



## **PROBLEM-BASED E-LEARNING SYSTEM FOR AGRICULTURAL EXTENSION**



**e-shamba**

**Project Website: [e-shamba.com](http://e-shamba.com)**

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## TABLE OF CONTENTS

1.0 INTRODUCTION.....	3
1.1 Objectives.....	3
1.2 Project Stakeholders.....	3
1.3 Previous Efforts.....	4
1.4 Project Outcomes.....	4
1.5 Project Methodology.....	4
1.6 Project Monitoring and Evaluation.....	4
1.7 Project Activities.....	5
1.8 Risks and Mitigation.....	5
1.9 Project Sustainability.....	5
2.0 STATUS OF PROJECT.....	6
2.1 Develop Agricultural Extension Curriculum.....	6
2.3 Upload Agricultural Extension Curriculum.....	6
2.4 Develop Problem-based learning (PPL) cases.....	7
2.5 Design code for on-line question assessment, search and comment solicitation.....	7
2.6 Report Writing of Phase I (Interim Report).....	8
2.7 Development glossary of terms for selected sections of the curriculum.....	8
2.8 Upload glossaries and related multimedia content.....	8
2.9 Upload PPBL content.....	9
2.10 Monitoring and Evaluation.....	9
2.11 Report Writing of Phase II (Final Report).....	9
3.0 WEB ACCESS STATISTICS.....	10
3.1 Summary of Monthly usage (Graphical).....	10
3.1 Summary of Monthly usage (Hits).....	10
3.2 Daily Usage Statistics for the busiest Month, i.e May 2015.....	11
3.3 Average Hourly Usage Statistics for May 2015.....	11
4.0 CONCLUSION.....	12
5.0 REFERENCES.....	13

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## 1.0 INTRODUCTION

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### 1.1 Objectives

**General:**

To developing a problem-based e-learning system to guide school and college learners and to supplement agricultural extension training services.

**Specific:**

To improve the knowledge, skills, practices and attitudes of the farming community in Western Kenya.

Problem-based learning (PBL) is an approach that challenges users to learn through engagement in a real problem.

The learner centered approach, it develops both problem solving strategies and disciplinary knowledge bases and skills by placing students in the active role of problem-solvers.

The project seeks to improves user learning outcomes through the use of contemporary web-based technologies employing problem-based learning and utilizing social media, rich interactive multimedia and digital storytelling.

This will compliment the existing mode of lerning delivery which include:

- a) Classroom
- b) Field Days
- c) Open Days
- d) Demonstrations
- e) Farm visits
- f) Agricultural Shows

### 1.2 Project Stakeholders

The stakeholders in the project are:

- a) Farmers
- b) Secondary School Students
- c) Agricultural Training Colleges (Agricultural, Dairy Training)
- d) Agricultural Research Institutes
- e) Kenya Agricultural Research Institute
- f) Kenya Sugar Research Foundation
- g) Universities
- h) Agri-industries
- i) Ministry of Agriculture

### **1.3 Previous Efforts**

There have been various efforts to improve the delivery of information, knowledge and skills to using ICT farmers. Notable examples are:

Agriculture for Secondary Schools (Phase One of the Project) by James Kulubi – Website:

Ministry of Agriculture (html and PDF) – Website:

Kenya Agricultural Institute (HTML and PDF) Website :

Sugar Research Foundation (HTML and PDF)- Website:

### **1.4 Project Outcomes**

1. improved the knowledge, skills, practices and attitudes of the farming community in Western Kenya.
2. Improved student performance in agriculture subject in secondary schools.
3. Agricultural farmers' extension problem-based curriculum:
  - a) Course Outline
  - b) Learning Outcomes
2. Agricultural farmers' extension problem-based e-learning system
3. Agricultural secondary school problem-based e-learning system
4. Over 3 Million unique hits per month in the high farm activity period.

### **1.5 Project Methodology**

Specific actions to be carried out include:

1. Develop the e-learning curriculum
2. Acquire and develop agricultural certificate and extension examination papers/assessments and their solutions in the last 10 years
3. Develop problem-based learning guides
4. Extract and package individual problem-cases and develop metadata and links
5. Create Multimedia and text content in HTML5 with social media accessibility
6. Link and upload to website
7. Promote the website site
8. Monitor user comments and reply or modify content as per suggestions
9. Monitor access and search statistics
10. Review web content based on the results from (8) and (9)
11. Develop performance report

### **1.6 Project Monitoring and Evaluation**

Assessment of Work Done by Project Leader and assessment of resources used carried out by the university internal auditor and

accountant. In addition the project leader will regularly review web usage statistics, web-search activity and comments from users and other stakeholders.

