iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 5 **Issue:** VI **Month of publication:** June 2017

DOI:

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Integrating Virtual Laboratory with Education Using Intranet

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Abstract: ***Virtual Laboratory is a project which is aims to provide remote-access to Laboratories in various disciplines of engineering for students at all levels. The terms virtual lab (VL) and learning platform are generically used to describe a range of integrated, web based applications that provide teachers, learners and others involved in education with an information, tools and resources to support and enhance educational delivery and management. An organization can share their study materials and information about their college event with their student in private network.***

I. INTRODUCTION

A virtual lab is an interactive experience during which students observe and manipulate resources in order to fulfill the learning objectives of a laboratory practice. Virtual laboratory is an area in which server and user meet via wired connection. My project aims at putting together an integrated environment for a user. A virtual lab is a computer-based activity where students interact with an experimental apparatus or other activity via a computer. Virtual lab provides both hardware and software program execution with reliability. The virtual lab is intended to be of use both to instructors giving in-class demonstrations and to students performing lab practical's. We maintain an updated database of all details like all courses, all student information, and all courses experiment information. Interactive learning environment by using animations and simulations for intellectual topic, where students become active in their learning, provide opportunities for students to construct and understand difficult concepts more easily. Therefore, use of Virtual lab or simulation programs, overcomes some of the problems faced in traditional lab and make positive contributions in reaching the objectives of an educational system. My project describes implementation of a virtual computing lab in one college. We report practical considerations of technology, cost, and security, and also examine student perceptions.

II. CURRENT EDUCATIONAL CONCERNS OF THE NATION

Education has been a problem in our country and lack of it has been blamed for others. We have recognized IITs, IIMs, law schools and other institutions of excellence and students now routinely score 90% marks so that even students with 90+ percentages find it difficult to get into the colleges of their choice; but we do more of thesame old stuff. Memorization learning still pestilences our system, students study only to score marks in exams, and sometimes to crack exams like IIT JEE. The foreign masters introduced education systems in India to create workers and domestic servants, and we have not deviated much from that pattern till today. If once the youngsters prepared for civil services and bank officers exams, they now prepare to become engineers. My proposed system able to make the student's understands the concepts instead of memorizing the concepts.

III. AIM OF THE PROJECT

The main objective of this Virtual Lab is to immerse the student in the topics, starting with very fundamental concepts and progressively building up his/her Knowledge to the level of current modern approaches.

IV. LITERATURE SURVEY

A. Title of the Project

Towards Virtual Laboratories Survey of LabVIEW-based Teaching/Learning Tools and Future Trends

1) *Author:* NESIMI ERTUGRUL University of Adelaide
2) *Description:* The paper aims to provide some background knowledge about the tools and to show alternative delivery methods, which may change the traditional practices. The main focus in the paper is given to the common problems faced by

the institutions and the educators, and it provides some guidance for the selection of the most suitable tools required. Finally, the paper contemplates the future trends and provides some discussion.

3) *Dis-Advantages:* The selection criteria of suitable software are the major issue.

B. Title of the Project

The First South American Free Online Virtual Morphology Laboratory: Creating History

1) *Author:* Rodolfo E.Avila, Maria E. Samar, National University of Cordoba, Imperial College, London
2) *Description:* To observe whether the online resource has changed the attitudes of student-users and offers a suitable replacement to traditional laboratory work.
3) *Dis-Advantages:* Security problems and network-based attacks.

C. Title of the Project

Virtual physiological laboratories. The impact of team work as a new learning tool

1) *Author:* Amy Khodr, University of Ottawa.
2) *Description:* To design laboratory protocols that promote team work in order to encourage students to discuss their own experimental observations, assumptions and conclusions among themselves.

