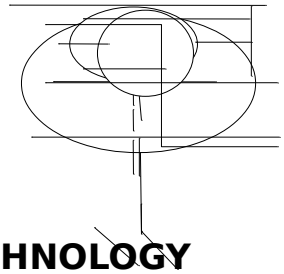

SUDAN UNIVERSITY OF SCIENCE & TECHNOLOGY
FACULTY OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

IMPLEMNTAION OF TRAINING MODULE WITHIN ENTERPRISE RESOURCE PLANNING (HIGH LEVEL AVIATION ACADEMY (CASE STUDY

OCTOBER 2016

THESIS SUMITTED AS A PARTIAL REQUIREMENTS 0F B.Sc. (HONOR) DEGREE IN COMPUTER SCIENCE

بسم الله الرحمن الرحيم

SUDAN UNIVERSITY OF SCIENCE & TECHNOLOGY
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OCTOBER 2016

الحمد لله

الحمد لله رب العالمين، أعطى اللسان، وعَلَّم البيان، وخلق الإنسان، فبأي ألآء ربكما تكذبان

لك الحمد يا من هو للحمد أهل، أهل الثناء والمجد، أحقُّ ما قال العبد وكلنا لك عبد.

لك الحمد.. من ضعيف يطلبُ نصرتَك

لك الحمد.. من فقير يطلبُ غناك

لك الحمد.. من ذليلٍ يطلبُ عزك

لك الحمد.. ما دعوناك إلا حسنَ ظنٍ بك..

وما رجوناك إلا ثقةً فيك، وما خفناك إلا تصديقاً بوعدك ووعيدك فلك الحمد..

حمدتك ربي كلما لاح كوكبُ * وما ناح قمري على الغصن يندبُ**

وشكر جزيلاً والثناء مردودٌ * لك الحمد ما امتدت إليك المطالبُ**

والصلاة والسلام على علم الأعلام، وإمام كل إمام، محمد بن عبد الله وعلى آله وصحبه أجمعين

الآيــه

بسم الله الرحمن الرحيم
قال تعالى:

وَيَسْأَلُونَكَ عَنِ الرُّوحِ ۖ قُلِ الرُّوحُ مِنْ أَمْرِ رَبِّي وَمَا أُوتِيتُم مِّنَ الْعِلْمِ إِلَّا قَلِيلًا)

صدق الله العظيم
(سورة الإسراء الآيه 85)

الإهداء

بدأنا بأكثر من يد وقاسينا أكثر من هم وعانينا الكثير من الصعوبات وهانحن اليوم والحمد لله نطوي
سهر الليالي وتعب الأيام وخلاصة مشوارنا بين دفتي هذا العمل المتواضع

إلى منارة العلم ، الإمام المصطفى
إلى الأمي وسيد الخلق
إلى رسولنا الكريم سيدنا محمد
صلى الله عليه وسلم

إلى الينبوع الذي لايمل العطاء
إلى من حاكت سعادتي بخيوط منسوجة من قلبها
إلى والدتي العزيزة

إلى من سعى وشقى لأنعم بالراحة والهناء ، الذي لم يبخل بشيء من أجل دفعي
في طريق النجاح ، إلى الذي علمني أن أرتقي سلم الحياة بحكمة وصبر
إلى والدي العزيز
إلى من حبهم يجري في عروقي ويلهج بذكرهم فؤادي
إلى أخواتي
إلى من سرنا سوياً ونحن نشقالطريق معاً نحو النجاح والإبداع إلى
إلى زميلاتي و زملائي

إلى من علمونا حروفا من ذهب وكلمات من درر وعبارات من أسمى وأجلى عبارات في العلم إلى من صاغوالنا من علمهم حروفاومن فكرهم منارة تنير لنا مسيرة العلم والنجاح
إلى أساتذتناالكرام

شكر وعرفان

الحمد لله الذي آنار لنا دروب العلم والمعرفة وأعاننا على آداء هذا الواجب وآداء هذا العمل ، ونتوجه بالشكر والإمتنان إلى كل من ساعدنا من قريب أو بعيد على إتمام هذا العمل وتذليل ما واجهنا من صعوبات ، ونخص بالشكر الأستاذة المشرفة : نفيسه بابكرعثمان ، التي لم تبخل علينا بتوجيهاتها ونصائحها القيمة التي كانت عوناً لنا في إتمام هذا البحث.

ولايفوتنا أن نشكر الأستاذ: مصعب عبد القادر ، الذي كان لنا نعم الأخ والموجه ، فلم يبخل علينا بما يحمل من علم وخبره ولم يتوانى عن تقديم يد العون كلما كنا بحاجته.

كما نتقدم بالشكر لكل موظفي : أكاديمية هاي ليفيل الطيران ، ونخص بالشكر الأستاذة : آيه خليل محمد ، لما بذلته من جهود عظيمة لإتمام هذا المشروع بالشكل المطلوب.

ABSTRACT

The aim of this study is to provide the integrated management services high-efficiency for (High Level Aviation Academy), where the

academy was facing various difficulties in managing staff training operations.

To study the problems and offer proposed solution has been to apply the following steps: the study follows up of the progress of operations within the academy, identify shortcomings and error in the current processes, the use of (OpenERP) in developing the new system, and linked training management system to the rest of the Academy departments.

The study reached several conclusions, including: saving time and effort that in manual manage of information related to trainer, trainees or training centers, the possibility of the trainee to requesting Course or more, manage and organize training plan for complete year, allowing the trainee or manager to evaluates performance for both trainee, the trainer and training center, finally the system allowed to print and extract reports for overall processes within system.

المستخلص

الهدف من هذه الدراسة هو تقديم خدمات الإدارة المتكاملة وذات الكفاءة العالية لأكاديمية هاي ليفل لعلوم الطيران ، حيث أن الأكاديمية كانت تواجه صعوبات شتى في إدارة عمليات تدريب الموظفين، لدراسة المشاكل وتقديم الحل المقترح تم تطبيق الخطوات التاليه: دراسة سير العمليات داخل الأكاديمية ، تحديد أوجه القصور والخطأ في العمليات الحالية ، استخدام (OpenERP) في تطوير النظام الجديد ،

ربط نظام إدارة التدريب ببقية إدارات الأكاديميه، توصلت الدراسة إلى عدة نتائج أهمها : توفير الوقت والجهد المبذول في عمليات التدوين اليدوي للمعلومات المتعلقة بالمتدربين أو المدربين أو مراكز التدريب ، إمكانية طلب المتدرب لكورس أو أكثر، إدارة وتنظيم الخطة التدريبة للسنة كاملة ، إتاحة الفرصه للمتدرب أو المدير بتقييم الآداء بالنسبه لكل من المتدرب والمدرب وأيضاً تقييم المركز التدريبي ، وبالفعل أتاح النظام إمكانية طباعة واستخراج التقارير الشامله لكل العمليات داخل النظام.

LIST OF TERMS

#	TERMS	DESCRIPTIONS
1	**ERP**	Enterprise resource planning
2	**SQL**	Postgre Structured Query Language
3	**XML**	Extensible Markup Language
4	**UML**	Unified Modeling Language
5	**CRM**	Customer Relationship Management
6	**ODOO**	version 8.0 of Opener

LIST OF FIGURES

LIST OF TABLE

TABLE OF CONTENTS

CHAPTER ONE
INTRODUCTION

1.1 INTRODUCTION

Information Technology covers a broad spectrum of hardware and software solutions that enable organizations to gather, organize, and analyze data that helps them achieve their goals.

Organization should be earning as well as learning. Employee should share knowledge of the work, human resource department should emphasis on Learning and training programming. [1]

Training allows employees to acquire new skills, perform better, increase productivity and be better leadership. Since a company is the sum total of what employees achieve individually, organizations should do everything in their power to ensure that employees perform at their peak. [2]

Based on the foregoing, given the importance of training, we have created a system for control and management of the Training Department, we implement it as the Enterprise resource planning (ERP) module because it comprehensive, open-source system and gains far outweigh the initial cost and the time and effort associated with incorporating the software into your organization’s efforts.

1.2 RESEARCH PROBLEM

Manual Training management process or by using paper may contain several problems, it can be: the difficulty of control of the process, management trainee’s data, training sites and dates of training. In addition, this method consumption of time and effort senior compared the proposed system.

1.3 IMPORTANCE OF RESEARCH

- Management of training and trainee’s data automatically and securely.
- provide integration between systems.

1.4 RESEARCH OBJECTIVES

This research aims to find out:

- Administration to organize courses ,by
  - Classify it by name, data and employees.
  - Create a training plan, that specifies the whole information about courses.
- Management and determine Training centers and Trainees.
- Follow up Training Courses.
- Taking into account the confidentiality and privacy of information and data.

1.5 SCOPE

This project was developed to (High Level aviation academy), in order to manage training operations within the academy, and it can be modified and used for any organization or company-based training management within its departments.

It was developed in the time period between 2015 and 2016 to be used within the academy for an unlimited time.

1.6 RESEARCH STRUCTURE

THIS RESEARCH DIVIDES TO SIX CHAPTERS AS FOLLOW:

Chapter one gives an introduction about the project, defining the problem, objectives, importance and scope.

Chapter two gives a theoretical background of ERP software, and the second section is about previous studies.

Chapter three gives a general description of OpenERP software as conception, and the second section describes the systematic techniques which used in the system.

Chapter four includes system requirements, the current system and the proposed system and describes the system analysis using UML technology.

Chapter five includes the proposed system interfaces.

Chapter six includes the result of the research, recommendation and conclusion.

- **ANALYSIS THE REQUIREMENT**

After completed the process of collecting Requirement from (the High Level aviation academy) has been analyzing the data and determine the system inputs, outputs, and data tables according to available information, and to facilitate the development of the system has been divided the total work into six modules, namely:

  - THE TRINNING NEED
  - DRAFT TRAINING PLAN
  - DATA DUMP
  - COURSES
  - FOLLOW UPPUNCTUALITY
  - APPRAISAL

.

CHAPTER TWO

BACKGROUND AND PREVIOUS STUDIES

This chapter is divided into two sections, the first section gives a general description of ERP software as a concept, and the second section describes the related studies to research project.

1.7 ENTERPRISE RESOURCE PLANNING

1.7.1 INTRODUCTION

Enterprise Resource Planning is a term originally coined in 1990 by The Gartner Group to identify the following generation of Material requirements planning (MRP) software. The aim was to integrate all facets of the business enterprise under one suite of software applications. The definition of ERP would be extended to admit almost any character of large integrated software. [3]

Enterprise resource planning (ERP) is business process management software that allows an organization to use a system of integrated applications to manage the business and automate many back office functions related to technology, services and human resources. ERP software integrates all facets of an operation, including product planning, development, manufacturing, sales and marketing. [3]

MRP evolved from the 1960’s need to manage demand and ordering. MRP II was developed in the 1970’s to bring both demand and time phasing of the demand into the planning process. At the same time, Accounting Management solutions where gaining strength. ERP, developed from earlier MRPII systems, were also integrated with financial applications to provide a complete solution to a company for managing their inventory, cash and people resources. [4] See Figure (2.1)

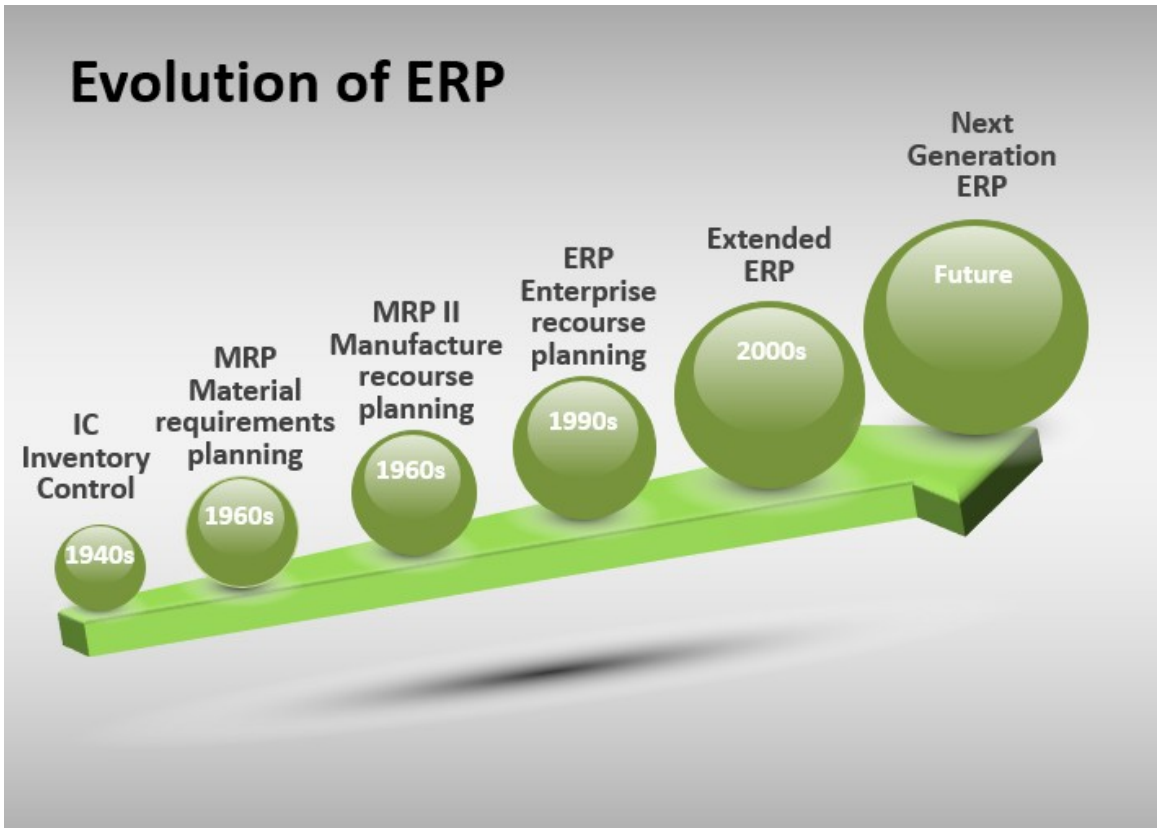


Figure (2.1) Evolution of ERP

1.7.2 MODULES OF ERP:

ERP systems are made up of many different software modules. Each of the modules is specialized to handle specific business processes. [5]

