Developing *e*-Learning Process Network (EPN) Prototype Using ADDIE Model for College Of Pharmacy University Of Mustansiriya

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الخلاصة:

ان الهدف من هذه الدراسة هي لتوظيف تكنولوجيا المعلومات في تحسين اساليب التعليم في كلية الصيدلة وذلك باستخدام التعليم الالكتروني، في السَنَوات الأخيرة لَعبَت تقنيةُ المعلومات دوراً مهماً في حقلِ العملَ. التَعَلّم الإلكتروني اصبحت له شعبية هامّة و يُتوقّعُ الإسْتِمْرار في المستقبلِ. التَعَلّم الإلكتروني نشاط متعدّد الأبعاد حيث كُلّ بُعد يَجِبُ أَنْ يَكُونَ بشكل كافي مدعوم من قبل نظامِ إلكتروني تَعَلّم الذي يجب أَنْ يُزوّدَ تَعَلّم مثمر إلى مستعملي نظام التعليم الالكتروني. يُقدّمُ هذا البحثِ E-Learning Process Network (EPN) prototype الذي سيزود طلبه كليه الصيدلة في الجامعه المستنصرية بالمعلوماتِ الضروريةِ ويُساعدُهم في ادارة و تقليل الوقت بإستعمال ADDIE) model) , تم اختبار النظام الاولي عن طريق تجربته باستخدام عينه من 17 شخص (11 رجل و 6 نساء) وبأعمار محدده كُلّ منهم أعطىَ تفسيرَ قصيرَ بخصوص الإستعمالَ وكيفيه استعمال النظام (النموذج الاولي) , وكان الاستبيان محدد ببعدين الاول عن مدى فائدة النظام والثاني عن سهوله استخدامه وكان معدل الاجابه هو من 1–5 وقد تم تحليل الاستبيان بواسطة Statistical Package for Social Sciences (SPSS) version 1.3 وكانت نتيجة التحليل هي اكثر من 4.00 عن كلا البعدين .

Abstract:

The objective of this study is to employee information technology to enhance learning in college of pharmacy using *e*-learning, in recent years, information technology has played an important role in the business field. E-learning has gained a significant popularity and it is expected to continue in the future. E-learning is a multi-dimensional activity where each dimension should be adequately supported by an E-learning system to provide a fruitful learning experience to its users. This research introduces an E-Learning Process Network (EPN) prototype by providing College of pharmacy/university of Mustansiriya students with the necessary information and helps them reduce and manage the time by using Analysis Design Development Implementation Evaluation (ADDIE) model, after the system has been developed; it was tested by running

the system. The user evaluation of the prototype was conducted on seventeen respondents (11 male, 6 female); each of them was given brief explanation regarding the usage and the user interface of the prototype. The questionnaire was adapted, covers two dimensions: usefulness and ease to use prototype, question in the dimension has a rate from 1 to 5, the Statistical Package for Social Sciences (SPSS) version 1.3 is used to perform descriptive statistics analysis for the collected data ,the result for every dimension is higher than 4.00.

Introduction:

E-learning is learning that involves the acquisition, generation and transfer of knowledge using information and communications technology (ICT). As defined in [1]: "Any entity, digital or non-digital, which can be used, reused or referenced during technology supported learning".

Because there is a limited social interaction, students must keep themselves motivated. The isolation intrinsic to e-learning requires students to communicate with each other and the instructor frequently to accomplish their assigned tasks. E-learning is efficient as it eliminates distances and subsequent commutes. Distance is eliminated because the e-learning content is designed with media that can be accessed from properly equipped computer terminals, and other means of Internet accessible technology.(Figure-1) shows the E-learning it become after when we get a Education and training then we have a learning ,and information with technology we get Knowledge management. To get E-learning we used knowledge with learning.

Figure- 1: E-learning principal

Problem and Objective:

Presently, training modules for process college application is not established in a proper approach as all training modules is conducted in manual separated booklet or handout, college of pharmacy having difficulties to generate a systematic training approach as most of training modules are not compiled accordingly to suit to the purpose of class approach . Each instructor has his own manual topic and training module on selected process class item while other instructors have other module of selected process instructor's item. This research is to apply the Analysis Design Development Implementation Evaluation (ADDIE) concept to compile those manual class modules into an

interactive basic E-Learning application to suit their requirement; design new e-Learning application will help college of pharmacy to utilize this application for their future in-house training with systematic user friendly approach using ICT media in the Intranet It provides highly effective utilization for students that can get the class material and extra topic that they need, when they need it without matter where they are located using (EPN) Prototype.