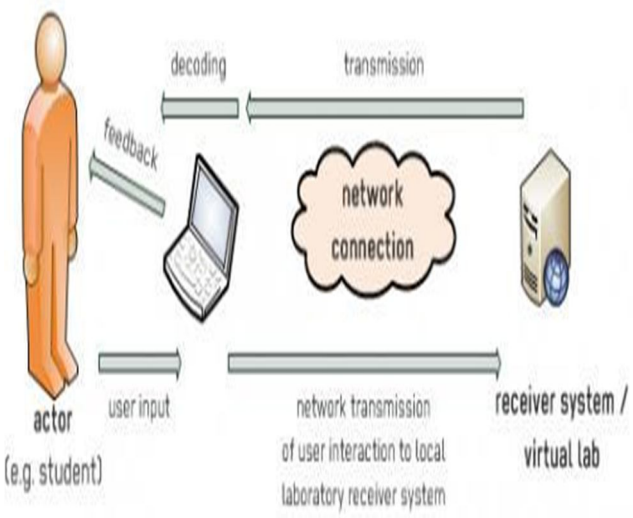
C. Title of the Project

Survey paper on Virtual Lab for E- Learners

1) *Author:* Ms. Shweta Soni and et'al, G.H.Raisoni Institute of Engineering and Technology for Women, Nagpur, India
2) *Description:* To achieve an integrated environment for measurement and instrumentation, we designed and implemented a server user environment and developed a virtual lab system for hardware and software experiments along with the study materials.

V. EXISTING SYSTEM

India is also one of the developing country, the problems faced by India can be summarized as follows: In carrying out experiments and arranging with tools, the laboratory activities are expensive. For planning and application, it is much time consuming and checking students' performance during the activities can be difficult. Lack of equipment or inadequate lab conditions which limits the teacher to perform a simple lab activity. Other than performing difficult or impossible experiments, simulations have advantages from the time, security, cost and motivation point of view. In existing virtual laboratory does not contain any monitoring system to monitor the student's performance and the faculty's involvement. This system also squandered the expectation of student.



A. Drawbacks

1) The time it takes to log on
2) Every student requires additional network connection.

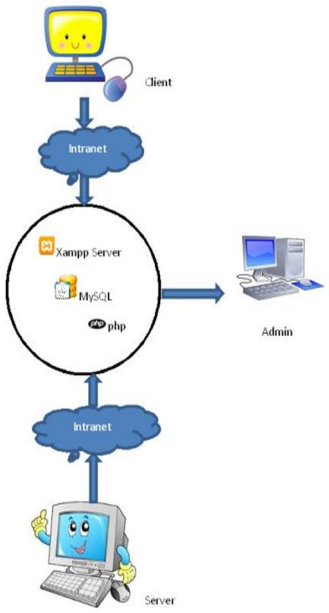
Volume 5 Issue VI, June 2017
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

3) Security constraints
4) It provides limited services to student
5) An organization could not fulfill the requirements of student

VI. PROPOSED SYSTEM

The actor is performing the actions by using an ordinary computer system to send the input over a network (Intranet transmission) to a server system.
The server system directly incorporates the virtual lab properties and these properties are accessed by the student through intranet.
The system itself directly sends the feedback over the communication channel back to the actor's computer.
All computations are done in the virtual lab and only feedback is sent to the user.
In addition to virtual lab, an organization share their study material and video lectures to the students within the organization through intranet.

VII. ARCHITECTURE



VIII. MODULES OF THE PROJECT

A. *Faculty module*
1) Each of the faculties must first register with the web module.
2) Once the prospective faculty registers with the web module they can avail the lab records.

B. *Student module*
1) Each of the students must first register with the web module.
2) Once the registration is complete, the student can sign-in to the website and can access their lab tools.

C. *Administrators Module*
1) The module will be focusing on the maintenance like Master Data Maintenance, Removal of old and outdated data from the web module.

IX. ACTORS OF THE PROJECT

A. *Student*
1) Posting the queries, and view the status of their query.

Volume 5 Issue VI, June 2017
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

B. Faculty

1) Viewing the queries, generating the reports.