- **PRODUCTION PLANNING MODULE**

In the process of evolution of manufacturing requirements planning (MRP) II into ERP, while vendors have developed more robust software for production planning, consulting firms have accumulated vast knowledge of implementing production planning module. Production planning optimizes the utilization of manufacturing capacity, parts, components and material resources using historical production data and sales forecasting.

- **PURCHASING MODULE**

Purchase module streamlines procurement of required raw materials. It automates the processes of identifying potential suppliers, negotiating price, awarding purchase order to the supplier, and billing processes. Purchase module is tightly integrated with the inventory control and production planning modules. Purchasing module is often integrated with supply chain management software.

- **INVENTORY CONTROL MODULE**

Inventory module facilitates processes of maintaining the appropriate level of stock in a warehouse. The activities of inventory control involve in identifying inventory requirements, setting targets, providing replenishment techniques and options, monitoring item usages, reconciling the inventory balances, and reporting inventory status. Integration of inventory control module with sales, purchase, finance modules allows ERP systems to generate vigilant executive level reports.

- **SALES MODULE**

Revenues from sales are live blood for commercial organizations. Sales module implements functions of order placement, order scheduling, shipping and invoicing. Sales module is closely integrated with organizations' ecommerce websites. Many ERP vendors offer online storefront as part of the sales module.

- **MARKET IN MODULE**

ERP marketing module supports lead generation, direct mailing campaign and more.

- **FINANCIAL MODULE**

Both for-profit organizations and non-profit organizations benefit from the implementation of ERP financial module. The financial module is the core of many ERP software systems. It can

gather financial data from various functional departments, and generates valuable financial reports such balance sheet, general ledger, trail balance, and quarterly financial statements.

- **HR MODULE**

HR (Human Resources) is another widely implemented ERP module. HR module streamlines the management of human resources and human capitals. HR modules routinely maintain a complete employee database including contact information, salary details, attendance, performance evaluation and promotion of all employees. Advanced HR module is integrated with knowledge management systems to optimally utilize the expertise of all employees. [6]

Figure (2.2) ERP Modules

1.7.3 THE BENEFITS OF ERP:

There are many benefits of an ERP system, but these are the chief ones:

1. **SCALABILITY :** An ERP system is easily scalable. That means adding new functionality to the system as the business needs change is easy. This could mean easy management of new processes, departments, and more.

2. **IMPROVED REPORTING:** Much of the inefficiency in operational work stems from improper reporting. With an ERP system, this possibility is eliminated as reporting follows an automated template system, allowing various departments to access information seamlessly.

3. **DATA QUALITY:** As compared with manual record-keeping or other traditional approaches, an ERP system improves data quality by improving the underlying processes. As a result, better business decisions can be reached.

4. **LOWER COST OF OPERATIONS**: An ERP system introduces fundamental innovations in managing resources, which eliminates delays and thus reduces cost of operations. For instance, use of mobility allows real-time collection of data, which is indispensable to lowering costs.

5. **BETTER CRM:** A direct benefit of using a good ERP system is improved customer relations as a result of better business processes.

6. **BUSINESS ANALYTICS:** Having high-quality data allows businesses to use the power of intelligent analytics tools to arrive at

better business decisions. In fact, many good ERP systems have built-in analytics functionality to allow easier data analysis.

7. **IMPROVED DATA ACCESS:** Controlling data access properly is always a challenge in organizations. With an ERP system, this challenge is overcome with the use of advanced user management and access control.
8. **BETTER SUPPLY CHAIN**: Having the right ERP system in place means improved procurement, inventory, demand forecasting, etc., essentially improving the entire supply chain and making it more responsive.
9. **REGULATORY COMPLIANCE:** Having the system in control means organizations can better comply with regulations. Further, the most important and recurring regulatory requirements can be built right into the system.
10. **REDUCED COMPLEXITY:** Perhaps the most elegant argument in the favor of ERP systems is that they reduce the complexity of a business and introduce a neatly designed system of workflows. This makes the entire human resource chain more efficient. [7]

1.7.4 ERP SOFTWARE SYSTEMS

Because an ERP system is such a large software investment, it’s imperative that you evaluate all of your ERP options to determine the best fit for your unique business needs. The following list of ERP Software will help you to start your search.

1.7.4.1 LIST OF ERP SOFTWARE SYSTEM:

1. **Openbravo 3.0**: Openbravo 3.0, the agile ERP, is a modular, ready to use, 100% web-based open source and free business

management system written in Java, that automates all of the core business processes for small and mid-sized companies. This makes an appealing alternative to SMEs. Openbravo is built on proven MVC & MDD framework that facilitate customization & maintenance of code. Openbravo already enjoys a growing customer clientele. [8]

2. **Oracle ERP:** Oracle ERP software is designed on Oracle App framework, which works on their own database, which is equipped with many advanced features and it has strong functioning. Oracle database is known for its high efficiency and speedy installation. Oracle Financials is the best of the most of the financial packages and its HRMS is also gaining popularity. It has strong strategies and the company hires expert consultants to inform buyers about the product. The customer support provided is very efficient and helpful. [9]
3. **Open ERP/Odoo**: Open ERP is a complete and modular system with about 700 modules. ERP software has a strong MVC architecture with an object database, a dynamic GUI, distributed server, flexible workflows, and reports. PostgreSQL Database and server part is written in Python. This is a complete open source ERP software, which is designed to address the needs of the company and the process. [10]
4. **Epicor ERP**: Epicor is providing integrated ERP Software with solutions for customer relationship management (CRM), manufacturing operations, supply chain management (SCM), human capital management (HCM) and more. Leveraging innovative technologies like Web services, Epicor develops end-to-end, industry-specific ERP designed to meet the needs of manufacturing, distribution, retail, services, and hospitality

industries. With the scalability and flexibility to support long-term growth, the Epicor enterprise resource planning system is complemented by a full range of services, providing a single point of accountability to promote a rapid return on investment and low total cost of ownership. [11]

	Openbravo 3.0	**Oracle ERP**	**Open ERP/Odoo**	**Epicor ERP**
Type of source	open source	Close source	open source	Close source
Modules	• JSON module • Weld module • Kernel module • Data Source module • Smart client module • Application module	• HRMS • Finance • Production • e-commerce gateway • Sales offline • Rapid Planning	More than 700 modules, some of them are: • Accounting • Application Builder • CRM • Human Resources • Invoicing • Marketing	• Client Relation Management
advantage	- It includes necessary functionality for complex retail management process. - Compatibility with Windows	- Oracle database comes with a high security feature and the security is based on the role based models.	- Open ERP is a cost-effective solution ERP software's and also downloadable from the Internet hence it can be	- The supply chain management solution is designed to provide

	and free operation system Linux.	- Oracle has a good record of providing fast customization and installation as compared to other enterprise software available in the market.	used in any business environment. - Open ERP also doesn’t require a license fee before it can be implemented and it can be easily installed and used, starting to work for the business immediately.	warehouse managem ent and supplier relationshi p managem ent. - The service module can help to predict improvem ents in a project and to improve the efficiency of the project.
Disadvant age	- The support system and documentation are inadequate. - Some users complain that the system	- Oracle forms cannot be connected to other databases and it is a major disadvantage of oracle systems.	- its limitations. - the business may not be able to maximize the use of the application.	- Epicor is mainly designed to meet the requireme nts of

crashes a lot.	North American buyers and customer from other parts of the world, may not find some features as per their needs.

Table (2.1) Difference between ERP systems.

1.7.4.2 WHY USING ODOO?

Our mission is to provide software that is intuitive, full-featured, tightly integrated, effortless to upgrade, all while running smoothly for every user.

We found several software's to implement the above requirements and that apply the concept of (Enterprise Resource Planning) but odoo program is distinguished from the rest because:

- No Lock-in and open source
- Comprehensive
- Highly modular
- Updated Technology
- Lower total cost of ownership

1.8 PREVIOUS STUDIES

1.8.1 IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING (ERP) IN MINISTRY OF INVESTMENT

Presented in October 2011, by students Asmaa Hashem et *al,* to obtain a bachelor degree in Computer Science from University of Sudan for Science and Technology. And it had been applied in the general management of administrative and financial issues in the ministry of investment to integrate data and processes in one system to make it easier to manage and control, also to connect administrations with each other in both small and large institutions to save time and effort. In the current study that has been done in High level Academy administrations has been linked together and a training system was established by using the application of open source Enterprise Resource planning (open ERP). [12]

1.8.2 IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING ON SHIEKAN INSURANCE AND REINSURANCE COMPANY, LTD

Presented in October 2012, by students Sari Babiker et *al,* to obtain a bachelor degree in Computer Science from University of Sudan for Science and Technology. and it applied for SHEKAN insurance company aiming to link administrations and administration institutes to save time and effort in reaching important information inside the company and store it in one united accurate data base by using the application of open source Enterprise Resource planning (Open ERP). To enable all beneficiaries inside the company to reach it. The study includes stores and Purchases departments, in the current study that has been done in High level Academy by using the application of open source Enterprise Resource planning (Open ERP).

which develop and maintain failure in training department and connect it to other department in the academy. [13]

1.8.3 DEVELOP INTEGRATED TRAINING SYSTEM FOR NILE RESEARCH CENTER (OPENERP)

Presented in October 2011, by students Samya Abdulmonem et *al,* to obtain a bachelor degree in Computer Science from University of Sudan for Science and Technology. This research aim to create an integrated training system by using the application of open source Enterprise Resource planning (open ERP)to develop training unite and administrative of operations , and link training unite with human resources and finance departments which are already exists in Nile research center in order to facilitate operations , reduce costs and improve performance, In the current study we made a training management system for High level Academy by using the application of open source Enterprise Resource planning (open ERP). [14]

1.8.4 SYSTEMS IMPLEMENT ERP

ICT has become more phenomena attached to the activities as a whole, with the spread of advanced modern technology for companies and institutions. There must be a particular environment to help regulate the presence of the ERP system, Enterprise Resource Planning integrates all aspects of the process, including product development, manufacturing, sales, training and marketing assistance and planning, it is also easy to install in Windows and Linux systems compared with the institution on another domain. Thus it evaluated three major studies of the ERP system institutions here within Sudan but in broad areas, including:

- ERP as a service for demand

- CRM System
- unified emergency system

All of these systems are all depended on the ERP system, but each system has unction’s and features.

- And the similarities and differences in this study with the study of this research:
- We all used similar environment scripts which ERP system.
- We disagree that each system has its own characteristics.
- Our study is interested only training institutions and corporate system.
- The ERP system most Important environments currently used. [15] [16] [17]

Study Name **the comparison**	**IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING (ERP) IN MINISTRY OF INVESTMENT**	**IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING ON SHIEKAN INSURANCE AND REINSURANCE COMPANY LIMITED**	**Developed Integrated Training System for Nile Research Center (OpenERP**	**Systems implement ((ERP**
The technique used	.(Enterprise Resource planning (open ERP			
Case study	The Ministry of Investment	Shiekan Insurance and Reinsurance Limited	Nile Research Center	• CRM SERVICE CENTER is a case study for: GIAD

				MOTOR
Additional techniques	-	-	-	• ERP as a service for demand • CRM System • unified emergency system
Modules used	Accounts , affairs of individuals and financial management departments	Warehouses and Purchase	Accounts	Human Resources Management, Project Management, Accounting and Finance and CRM

Table (2.2) Difference between previous studies.

