

Toward Enhancing Educational Schools Performance Using Open ERP System

***Rasha Mohammed Alolayan¹ and Prof. Ahmed Zayed M. Emam²**

^{1,2} King Saud University, College of Computer and Information Science, Information Systems Department, Kingdome of Saudi Arabia, Riyadh

*Corresponding Author Email: rmso2006@yahoo.com²



Corresponding Author

Rasha Mohammed Alolayan

King Saud University, College of
Computer and Information
Science, Information Systems
Department, Kingdome of Saudi
Arabia, Riyadh

*Corresponding Author E-mail:
rmso2006@yahoo.com²

Abstract

Most of the learning schools understand that it is necessary at times they should incorporate an Enterprise Resource Planning (ERP) for the management of the educational schools. It refers to software that facilitates the integration between the different areas of a company: billing, finances, accounting, Human Resources, manufacturing, supplies, purchases, customer service, quality, etc. The educational centers, as a company, have chosen to adapt to different ERP standards of the market, have developed their ERP, or have opted for the exploitation of different modules to manage the different areas of the educational center. In the current study, different ERP modules were discussed to enhance the performance of the educational institutions management systems. A methodology was developed to create the new strategy to replace the old systems of record keeping and the manual procedures that come with the same and the introduction of an online software system will surely provide transparency and reliability in the school procedures. The proposed strategies have a positive impact on the performance of the institution. The feedback of students and teachers regarding this new system implementation was very positive and it showed promising avenues for the future work. We were able to enhance the open educational source system (OpenEduCat System) because the current research in this project helps to illustrate the technological advances in the administrative and academic parts of the school that have changed the way in which the institution operates as an important part of a decision making strategy. ERP systems make it possible to adapt to the company's needs and automate procedures, enhance decision-making at a lower cost, allowing advantages to be achieved before the competition as it manages and organizes various processes, thereby achieving greater efficiency in them. This small innovation in the institution will influence the human factor and the institution's organizational culture, where it indicates that open and accessible learning is strongly implanted in the schools context and constitutes the highest educational exponent.

Key words: Enhancement, Educational Schools, ERP.

Introduction

Open ERP (formally Odoo) is a complete open source business management system (ERP) without cost of licenses that covers the needs of companies, supports multiple companies and accounting, based on the integration of functional domains in organizations, incorporating document management functionalities to streamline collaboration between departments and teams in companies, allowing to work remotely through a web interface from any computer connected to the Internet (Antero, 2015). The school, as a whole, consists of many different departments. All these departments are supposed to maintain their data. The process of keeping this data by the school will, therefore, prove to be hard and technical and infiltrated with risks of data redundancy and possible loss of the data, some of which are very confidential and of high importance. This ERP system is mainly focused on the storage of data and the reduction of the risk of loss of sensitive information. It is also focused on the reduction of paperwork. The system can also be programmed in a way that it notifies every member who is subscribed to the same of possible updates that have happened in the system.

Now Odoo has partners in over 100 countries and more than two million users. Fabien's goal is simple - to provide affordable, easy-to-use, open source and integrated business software so companies can focus on growing their business rather than running it.

A June 2009 edition of Trend Tendances magazine wrote of Fabien, the "New Bill Gates is Belgian". In addition, Fabien has personally and on behalf of Odoo received several awards for business, technology and innovation including:

- "Instead Innovator Prize of the Year (2011)"
- "Trends Gazelle BW (2013)"
- "Deloitte Fast 50 (2012)"
- "Bossie Award (2012)"

More information here's:
<https://www.odoo.com/page/fabien-pinckaers-biography>

The prime benefit of Odoo is its extensible architecture. A large number of freelancers and organizations develop Odoo Apps or Modules and place them in the marketplace for sale or to be downloaded for free. The main Odoo components are the framework, about 30 core applications (also called official modules) and more than 20000 community modules. Most Odoo modules are available in Odoo S.A's marketplace where community could buy or download many modules for free. As per 9 July 2018, 15759 Apps or modules were found on the marketplace in different categories. Most modules are served in all active versions of 10.0, 11.0 and 12.0.

Significance of IS (Information System) Field

Information System (IS) field can be defined technically as a field of interrelated components that allow capturing, processing, storing and distributing information to support decision making and control in an school. The organization requires information, among other things, to control its activities, make decisions, create new products and services, and evaluate expansion possibilities. To produce the required information, the information systems carry out 3 processes.

Information Systems can be informal, which are governed by agreements and norms not established. They can also be formal, based on standardized and previously protocolized procedures. They can be classified into computer-based or manual methods. If they are manual, they often use pencil and paper to develop their activities. If they are computer-based, they use all the hardware, software and telecommunications technology, as well as the constant study and update in Information and Communication Technologies. It is important to bear in mind that information systems have a classification that makes them particular and positions them within an organization. Academic Management Systems It is a set of tools and processes that facilitate the implementation of value-based management. These systems provide an integrated and real-time view of information on school performance through management structures that allow those responsible for school management to evaluate and improve the school value Crook, C. (2018).

In the breadth of data volumes handled by academic organizations are answers, answers that academic management systems found in the data warehouse of the organization. Normally, these management systems focus on the information of the teachers and isolate in some way the information of the students, leaving aside their main clients. In addition, these systems are not integrated to the other functions of the educational organization.

Importance of the problem

The online system keeps every member of the school updated on the day-to-day developments. The problems that existed in the former mode are now being overcome by this new system. The system is modeled and created in a way that it suits every role. The following are the most important roles:

A. Students

In this model, the students are able to easily change and update their profile. The student is also able to view different notifications that appear on the system view any current and upcoming school event and see their own attendance record.

B. Staff

On the system, the staff is able to effectively edit their profile. The staff is also able to update the system on the information containing different students, post notifications and also request for time off from work.

C. System administrator

The system administrator is able to add information in the system about the school's staff and students at large. The administrator is also able to add any new information regarding the school in the system.

D. Training and placement officers

The main function of the placement officer is to place students in the school. This system goes a long way in easing the work of the placement officer for they are able to effectively add and review the students profile and the profile of other companies that are interested in different contracts with the school.

Comprehensive Open Source ERP for Educational Institutes

Open Source Online Cloud Based Educational Management System for University, College & School (<https://www.openeducat.org/>)

Higher Education ERP Systems

Get the best higher education ERP systems for your business. Compare product reviews, pricing below. Read our buyer's guide for more help (<https://softwareconnect.com/higher-education-erp/>).

School Motivation

The school managers and owners want to motivate faculties of school to enhance the educational processes inside the schools. Traditional classroom teaching alone cannot motivate every student. Given that children love entertainment, inspirational movies are an effective and easy medium to motivate them.

Teacher and parent might understand this system very well. It is essential for students to feel affection towards learning. It is not difficult to screen a movie today. We have smart classrooms with projectors and screens. Here are some good inspirational, educational Hollywood & Bollywood movies that can motivate students from schools and colleges alike. These teach students the value of hard work and proper education. But with system and good of educational processes which can be achieved if we manage all of activities systemically, can help the teacher and school management motivate students for better reputation for this school, By OpenEduCat will manage the student activities for Motivation

- Let's start with login

Main goals

As mentioned the school manager want to handle a number of big data to achieve, they should use the ERP system based on cloud and web application so the best choice is Odoo, with following objectives and goals:

- Handle big data.
- Deploy new software.
- Easy accessibility for software.

