Improving Teaching Learning with Development of Virtual Laboratory

[1] Seema Desai [2]Jayashree Awati [3]Manisha Waghmode
[1&2] MBA and ETC Department, Rajarambapu Institute of Technology,
[3]Bharati Vidyapeeth's Institute of Management Studies & Research, Navi Mumbai. Maharashtra,
India

Abstract- The pandemic Covid-19 has brought a change in the education significantly. As we all know that Education Industry was the drastically hit industry in the service sector. The future of education completely depends upon experiential learning. Now the students can find their courses and books online where they can study as per their own schedule. In these times of need, online learning tools emerged as a boon. In this regard the department tried to design and implement a web- based simulation models under Virtual BIZ & Investment Lab for the student Learners. This paper talks about the benefits of Virtual lab and how it will expose the student learners to real world problem solving and decision making issues to make them industry ready.

***Keywords- Virtual lab, Industry Ready, Education*, Teaching, Learning.**

JEET Category—**Industry Ready Education,**

I. INTRODUCTION

Virtual Lab is available to all students anywhere, easy to access and provide hands on experience. The Virtual Lab has exposed students to real environmental and business issues related to finance, operations, marketing, HRM and other business functions. The future of education completely depends upon experiential learning. Need of online learning tools emerged as a benefit. Virtual Lab has lots of paybacks such as portability, ease of access to software, less need for physical infrastructure, low costs and more flexibility.

A. *Need of Virtual Lab*
The pandemic Covid-19 has brought a change in the education significantly. As we all know that Education

Industry was the drastically hit industry in the service sector. The future of education completely depends upon experiential learning. Now the students can find their courses and books online where they can study as per their own schedule. In these times of need, online learning tools emerged as a boon. In this regard the department tried to design and implement a web-based simulation models under Virtual BIZ & Investment Lab for the student Learners.

The Virtual BIZ & Investment Lab will expose students to real economic, environmental and business issues related to finance, operations, marketing, HRM and other business functions and need to integrate Virtual Laboratory in the process of teaching and learning. Virtual based e-learning is seen as an effective supportive in teaching and learning process. This method is able to create a student-centered learning. Virtual education has many benefits such as movability, ease of access, reduced need for physical infrastructure, lowered costs and greater flexibility.

The annual best practice activity initiated at the institute level through scientific approach of identifying the problems faced by the department and finding a feasible solution on it made our team to first identify the problems of the department, which was done through the brainstorming session held among the members in consultation with the Head of the department. Following problems were identified through the session; biggest challenges facing online education today.

Biz Lab: Biz Lab is a virtual business Laboratory designed for Management students to offer them hands on experience on management concepts and make them industry ready.

B. *Objectives*
• To provide remote-access to simulation-based labs in various management areas for easy access.
• To enthuse students to conduct experiments by arousing their curiosity.
• To design complete Learning Management System for supporting learning through virtual Labs.
• To provide students hands on training on online simulation software to encourage investing behavior and develop their own strategies for their portfolio.
• To develop realistic scenarios for retraining and practice till one can master the skills.

II. VIRTUAL LAB ACTIVITIES
Improving the teaching learning the following activities were conducted.

1. Expert training sessions for students on every Saturday.
2. Online Trading Platform (OTP) demonstration & hands on training.
3. Create Investment awareness through different online simulation platforms like trading view.com, optraoption.com, angel one's brokers platform, moneycontrol.com
4. Virtual training and practice sessions with virtual money provided on online simulation platforms.
5. Experiential learning sessions through Industry connect (Angel One)
6. Create Investment awareness within stakeholders and society.

A. Steps

1. Identification of the need
2. Identification of free Simulation platforms which are readily available in the market
3. Introduction and Training to the faculty through Expert Talk
4. Giving access to each faculty.
5. Preparation of different strategies on simulation platform.
6. Introduction and training to the students by faculties.

B. BEST PRACTICES

Best practices activity carried out for Investment Lab, Payroll Management Lab, HR Dashboard Lab and Marketing Management.

III. INVESTMENT LAB

Investment Lab endeavor to create informed Investment decision related to Financial Markets and various financial Instruments by the students also to develop independent Investor for future, who will generate good wealth by investing in Financial Markets to secure their future and become financial independent.

Vision: To enable students by educating on investing skills through hands on simulation. Mission: To mold budding investors to learn, develop and improve their investing skills with the help of various investment tools.