CHAPTER THREE

TECHNOLOGIES USED IN THE SYSTEM

This chapter is divided into two sections, the first section gives a general description of OpenERP software as a concept, and the second section describes the systematic techniques, which used in the system.

1.9 OPEN ENTERPRISE RESOURCE PLANNING

Open ERP an integrated software system for enterprise resource planning (ERP) is available for free as a ready-to-use and an applet source are adjustable according to the open source software license AGPL. System consists of a basic platform and a set of software modules that provide the functionality of the program to the user, such as accounting, sales, procurement, warehousing, manufacturing, customer relations, human resources, and other points of sale. It intends to add a more coherent and concise syntax and provide a bidirectional compatibility.

With 3.000+ apps, OpenERP is unique. No other product allows such a level of integration out-of-the-box. For these reasons we think it's time to differentiate OpenERP from traditional ERP players. There is no comparison anymore.

So, the company renamed the product and company into "Odoo". [18]

1.9.1 ODOO FEATURE:

- It satisfies all company specifications. You can side away the undesirable functions of this program, if you don't want them in your company procedure.
- Custom ERP Application is a least servicing application.
- It is less costly than packed resources.
- Custom application can be quickly applied in flip structure within a company.

- It reduces the possibilities of danger relevant to cut over of big projects.
- This program is based on your company techniques, so that you should not turn our company procedures to fit in the ERP program.
- This application is backed by experienced designers. [19]

1.9.2 THE ARCHITECTURE OF OPENERP/ODOO

1.9.2.1 DATABASE LAYER (POSTGRESQL)

Open ERP uses PostgreSQL as the default database for all its functionality. The PostgreSQL database server contain all data and most elements of the Open ERP system configuration.

1.9.2.2 ODOO APPLICATION SERVER (MIDDLE LAYER)

The Open ERP application server, which contains all of the enterprise logic and ensures that Open ERP runs optimally. The Server itself is written in Python language. Open ERP application server is released under Aeffro GPL License.

1.9.2.3 CLIENT LAYER

The web server, a separate application called the Open Object client-web, which enables connecting to Open ERP from standard web browsers and is not needed when system is connect using a GTK client.

The client-web component can be thought of as a server or a client depending on the user’s viewpoint. It acts as a web server to an end user connecting from a web browser, but it also acts as a client to the Open ERP application server just as a GTK application client does. [20] See Figure (3.1)

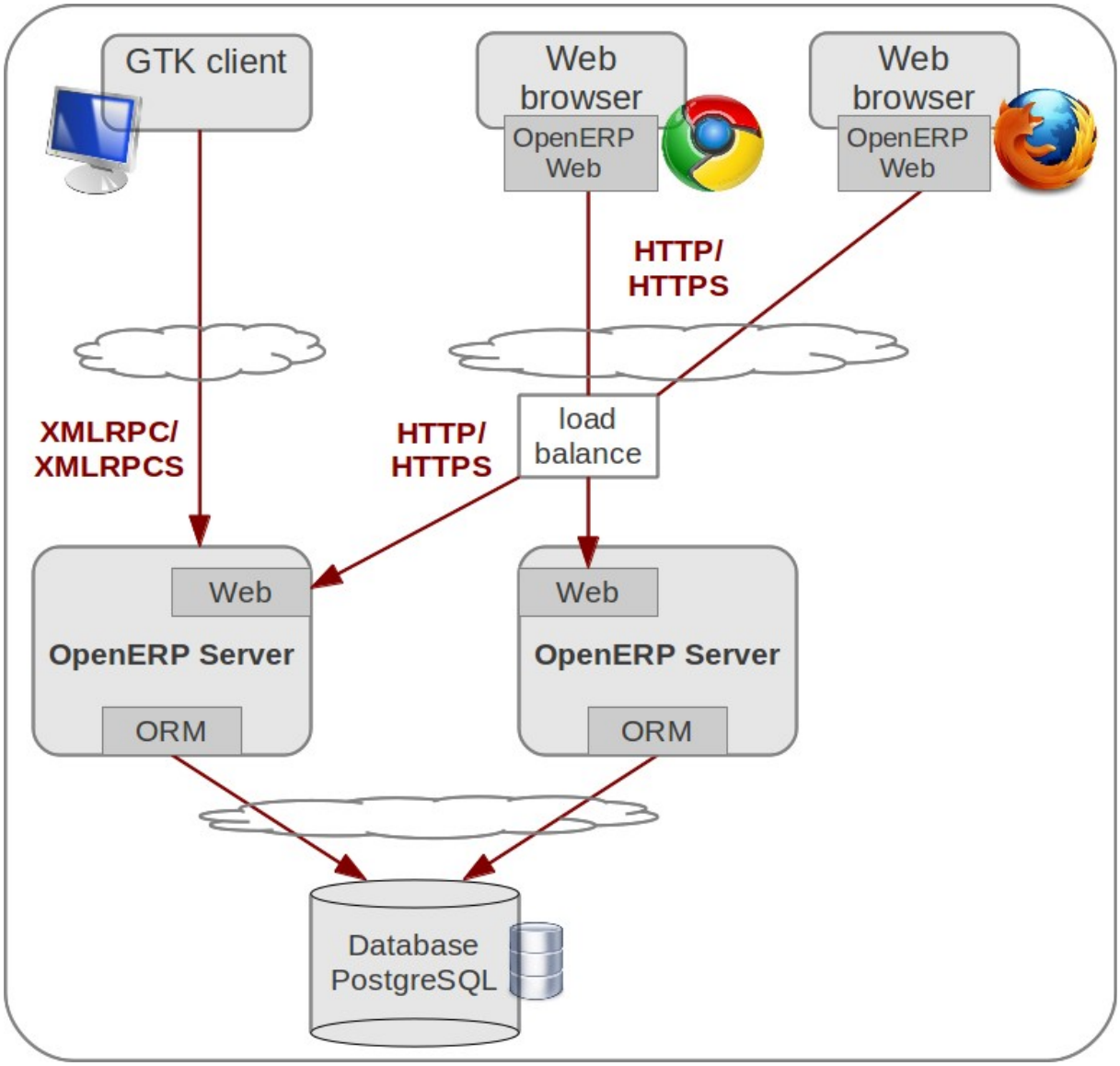


Figure (3.1) Three Tier Architecture.

1.10 TECHNOLOGIES TO BE USED

1.10.1.1 PYTHON

Python programming language represent one of high-level languages, characterized simply written and read, easy to learn, use the object-oriented programming style (OOP), open source, and scalable. Python is the language of explanatory language, multi-purpose and are widely used in many fields, such as building

independent software using the graphical interfaces knowing the work of Web programs. [21]

FEATURE:

- Is very flexible language.
- Extensible.
- Embeddable.
- Extensive Libraries.

1.10.1.2 POSTGRESQL

(Pronounced "post-Gress-Q-L") is an open source relational database management system (DBMS) developed by a worldwide team of volunteers. PostgreSQL is not controlled by any corporation or other private entity and the source code is available free of charge.

1.10.1.3 XML

Extensible Markup Language (XML) is a markup language that defines a set of rules for encoding documents in a format which is both human readable and machine-readable. It is defined by the W3C's XML 1.0 Specification and by several other related specifications all of which are free open standards.

1.10.1.4 UML

Unified Modeling Language, or UML, provides an overview of the most important diagrams used in the visual modeling of computing programs.

The article is ideal for those who have little knowledge of UML concepts, including managers as well as novice practitioners.

Behavior diagram:

1. Use case diagram.

2. Activity diagram.

3. Sequence diagram.

CHAPTER FOUR

SYSTEM REQUIREMENTS

AND

PROPOSED SYSTEM ANALYSIS

This chapter includes specification of system requirements, the current system and the proposed system and describes the system analysis using UML technology.

1.11 SYSTEM REQUIREMENTS

1.11.1 FUNCTIONAL REQUIREMENTS:

• Login to the system via the log Screen that connect to Database

(PostgreSQL).

• System Administrator and the Training requirement has the authority to change the system and to monitor the system.

• The system will save the course information, modify them, add and modify course center.

1.11.2 NON-FUNCTIONAL REQUIREMENT:

It is features and characteristics which should be available in the system:

1. **Usability:** The level of Software ability to enable users to easy system operation and control. Where we find that the program is easy to use in terms of management and control procedures and follow-up the work in simple and clear way.
2. **System availability:** Ease of use of the system. - Speed access to system services. - The possibility of using the system at any time. - The possibility of using the system from any device with any specifications.
3. **Integrity:** The level of software product's ability to ensure the validity of the data is completed during the treatment process and transmission.

4. The data transmission is safe; this feature is provided by the database.
5. **Accountability:** The level of software product's ability to keep track of all actions carried out by any user in the system separately.
6. **Performance efficiency:** The level of software product's ability to provide adequate performance for the resources used in the framework of agreed conditions. Means the resources available here Software -Hardware - Paper, printing and others, are sub-characteristics of effective performance in the following:

 Time behavior: The product's ability to provide a programmatic response time, productivity and address the appropriate rate acceptable when performing any task according to pre-defined conditions.

 Resource utilization: Product programmatic level of consumption or application of resources at the quantity and quality at the level of implementation of any task within the framework of the conditions laid down.

1.12 THE CURRENT SYSTEM AND THE PROPOSED SYSTEM

1.12.1 THE CURRENT SYSTEM

1.12.1.1 DESCRIBE THE CURRENT SYSTEM

Currently there is no actual software system management of training operations within Hi Level Aviation Academy, operations

done within the academy manually using paper and may cause many problems for the data, including: damage and loss data, errors committed by the employee in the division courses and dates of operation.

1.12.1.2 THE CURRENT SYSTEM PROBLEMS

- The difficulty of control of the process.
- Management trainee’s data.
- Training sites and dates of training.
- Consumption of time and effort senior compared the proposed system.

1.12.2 THE PROPOSED SYSTEM

Build system that Administration to organize courses, management and determine training centers and Trainees, follow up training courses, and taking into account the confidentiality and privacy of information and data.

1.12.2.1 DESCRIPTION OF PROPOSED SYSTEM

Course request is done in two ways:

Either the trainee requests a course he need it,

Or the department manager write Notes for the weakness of the trainee in a certain skill, and request the course which develop that skill to the trainee After the course request by the first way it is pending approval by the department manager, then all the Courses approved move to the data dump partition until the courses be sorted and categorized in order of priority and on budget for training for that year, then the annual training plan, after which it is teaching courses then return the trainee , the trainer and department

manager to assess the yield of this training , finally the system allows spatial print reports that needed by the users of the system.

1.12.2.2 THE PROPOSED SYSTEM USERS

- **DEPARTMENT ADMINISTRATOR**

  The administrator has authority to modify or delete trainee’s information.

- **EMPLOYEE**

  The person who takes course.

- **THE EMPLOYEES WHO WORK IN TRAINNING DEPARTMENT**

  The employees in this training department receive the data of approval courses, then make the training plan.

