in the U.S. who will be creating preliminary lesson plans for these teachers to use.


The article entitled Technology-Based Lesson Plans: Preparation and Description was obtained from the ProQuest database. The article analyzes the ways in which information technology can facilitate the development of personalized lesson plans for teachers. This article is useful for our project because it identifies in detail the problems with the current situation of lesson plans and templates. It is not useful for us in that it speaks about technology usage to make dynamic templates in general terms and does not give specific interface examples.


The article entitled Using Inexpensive Technology and Multimedia to Improve Science Education in Rural Communities Of Nepal was found in the McGill Journal Of Educations. It explores the ways in which affordable technologies can be used to give access to science education in rural Nepal. While this article talks about using some different affordable technologies than what our project uses (although there is some overlap), it contains a detailed description of the communities in rural Nepal, as well as the education system there, which are very useful for our project.

Stash, Sharon. Who Goes to School? Educational Stratification by Gender, Case, and Ethnicity in Nepal.

This article entitled Who Goes to School? Educational Stratification by Gender, Case and Ethnicity in Nepal was obtained from the JSTOR Journal database, in the Comparative Education Review that is part of Chicago Journals. The article relates to our project because it provides an in-depth background of the existing issues within the primary education system in Nepal. It is vital to understand the system in which our software will be implemented. This article focuses on the issues of gender and caste, and how they impact access to education for impoverished children in Nepal. The combined values associated with both forces reinforce caste hierarchies despite educational expansion in Nepal, as the education system favors boys of higher castes.


This article was obtained from the International Journal of Academic Research in Progressive Education and Development. It is relevant to our project, as it details the ways in which open educational resources (OER) not only allow for universal access to education, but also promote the integration of a variety of genres of educational media, such as videos, images, textbooks, games, etc. As Looma’s content is based on OER, and our lesson planning software will allow for the mix of these different media, this article is pertinent to our topic. This article details the importance of having platforms for finding, organizing, and sharing OER, which is essentially what our lesson plan application would enable. Instead of just giving teachers access to all of the raw multimedia content on Looma, our application will allow for the creation of meaningful connections between OER with related subject matters.
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**Key**
- Roshan Ramankutty
- Kate Lassalle-Klein
- Elise Herrmannsfeldt
- Suparna Jasuja
- All
- Deadline

**Requirements**
- Gather initial requirements
- Communication with Customer

**Design**
- Reqs/Use Case/Arch Design
- Activity Diagram/Conceptual Model/Figures
- Design Rationale/Testing Plan/Risk Analysis

**Implementation**
- Create form on Adobe Acrobat

**Testing**
- Create mock-up
- Test Adobe software functions
- Usability Testing