This system is aimed at replacing the old methods of record-keeping, and the manual procedures that come with the same and the introduction of an online software system will surely provide transparency and reliability in the school procedures. This work includes the improvements to be made in Higher Education through an increase in performance and efficiencies in administrative functions by applying a process approach, which is intended to be carried out through an information system and, in particular, an integrated management system. Finally, it will improve the functions associated with operational, tactical, and strategic tasks.

Requirement Reengineering

Project Requirement Analysis

# ID	Functional Requirement	Software Module(s)	Verification	Additional Comments
R1.	Record Student information	EduCat Student information	In student form View	(Name, Address, Birth date, Nationality.... Etc.)
R2.	Track Student Expenses	EduCat Student information	In student form View	
R3.	Define parents for students	EduCat Student information	In student form View	
R4.	Define Subjects for student	EduCat Student information	In student form View	
R5.	Define grades for student	EduCat Student information	In student form View	
R6.	Acknowledge health details for students	EduCat Student information	In student form View	
R7.	Record and define assignments for students	EduCat Student information	In student form View	
R8.	Track Student library membership	EduCat Student information	In student form View	Track membership expiry date
R9.	Track activity log for students	EduCat Student information	In student form View	Track list of school actives for each student
R10.	Show list of student in different view (Kanban view, list view)	EduCat Student information	Students apps	
R11.	Define Parent for each student	EduCat Parent	In parent form View	
R12.	Assign parent for students	EduCat Parent	In parent form View	
R13.	Assign more than one parent for same student	EduCat Parent	In parent form View	
R14.	Manage and record admission registers	EduCat Admission		
R15.	Able to record admissions applications	EduCat Admission		
R16.	Able to submit admissions applications	EduCat Admission		
R17.	Able to confirm admissions applications	EduCat Admission		
R18.	Able to manage admission analysis reports Able to print PDF	EduCat Admission	Manage per registers application or per date (From – To)	

	report			
R19.	Able to record attendance Registers	EduCat Attendance		
R20.	Able to Track and manage attendance sheet	EduCat Attendance		
R21.	Able to analysis attendance per student for each grade or courses	EduCat Attendance		
R22.	Able to configure exam room	EduCat Exam	Define each exam per room	
R23.	Define exam type	EduCat Exam	Midterm , Final and monthly	
R24.	Manage Student Hall tickets	EduCat Exam		
R25.	Able to Print Hall tickets for each student	EduCat Exam	Print Hall Ticket with student photo	
R26.	Define Exam sessions	EduCat Exam		
R27.	Define exams	EduCat Exam		
R28.	Manage attendees of exams	EduCat Exam		
R29.	Manage mark sheet for exams	EduCat Exam		
R30.	Manage exams results	EduCat Exam	Result analysis Line	
R31.	Record Library card for each student	EduCat Library		
R32.	Manage issue date of Library card	EduCat Library		
R33.	Manage borrowing duration and penalties	EduCat Library		
R34.	Define Media type and authors (books)	EduCat Library		
R35.	Manage Media (books) queue requests	EduCat Library		
R36.	Manage Media Purchase requests	EduCat Library		
R37.	Manage Media Movements	EduCat Library		
R38.	Able to Record Subject Registration (SR)	EduCat Facility	Get button Subjects	
	Submit Subject	EduCat Facility		

R39.	Registration (SR)			
R40.	Approve Subject Registration (SR)	EduCat Facility		
R41.	Reject Subject Registration (SR)	EduCat Facility		
R42.	Define Classroom	EduCat Classroom	Set Capacity for each classroom	
R43.	Relate Classroom with assets management	EduCat Classroom		
R44.	Website for school management system	Web OpenEduCat		
R45.	Define Fees Terms	EduCat Fees		
R46.	Track Student Fees	EduCat Fees		
R47.	Get analysis report for student's fees	EduCat Fees		
R48.	Related Fees management with accounting and finance Department			
R49.	Able to Create assignment for each batch or course	EduCat Assignment		
R50.	Define reviewer for this assignment	EduCat Assignment		
R51.	Able to submit assignment online through website	EduCat Assignment		
R52.	Able to define assignment type a	EduCat Assignment		
R53.	Parents can view student assignment online	EduCat Assignment	Through website ducat module	

Table 1: Current commercial and open sources adapted Systems

Educational institutions	Open ERP system	Model of Implementation	Measurement of Performance	Limitations of the System	Terminologies
Coimbra University	Odoo Open ERP Education Management System	<p>All the educational institution's systems are consolidated into this Odoo ERP, including but not limited to the library management system, attendance management system, student database management system, employee details, and fee details.</p> <p>Think Open, who also provided training to the users, especially the campus IT staff, did the implementation.</p>	<p>Savings on time and investment.</p> <p>Return On Investment (ROI) and feedback and reviews from the users.</p>	<p>Over-customization of the Odoo open ERP, which brings negative outcomes instead of the desired results.</p> <p>Customization consumes the time and energy of the IT team because of the perceived expectations that they should always work on the program to achieve its full potential.</p>	<p>Proprietary software- these are software that was used before the open Enterprise Resource Planning.</p>
American Indian College (AIC)	Cams Cloud open ERP	<p>Cam Cloud is installed via the software-as-service (SaaS) model, which is a cheap mode of implementation of all ERP systems. Developed Cams Cloud as a user-friendly that totally integrates all academic activities of educational institutions under one system including but not limited to, student registration, billing, admissions, financial aid, fundraising, student information and services, human resource management and employee payroll.</p>	<p>Return On Investment (ROI), efficiency and productivity, feedback, and reviews from the users.</p>	<p>The college needs a backup database to store its sensitive information to avoid privacy issues due to the leaking of information. These backup systems are costly to operate, provided that most of the operations are done through the Cams Cloud ERP system.</p>	<p>Cloud-based- this means that the ERP connects the users in the organization through an external server that is managed by the IT vendor or provider.</p>
Oklahoma State University	Ellucian Banner	<p>Initially, the system was implemented with features that enabled the students to apply for admission, register, and enroll for classes, and verify their financial aid status. The university later implemented Ellucian Portal, Ellucian Mobile, Banner Data Defense, and Banner Financial Aid.</p>	<p>Time and costs metric, Return On Investment (ROI), and feedback and reviews from the users.</p>	<p>It requires periodic review by ERP consultants who are expensive to hire. Reports suggest that almost 60% of the maintenance budget is taken by this consultation.</p>	<p>Advisors- these include class instructors, professors, and deans of students.</p>
Lynchburg College	CampusNexusERP system	<p>Lynchburg College embraced this system as a change in its annual strategic plan of improving operational efficiency.</p>	<p>Return On Investment (ROI) and feedback and reviews from the users.</p> <p>Evaluation by ERP experts.</p>	<p>The decrease in efficiency when the quality of data is poor or lack of sufficient quantitative data.</p>	<p>LinkedIn- this a social website that allows people to interact based on their academic profile and job status.</p>

<p>Southwestern Community College</p>	<p>Jenzabar EX ERP system</p>	<p>The system was expected to meet the desired growth needs, and Southwestern Community College adopted its module after module. Jenzabar EX ERP software is also cloud-based, meaning that the system administrators can easily access the program anywhere and anytime.</p>	<p>Return On Investment (ROI) and feedback and reviews from the users.</p>	<p>This system has a user-friendly dashboard, but beyond it, the program becomes complicated. Sorting of information is technical and only trained users who can benefit from the actionable data.</p>	<p>Imports and Exports- in ERP, these words mean transferring data to or from one program to another. For instance, from Excel to Jenzabar EX ERP system.</p>
--	--------------------------------------	---	--	--	---

Literature Review

The ERP system is an information system that is ably combined with other advanced factors such as management thoughts and instruments. This has prompted the National Informatics Center to develop an exact system that will be fixed in the schools, both public and private, to keep track of every student and regularly update their profiles and data (Chaushi, Chaushi, & Ismaili, 2018).