1.12.2.3 THE PROPOSED SYSTEM REPORT

- Reports about training Courses in a specific time period
- Employee reports
- Reports about training plan
- Reports about the training requirement

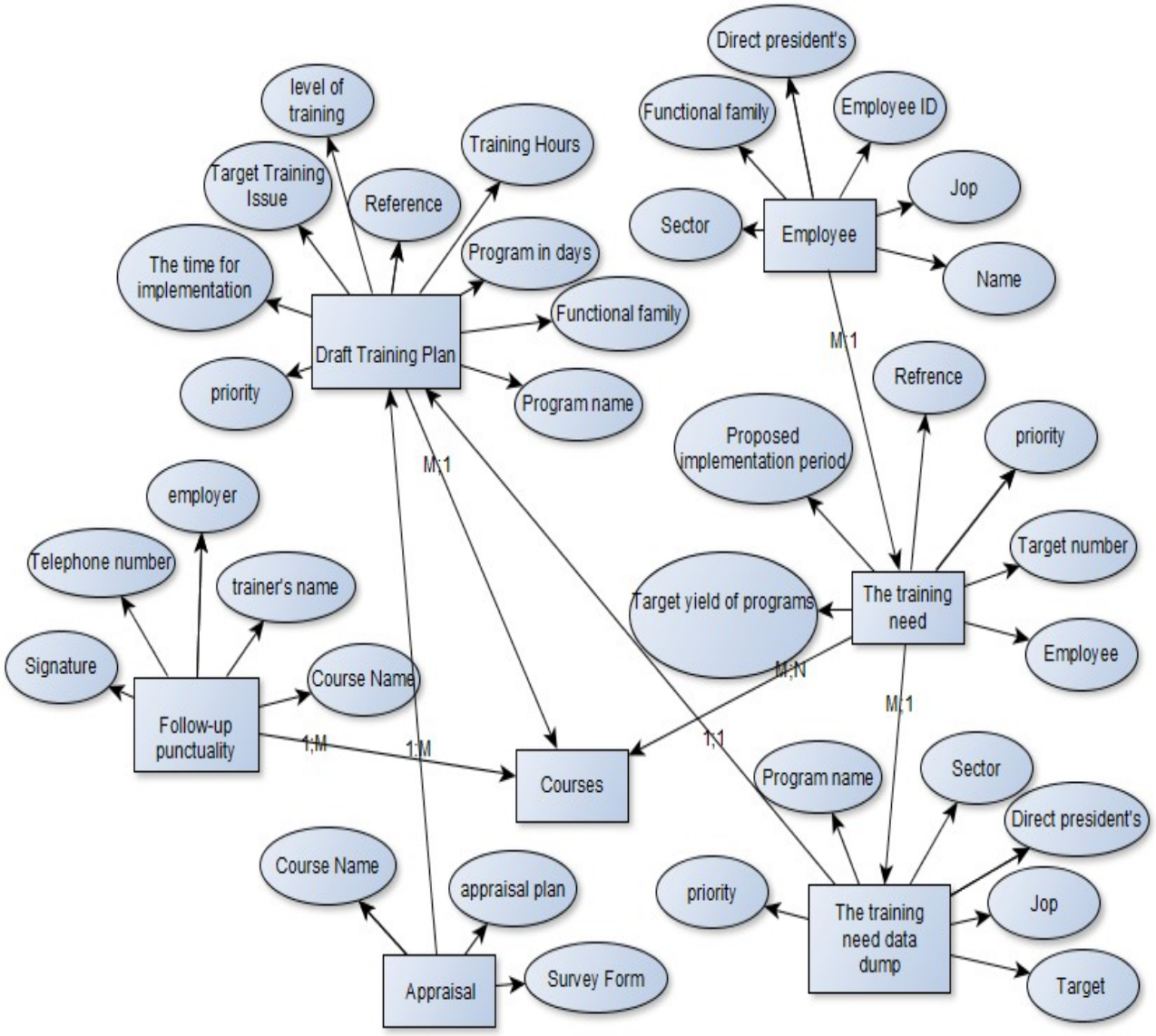
1.12.2.4 PROPOSED SYSTEM PROCEDURES

- Receive course request
- Determine the dates and center of courses
- Providing multiple questionnaires to enable the evaluation process
- Extract the Report

1.13 SYSTEM ANALYSIS

Analysis process is an Essential process to ensure the development of the system as required in accordance with the

requirements of the customer, in this research after the collection of data from (HIGHLEVELAVIATION ACADEMY), it has been analyzed clearly and determine the inputs and outputs of the system and data table and will clarify the functions of the system in detail in this chapter. For more details about analysis of requirement see figure (4.1)



.Figuer (4.1) analysis for the system

1.14 SYSTEM ANALYSIS USING UML

1.14.1 USE CASE DIAGRAMS

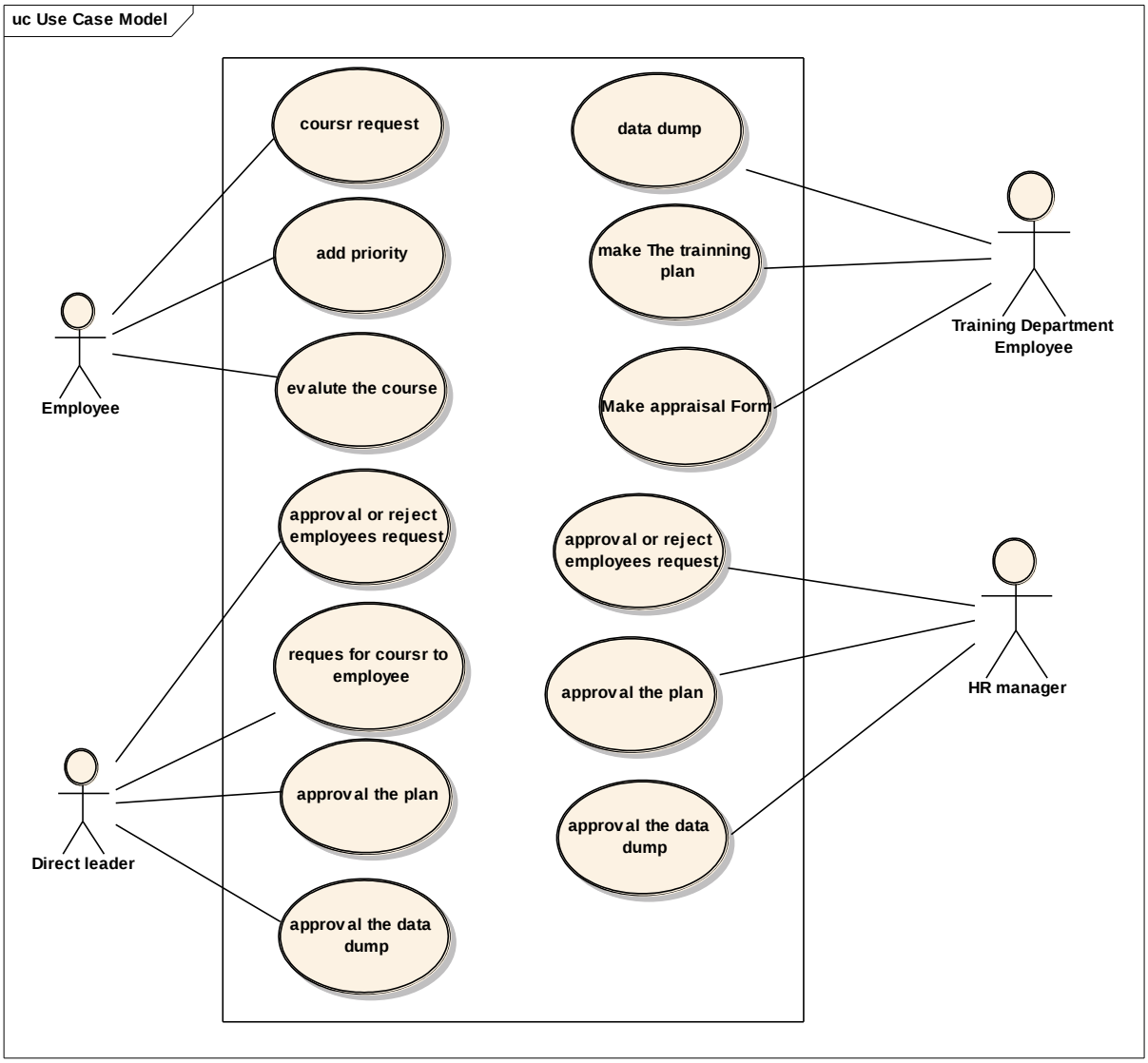


Figure (4.2) Use Case Diagram for the system.

1.14.2 SEQUENCE DIAGRAMS

1.14.2.1 DIAGRAMS FOR EMPLOYEE SIDE

1.14.2.1.1 LOGING FOR EMPLOYEE

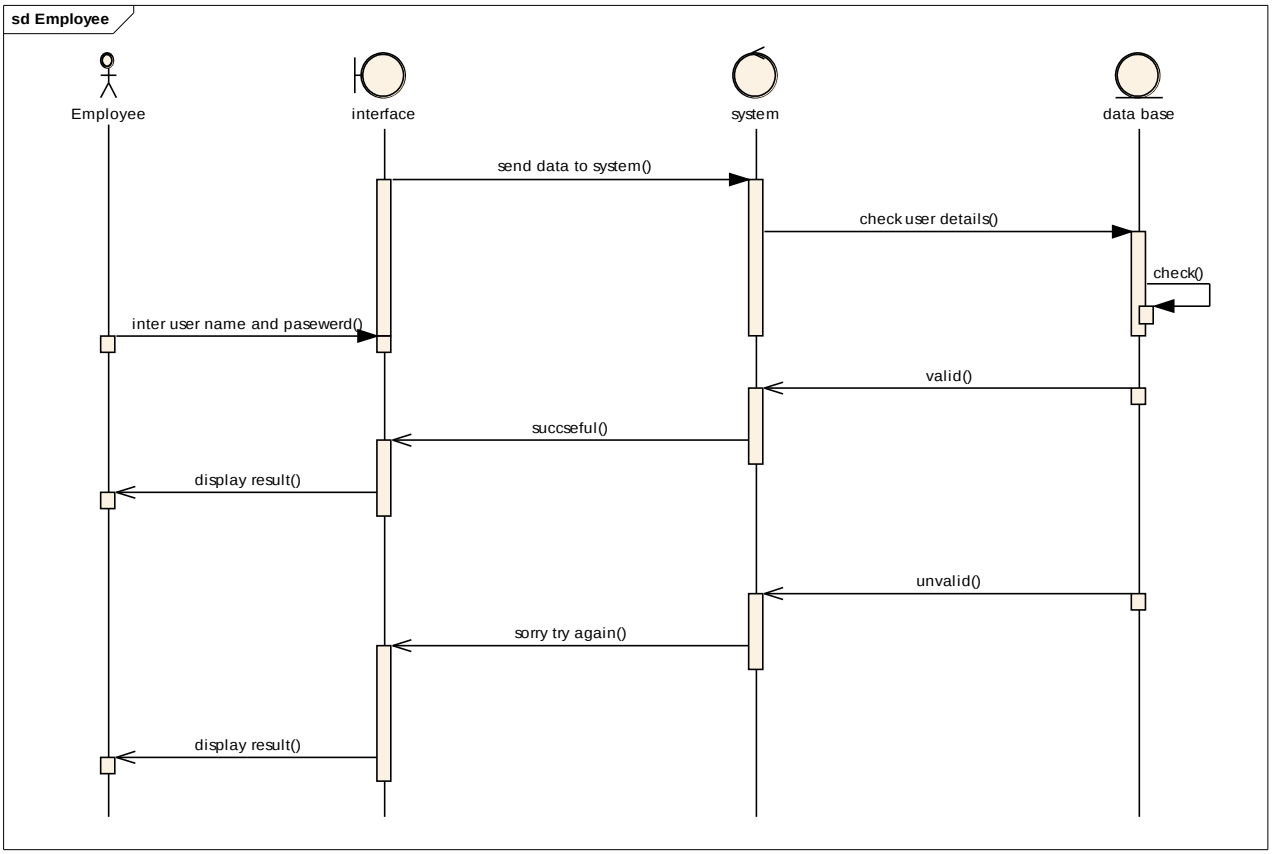


Figure (4.3) Sequence Diagram login for Employee Side.

1.14.2.1.2 COURSE REQUEST

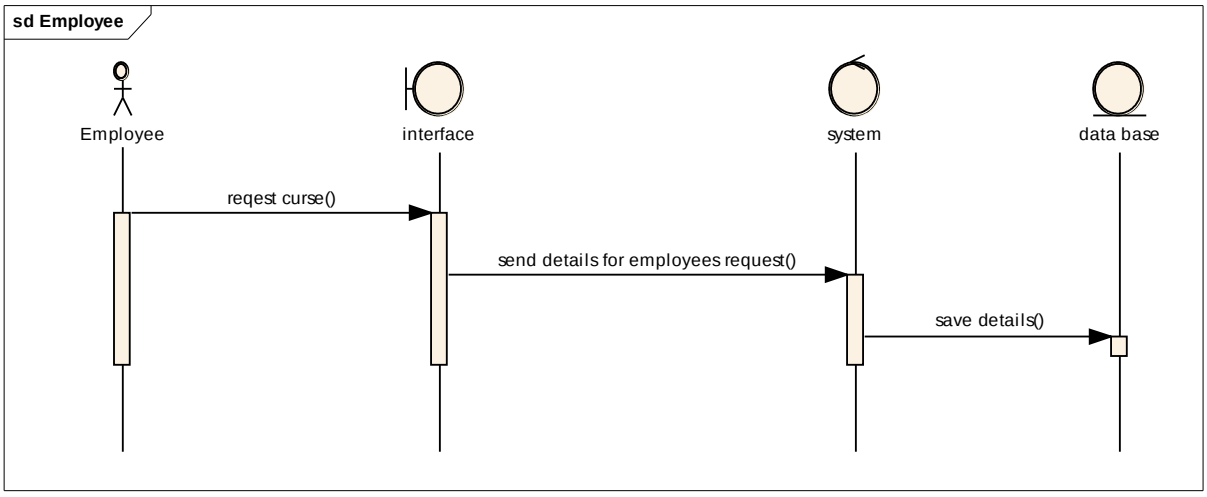


Figure (4.4) Sequence Diagram for Course request.