Scope:
      The main important thing is to develop one of the designs new systems in e-learning using (ADDIE) model to apply this model for the online learning center in the college of pharmacy to help the instructor having a systematic training approach. The prototype will be developed as an alternative approach to reduce cost and time during the designing phase of the system. As shown in the (Figure-2)
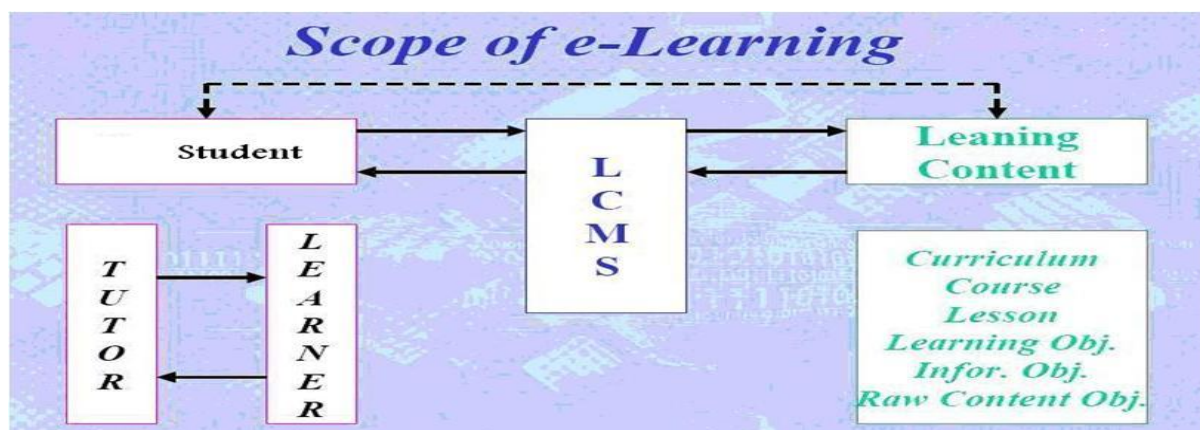

Figure 2: Scope of e-learning

      Figure above describes the scope of the study as following: The Learner deals with Tutor to get any information and to get better feedback, students will interact with learning content. Throw LCMS (learning content management system).

Literature Review
UUM Portal Brief Description: - E-learning portal includes web services compositions, course management, assessment tools, asynchronous and synchronous **communications**, **collaboration**; Today many e-learning applications achieve high standards in providing instructors to manage **video conference** and **online courses** via web technologies and database system.
The Problem: - Hard to involve long duration of the software development lifecycle process also software customization is extremely expensive.
The Method: - By used generic data model and synchronous collaboration to implement web prototyping development for e-learning. The generic data model allows adaptability, extensibility and reusability of database structure in the e-

learning system. In general, forms and attributes in the system cannot be modified.

The Result: - To achieve adaptability, extensibility and reusability in the e-learning portal. The web authoring toolkit provides a fast track design route for new e-learning portal to be designed and assessed by instructors or administrators. Developers can create functional e-learning portal through rapid prototyping development with minimum amount of efforts [2].

USM portal Brief Description: - The e-learning design is a solution of the problem of education organization that has to ensure the existence of an education model. Such a model can represent the simplest education system that consists of a teacher and a learner. They work together to achieve a shared educational goal [3,4].

The Problem: - It's difficult to ensure the existence of an education model. Such a model can represent the simplest education system that consists of a teacher and a learner.

The Method: - These e-learning systems can guarantee the choice of a didactical method that is suitable for a concrete learning style. The adaptive behavior of the e-learning systems can be represented by the following categories, adaptive interaction, adaptive course delivery and adaptive collaboration support.

The Result: - The teacher is an agent-factor in the education. The learner is a selfish agent. This model presents the following important characteristics of education systems:

- The relation between the teacher and learner is symmetrical
- The education system is not linear
- The education system bases on collaboration [5,6]

Research Methodology:

ADDIE the process methodology follows for all our learning solutions is based broadly on the ADDIE model of Instructional Design. This model places a great emphasis on analyzing the problem and designing an effective solution that fills up the gaps identified at the analysis stage. This model supports our conviction towards providing quality solutions that impact performance positively. ADDIE is very generic and very successful model, so most of designer followed. (Figure-3) shows the steps of (ADDIE) model and the relation
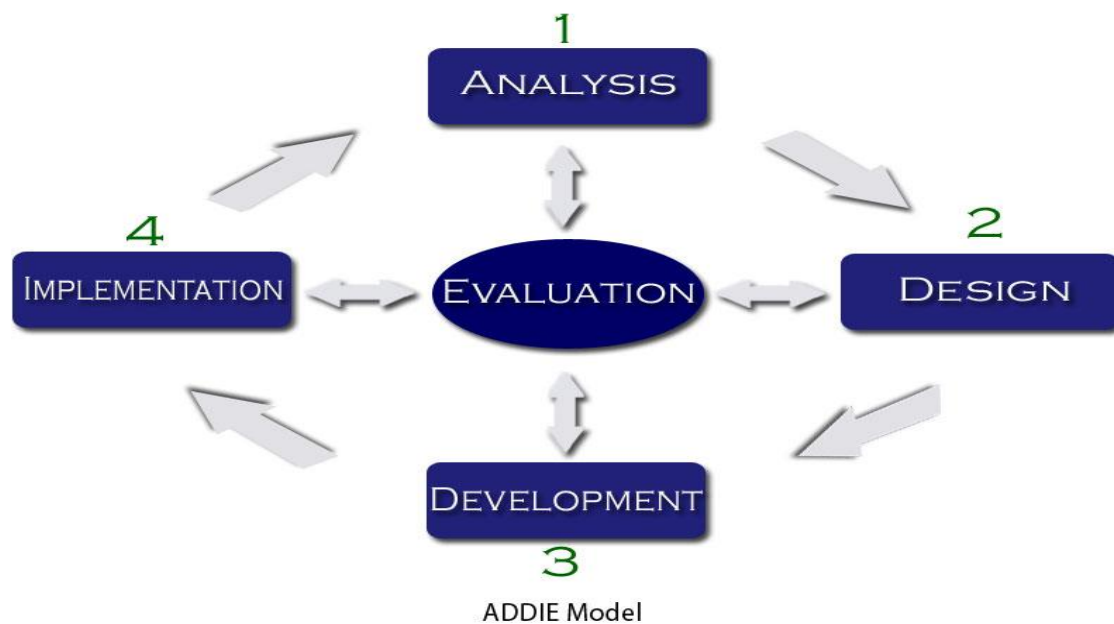
Figure 3: ADDIE MODEL