Information that will be stored in the student's portal include their details, their access or lack thereof of financial aids and scholarships, their academic reports and the trends in their students, their fitness records, the achievements they have attained at the school, the regularity of attendance to class lessons and participation in other activities, their economic status, their family backgrounds and a variety of other information (Naser & Zaqout, 2016).

The system is in conjunction with the ministry's needs to go paperless. This vision is to be implemented within the next two years. In order to achieve this vision, the institutions, together with the ministry will create a database that every student's information will be stored. The system will have the students' mark sheets available online and through digital means, together with other appropriate identification details (Masa'deh, Shannak, Maqableh, & Tarhini, 2017).

This will have the overall effect of authenticating student's details whenever the information is needed, say during work interviews, and it will also simplify the process of enrolling and admitting new students into schools. The ERP as an open-source tool worked with modules allows to include or eliminate functionalities that are required by the institution, with this we can adapt to our educational needs and provide a better service, this business resource planning system (ERP) It can be referred to as a management information system, automating and improving business processes in our case in higher education associated with the control of educational activities (Mishra & Kar, 2016). Table 1 shows the most important points in the scientific institutions that used the open education system.

The Need for Open Source ERP in Education

Schools in general, such as schools, colleges, institutes, academies, faculties, business schools, universities, are currently facing certain common problems that until a few years ago, they did not have. Technological developments and new educational formulations facilitate the transit of old management systems to the use of specialized software platforms to manage, protect and find the necessary data or information at the right time. This type of management software has been used successfully in the business world for a couple of decades and is generically referred to as "enterprise resource planning systems" (ERP) (Schindel, 2018).

An educational ERP platform integrates the management of the multiple activities that today's colleges and universities carry out, to name a few, the information of students, teachers or teachers (classes, assessments, cost time, time availability and time of displacements, programs, competencies, consultations, evaluation of teaching performance ..), staff, administration (planning, educational programs, management of the faculty and staff of the center), communication, control of teaching processes, financial and accounting management, logistics tasks, class calendar, careers, subjects, exam qualifications, document management, reservation of physical spaces, equipment maintenance, extracurricular activities, languages, dining rooms, vehicle or school bus routes, online education (digital campus), etc. (Kattimani & Mallinath, 2017).

How does an ERP platform benefit an educational center, college, faculty, or university?

The general objectives of this type of platform are the simplification of processes, the automation of tasks, the empowerment of teachers, the promotion of parental involvement and the greater participation of students in academic and extra-academic activities. But more specifically:

- **It improves the organization:** first, the huge volume of data or information they manage increases exponentially. An ERP avoids delays and many problems in finding and maintaining files and documents. Remove paper almost completely.
- **The satisfaction of staff, teachers and students:** An educational ERP streamlines information and makes it available to authorized personnel. When management flows, the staff can focus on their work (removing many unnecessary concerns) which gives confidence, self-esteem and personal satisfaction.
- **Profitability:** The time, effort, and money used in printing or photocopying of documents, books, evaluations, titles, folders and files are minimized. An ERP stands for scanning, and it does not consume physical storage space. The documentation does not deteriorate. Documentary files are kept with several backup copies. It also helps to optimize the human resources of the educational center (Pawar, Geet, Sonawane & Barhate, 2015).
- In the case of free, open-source applications, profitability also comes from not having to pay licenses for the use of the software. Surely, if they will have to pay the other common costs in this type of software such as the costs of implementation, customization to meet the particular needs of the educational center, monthly payment of the server where the software is implemented, maintenance and security, training of the employees they will manage the platform and some other expense. In any case, the price will be much lower than that of proprietary software.
- **Management automation:** Management automation helps make better decisions, faster and with minimal human participation. For example, when the teacher scored the exams, the information on the grade or grade of the exam to the students was done manually and, sometimes, in person. With an ERP, the results can be digitally graded in a few minutes, and notifications can be sent to every student to their account (or email or SMS) and the administration of the center. This allows the information to reach those who have to reach and a documentary record of the entire process.
- **Faster responses:** Normally, schools take several days or even weeks to respond to a simple request. The reason for this is that they lack automated data management, which translates into a slower response. If the organization uses an ERP, the data will remain at all times in the eyes of the operator, and any decision or information retrieval can be implemented instantly.
- **Complex calculation skills:** some several decisions and calculations require a lot of analysis

and human effort. If the school wishes, for example, to recover the qualifications of some students of a class during the last three years, manually, you should investigate through several sheets of documents before you can conclude. But if an ERP were used, some queries would have to be executed in the system and the results will appear on the screen for a few seconds (Kulkarni, Hegde, Sharma, Kulkarni, Hegde & Sharma, 2015).

Main open-source platforms for university academic management

- Odoo ERP Education

Currently, the most advanced and complete ERP open-source on the market is Odoo ERP which is a modular suite that integrates functionalities (modules) for the management of all types of companies, including complete financial management, accounting, purchases, sales, collections, payments, fixed assets, manufacturing or manufacturing, stock, inventory management or control; warehouse or warehouse management; Projects management; integral management of purchases, sales, marketing; customer relationship management or CRM; electronic sales order management - EDI; mobile solutions for sale and presale; call center sales web integration; Online shop; POS or POS points of sale; marketing management, complete analytics or BI Business Intelligence, HR management; Document management and automatic storage of orders, delivery notes, electronic invoicing, etc. Odoo ERP competes in the business and institutional market with software developers such as SAP, Microsoft Dynamics, Oracle, and SAGE and is used by companies such as Boeing, Danone, Toyota, Hyundai, and thousands of colleges and universities around the world. Along with this, specific vertical sectors modules have been developed, for example, education sector (schools, colleges, faculties, academies, universities, business schools, and research centers), health sector (clinics, medical centers, and hospitals), construction sector, financial sector, engineering and projects, food, automotive, etc. As it is a modular structure, in the process of implementation, the service modules to be used and implemented must be selected and, on the other hand, the specific vertical module, that is, the module to form the educational or academic center. There are several modules developed for this sector that work perfectly well within this powerful ERP. They are many hours of consulting and development but well implemented; the result is very satisfactory. Also, Odoo ERP can be integrated through modules with OpenEduCat which, as explained a little later, is a high-level open source educational platform, one of the most efficient in the market (Anand, Poojary, Mondal, Prajapati & Pal, 2017).

Pros and cons

The education sector is perhaps one of those who have most accused the technological change of recent years. That is why the concepts of ERP applications and education have been related for some time. But what benefits are derived from the use of ERP systems in the education sector?

- **Cost reduction:** Contrary to what it might seem when you invest in an ERP program, you are saving time in the medium to long term to carry out administrative procedures, etc.
- **Data security:** The data is stored on the ERP servers (either in the cloud or on physical servers), and periodic backups are made that guarantee the best preservation of the center's data.
- **Improvements in administrative automation:** General increase in the efficiency of the most common administrative procedures in training centers (enrollments, payment of fees, etc.).
- **Reduction of time spent by teachers in attendance control and assignment of grades:** Because the priority of the training centers must be precisely education.
- **Better organized information:** Using an ERP, you can organize all the information about the center in a simple and accessible way.