- Provide complete guidance for beginners on stock markets through online videos.
- Supported by an ecosystem of expert market practitioners, academicians and big brands in stock investment
- Helps in building portfolios with virtual money and real live price feed and knowledge base with zero risk.
- Helps to practice with Track Invest stock trading simulation tool accessible across multiple device interfaces
- Offers certification courses designed by industry experts and simulations for competing for rewards.

TABLE I

KEY FEATURES OF INVESTMENT LAB

Online Trading Consultancy	NISM Exams Mock Stock	Expert Talk Technical Analysis Stock Analysis
Personal Financial Planning	BSE Visit Sector Analysis	
Investment Planning	Research Report Analysis	NCFM Exams
Fundamental Analysis	Portfolio Management	Investment Advices

A. Outcomes:

After successful use of investment lab tools and templates students will be able to:

1. Develop an understanding about various investment tools and templates required to support investment decisions.
2. Calculate returns on various investment avenues.
3. Select preferable investment avenues for investment.
4. Prepare and manage virtual investment portfolio.
5. Evaluate the performance of portfolio returns.

B. Problems Identification

Fig.1 List of the problems faced by department

Fig. 2 Problem Selected Through Rating Method

C. Problem Selection

Once we were armed with a probable list of problems, we used the rating method to select the problem. Out of the 51 problems listed we filtered 10 problems and rated them on a scale of 5 per group member, after this the points were cumulated and the highest rated problem was finalized.

D. Why - Why Analysis

The student related causes are:
.Lack of participation & engagement in the class
.Lack of technical and hands on skills.
.Lack of ICT tools in education
.Lack of Continuous Learning.
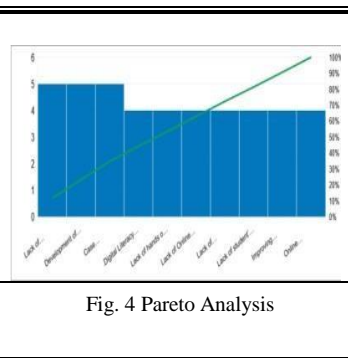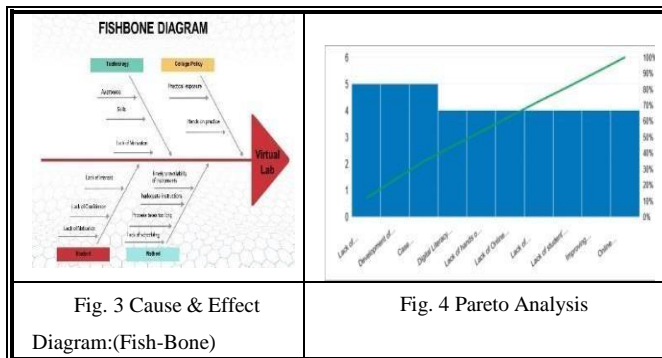.Lack of Knowledge of financial Investment
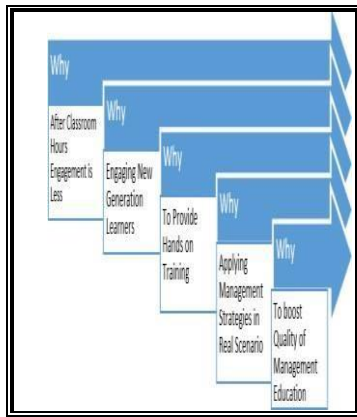
.Lack of knowledge of trading in live market