1.14.2.1.3 APPRAISAL

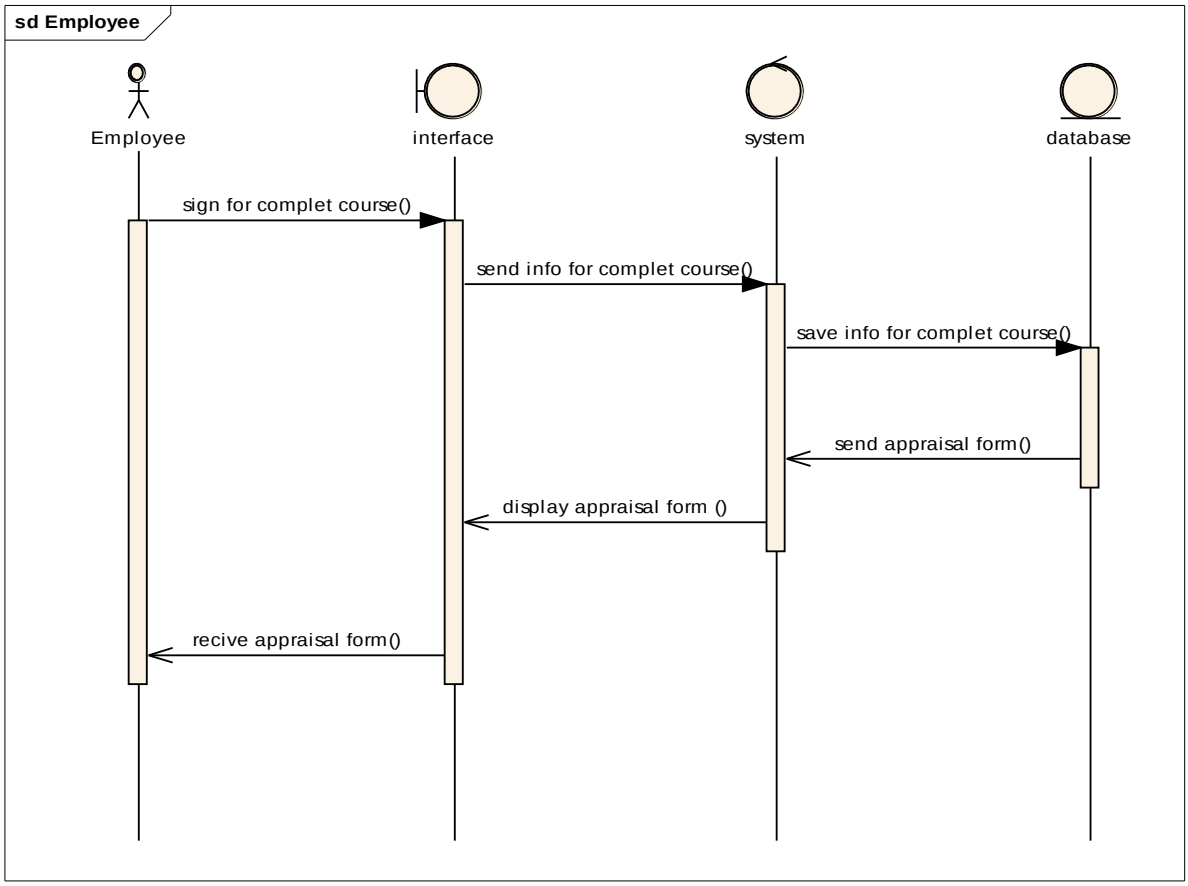


Figure (4.5) Sequence Diagram for appraisal form.

1.14.2.2 DIAGRAMS FOR DIRECT LEADER SIDE

1.14.2.2.1 LOGING FOR DIRECT LEADER

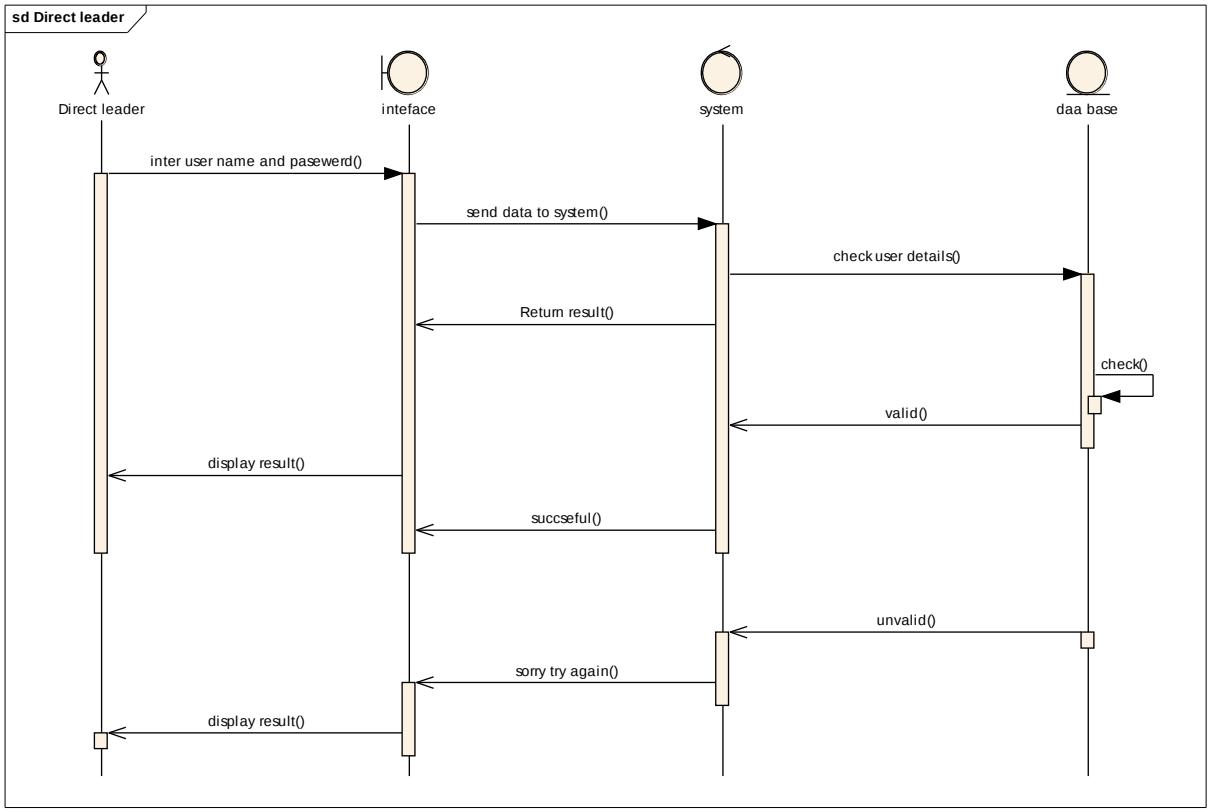


Figure (4.6) Sequence Diagram login for Direct Leader Side.

1.14.2.2.2 REQUEST COURSE FOR EMPLOYEE

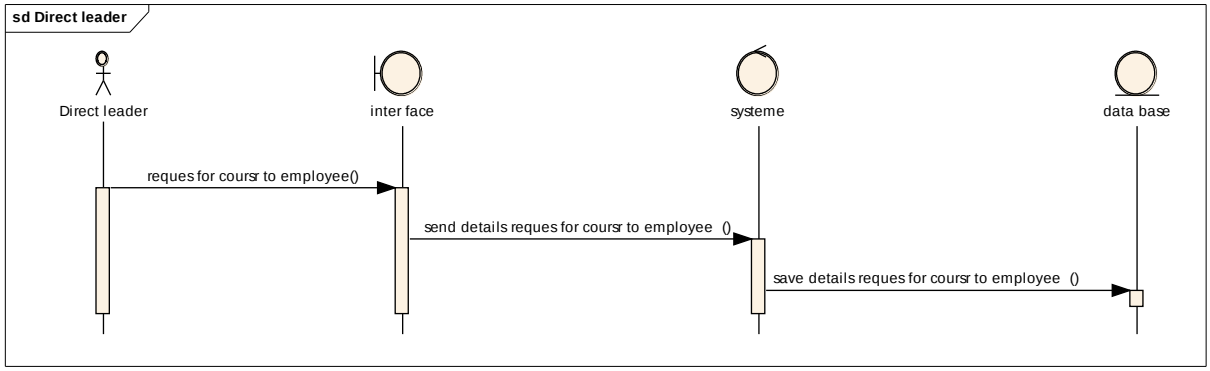


Figure (4.7) Sequence Diagram for Request Course for Employee.

1.14.2.2.3 APPROVAL DATA DUMP

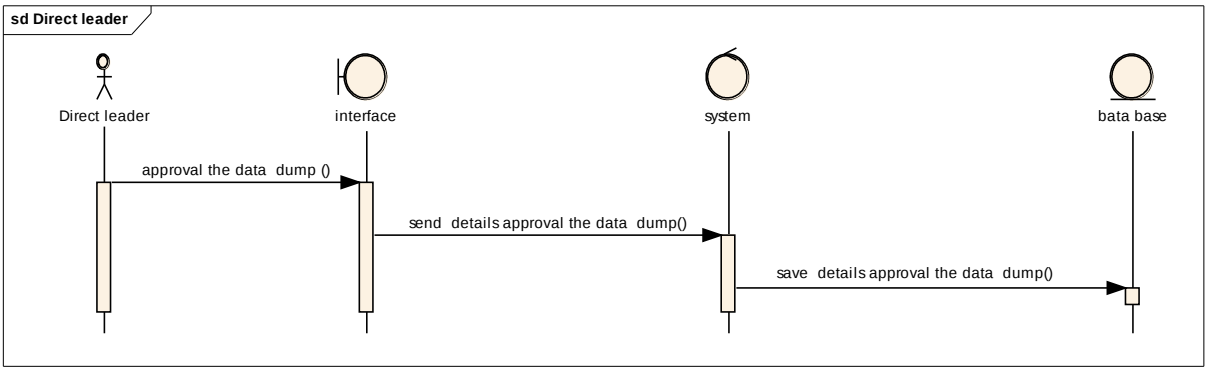


Figure (4.8) Sequence Diagram for approval data dump.

1.14.2.2.4 APPROVAL EMPLOYEE REQUEST

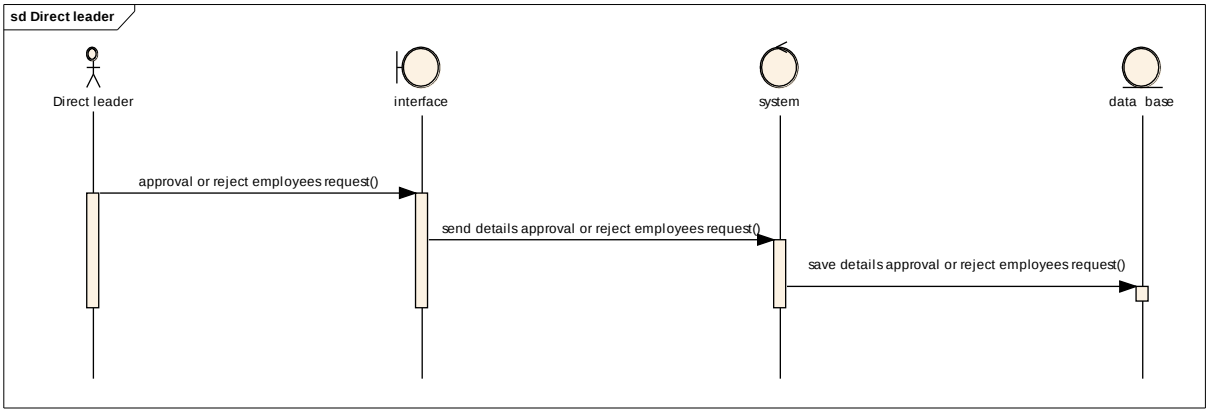


Figure (4.9) Sequence Diagram for approval employee request.