However, ERP systems entail a series of drawbacks that should be taken into account before launching them into an educational center: Every ERP system involves an investment, both economic and time, for its implementation, personalization, and insertion of data. Therefore, it is interesting to assess these aspects before deciding to start working with an ERP. It may not be easy to understand the operation of an ERP program at first, which is why users should spend enough time to use them efficiently and easily. That is why it is recommended to study the specific case of each center, analyze their real needs along with both economic and resource possibilities, to ensure that such an important and significant step in the way the center works make with all possible guarantees of success in the implementation of an ERP and thus open a new stage for technological evolution (Anand, Poojary, Mondal, Prajapati & Pal, 2017).

Research Gaps

Recent studies in deep learning-based intrusion detection achieved promising results. However, deep learning approaches shortened to cover intrusion detection in several domains. It is thus necessary to revisit the IDS problem in the emerging domains, such as IoT platforms. Extensibility to different domains requires a dataset that truly reflects the targeted environment and achieves better results. This research investigates the applicability of deep

learning approaches for the IoT environment and evaluates the proposed solution using Bot-IoT dataset, an IoT intrusion dataset released in mid-2018. “

The proposed Methodology

This section provides a detailed description of the methods and tools used to carry out this research in order to achieve its objectives. Basically, in computing, scientific research methodologies are broadly categorized into theoretical, experimental, and simulation methodologies. This research follows experimental methodology to evaluate the effectiveness and efficiency of the ERP in school performance.

To answer the research questions, this work is divided into three major phases. First, before building the, is conducted. Second, the experimental part that involved building the anomaly detection models is outlined. Then, the metrics used to evaluate the models performance are presented. The major phases of this research methodology shown in Fig. 1.

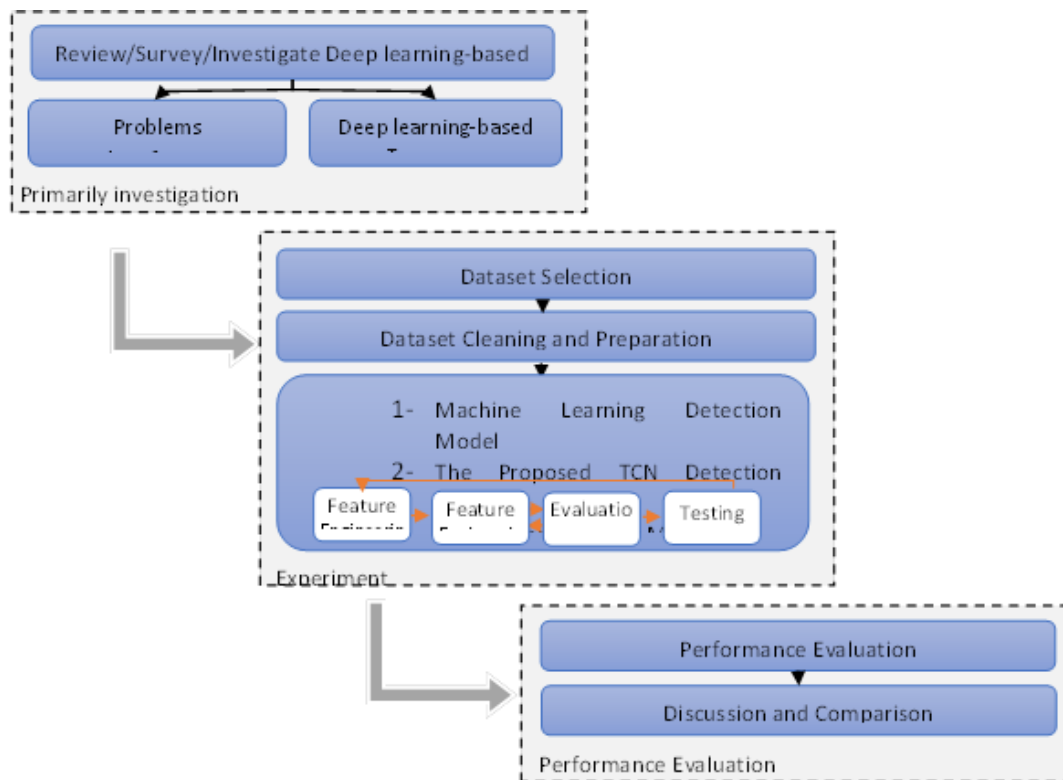


Figure 1: The Proposed methodology

The development of this ERP project within the school has been increasing according to the needs of the institution and focused on an investigation with qualitative and quantitative approaches, for which the administrative population and teaching staff of the school was considered. In this research, different modules of ERP systems are studied to make innovations and improve the system for more benefits.

The proposed system aims to study the current situation of the school system. Besides, to make the necessary improvements and changes to enhance the existing educational process. This change will help all parties that are involved in the existing educational process. The proposed ERP system is mainly focused on the storage of data and the reduction of the risk of loss of confidential information. It is also focused on the reduction of paperwork.

The system can also be programmed in a way that it notifies every member who is subscribed to the same of possible updates that have happened in the system. This system is aimed at replacing the old methods of record-keeping, and the manual procedure that comes with the same, and the introduction of an online software system will surely provide transparency and reliability in the school procedures.

The OpenEduCat is the most popular for all types of schools including universities. Open source ERP Solution has lots of benefits. The system designed to be used friendly and easily. It can be used in any device such as mobile, tablets and or Pc. The system can be used by the teachers, the students and the parents. The system is helping more than five hundred thousand users around the world, in forty five countries in sixty five languages with more than three hundreds plus modules. In short, the OpenEduCat can offer any school and or users to simplify, automate and balance everything right from curricular coherence, creating and sharing meaningful experience in real contexts mentoring and creating a structured way of combined all needed activities. In addition, it communicates and handle everything to achieve the school goals.

ODOO Educational use

Odoo has been used as a component of university courses. A study on experimental learning suggested that Odoo (then known as OpenERP provides a suitable alternative to proprietary systems to supplement teaching. Odoo also offers a completely free Module called Odoo Education, which allows teachers and/or students to create an Odoo database for academic purposes. In 2019, Odoo launched its e-learning platform and a business game

named 'Scale up' that his distributed for free to teachers and students.

For more installation methods check the below link: (<https://www.odoo.com/documentation/11.0/setup/install.html>)

Odoo Releases History

There are multiple ways to install Odoo, or not install it at all, depending on the intended use case. For example:

- **Online:** The easiest way to use Odoo in production or to try it.
- **Packaged installers:** Suitable for testing Odoo, developing modules and can be used for long-term production use with additional deployment and maintenance work.
- **Source Install:** Provides greater flexibility: e.g. allow multiple running Odoo versions on the same system. Good for developing modules, can be used as base for production deployment.
- **Docker:** If you usually use docker for development or deployment, an official docker base image is available.