payment of staff salaries. This can help to reduce costs and efforts spent on the management of these tasks. This payroll management system manages employee's salaries, deductions, other conveyance, net pay, and generation of pay-slips, etc. This system has an appropriate structure for deductions and payments that are automatically set in the record to be used to calculate salaries/wages.
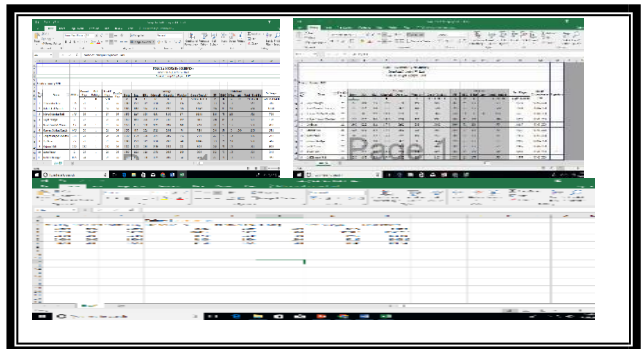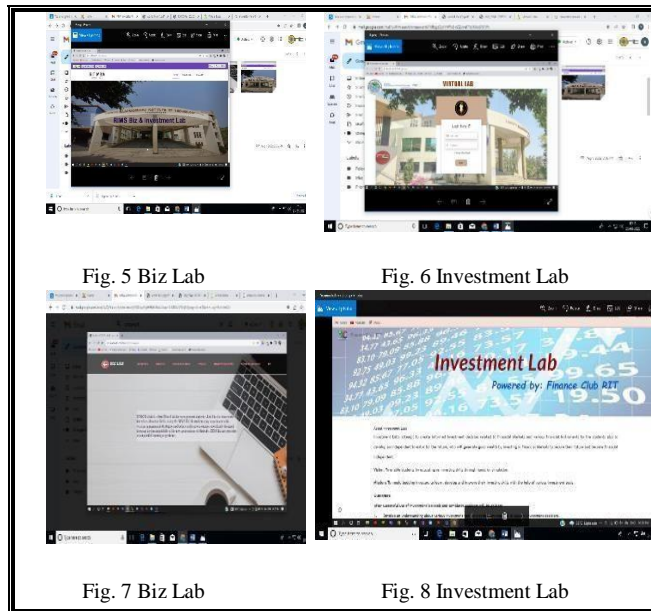
E. Cause and Effect Analysis:

Fig. 3 Cause & Effect Diagram:(Fish-Bone)	Fig. 4 Pareto Analysis

B. Benefits of using payroll

There are lot of benefit of using Virtual payroll system like, you can calculate base of salary and wages. It also includes Profit sharing, Retirement benefits, health insurance and life insurance.

Avoid Making Mistakes	No Need for Expertise	Understanding Payroll Methods
Time-Saving	Cost-Effective	Accurate Calculations

C. OUTCOMES

1. To identify the components of salary 2.To maintain employer compliance 3.To reduce the error chances
4. To calculate expenses, holiday pay with minimum effort

F. Development of Solution & Action taken for enhancement:

Fig. 5 Biz Lab	Fig. 6 Investment Lab

Fig. 7 Biz Lab	Fig. 8 Investment Lab

Fig. 9 Screen Shot of Payroll Management

D. Template for HR Dashboard

Introduction

This virtual HR dashboard helps the human resource team to track the HR reports, KPI reports and also analyze them. This HR virtual lab helps to combine all together data on one platform and makes it easier to combine all the required data and analyze the reports.

TABLE II
BENEFITS OF DASHBOARD FOR HR TEAMS

Enhanced Communication	Increased Transparency	HR Monitoring
Trend Analysis	Comprehensive View	Automated Reporting

IV. PAYROLL MANAGEMENT
(TEMPLATE FOR SALARY CALCULATION OF EMPLOYEES)

A. Introduction

System is a set of processes that helps the update salaries, bonuses, deductions, taxes, and other necessary aspects of the net pay of all the employees in the organization. The primary function of payroll is to assist the company in the timely

Work On-the-go	Data Delivery	Management Information

TABLE III
STEPS TO CREATE HR DASHBOARD IN EXCEL

Import your data into Excel	Underst and your requirements	Build your chart
Clean your data	Figure out which charts	Select your data

Data sheet   **Sales   Pivot   Table**
                                  (Price)

Sales Pivot   **Dashboard**
(Quantity)

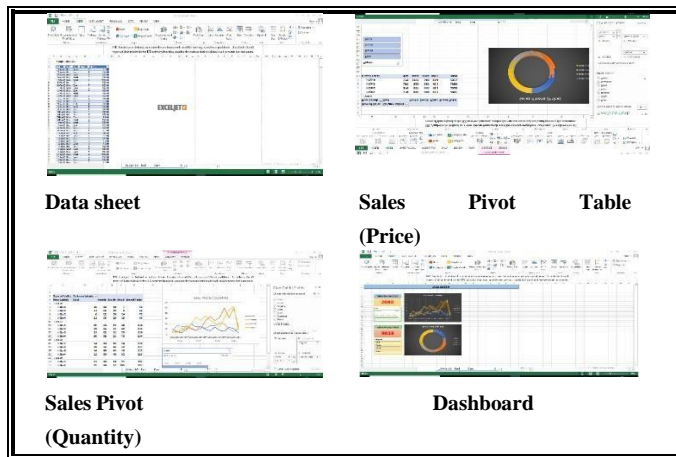Fig. 10 Outcomes Screenshots

IV. MARKETING MANAGEMENT (STUDENT'S VIRTUAL LAB MANUAL)

A. Contents
  1. Activities
  2. Multiple Choice Questions / Quiz
  3. Management Simulation / Management Games
  4. Web – Links
  5. Case studies

B. Template for Investment Decisions (Investment Lab)

Introduction:

Investment Lab's attempt to create informed Investment decisions related to Financial Markets and various financial Instruments by the students also to develop an independent Investor for the future, who will generate good wealth by investing in Financial Markets to secure their future and become financially independent.

