

Collaborating Towards Learning, Using Social Spreadsheets for Health Education and Community Awareness

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Abstract

Technology Enabled Education has provided the world with new and improved ways of learning. Various frameworks in different education sectors have been established in order to facilitate easy and effective communication and dissemination of information amongst the masses. In our effort to do the same, we have discussed the use of a Cloud enabled Social Spreadsheet to introduce a new system for development of an on-line Community Health Resource Centre. Through this paper, we aim to present a framework for information sharing and learning by demonstrating some use-cases, its user interface and instructional design.

1. Introduction

Past two decades have seen a phenomenal growth in understanding of health behaviors with a focus being largely on new community practices and ways to sensitize the masses about basic health and wellness [1]. With health literacy being indispensable in the present scenario [2] and a paradigm shift to create an international community for life-long knowledge distribution [3], the emphasis is now on creating web based applications that make health education available to all.

This is where Spreadsheets emerge as a valuable tool to collate data and present information while banking upon the organizational aspect of the framework. For organizations and institutes, the cloud based Spreadsheets provide with an interface that helps them collaborate with each other and contribute towards productivity and learning. There have been a number of spreadsheet tools that are available for users viz Google Docs, EditGrid, Zoho Sheet and Secure Sheet. Though we have all these spreadsheet tools available, the development of open source learning resources having its pedagogical advantages on the spreadsheet interface hasn't been fully realized.

SocialCalc provides a spreadsheet platform to create and share curriculum and content matter in a simple and an effective manner. It gives users an opportunity to form new information systems that help in communication by using spreadsheet as a tool to manage productivity and ease organization. Thus, it is imperative to develop practices and models that can help in improved learning and assimilation of health related knowledge.

This paper is a manifestation of such practices in our effort to introduce a novel approach of health information sharing in the world.

2. Introduction to SocialCalc Spreadsheet Activity on Sugar

Providing poor kids with affordable educational devices is the guiding principle of One Laptop Per Child (OLPC)[4]. The organization enables education for the kids in the developing world by providing them with low cost connected laptops (XO) with

installed educational software. The software is designed to facilitate self empowered, critical and cognitive learning for all.

Sugar [5] is open source software used for this initiative. Sugar has introduced several activities to help students understand basic concepts in a playful manner. SocialCalc is the one of the well used spreadsheet activities of the Sugar environment. Its OLPC development was undertaken by Manu Sheel Gupta, Managing Director of SEETA with K.S Preeti and Vijit Singh, alumni from Netaji Subhas Institute of Technology and Luke Closs from Socialtext Inc. under the guidance of Walter Bender, Oversight Board Member at Sugar Labs and Dan Bricklin, Founder and President of Software Garden Inc. for Socialtext, Inc. [6]. Through activities on Sugar, the aim is to :

- Make learning collaborative.
 - Enhance cognitive understanding.
 - Promote critical thinking.
 - Emphasize upon usage of analysis and evaluation while learning basics of mathematics.
- We are using one of the next generation versions of SocialCalc for Open Educational Resources (OER) called the EtherCalc.

3. Features of the Social Spreadsheet

The following are the features of the social spreadsheet:

- 3.1 Open and Inclusive learning** - No user login is required. Every time you visit the site you can create one spreadsheet. You are provided with a unique URL.

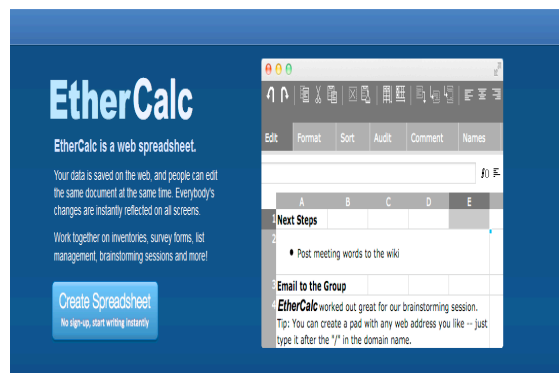


Figure 1: No login

- 3.2 Collaboration-** EtherCalc employs an excellent feature of collaboration. As mentioned before, every sheet is provided with a unique URL and sharing that specific URL will allow others to view and edit contents in the sheet concurrently or turn by turn. Thus, collaboration is greatly achieved as the URL just needs to be broadcasted on any of the social media networks or otherwise in order to share the information.