Performance Enhancement

OpenEduCat is an open ERP system, providing modules that cover the major needs in educational school process and cover most of intended user's requirements. Figure 2 shows the modules of OpenEduCat system. Questionnaire was prepared and interviews were conducted with different types of real users (Table 2). After we had the interview with the school and obtaining all the important requirements suggested by them for improvement, we were able to enhance the open educational source system (OpenEduCat System). On Dec 1, 2019, we had to visit the school again to discuss what has been enhanced and to receive their comments on such enhancement using the open-source educational system (OpenEduCat System). Their observations were as follows:

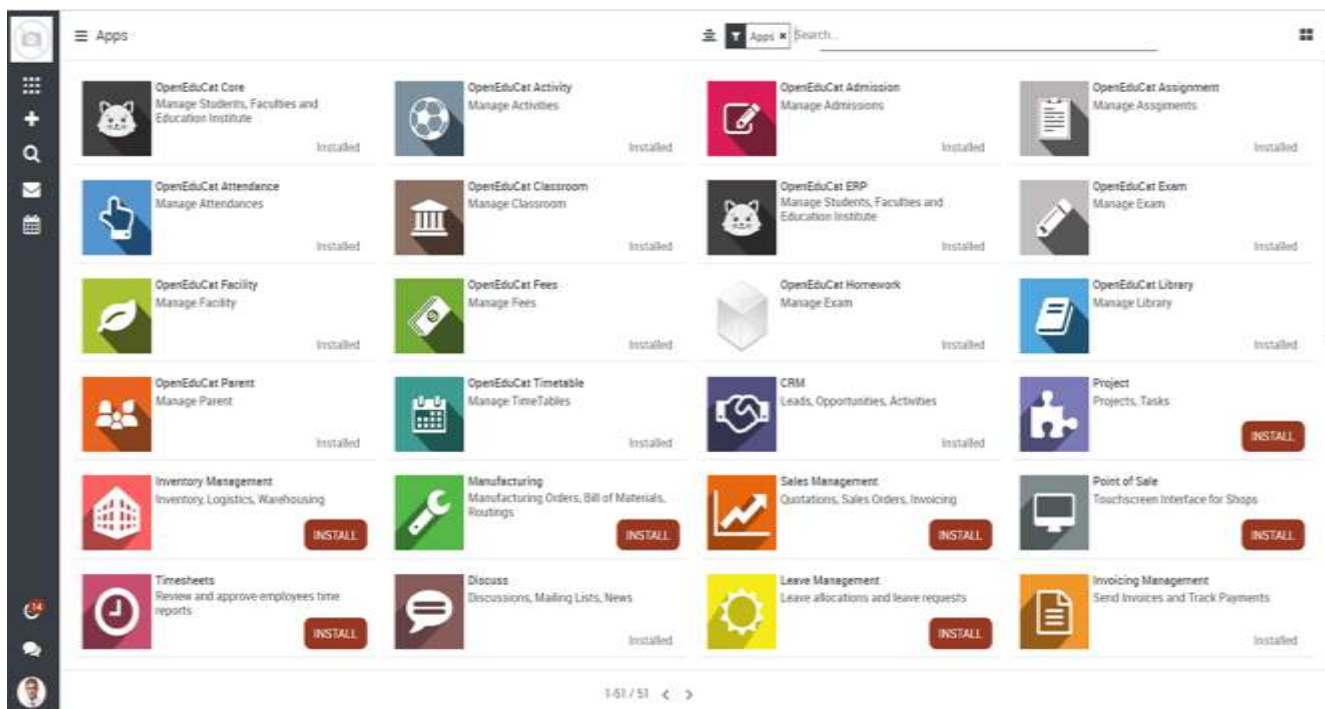


Figure 2: OpenEduCat Modules

Table 2: Purpose, Scope, Background, References, Constraints, Assumptions

Purpose	Our main purpose is providing readable and effective requirements that play major role in enhancing the process of OpenEduCat according to previous investigations and study.
Scope	List of new requirements and validations over the existing OpenEduCat modules.
Background	Educational schools process and Odoo knowledge is important to accomplish correctly.
References	All references are listed below.
Constraints	We are constrained by current OpenEduCat business flow. However, we were able to enhance the required needs without changing the core modules.
Assumptions	It's considered as an open source and we are free to edit and update existing or new modules legally.

There are a lot of main benefits of the developed system performance as mentioned below:

- **Access School Data in Real Time:** It is great that we can get all the history of our students within a minute. At present, within a few seconds, we can get all the information needed on a computer screen.
- **Decision Making:** Knowing everything about our students, teachers, assistants, student classes, subjects and students' grades, their rates, how they receive their courses, and the level of understanding it all helps us to make a good decision related to any aspect, as mentioned. This is only if we have these data registered and updateable inside the system.
- **Admission Cycle:** How many times, parents come to school and get rejected only because there is no capacity, sometimes they deserve to join the school according to different factors, like, for instance, the geographical location, grades, and interests.
- **Data Security:** It's very important to save and secure our staff and students' data; for sure, the system helps to obtain and maintain this process better than manual papers and documents.

Transportation: The current system was not including the transportation module. Our transportation module will save almost 70% of the manual process. Through the transport unit, we can do it easy for the school to record all the information related to the drivers, buses, transport points with time and prices. Therefore, once the parents sign in to the system, they can access the given information and can know the number of seats available to be able to register their children accordingly. Figure 3 shows the overall look of EMS module.

Enhancement System Modules

OpenEduCat consist of several modules, as well as the enhancements, included new modules and screens.

EMS Module: School Configuration

Adding a new feature by linking multiple schools together in the system. It will help to share knowledge and information about each practice, and the researches done regarding the process enhancement, even the case studies related, will be shared among the different schools. Maybe it seems small feature, but it's powerful in the process of enhancement, suppose you are tracking the progress of students for one school by knowing and understanding what is going on, for instance, in one subject.

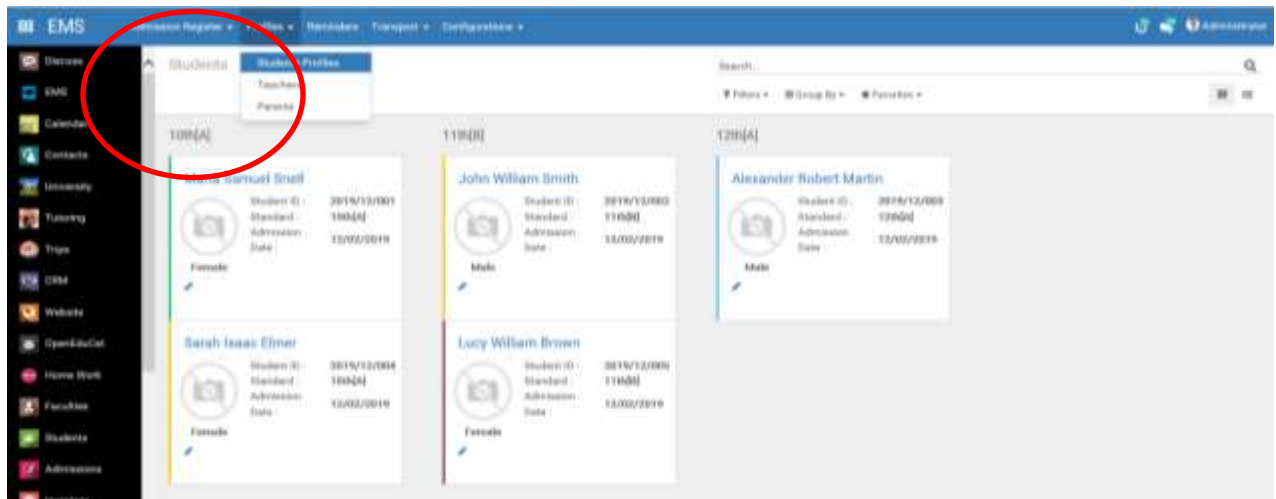


Figure 3: Students / Teachers / Parents (Profile)

Student Module: The student module mainly contains much information related to the student himself, but the enhancements were made included adding medical history and issues for each student as recorded data. These requirements will help us a lot, especially in the case of student injury. It will help us figure out the situation and find a temporary solution by using first aids before the

ambulance come. Also by adding a new function to the student's profile called my bag to let the student save his attachments, will be very useful in reducing the paperwork and help students to collect their personal attachments and get to it easily any time, any place they want. Figure 4 and 5 shows the old and new look of student module respectively.