  Vision: To enable students by educating them on investing skills through a hands-on simulation.

  Mission: To mold budding investors to learn, develop and improve their investing skills with the help of various investment tools.

C. Objectives

The investment lab is a virtual platform that provides various templates for the students to fulfill the following objectives:
• To understand the various investment avenues available for investment.
• To create awareness about the investment process.
• To develop computation skills that are required to take investment decisions.
• To get active involvement of students in investment and portfolio analysis.
• To calculate the returns on investment.
• To plan for future life.
• To compare the returns generated through various investment portfolios.

D. Outcomes:

After successful use of investment lab tools and templates students will be able to:
1. Develop an understanding of various investment tools and templates required to support investment decisions.
2. Calculate returns on various investment avenues.
3. Select preferable investment avenues for investment.
4. Prepare and manage a virtual investment portfolio.
5. Evaluate the performance of portfolio returns

V. INVESTMENT LAB: TEMPLATES

Investment Lab is the virtual platform powered by the Finance club to enhance the investing skills of the students. It includes the following important templates:

A. Portfolio Management:

The portfolio management template is the template that provides an opportunity for the students to create their virtual investment portfolio. It is a simulation of an investment portfolio where students can select and invest a virtual amount in various investment avenues available. They can track the progress of the investment portfolio through net worth, assets, latest value of the investment, investment cost, asset allocation, and unrealized and realized gain. It gives hands-on experience in the management of individual investment portfolios.
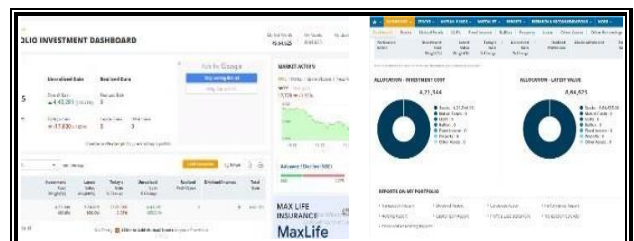
Fig. 11 Portfolio Management

B. Provident Fund Calculator

The EPF calculator is a simulation, which shows the amount of money that will accumulate in your EPF account at retirement. It helps to calculate the lump- sum amount, which includes both your contribution and the employer's contribution, along with the accrued interest on the investment.

Fig. 12 Provident Fund Calculator

C. Equated Monthly Installment - EMI Calculator

It is the amount that a loan borrower pays every month in order to repay the money borrowed.

The borrower has to pay his respective EMI at a particular date of every month.

The EMI Calculator is used as a utility tool, which helps to calculate the amount you repay each month towards your loan. The EMI calculator is useful to calculate the EMI amount on a car loan, home loan, bike loan, or personal loan. Borrower can get an idea of the monthly repayments make towards these loans.

The EMI calculator has three sliders in a box with the loan amount, number of months, and interest rate. After you fill up the details using the slider, the EMI calculator shows how much borrower must pay off each month, to repay the loan   within the duration you have selected.
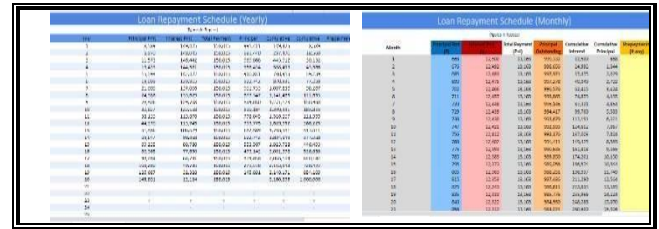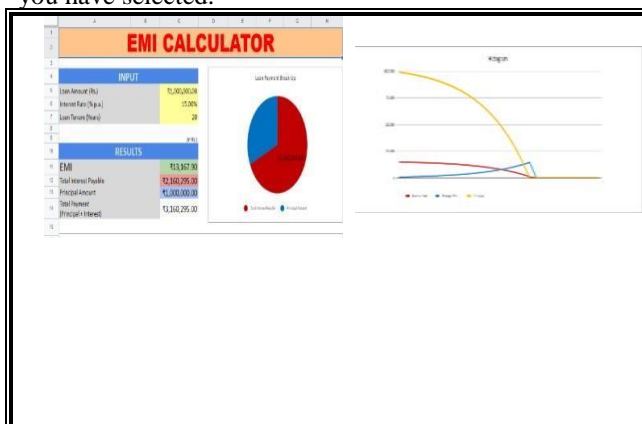