1.14.2.3 DIAGRAMS FOR HR MANAGER SIDE

1.14.2.3.1 LOGING FOR HR MANAGER

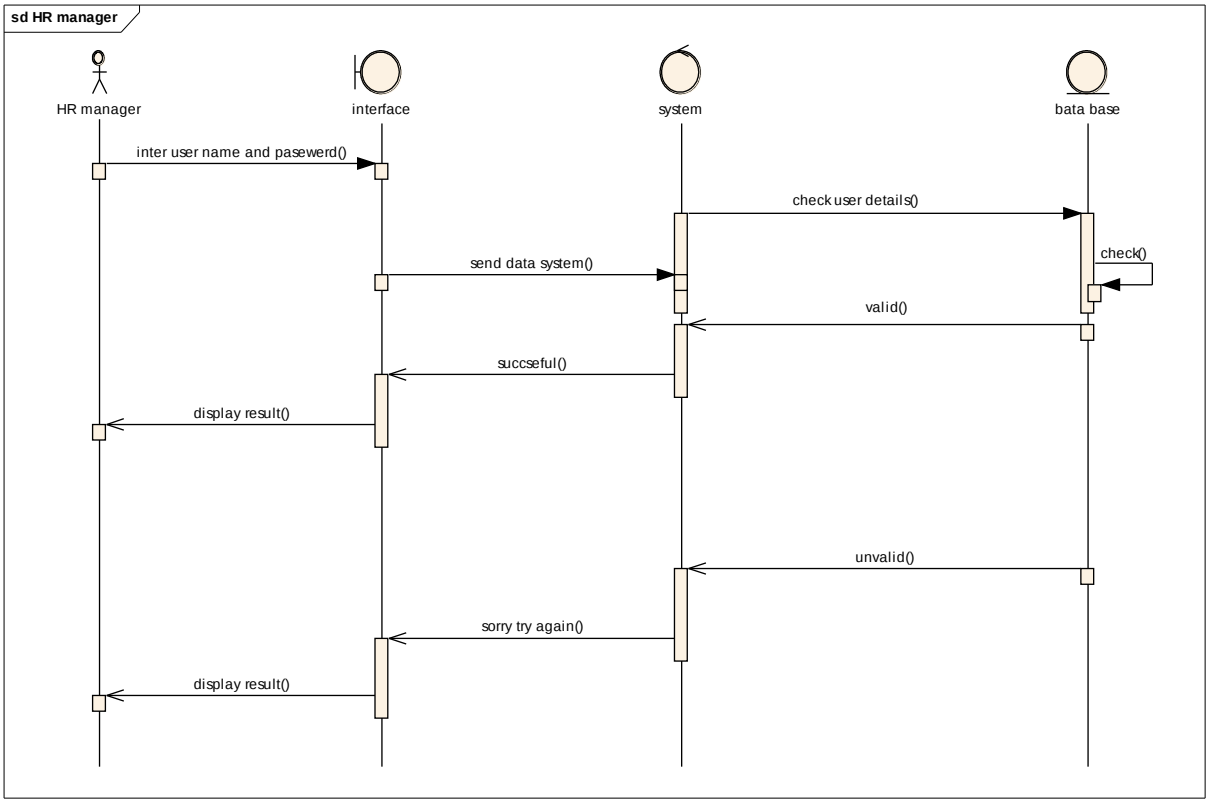


Figure (4.10) Sequence Diagram login for HR manager Side.

1.14.2.3.2 APPROVAL EMPLOYEE REQUEST

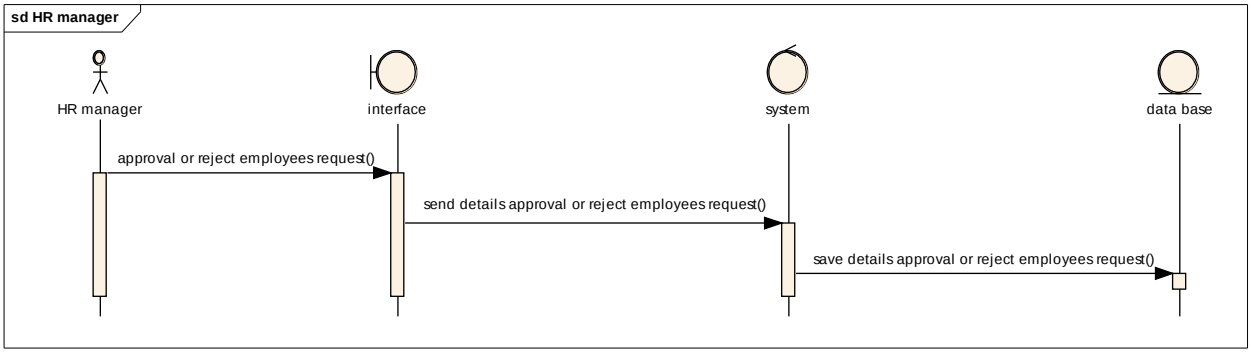


Figure (4.11) Sequence Diagram for approval employee request.

1.14.2.3.3 APPROVAL DATA DUMP

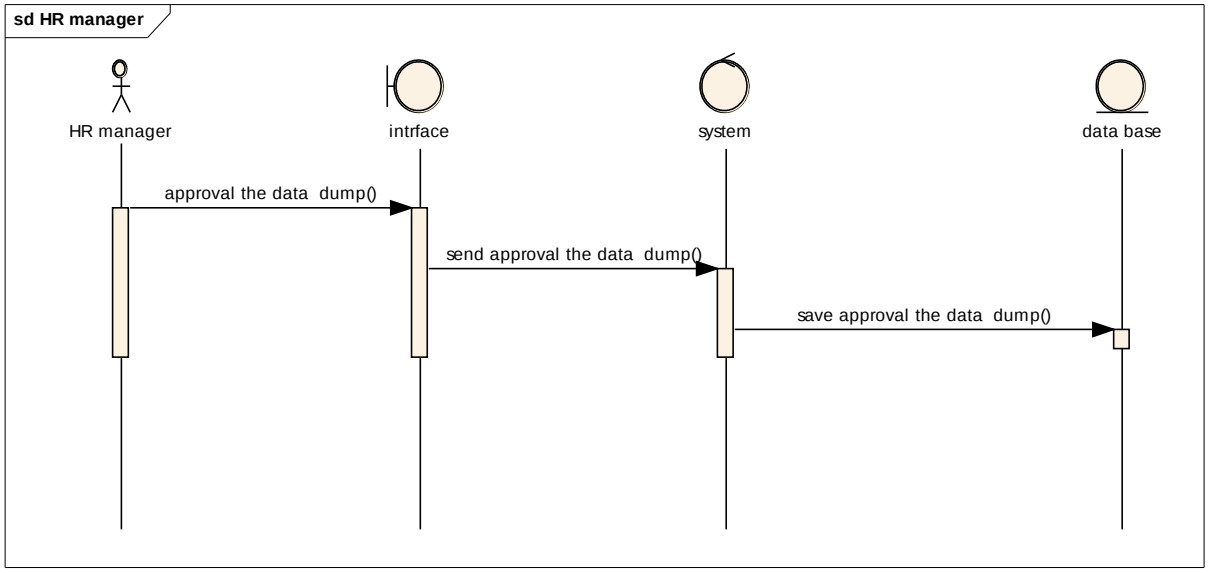


Figure (4.12) Sequence Diagram for approval data dump.

1.14.2.3.4 APPROVAL TRAINING PLAN

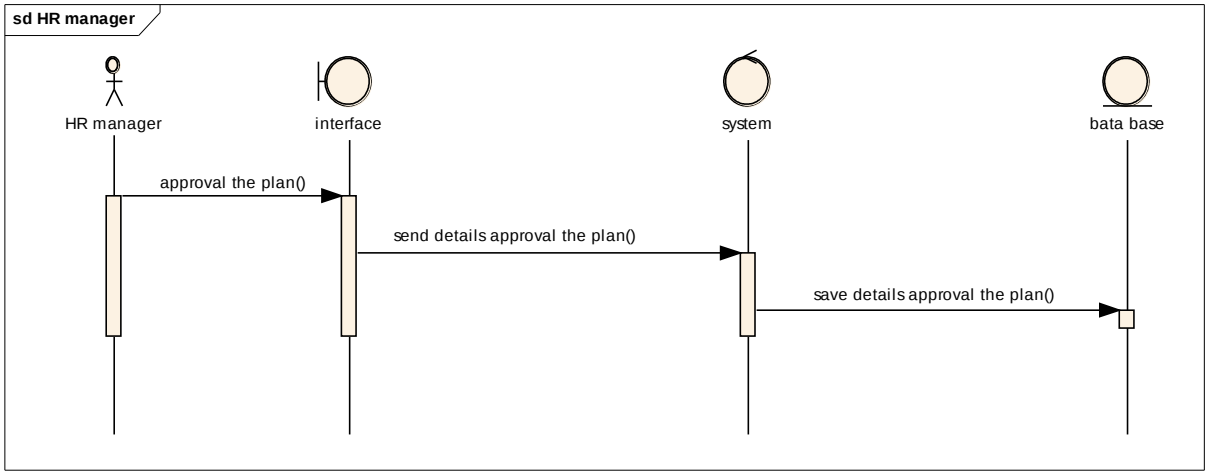


Figure (4.13) Sequence Diagram for approval training plan.

1.14.3 DIAGRAMS FOR TRAINING DEPARTMENT SIDE

1.14.3.1.1 LOGING FOR TRAINING DEPARTMENT

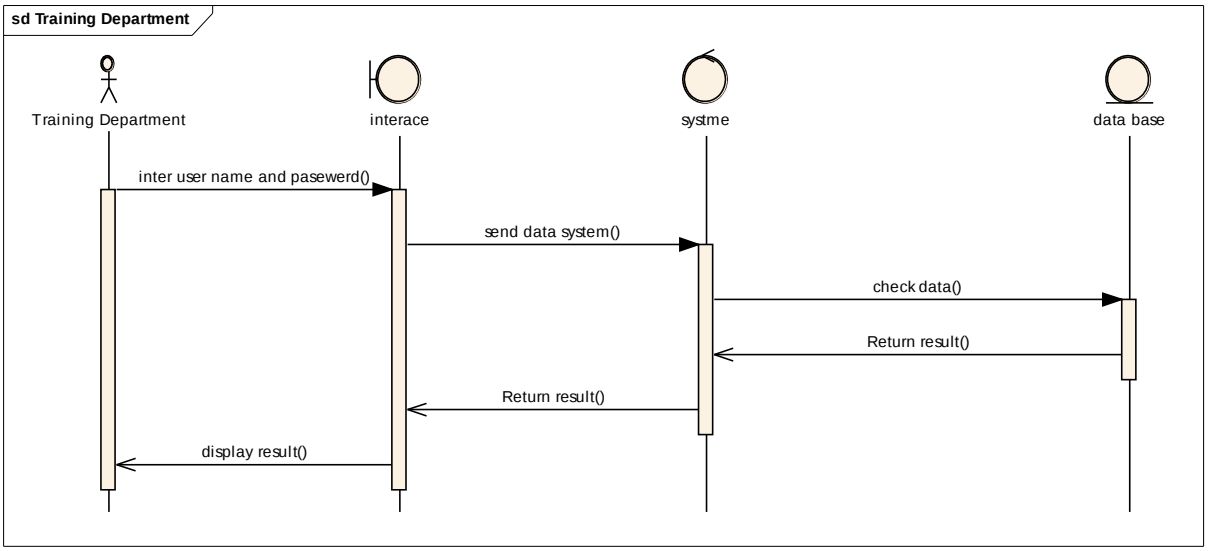


Figure (4.14) Sequence Diagram login for training department Side.

1.14.3.1.2 WRITE APPRAISAL FORM

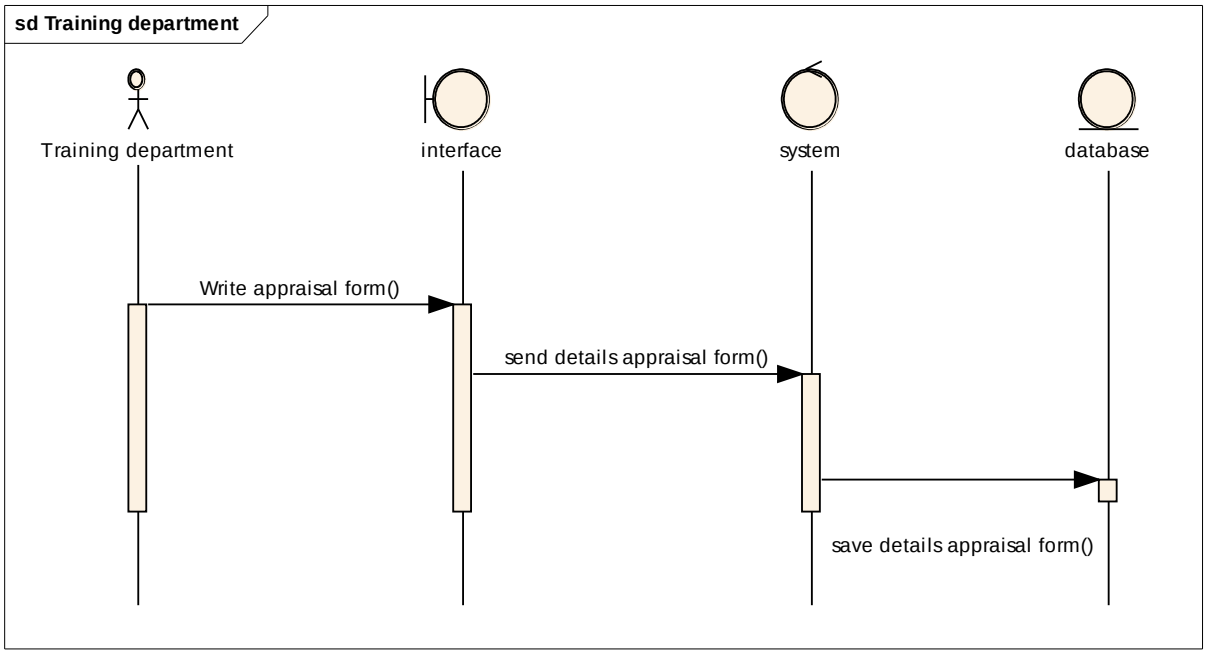


Figure (4.15) Sequence Diagram for write appraisal form.