Web access statistics and web search history will be used to assess user interests which will be used to enrich content.

## **1.7 Project Activities**

The project activities are as follows:

1. Develop Agricultural Extension Curriculum
2. Acquire Website (e-shamba.com)
3. Upload Agricultural Extension Curriculum
4. Develop Problem-based learning (PPL) cases
5. Design of on-line question assessment, search and comment solicitation
6. Upload PPL Content (www.eshamba.net)
7. Report Writing of Phase I (Interim Report)
8. Development glossary of terms for selected sections of the curriculum
9. Upload glossaries and related multimedia content
10. Upload PPBL content
11. Monitoring and Evaluation
12. Report Writing of PhaseII (Final Report)

## **1.8 Risks and Mitigation**

1. Legal – Infringement on copyrighted works (books, video, etc)
2. Economic – Ability of farmers to purchase phones and computers capable of receiving rich multimedia content.
3. Technical – Wireless broadband access in rural areas

### **Mitigation:**

1. Legal: Develop original content and include expert review.
2. Economic: Phase the project with government e-initiatives e.g. Internet for schools and zero taxation on computer equipment
3. Technical: Ride on the government broadband project now in phase II

## **1.9 Project Sustainability**

Advertisements placed on webpages

Premium content will be accessed at a fee following the following developments in Kenya from:

- a) Mobile Money Service
- b) Licensing of MVNOs

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## 2.0 STATUS OF PROJECT

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### 2.1 Develop Agricultural Extension Curriculum

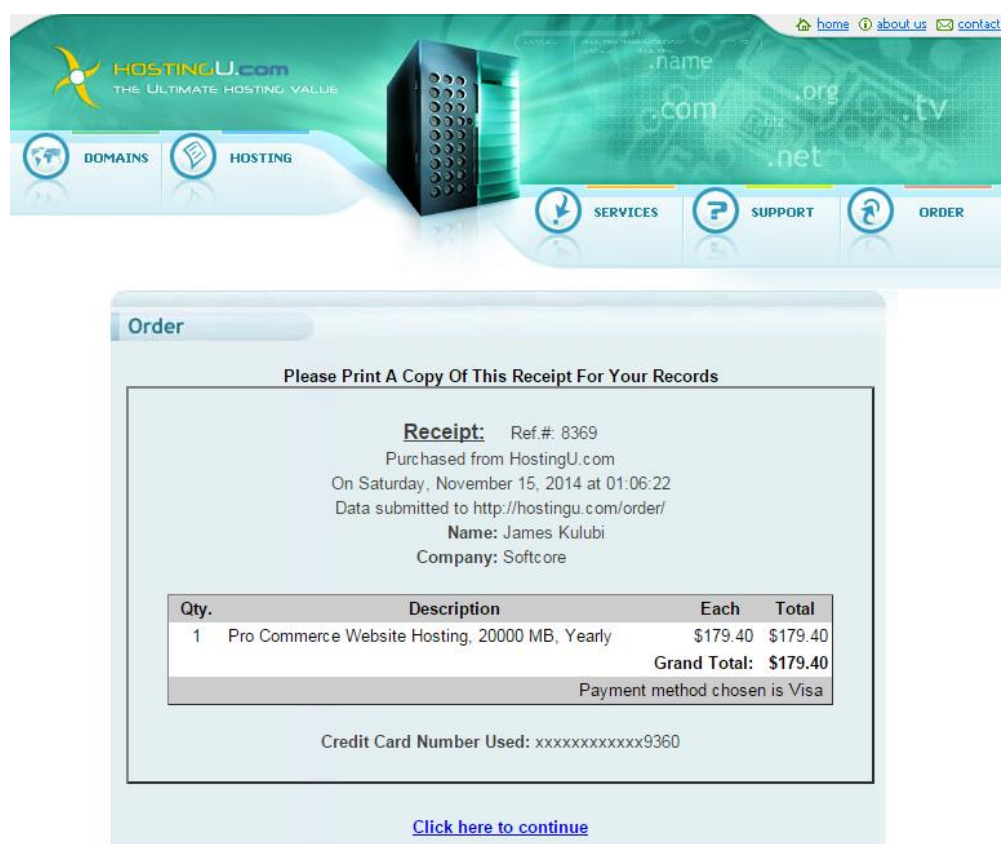
Status: Complete

The agricultural extension curriculum was developed in consultation with the Ministry of Agriculture, Kenya Agricultural and Livestock Research Organization, Department of Agriculture, Egerton University, Department of Agriculture (MMUST), Bukura Agricultural College and Extension officers in Western region of Kenya (Kakamega, Bungoma, Busia, Vihiga, Siaya, Kisii, Kisumu, and Migori counties).