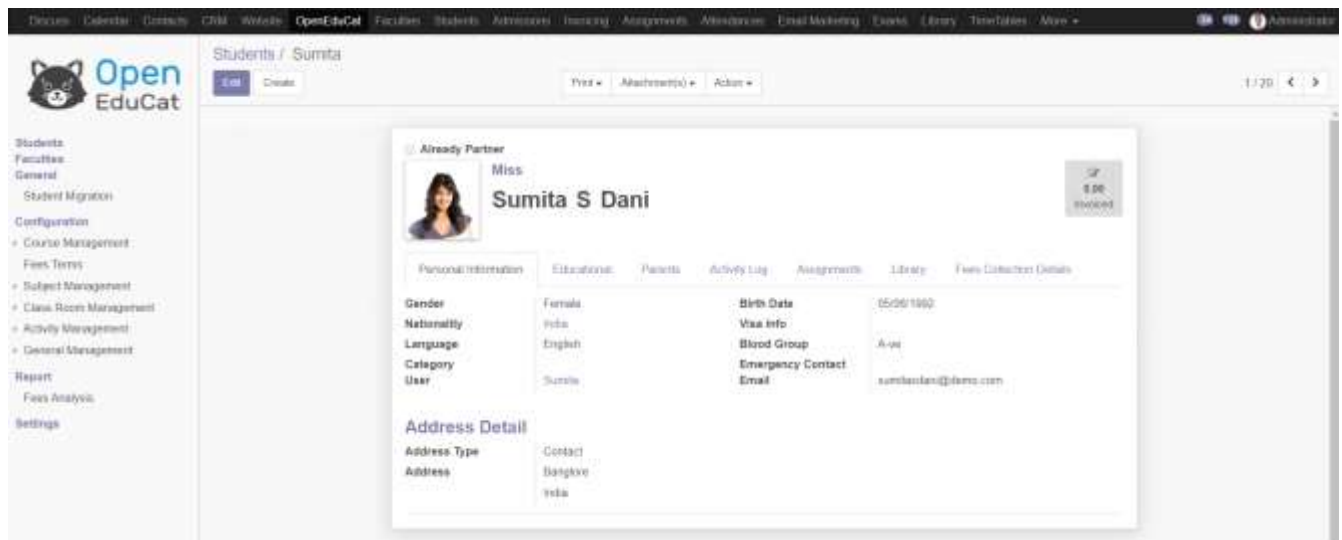


Figure 4: Old Student's Profile

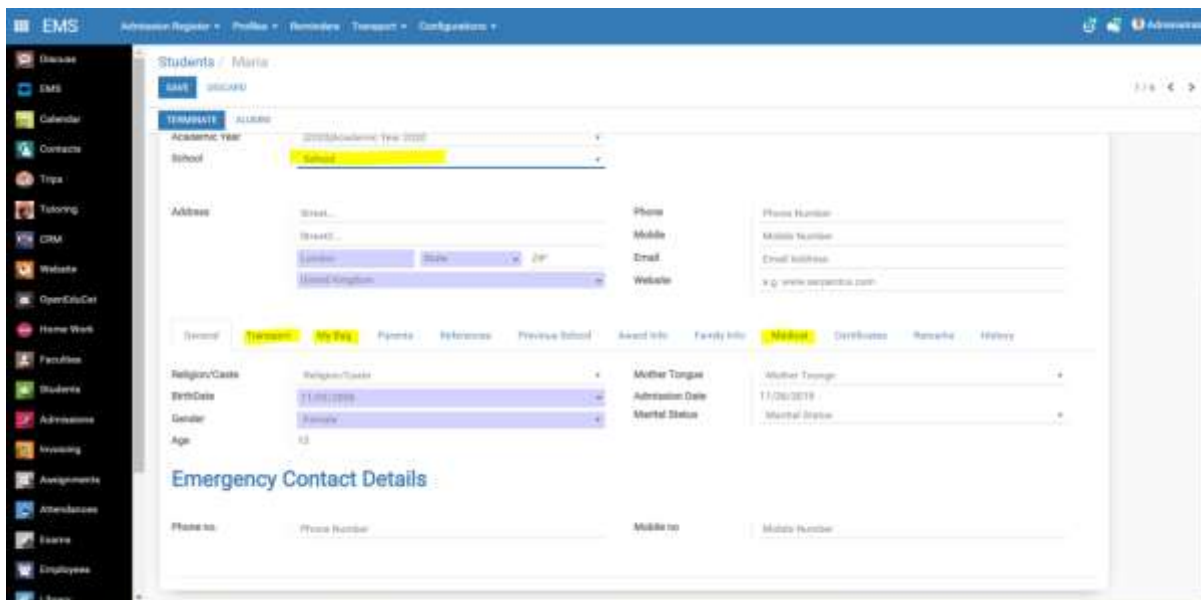


Figure 5: New Student's Profile

Attendance Module: The OpenEduCat system attendance module is very useful for managing the students' attendance. Moreover, the enhancement that was done in the module will save the parent's time and removing the stress of losing points for students in case of absence. Further, there will be a better absent record for each student. Students are usually absent due to circumstances that may be beyond their control, but parents must explain why their children are absent. Therefore, the enhancement developed the absence module and made it possible for parents to enter the attendance file of their children and attach the reason for the absence without the need to come to school. Further, this will also enable them to monitor the presence of their children, where they will receive a message immediately after their children's absence.

Homework Module: Homework is very important to determine the level of knowledge accomplished during class. Therefore, it is necessary to attach the homework electronically instead of doing them manually. This will save printing more documents and distribution efforts.

Discussion and Chatting Area Module: Admin, parents, students, and teachers from different schools will be connected to gather; this will increase the amount of knowledge that students could have.

Tutoring Module: Many students may need tutoring; however, other students have the ability to help their friends at school and clarify difficult points. This will develop students' social communication and cognitive abilities. Hence, the system notifies students who need

private lessons so that they do not miss the opportunity. This is a great thing to have.

Trips Module: Social life is important in communities such as schools, universities, and even in the workplace. Trips are part of the educational system. Also, consider part of the students' culture and the expansion of their thinking. Usually, schools organize trips manually. The school has to write a manual letter to be sent to the parents to get their approval. The information in such a letter most of the time is not enough for parents. Besides that, the manual process is wasting paperwork, time, and effort. So with this enhancement. Students can then register and get parents' approval. Parents can request to join the trip by writing any notes on the site and sending them to the school. This model will make it easier for students to join the trips, for the parents to request and see trip details. In addition, parents can give their approval or rejection easily.

Library Module: The enhancement of this unit by allowing the administration to add information about some books located in some well-known book stores in the same region will help students to access these books easily if they are not available in the school library.