Figure 2: Example of the Unique URL provided to every new collaborator

3.3 Customizable Web Address- The user may create a Spreadsheet of desired web address by editing and typing it after the “/” in the domain name.

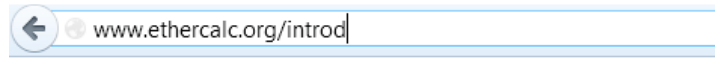


Figure 3: Editing the URL to a desired domain name

3.4 Editing the sheet: Clicking on URL of the existing sheet opens the sheet for any user to edit it.

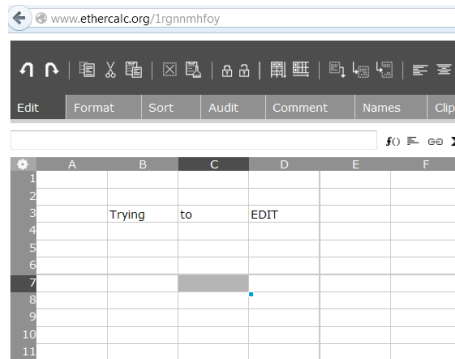


Figure 4: Edit Mode of the sheet

3.5 Cell Locking- To ensure that certain or all data in the sheet doesn't get edited when opened by some other user, cells can be locked by the creator. This means that data in those (or all) cells cannot be edited by subsequent users. This shall ensure that useful information doesn't get edited during the sharing process. All that a user is required to do is to select the cells for which the data shouldn't be altered and click on LOCK option in the menu above.

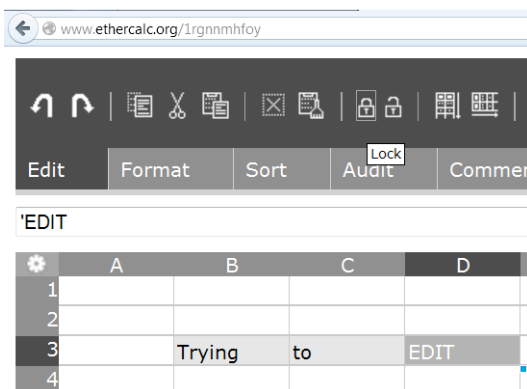


Figure 5: Locking the cells

RPC's are created using the JSON (JavaScript Object Notation) [7]

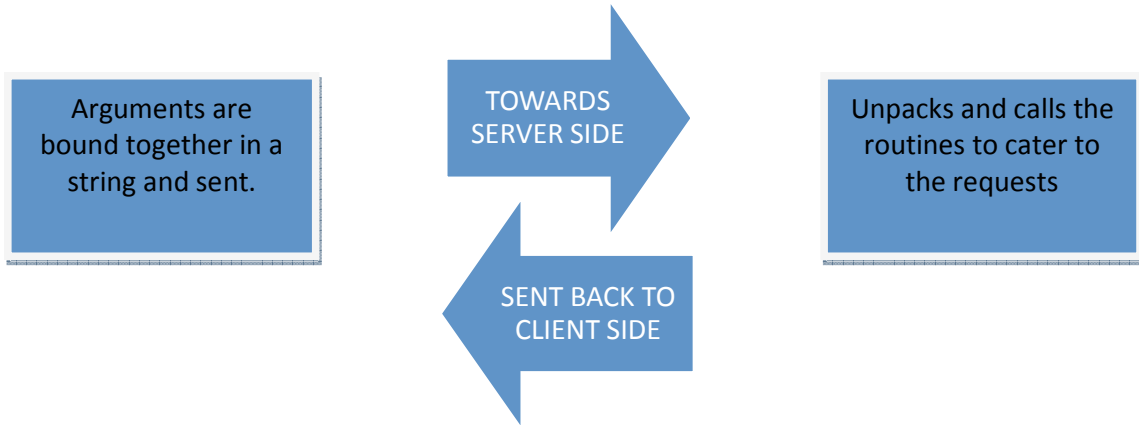


Figure 6: Making an RPC

Functions performed via RPC:

A user record for each sheet is maintained. Whenever anything is modified in the sheet, the changes are sent as string to the server side so as to reflect those changes and making them visible to other active users.