### 2.2. Acquire Website

Status: Complete

A domain name (URL: <http://www.e-shamba.com>) was registered on 15<sup>th</sup> November 2014. Web hosting services acquired for a period of one year from hostingU.com. An e-receipt for the same was issued and is shown below.



### 2.3 Upload Agricultural Extension Curriculum

Status: Complete

Curriculum available at: <http://www.e-shamba.com>

## **2.4 Develop Problem-based learning (PPL) cases**

On-going

Review of cases ongoing by experts and the project team

## **2.5 Design code for on-line question assessment, search and comment solicitation**

On-going

Code and testing development on going using HTML5, SQL

Upload PPL Agricultural extension curriculum to project website ([www.e-shamba.com](http://www.e-shamba.com))

On-going

The following curriculum content has been uploaded:

1. Introduction to Agriculture:  
[http://e-shamba.com/Introduction/default\\_Introduction.html](http://e-shamba.com/Introduction/default_Introduction.html)
2. Agricultural economics  
[http://e-shamba.com/Agricultural\\_Economics/default\\_Agri-Economics.html](http://e-shamba.com/Agricultural_Economics/default_Agri-Economics.html)
3. Agroforestry  
[http://e-shamba.com/Agroforestry/default\\_Agroforestry.html](http://e-shamba.com/Agroforestry/default_Agroforestry.html)
4. Apiculture (Bee-Keeping)  
[http://e-shamba.com/aquaculture/Aquacultures\\_default.html](http://e-shamba.com/aquaculture/Aquacultures_default.html)
5. Aquaculture (Fish farming)  
[http://e-shamba.com/Crop%20Production/default\\_Crop\\_Production.html](http://e-shamba.com/Crop%20Production/default_Crop_Production.html)
6. Farm Power and machinery  
[http://e-shamba.com/Farm%20Power/Farm\\_Power\\_Machinery\\_default.html](http://e-shamba.com/Farm%20Power/Farm_Power_Machinery_default.html)
7. Farm Structures  
[http://e-shamba.com/Farm%20Structures/Farm%20Structures\\_default.html](http://e-shamba.com/Farm%20Structures/Farm%20Structures_default.html)
8. Farm Management  
[http://e-shamba.com/Farm\\_Management/Farm%20Management\\_default.html](http://e-shamba.com/Farm_Management/Farm%20Management_default.html)
9. Farm Tools and Equipment  
[http://e-shamba.com/Farm\\_tools\\_Equipment/Farm%20Tools%20and%20Equipment\\_default.html](http://e-shamba.com/Farm_tools_Equipment/Farm%20Tools%20and%20Equipment_default.html)
10. Inorganic Fertilizers  
[http://e-shamba.com/Inorganic%20Fertilizer/default\\_Inorganic%20Fertilizer.html](http://e-shamba.com/Inorganic%20Fertilizer/default_Inorganic%20Fertilizer.html)
11. Irrigation and Drainage  
[http://e-shamba.com/Irrigation/Irrigation\\_Drainage.html](http://e-shamba.com/Irrigation/Irrigation_Drainage.html)
12. Land Preparation

13. Livestock Selection and Breeding  
[http://e-shamba.com/Livestock%20Breeds/Livestock\\_Breeding\\_default.html](http://e-shamba.com/Livestock%20Breeds/Livestock_Breeding_default.html)
14. Livestock Health  
[http://e-shamba.com/Livestock\\_Health/Livestock%20Health\\_default.html](http://e-shamba.com/Livestock_Health/Livestock%20Health_default.html)
15. Poultry production  
[http://e-shamba.com/Poultry/Poultry\\_default.html](http://e-shamba.com/Poultry/Poultry_default.html)
16. Livestock Food and Nutrition  
[http://e-shamba.com/Livestock%20Nutrition/default\\_Livestock\\_Nutrition.html](http://e-shamba.com/Livestock%20Nutrition/default_Livestock_Nutrition.html)
17. Organic Fertilizers  
[http://e-shamba.com/Organic%20Manure/Organic\\_default.html](http://e-shamba.com/Organic%20Manure/Organic_default.html)
18. Soil Conservation  
[http://e-shamba.com/Soil%20Conservation/Soil\\_default.html](http://e-shamba.com/Soil%20Conservation/Soil_default.html)
19. Water Supply and Conservation  
[http://e-shamba.com/Water\\_Conversation/Water\\_default.html](http://e-shamba.com/Water_Conversation/Water_default.html)
20. Weeds and Weed Control  
[http://e-shamba.com/Weeds%20and%20Weed%20Control/Weeds%20and%20Weed%20Control\\_default.html](http://e-shamba.com/Weeds%20and%20Weed%20Control/Weeds%20and%20Weed%20Control_default.html)