Exam Module: The enhancement that was done in this unit by allowing parents to have a direct notification for all their child's exam grades will help parents monitoring their child's educational level and provide support and assistance to them when needed.

After Graduate Module (Universities Module): After graduation from high schools, most of the students don't know exactly where to go and apply for a suitable college

or university. They need guidance in advance. It is the responsibility of their parents, teachers, and school admin to explain the benefits and the main objective of each field they select to complete their university/college study. As long as their teachers know exactly their interests and skills, it's very important to show them the boundaries of options available for the next step. Without any constraints, here in this module, students can see a list of universities and colleges database filled by the administration staff to help students in their future path decisions.

Conclusion

The present research in this project allows showing the technological advances in the administrative and academic parts of the school changed the way of working in the institution as an important part of a strategy in decision making. ERP tools allow adapting to the needs of the company to optimize processes, improve decision making at a lower cost, which allows obtaining advantages before the competition because it controls and organizes different processes, thus achieving Greater efficiency in them.

At present, the system is working with different modules such as EMS module, attendance module, trips module, library module, homework module, tutoring module, university module, course management, and time table. This will allow the automation of processes; however, it is required to continue automating some services to achieve a total systematization in the educational part that will provide a better service to teachers, students, and the educational community in general.

Finally, this small innovation in the institution will not only allow us to adhere to the current free software technology but rather will influence the human factor and the organizational culture of the institution where it indicates that open and accessible learning is strongly implanted in the university context and constitutes a maximum exponent of education. Employees must commit to the change initiative and leadership that mitigates risks and resistances that the transformation of it can present.

By using ERP which stand for enterprise resource planning to handle all company / school resources with the efficient way of handling and success. The big challenge that company / School faced during the deploying and implementing an ERP system which is the human nature refuse / resist the changes. But more benefits of deploying and implement an ERP system. In general implementing a new software will give you more accessibility in your data also the below benefits or Advantages:-

- Improved Process Efficiency
- Accurate Forecasting
- Department Collaboration
- Scalable Resource
- Cost Savings
- Streamlined Processes
- Customized Reporting

- Increased Productivity
- Flexible Systems
- Data Reliability

There are multiple ways to install Odoo, or not install it at all, depending on the intended use case. For example: -

- **Online:** The easiest way to use Odoo in production or to try it.
- **Packaged installers:** Suitable for testing Odoo, developing modules and can be used for long-term production use with additional deployment and maintenance work.
- **Source Install:** Provides greater flexibility: e.g. allow multiple running Odoo versions on the same system. Good for developing modules, can be used as base for production deployment.
- **Docker:** If you usually use docker for development or deployment, an official docker base image is available.

Future Work

Its appearance was in the 50s for military use in which it was used in the complex tasks of military production and logistics, over the years it was adapting to what we know today as a business resource planning system. Currently, ERP implementation times have been reduced, global control over management has been allowed, and they are also adapting to new technologies such as cloud computing, Smartphone and software with services (SaaS). All to improve customer support, cost determination, efficiency and information management. But the question we have today is what will happen with this type of software in the future? The quick answer would be to say that ERPs have a hopeful future, but why? New features: more and more applications are being integrated into ERPs, such as CRM, SCM, POS, etc. All this to be able to manage all the data of the company (Anand, Poojary, Mondal, Prajapati & Pal, 2017).

- **Smartphone and ERP:** Their arrival on these platforms was more than obvious; the ease with which a company can be managed through a smartphone is a clear advantage for the future of this type of software.
- **Simplification:** ERPs are becoming easier and more intuitive, which makes their training shorter, saving the company's costs.
- **The cloud:** although at first it was said that this would be the reason why the ERP would disappear, it has not been that way more and more its integration into the software of enterprise resource planning is greater.

With all this, the ERP market is growing, not only nationally, but worldwide. The continuous improvements that they are having make ERPs more attractive, and the providers of this type of software constantly integrate improvements for better and faster access to data, not to mention the increasingly affordable prices, it is clear that in the future The question will no longer be if you have a WEB ERP but which one you have (Anand, Poojary, Mondal, Prajapati & Pal, 2017).

Today's digital businesses rely on all types of software to help them maximize their productivity and maintain their development in the most efficient way possible, from payment processing to business intelligence generation and customer interaction management. One of the most important is the enterprise resource planning (ERP) software, which has undergone major changes from the monolithic material requirements systems (MRP) to integrate, at present, all the essential processes to manage a company, allowing interpret All data to provide real-time information. Looking ahead, the ERP market shows no signs of slowing down. For example, the financial analysis firm Market-Watch predicts that the global ERP market will have grown to \$ 47 billion by 2022, representing an annual growth rate of 7%. Others are even more optimistic, as Statistics MRC forecasts that the industries will more than double in the next eight years, reaching \$ 74 billion by 2026. Several levers are expected to influence this growth, including cloud integration, improved data security measures or the integration of state-of-the-art technologies such as Machine Learning or Artificial Intelligence (AI).

Open ERP system is excellent system and from the finding of this research it will be able to enhance the usage of such system as follow:

Moreover, the Measurement Center for the Provision of Conditional Test can be part of the system and can link universities admission sections. The system can offer training courses to help students pass and or practice for the final test. Such system will allow the educational schools to send any requirements for parental approval. Last but not least data information about International Universities and majors and other important data can be accessed by any one of the students and their parents who will be allowed to use.

It is recommended that schools connect with famous libraries in Saudi Arabia so that these libraries are linked with the site and provide all the books with best offers that students need so they can purchase online, this well facilitate the task of buying books for students. Further it is also recommended that each student have a school entrance card which contains students' information with a bar code, by passing this card throw a time attendance machine SDK and toolkits, the system will be able to calculates students' attendance without the need for teachers' involvement in the process of punching in and out through the system to calculation of student attendance.

It is also recommended to have data migration process, since the students' personal information are added to the government database, we are supposed to consider this in the future work and create an integration module to link automatically without the need to add students one by one and waste time and effort. The system screens and modules are many; users need customizations as much as possible to focus on their needs as usual. We shall provide the user with the ability to customize their own screen in favorite options so they can access their daily screen easily.

Recommendations for Enterprise Resource Planning

An ERP system, also known as the "Enterprise Resource Planning System" of the English "Enterprise Resource Planning," aims to simplify processes and improve information management to produce and sell more. But is an ERP system really necessary in your SME? Can you take advantage of it when it comes to improving the management of your company? There are currently a lot of ERP systems on the market, which adapt to the needs of different companies, whatever their size and sector. In this sense, it is worth getting informed to choose the one that is most comfortable for us. It should be noted that there are also ERP systems based on free software, which are usually cheaper or even free for your activity, but how can they all improve the management of a small or medium-sized company (Kulkarni, Hegde, Sharma, Kulkarni, Hegde & Sharma, 2015).

ERP Systems: This helps you improve the management of your SME;

- **Access to real-time information:** Imagine you have a shoe store. And that shoe store has two different stores, each with a small warehouse. In each of these stores, you will have shoes of sizes and models that will not be in the other. What if a customer asks you in-store A for a model that doesn't exist, but that you do have in store B? What do you do? Are you running to check the other store? No. If you have an ERP system, you could look at the computer and solve the problem (Kulkarni, Hegde, Sharma, Kulkarni, Hegde & Sharma, 2015).
- **Data updated at all times:** Before having an ERP system, you likely kept all orders, invoices and paper receipts. With them, you could, for example, make decisions to make purchases in the following season. And if it turns out that parts of those documents are missing or that they are not as up-to-date as they should? Will you be making the right decision? By implementing a business resource planning system, you will have all the information at hand and make sure you check the

entire period that interests you without missing documents (Umar, Basheer, Isa & Watsilla, 2018).