Synchronous checking is currently employed to reflect back changes from the server side back to the client. In this way, the client keeps on checking for any modifications by creating RPC after specific time. Thus, if any modifications are seen, the data is collected and shared back to the client.

4. Architecture for the Social Spreadsheet Framework

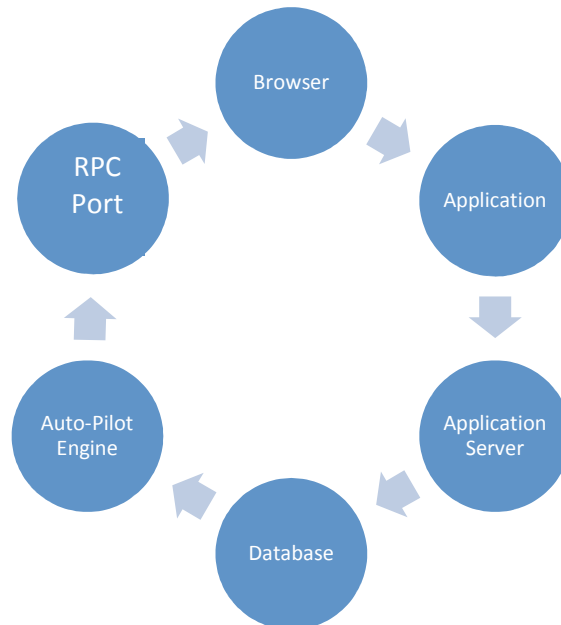


Figure 7: Software Architecture of the Social Spreadsheet

The above Figure shows the proposed architecture of the system. The framework can be used for other spreadsheet based activities.

5. Cloud enabled Social Spreadsheet

While focusing on taking the spreadsheet to the cloud, the architecture was designed to make it possible for the application to use the school server which is common for all the XO laptops. But in order to achieve the collaborative learning aspect, the Python and JavaScript language parts were modified, the framework was created and it was successfully setup on Google App Engine, where Python served the needs at the server side and JavaScript was employed at the browser. An improved version called “EtherCalc” has been contributed by Audrey Tang from Socialtext, Inc. using JavaScript at the server end and an improved speed of collaboration.

6. Building Community Health Resource Centre on Android phones

Frost and Sullivan have aptly mentioned healthcare as one of the major trends that would shape the future of the world [8]. The importance of nutrition in overall wellness of a human being cannot be understated [9]. Thus, sharing of relevant information in this domain amongst masses can be a great beginning to sensitize people and students about the health and wellness related issues. This can be of great help in creation of a health resource centre to mobilize information in the world about the basic facts associated with food, diseases, hygiene and human body as a whole.

Lesson Plan: Fundamental understanding of 15 Indian fruits and their varieties [10] for the students at the primary school level.

Principle- The underlying principle of creation of such a resource is to make the essential facts about nutritive value of fruits, their processing methods et al available at a cost effective open source mobile platform.

Features of the curriculum-

6.1. Creation of individual sheets for database- The idea here is to combine all the relevant data like the nutritive value of all fruits and to call it a unit.

- Here, Unit-1 summarizes and gives a comprehensive overview of nutritional aspects of various fruits available.

Fruits	Nutritive Value per 100 grams of fruit										
	Protein	Energy	Vitamin A	Carotene	Calcium	Iron	Phosphorous	Fibre	Vitamin C	Sodium	Potassium
Amla	0.5 g	58 KCal	151 I.U.	9 ug	50 mg	1.2 mg	20 mg	3.4 g	600 mg		
Apple		59 KCal		0 ug	10 mg	1 mg	14 mg	1g	1 mg	28 mg	75 mg
Ripe Banana		116 KCal			17 mg	0.9 mg	36 mg		7 mg		
Blue Grapes		58 KCal		3 ug	20 mg	0.5 mg	23 mg	2.8 g	1 mg		
Green Grapes		71 KCal		0 ug	20 mg	0.5 mg	30 mg	2.9 g	1 mg		
Guava (common variety)		51 KCal		0 ug	10 mg	1.4 mg	28 mg	5.2 g	212 mg		0 mg
Guava (Pahadi type)		38 KCal		0 ug	50 mg	1.2 mg	20 mg	4.8 g	15 mg		91 mg