## **2.6 Report Writing of Phase I (Interim Report)**

Status: Complete

Submitted to FireAfrica in January 2015.

## **2.7 Development glossary of terms for selected sections of the curriculum**

Status: Complete

Extensive glossary of terms and standards have been developed by using web resources, dictionaries and textbooks to cover the following sections.

1. Agricultural Economics
2. Agroforestry
3. Apiculture (Beekeeping)
4. Aquaculture (Fish-farming)
5. Farm power and machinery
6. Farm Tools and Equipment
7. Livestock production
8. Poultry Production

## **2.8 Upload glossaries and related multimedia content**

**Status:** Complete

The following glossaries have been developed and uploaded. Click on Hyperlink to access the content.

1. [Agricultural Economics](#)



2. [Agroforestry](#)
3. [Apiculture \(Beekeeping\)](#)
4. [Aquaculture \(Fish-farming\)](#)
5. [Farm power and machinery](#)
6. [Farm Tools and Equipment](#)
7. [Livestock production](#)
8. [Poultry Production](#)

## **2.9 Upload PPBL content**

Status: Yet to start

The Problem-based content is being reviewed by the project team and experts. It will be uploaded in stages as soon as the coding of web-based assessment modules is tested and installed on the web server.

## **2.10 Monitoring and Evaluation**

Status: On-going

Monitoring and evaluation of the project is being carried out by both the project leader and the university audit and accounting departments.

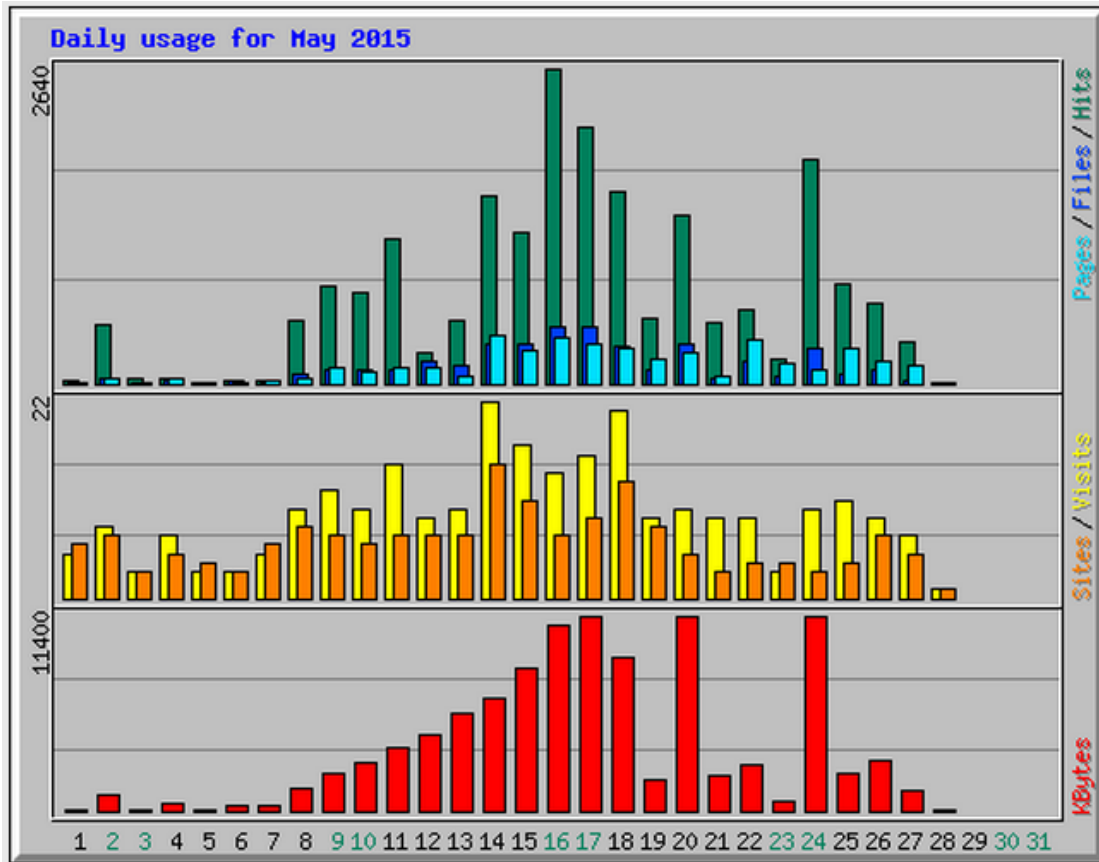
Web access and web search statistics are evaluated weekly and are discussed in the next section.