Fig. 13a EMI Calculator

D. SIP Calculator

A Systematic Investment Plan (SIP) calculator is a template that can help to calculate the returns individual would earn on their SIP investments. The calculator also tells investors how much they would need to invest every month to earn a target corpus.
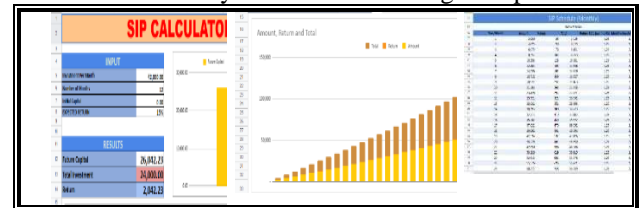

Fig. 14 SIP Calculator

E. Life Insurance Planner

In Financial Planning, Life Insurance Planning is one such component which is very critical and includes lot of risks in evaluating and determining proper and correct insurance coverage of a individual. This template will help in taking a decision about how much amount insurance coverage is required for the investor in the present financial condition.

Fig. 15 Life Insurance Planner

F. Crorepati Calculator

Crorepati Calculator helps to calculate how much money needs to save monthly to become a crorepati.

Fig. 16 Croepati Calculator

G. Retirement planner

Retirement planning includes preparation for future life. This includes the amount of money an individual may need to save for his retirement savings.

Fig. 17 Retirement Planner

VI. INVENTORY MANAGEMENT Lab (TEMPLATE FOR CALCULATION OF ANNUAL CONSUMPTION VALUE)

A. Introduction

Inventory management refers to the process of ordering, storing, using, and selling a company's inventory. This includes the management of raw materials, components, and finished products, the s well as warehousing and processing of such items.

Annual Consumption Value or also called as Inventory Management means to manage the finished products, raw material and components. Also in includes store management or ware house management. The inventory management primarily maintains appropriate stock levels for the business needs, minimizes wasted inventory, minimizes funds tied up in stock, and lost income through stocks dropping too low.

B. Inventory Management Benefits

1) More Accuracy in Inventory
2) Reduce Costs
3) Greater Productivity
4) Reduce Wastages and losses
5) Effective control
6) Support for smooth production flow

VII. CLASSIFICATION OF ITEMS (ABC ANALYSIS)

In ABC Analysis, A stands Class Inventory, B stands Class Inventory and C stands Class Inventory in Classification of items under ABC Analysis.

Category	%age of item of Quantity (In terms of Numbers)	%age of item of Value (In terms of money)	Types of Control Required
A	10	70	Close/Strict Control (Most Important)
B	20	20	Moderate Control (Moderately Important)
C	70	10	Loose Control (Least Important)

Fig. 18 ABC Analysis

A. Category 'A'

Most valuable and costly items are classified under 'A' category. Such items have large investment but not much in number. For example, 10 percent of items account for 70 percent of total invested in inventory. So, more careful and strict control is needed for such items. This category will be the smallest category in quantity but largest in monetary terms.

B. Category 'B'

Category 'B' represents the middle parts of products between Category 'A' and Category 'C'. They are larger in number than category 'A' but smaller in monetary term. These items having average consumption value. 20 percent of the item in an inventory account 20 percent for total investment. These 'B' items have less importance than 'A', so moderate control is needed for them.