1.14.3.1.3 WRITE TRAINING PLAN

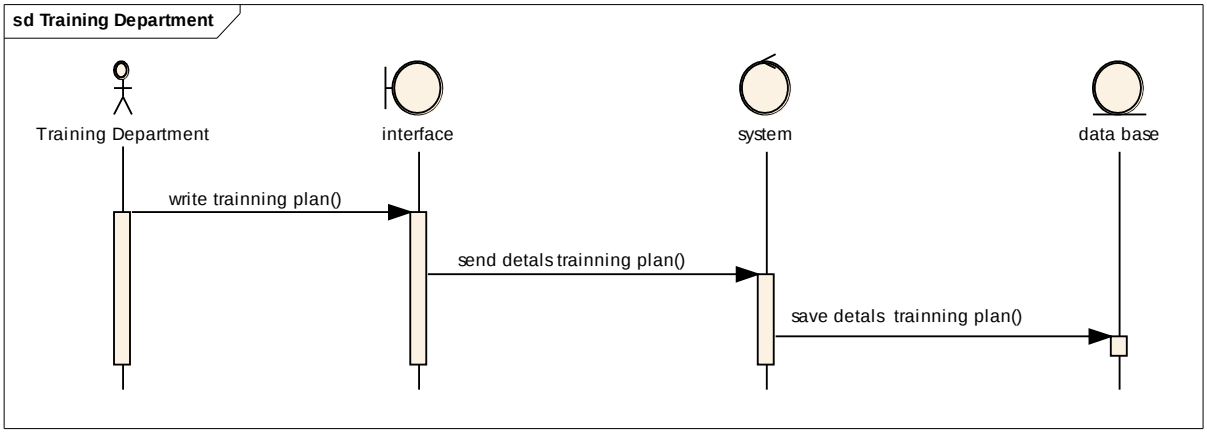


Figure (4.16) Sequence Diagram for write training plan.

1.14.4 ACTIVITY DIAGRAMS

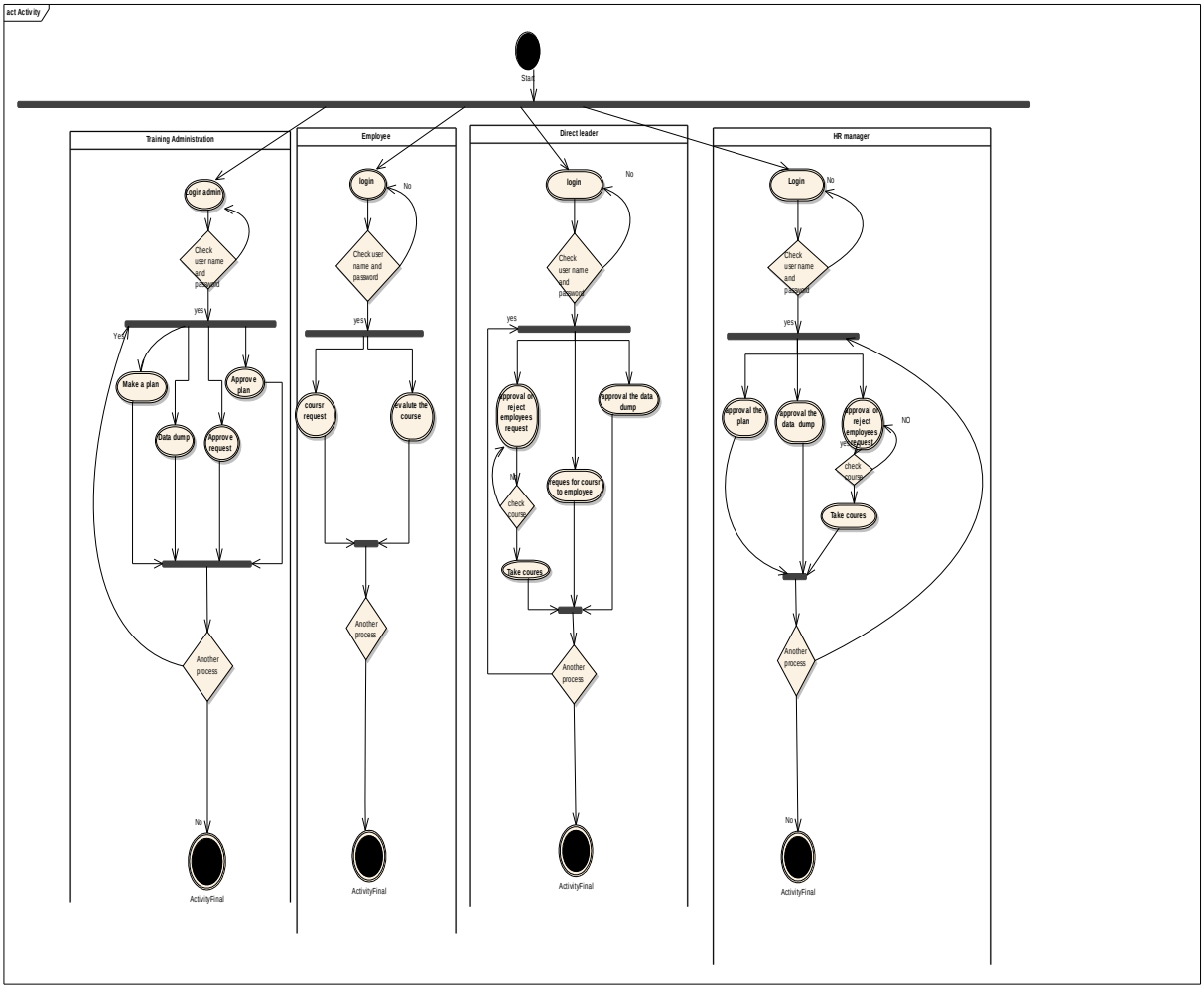


Figure (4.17) Activity Diagram for the system.

CHAPTER FIVE

IMPLEMENTION

1.15 INTRODUCTION

This chapter includes the proposed system interfaces.

1.16 THE PROPOSED SYSTEM INTERFACES

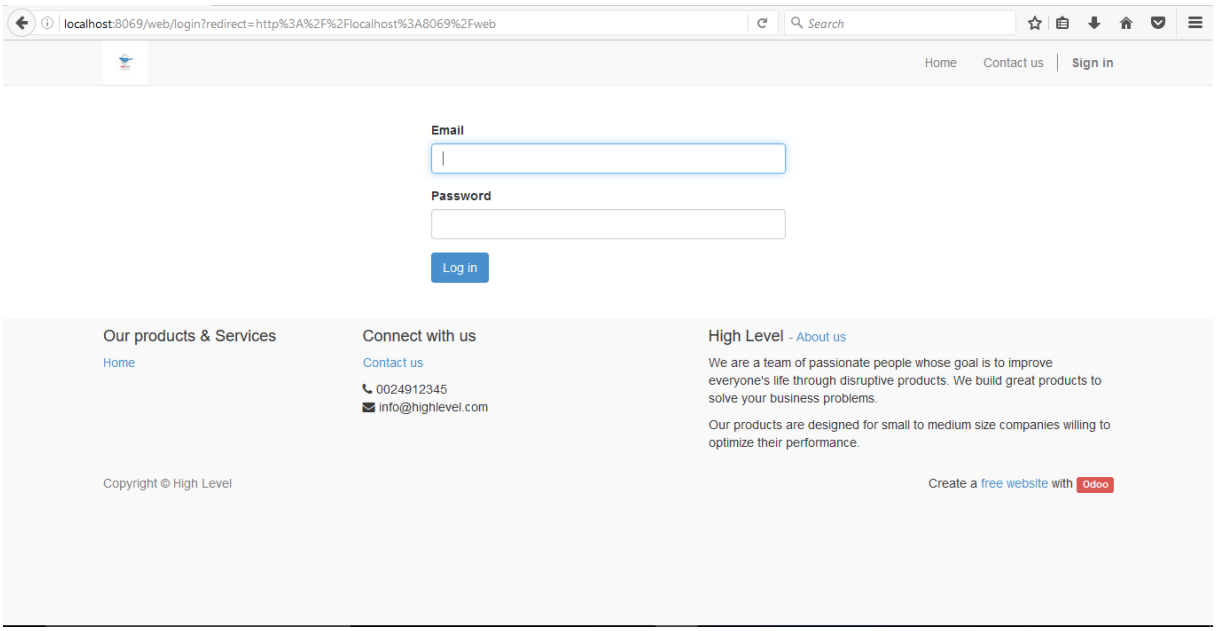


Figure (5.1) System Login interface.

DESCRIPTION:

The login interface requires correct username and password for login to system, every user in the system must has unique user name and password to access the system.

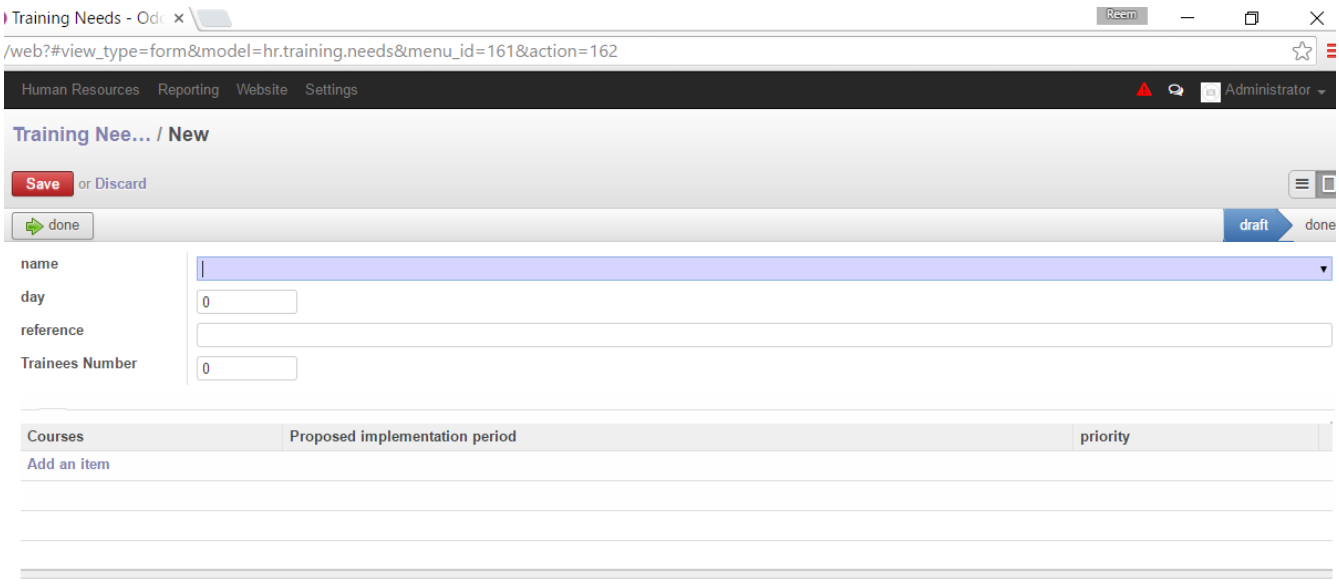


Figure (5.2) Training need interface.

DESCRIPTION:

This is the first screen appears to both employee and direct manager; to request a course.

The training need interface includes the following fields:

1. Name of employee who need the course.
2. The date of course.
3. The reference of employee.
4. The number of Trainees who order this course.
5. Add an item (The course):
    - Name of course.
    - The proposed implementation period (specific quarter of year).
    - The priority of course (High, Medium, low).

After fill all fields press save to complete the request.