Figure 8: Creation of unit-1 of the Health Resource Centre that contains the nutritive values of 15 Indian fruits and their varieties [10]

- Unit-2 on the other hand provides an entire module on a specific fruit cell. It gives facts about its history, names, nutritional aspect, activities for better understanding and provides the students with a questionnaire so that the teachers can easily assess how well the students have grasped the subject through these activities. Teachers may also add their comments or recommend changes in the Fruit Module so as to make this learning process collaborative and evolving.

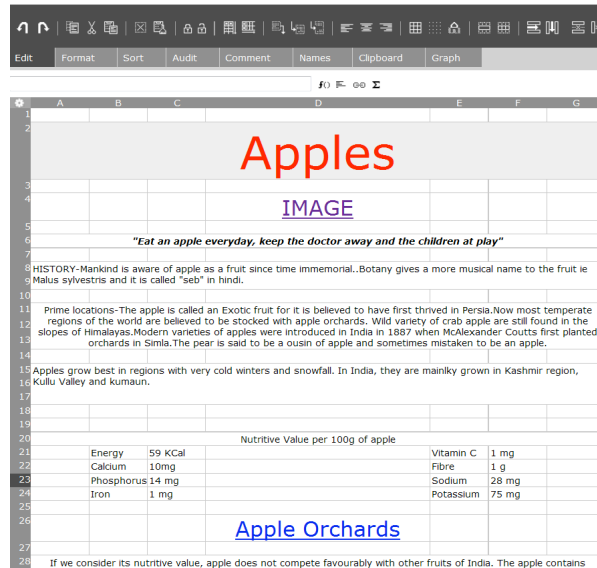


Figure 9: Fruit Module: Apple. [11]

Both, “Apple Orchards” and “Image” are hyperlinks that link to the external websites showing images of the fruit and orchards.

6.2 Creation of an index- As described before each unit has a separate URL. The biggest concern here is that the information, though collaborative, remains scattered. For this purpose, there is a need to create a combined index of various units and broadcast that index. Different units of information are assimilated into the index as a hyper link, clicking on which will take you to the separate sheet with the required information. This can be attributed to the ability of EtherCalc to link URLs in the sheet in a simple and efficient manner.

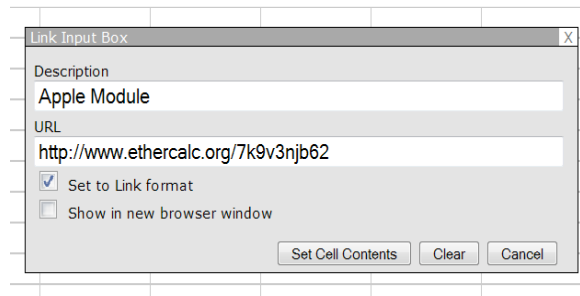


Figure 10: Creating a hyperlink from a URL to link modules

Thus, with this we aim to create a curriculum so as to provide students with a structured way of learning about health and nutrition. The curriculum aims at creating a learning mandate for students of a particular age group in a cost effective manner.

Fruits				Lesson Plan
Amla				Amla
Apple				Apple
Ripe Banana				Ripe Banana
Blue Grapes				Blue Grapes
Green Grapes				Green Grapes
Guava (common variety)				Guava Common
Guava (pahadi type)				Guava Pahadi
Jackfruit				Jackfruit
Jamun				Jamun
Roseapple				Roseapple
Ripe Mango				Ripe Mango
Green Mango				Green Mango
Musk Melon				Musk Melon
Water Melon				Water Melon
Tinda				Tinda

Figure 11: Creating index for Fruit Module where hyperlinks to different fruits represent their respective lesson plan.

Use Case 1: The creation of curriculum for any school in rural India with facility of just one desktop, mobile phones at home and lack of other learning resources.