## **2.11 Report Writing of Phase II (Final Report)**

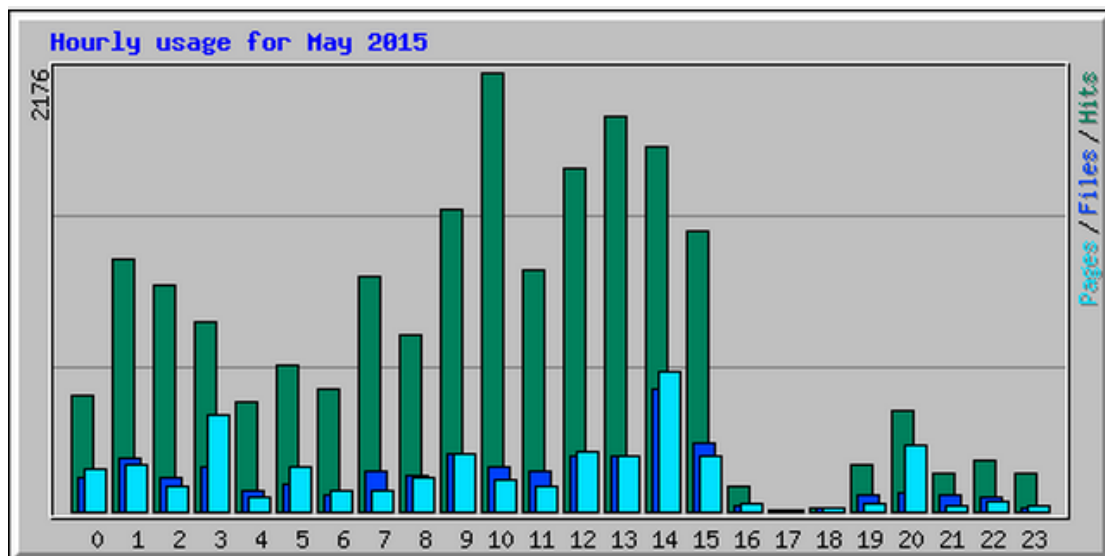
Status: Ongoing



### 3.2 Daily Usage Statistics for the busiest Month, i.e May 2015



### 3.3 Average Hourly Usage Statistics for May 2015



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## **4.0 CONCLUSION**

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The project has reached the final stages with the outstanding activities being:

- a) coding of the routines for assessing questions;
- b) uploading the questions to the web server
- c) Monitoring and analysis usage.

The challenges in developing the system so far have been:

- a) optimizing the website for access by smart phones.
- b) Assessing the scope of the project which not only includes deciding on the topics in agricultural extension to be covered but also on the access level.

The project team expects the system to be fully functional in August 2015 for the following modules:

1. Agro forestry
2. Livestock production
3. Poultry
4. Soil conservation
5. Water supply and conservation
6. Weeds and weed control

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## 5.0 REFERENCES

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- [1] Milu Muyanga and T. S. Jayne, *Agricultural Extension in Kenya: Practice and Policy Lessons*, Tegemeo Institute of Agricultural Policy and Development, <http://ageconsearch.umn.edu/bitstream/55168/2/wp26.pdf>
- [2] Kibett J.K., Ogunyini M.E. and J. Muchiri, *Elements of agricultural extension policy in Kenya: Challenges and opportunities*, African Crop Science Conference Proceedings, Vol. 7. pp. 1491-1494 <http://www.acss.ws/upload/xml/research/691.pdf>