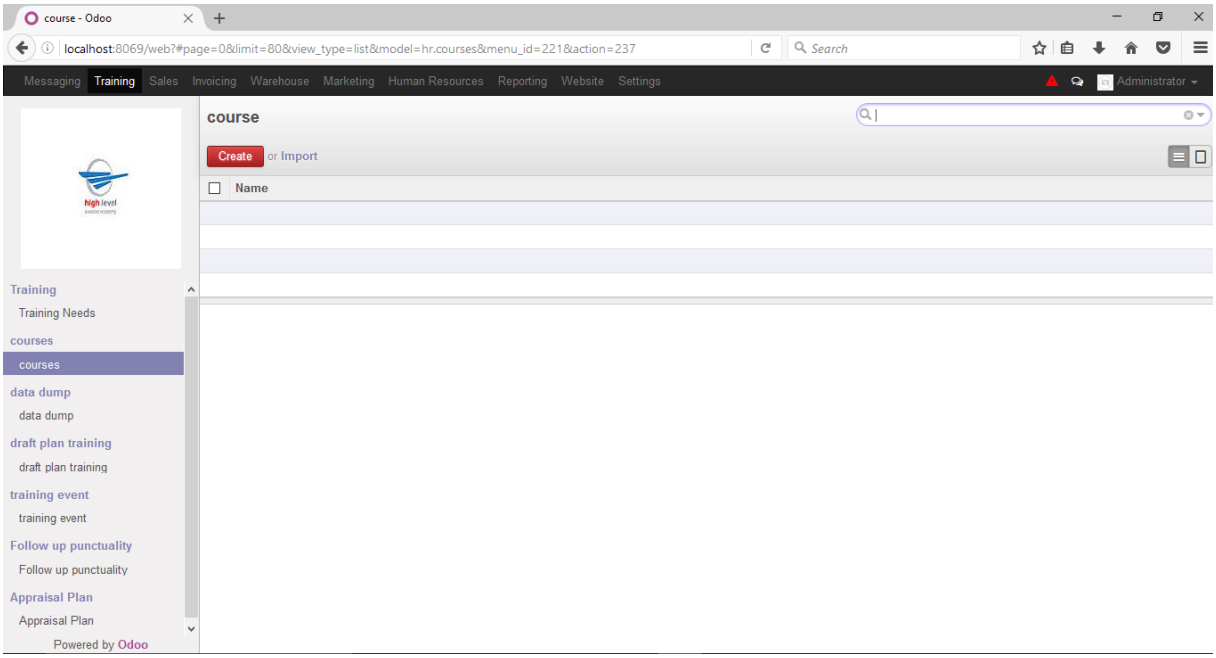


Figure (5.3) The course interface.

DESCRIPTION:

After complete all fields in Training need interface and save it, the data of courses will send to course module and stay there to display it or add new course from this interface.

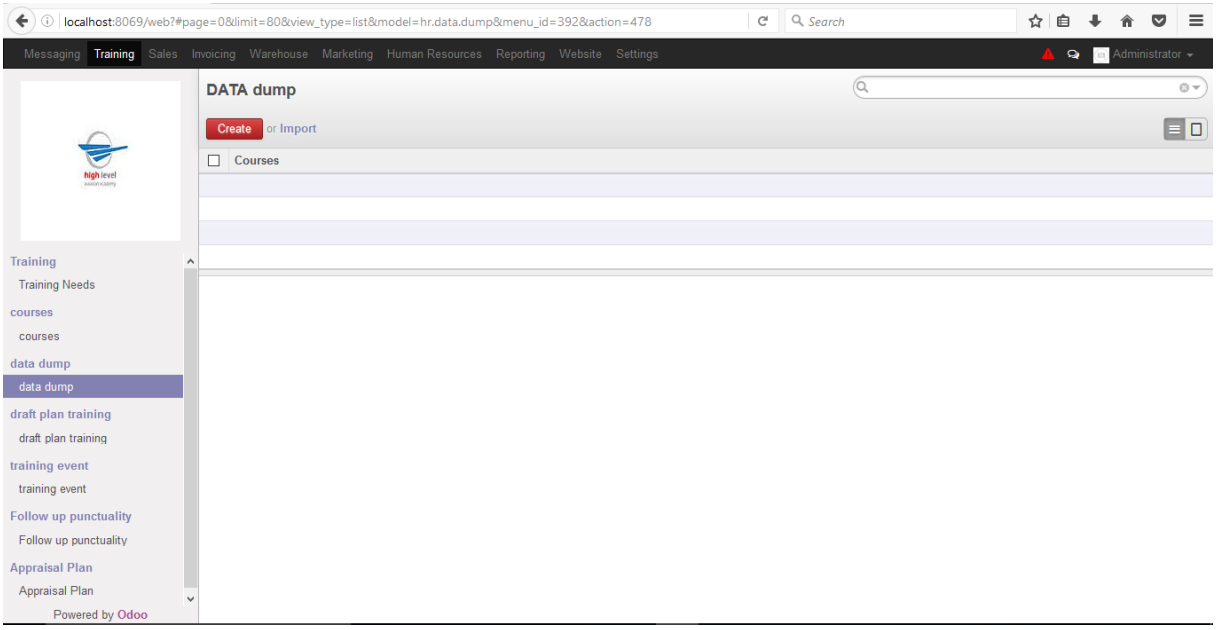


Figure (5.4) The data dump interface.

DESCRIPTION:

Another copy of data that saved in the training need interface; will send to data dump module, to classified by courses to determine the number and name of courses, employees and the other information of courses.

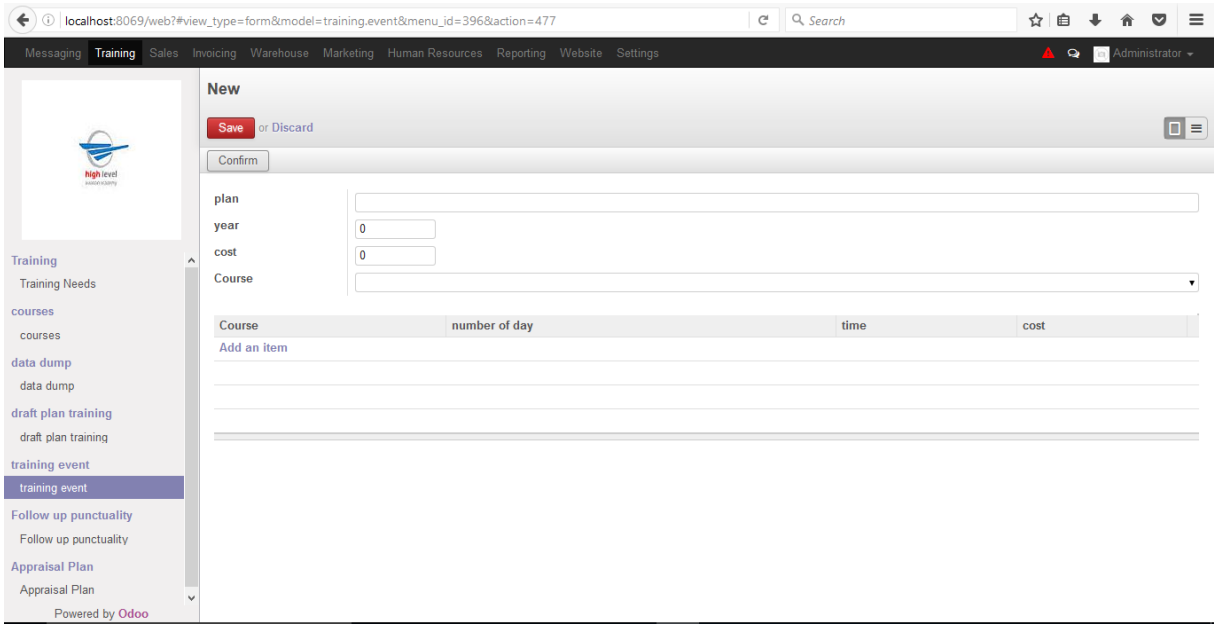


Figure (5.5) The Training plan interface.

DESCRIPTION:

This screen is most important one in the system, it to produce a plan for a training for a year.

The Training plan interface include:

- Name of plan.
- The year which plan for.
- The whole cost of courses in plan.
- The courses involved in plan.
- Add an item (add all courses and their information:
  - Number of days of target course.
  - Time to start and finish the course.

- The cost of target course.

After fill all fields it will saved to complete the plan.

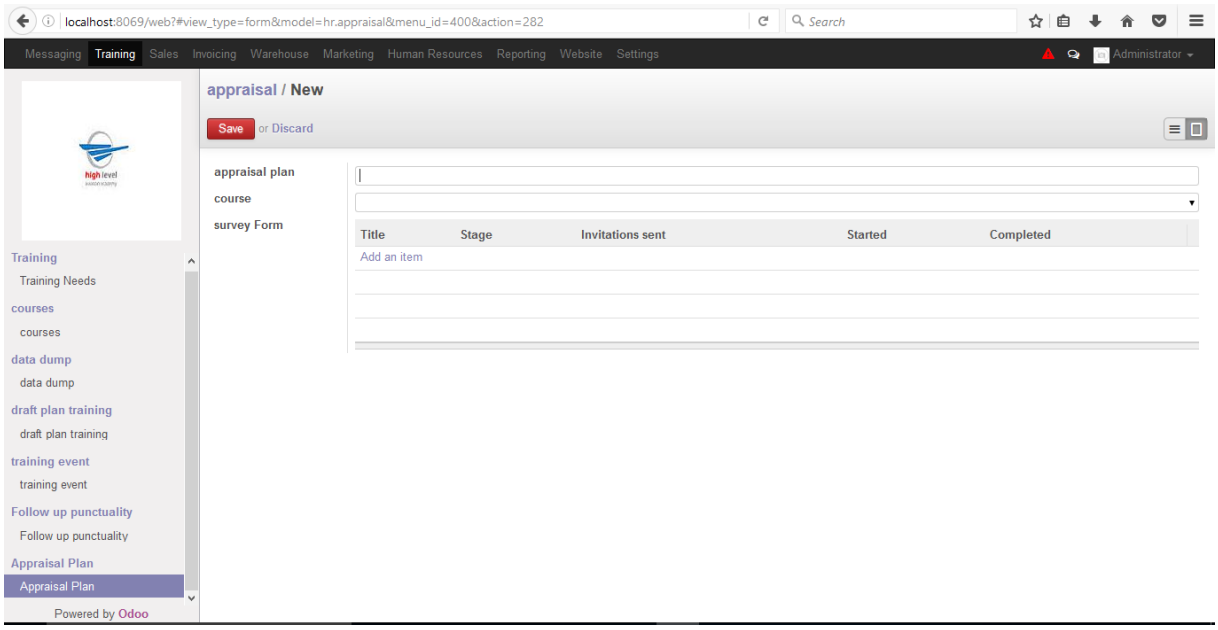


Figure (5.6) The Appraisal interface.

DESCRIPTION:

The training administration team make appraisal form and send it to all employees who complete target course.

The appraisal interface includes:

- Name of appraisal plan.
- Course which appraisal for.
- Survey form (title of survey, stage, invitation sent, started and completed)

After the survey form completed, the training administration team will send it to employee to answer it and return it to them to calculation the feedback of the course.

CHAPTER SIX

RESULTS AND RECOMMENDATIONS

This chapter includes the result of the research, recommendation and conclusion.

1.17 RESULT:

- linking Training module with ERP system.

- Training Courses assemble and develop the annual plan for training.
- Employees nominated by their superiors to join training courses.
- Training Unit provides a questionnaires based on the courses, and send them to employees who enrolled in the course.
- Extract reports to follow up the training plan.

1.18 RECOMMENDATION:

To make this system more reliable and provide attractive services we recommend doing some tasks:

- Complete the work on the evaluation section, and follow-up improvement in the places of deficiencies inferred from questionnaires.

1.19 CONCLUSION:

A system had been developed to management all training processes in one system (requesting for courses, Approval of Courses and Evaluating Courses) by using OpenERP System. The main idea in this research is solving the problem of Management of training and trainee’s data automatically and securely. The system has been done to develop a yearly training plan, specify courses information, then produce a questionnaire to all trainees who involved in that course to see the result of the Training Course.

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APPENDICES

APPENDIX A:

Explain Figure	Name Figure	Figure

An actor is anything outside the system that interacts with the system to complete a task.	Actor	
Each use case on the diagram represents a single task that the system needs to carry out.	Use Cases	
A system components	object	
It is usual to display use cases as being inside the system and actors as being outside the system.	boundary	

1. **EXPLAIN FORMS UML**

Figure (A.1) Explain form UML

2. **UML RELATIONSHIPS**

Explain Figure	Name Figure	Figure
The association is the link that is drawn between	Associate	

actor and a use case. It indicates which actors interact with the system to complete the various tasks.		
Use the includes link to show that one use case includes the task described by another use case.	Include	
Use the Extends link to show that one use case extends the functionality of another use case at specific Extension Points.	Extend	
A self-message can represent a recursive call of an operation or one method calling another method belong to the same object.	Self-massage	
The sender sends the .message	Message	

Figure (A.2) UML Relationships