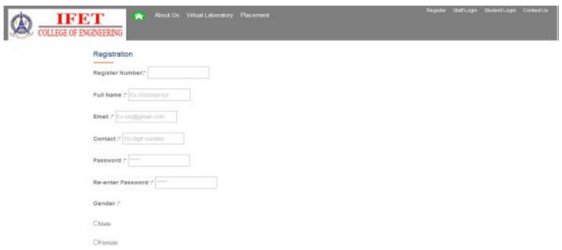
C. Administrator:

1) Monitoring the process

X. FUNCTIONALITIES PREVIEW

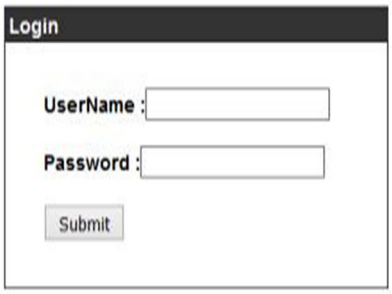
A. Registration

1) This use case is having the functionality of registering the new student details.



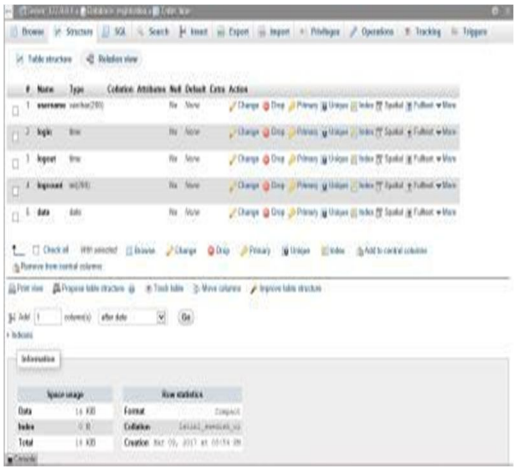
B. Login

1) To login into the system the user must provide user name and the password and it should be correct.



C. Discussion Forum

1) After login to system and utilizing the system resources an user can make the discussion about the doubts.



D. View Status

1) The student can view the status of their queries.

Volume 5 Issue VI, June 2017
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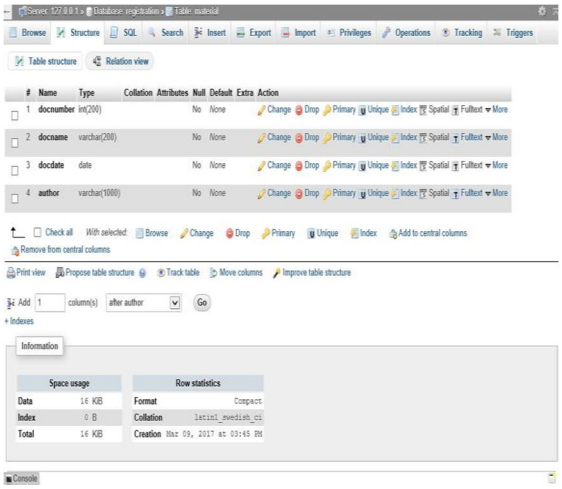
E. View Reports

1) The administrator can login to the system and can view the reports generated by the faculties.

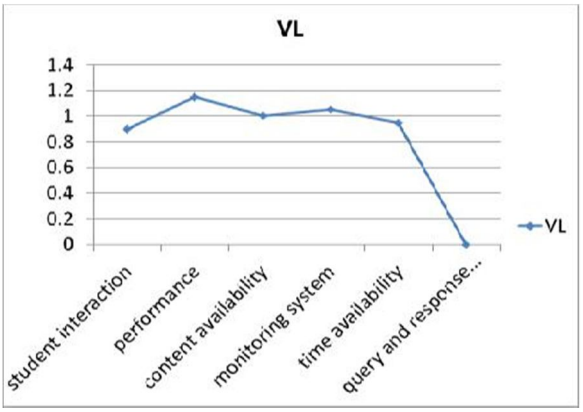


F. Logout

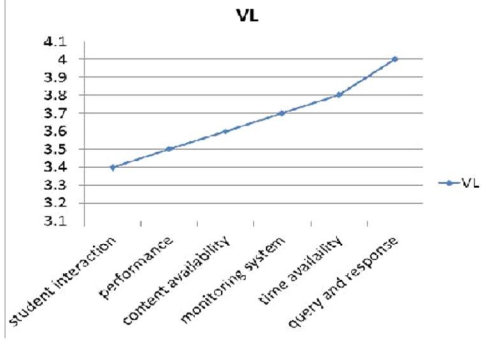
1) The users to logout from the system.