- **Customer Relationship Improvement:** An ERP system can also be used to manage customer data. You can create a personalized file for each of them with which you can track your purchases and anticipate their actions. You will improve your relationship with the customer, you will be able to surprise him, and you will have more possibilities to increase your sales.
- **Increased competitiveness:** If in the shoe store in our example there are missing pairs of shoes that you know that, for the season you are in, they will sell well, you could anticipate the purchase of replacement merchandise. In this way, you would not run out of the flagship product ahead of time. In that sense, an ERP system can help you maintain a correct stock, to be more competitive in terms of available models that the public is looking for. Implementing an ERP system in your SME does not have to be a complex task. You need to choose the one that best suits your needs and learn how to use it. In the beginning, it may be necessary to invest a lot of time in the implementation, but once you have everything ready, you will notice the difference compared to the management you did without it. It will improve productivity, competitiveness and also sales.

References

Antero, M. C. (2015). A Multi-case Analysis of the Development of Enterprise Resource Planning Systems (ERP) Business Practices. Morten Friis-Olivarius *The Associative Nature of Creativity*.

Bhatia, S. S., Rai, A., &Kaur, H. An Architectural Framework for the implementation of ERP using Cloud Computing in SMEs: A Literature Survey.

Chaushi, B. A., Chaushi, A., &Ismaili, F. (2018, May). ERP systems in higher education institutions: Review of the information systems and ERP modules. In 2018 41st International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO) (pp. 1487-1494). IEEE.

Crook, C. (2018). *Computers and the Collaborative Experience of Learning* (1994). Routledge.

Kulkarni, A., Hegde, N., Sharma, M., Kulkarni, A. A., Hegde, N., & Sharma, M. (2015). Educational ERP systems in the market—a comparative study. *International Journal of Innovative Research Science in Technology*, 1(8), 84-91.

Loan, N. T. P. (2016). ERP IMPLEMENTATION IN HIGHER EDUCATION INSTITUTION: CASE STUDY AT FACULTY OF INFORMATION TECHNOLOGY. *Vietnam Journal of Science and Technology*, 54(3A), 74.

Masa'deh, R. E., Shannak, R., Maqableh, M., &Tarhini, A. (2017). The impact of knowledge management on job performance in higher education: The case of the University of Jordan. *Journal of Enterprise Information Management*, 30(2), 244-262.

Maskey, C. L. (2011). An evaluation of the relationship between reflective judgment and critical thinking in senior associate degree nursing students

Mishra, S. K., &Kar, S. K. Pivotal Role of Academic ERP in Institutional Management.

Naser, S. A., Zaqout, I., Ghosh, M. A., Atallah, R., &Alajrami, E. (2015). Predicting student performance using artificial neural network: In the faculty of engineering and information technology. *International Journal of Hybrid Information Technology*, 8(2), 221-228.

O'Brien, J. A., &Marakas, G. M. (2006). *Management information systems* (Vol. 6). McGraw-Hill Irwin.

Singh, K. (2016). Implementing Enterprise Resource Planning Education in a Postgraduate Accounting Information Systems Course.

Soliman, M., &Karia, N. (2015). Enterprise Resource Planning Systems in Higher Education Context: Functionalities and Characteristics. *International Journal of Innovative Research in Science, Engineering and Technology*, 4(11), 10408-10413.

Surendro, K. (2016). Academic Cloud ERP Quality Assessment Model. *International Journal of Electrical & Computer Engineering* (2088-8708), 6(3). Retrieved. Pivotal Role of Academic ERP in Institutional Management. <https://quintagroup.com/>.

Amal Ganesh, Shaniik.N ,Sunitha C, Midhundas A.M. (2016). OpenERP/Open ERP – An Open Source Concept to ERP Solution.

Al-Saleem, S. M. (2013). A Comparative Analysis and Evaluation of Open Source ERP Systems. *International Journal of Computer Science and Network Security (IJCSNS)*, 13(4), 24.

Jewer, J., &Evermann, J. (2015). Enhancing learning outcomes through experiential learning: Using open-source systems to teach enterprise systems and business process management. *Journal of Information Systems Education*, 26(3), 187.

Wang, S., & Wang, H. (2014). A Survey of Open Source Enterprise Resource Planning (ERP) Systems. *International Journal of Business & Information*, 9(1).

Sabau, G., Munten, M., Bologa, A. R., Bologa, R., &Surcel, T. (2009). An evaluation framework for higher education ERP Systems. *WSEAS Transactions on Computers*, 8(11), 1790-1799.

Naser, S. S. A., &Zaqout, I. S. (2016). Knowledge-based systems that determine the appropriate students major: In the faculty of engineering and information technology.

Chatterjee, S., Hore, S., Dey, N., Chakraborty, S., &Ashour, A. S. (2017). Dengue fever classification using gene expression data: a PSO based artificial neural network approach. In *Proceedings of the 5th international conference on frontiers in intelligent computing: theory and applications* (pp. 331-341). Springer, Singapore.

Kim, J., Kim, J., Thu, H. L. T., & Kim, H. (2016, February). Long short term memory recurrent neural network classifier for intrusion detection. In *2016 International Conference on Platform Technology and Service (PlatCon)* (pp. 1-5). IEEE.

Zabidi, A., Yassin, I. M., Hassan, H. A., Ismail, N., Hamzah, M. M. A. M., Rizman, Z. I., &Abidin, H. Z. (2017). Detection of asphyxia in infants using deep learning convolutional neural network (CNN) trained on Mel frequency cepstrum coefficient (MFCC) features extracted from cry sounds. *Journal of Fundamental and Applied Sciences*, 9(3S), 768-778.

AlBar, A. M., &Hoque, M. R. (2019). Factors affecting cloud ERP adoption in Saudi Arabia: An empirical study. *Information Development*, 35(1), 150-164.

- Cragg, T., & McNamara, T. (2018). An ICT-based framework to improve global supply chain integration for final assembly SMES. *Journal of Enterprise Information Management*, 31(5), 634-657.
- Venkatraman, S., & Fahd, K. (2016). Challenges and success factors of ERP systems in Australian SMEs. *Systems*, 4(2), 20.
- Schindel, K. (2018). An analysis of implementing an ERP system in a higher education institution.
- Pawar, S., Geet, G., Sonawane, P., & Barhate, C. B. (2015). College ERP System. *International Journal for Research in Engineering Application & Management (IJREAM)*., 1(02).
- Umar, K. I., Basheer, M. M., Isa, R., & Watsilla, H. (2018). ENTERPRISE RESOURCE PLANNING (ERP) SYSTEMS FOR EFFECTIVE ORGANIZATIONAL PERFORMANCE: A CASE OF ERP IMPLEMENTATION AT THE AMERICAN UNIVERSITY OF NIGERIA.
- Kattimani, M. S. L., & Mallinath, M. W. K. (2017). Academic Resources Architecture Framework Planning using ERP in Cloud Computing.
- Anand, V., Poojary, A., Mondal, R., Prajapati, P., & Pal, S. C. (2017). ERP System for College. *International Journal of Computer Science Trends and Technology (IJCST)*.