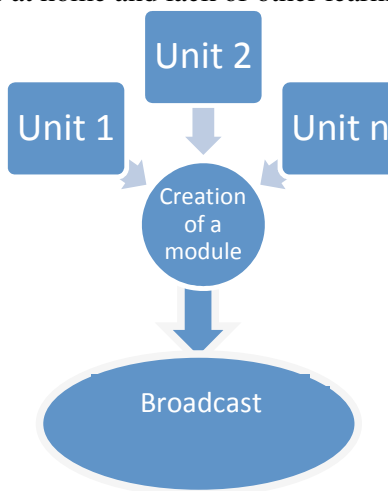


Figure 12: Creation of community health information module

The curriculum [12] will aim to provide the community members with a series of links to further the educational opportunities in the health sector. The fruit module may be executed as follows:

- Target group - Children in the age group of 8 to 12 years
 - Resource required- Desktop or mobile phone at school and mobile phones at home. Internet connection is required.
 - Assumptions – Frequent power cuts and lack of regular electricity supply.
 - Objective:
 - To make students aware of basic facts about fruits, their types, locations etc.
 - To get a better understanding of fruits in their local regions and seasonality through various activities.
 - To make teachers assess the grasp of students by making them fill a basic questionnaire based on their observations.
 - Pre Learning Activities: Make them observe a fruit, the seeds, color and so on by asking them to engage in group activities like cutting the apple and making it dry so as to retain the nutritional value of the fruit.
 - Learning: Provide them with hard facts about these values, food processing techniques, locations, availability and so on as listed in the specific fruit module.
 - Post Learning: Ask them to fill a questionnaire provided in the module so as to assess how well the students have grasped the knowledge.
 - Collaborate: Share your knowledge with the community by adding your observations in the module, so modifications can be easily made.
- The modules can also be used to sensitize the adults in rural India during their evening classes, thus, realizing the dream of providing free and useful health educational resources to all.

Use case 2: Creating a system to disseminate information through mobile phones about deficiency diseases in rural India.

Principle- The aim is to create useful material that could help children and adults to understand malnutrition; its causes, symptoms, type, prevention and cure.

Operations: The following use case is also developed by using the aforementioned model. This is done by creating units and linking them to the main Disease Module that contains hyperlinks to the other deficiency disease units.

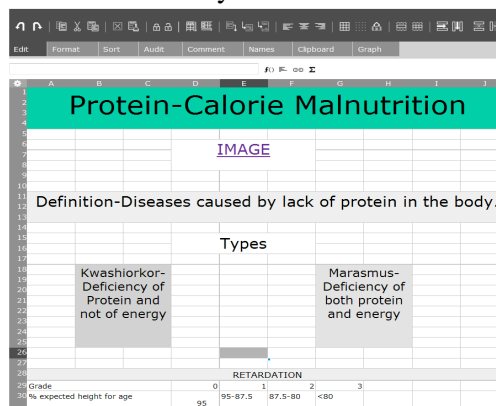


Figure 13: Protein-calorie malnutrition details

7. Implementation Plan

The milestone and tentative timelines for deployment of the Community Health Center are discussed in the following table.

Milestone	Tentative Timelines
Deliverable I – Prioritized list of learning objectives	T+2 Weeks
Deliverable II – Lesson Plans	T+5 Weeks
Deliverable III – Teacher Training Workshops	T+7 Weeks
Deliverable IV – Deployment and Support	T+10 Weeks
Deliverable V – Assessment	Mid-term and Final project

Additional support requirements:

The deployment team will ensure that sufficient capacity of teachers is developed during the teacher training workshops. However if the school or community centre would like any hand holding support from the deployment team, the same will be organized via conferences and webinars.

8. Monitoring and Reach

With the introduction of this new form of knowledge sharing for health and wellness, it becomes pertinent to monitor the quality of reach and understand user behavior and needs. For the same, we plan to integrate a Customer Feedback Form [13], planned to be evolved and made available at the home page of EtherCalc as a hyperlink. Thereby, the analytics provided by user feedback will help us evaluate and create a seamless platform to promote health education and awareness.

9. Future Scope

While the main focus in this paper remains on sharing of health and wellness related information to all on the cloud, we aim at creating a robust chassis for establishment of such a knowledge sharing platform in every branch of education so as to standardize learning and create resources for the emerging world.

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