XI. PERFORMANCE EVALUATION

A. Existing System



B. Proposed System

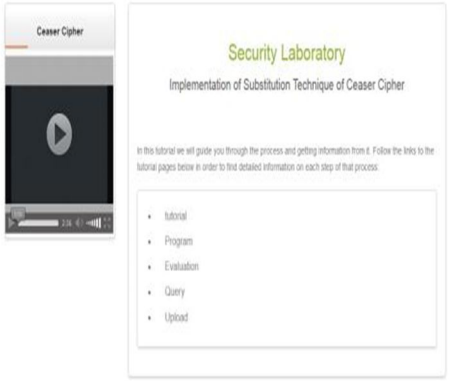


Volume 5 Issue VI, June 2017
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

XII. OUTPUT

A. Homepage

B. Lab Resource



C. Program

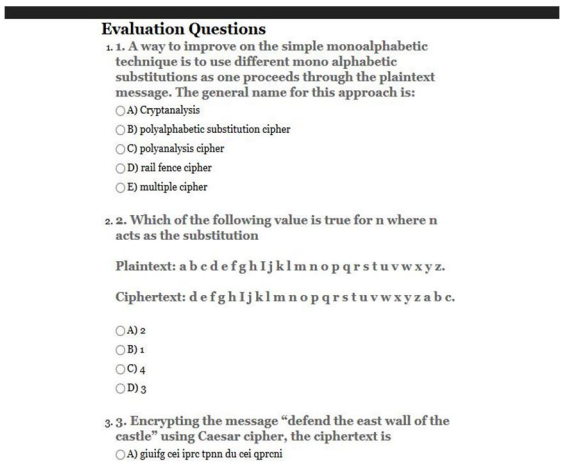
Security Laboratory

Implementation of Substitution Technique of Ceaser Cipher

This is a java program to implement Caesar Cipher Encryption algorithm. This is the simplest of all, where every character of the message is replaced by its next 3rd character.

```
import java.util.Scanner;
public class CaesarCipher
{
public static final String ALPHABET = "abcdefghijklmnopqrstuvwxyz";
public static String encrypt(String plainText, int shiftKey)
{
plainText = plainText.toLowerCase();
String cipherText = "";
for (int i = 0; i < plainText.length(); i++)
{
int charPosition = ALPHABET.indexOf(plainText.charAt(i));
int keyVal = (shiftKey + charPosition) % 26;
char replaceVal = ALPHABET.charAt(keyVal);
cipherText += replaceVal;
}
return cipherText;
}
public static String decrypt(String cipherText, int shiftKey)
{
cipherText = cipherText.toLowerCase();
```

D. Evaluation



Evaluation Questions

1. 1. A way to improve on the simple monoalphabetic technique is to use different mono alphabetic substitutions as one proceeds through the plaintext message. The general name for this approach is:
   - ○ A) Cryptanalysis
   - ○ B) polyalphabetic substitution cipher
   - ○ C) polyanalysis cipher
   - ○ D) rail fence cipher
   - ○ E) multiple cipher
2. 2. Which of the following value is true for n where n acts as the substitution

   Plaintext: a b c d e f g h I j k l m n o p q r s t u v w x y z.

   Ciphertext: d e f g h I j k l m n o p q r s t u v w x y z a b c.