C. Category 'C'

The items placed under category 'C' have the lowest consumption value. But, nearly 70 per cent of inventory items account only for 10 percent of the total invested capital. So, these are "trivial many" items which do not catch much strict management attention i.e. loose control is needed for such items.
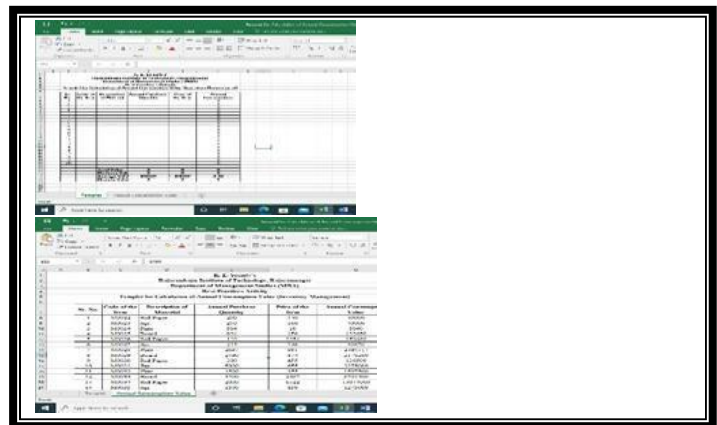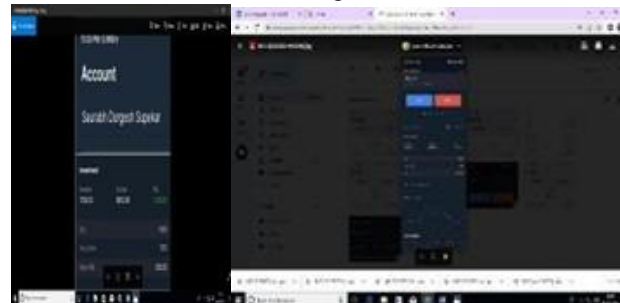

Fig. 19 Screenshots of ABC Analysis

D. Outcomes of Investment Lab

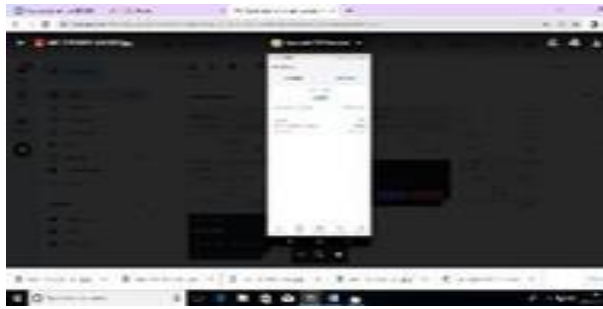Students have started trading in live stock market.
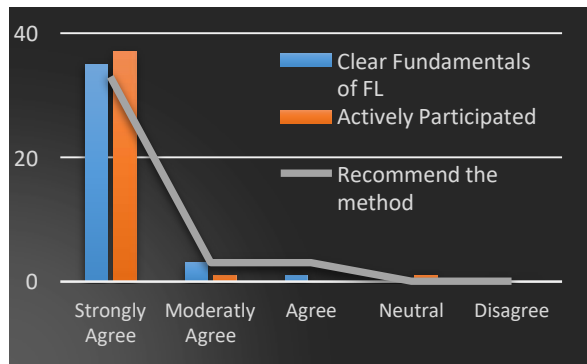
Fig. 20 Screenshots of outcome

Fig. 21 Student Feedback analysis

All participants agreed to recommend the virtual lab activity activity to other students. Fig. 21 represents the feedback analysis of students on virtual lab implemented.

TABLE IV
ANOVA TESTING

		Sum of Squares	df	Mean Square	F	Sig.
Industry_Rediness	Between Groups	13.838	4	3.460	3.619	.079
	Within Groups	76.468	80	.956		
	Total	90.306	84			
Learning_improvement	Between Groups	13.901	4	3.475	3.074	.081
	Within Groups	88.195	78	1.131		
	Total	102.096	82			

The Table III indicates the ANOVA testing for the hypothesis that "Learning is improved with Development of Virtual Laboratory" is tested statistically. The outcome is validated at the placement interview and the expectation of the industry from fresher is validated. The employers are happy with performance of students. 3. Different analytical tools such as correlation, ANOVA testing and internal questionnaire significance is tested. Data is validated with Chronbachi alpha value 0.73 which is closer to 1. Therefore the feedback data is validated analytically.

VIII.   CONCLUSION

The future of education completely depends upon experiential learning. Need of online learning tools emerged as a benefit. The Virtual Lab has exposed students to real environmental and business issues related to finance, operations, marketing, HRM and other business functions. Virtual Lab is available to all students anywhere, easy to access and providing hands on experience. Virtual Lab has lots of paybacks such as portability, ease of access to software, less need for physical infrastructure, low costs and more flexibility. Virtual BIZ & Investments Lab provides simulation exercises and various templates for developing student's digital literacy. Investments Lab enable students by educating on investing skills through hands on simulation. Investment Lab develop an understanding of various investment tools and templates required to support investment decisions and calculate returns on various investment avenues.

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