   - ○ A) 2
   - ○ B) 1
   - ○ C) 4
   - ○ D) 3
3. 3. Encrypting the message "defend the east wall of the castle" using Caesar cipher, the ciphertext is
   - ○ A) giuifg cei ipre tpnn du cei qprcni

XI. CONCLUSION

A. Virtual lab has been presented an innovative solution to developing and enhancing lab practice.

B. Virtual lab provides the basic knowledge to the student who doesn't have any idea about the experiment.

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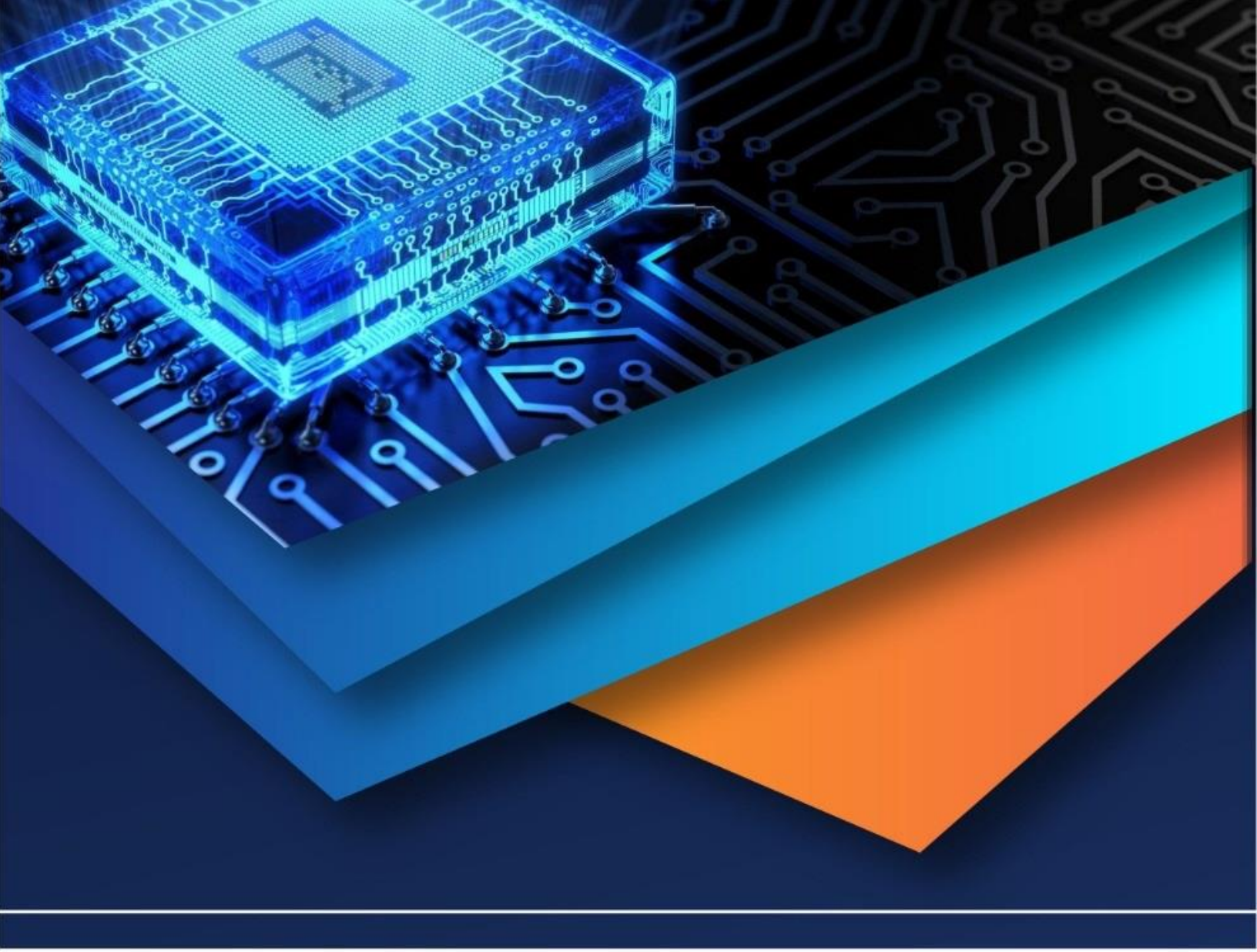

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