Analysis:

In this step all requirements and data manufacturing related process will be collected by using questionnaires and interviews, set the scope of the content to be covered in terms of time required, number of training module and it is important to know who wants to learn and what he wants to learn. If training is needed, there are many times that processes need to be improved that do not require training. In this step, try to answer what the department wants to learn a new engineer.

Design:

In this step the definition will be interpreted in terms of specific measurable objectives, and the teaching resources and activities chosen to complement the learning outcomes, and structure the content of learning material, in the design phase, storyboards are created. Every screen of the course is designed using these storyboards. These storyboards are handed on to the developing for the actual production [7]. In this step our design consists of many type of course format, for example we get the user if he wants to choose the PDF file or power point or HTML in text course .And for video course he can watch the lesson or download to watch and quiz.

Development:

The development phase builds on the Process Performance Objectives and measurement tools constructed in the design phase. The product of this phase is a detailed plan of action that lists step-by-step procedures for implementing the change. In this phase the college of pharmacy will be developed to validate the requirement, also UML model diagrams will be developed to analyze the requirement of the system. In this phase the prototyping approach had been used as its method; the prototyping process contains three main steps which were

adapted from [8], as shown in (Fig-4). By interacting with the prototype, users can get a better idea of their information requirements. The application approved by the users can be used as a template to create the final system [9].
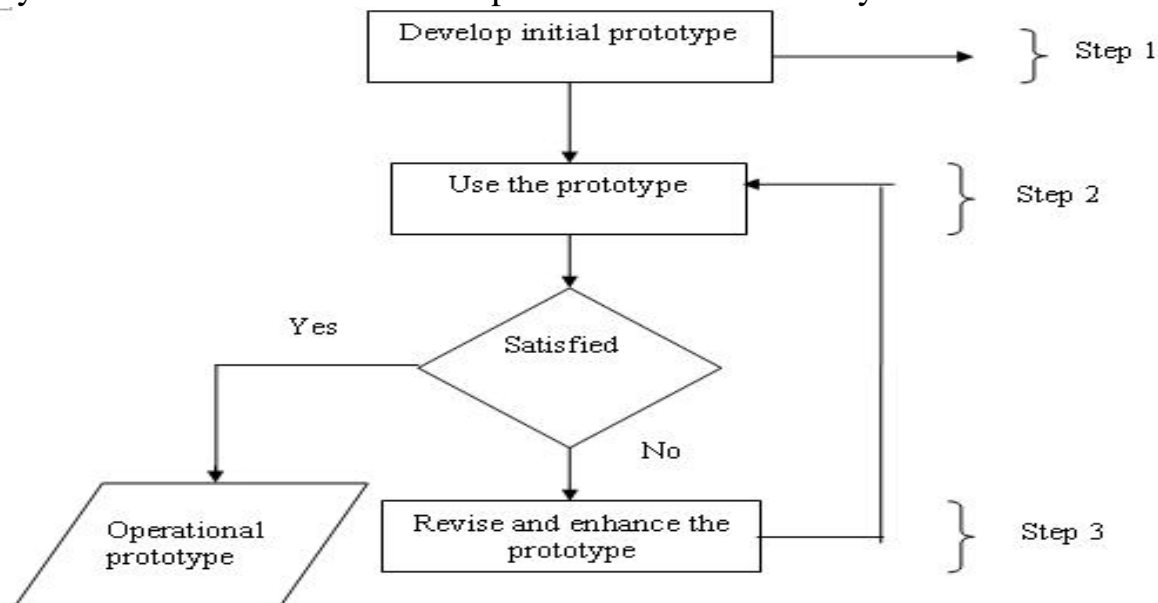

Figure 4: The Prototyping Processes Adapted from

Step 1: Develop Initial Prototype

Based on the requirements that had been identified in the analysis step, college of pharmacy online learning department was built.

Step 2: Use the Prototype

In this step, users are encouraged to use the college of pharmacy online learning department, prototype in order to identify errors and measure the efficiency of the functionalities provided.

Step 3: Evaluate as Operational Prototype

In this step, a sample of about 17 users was selected randomly to measure the user satisfaction towered the college of pharmacy online learning department prototype.

Implementation:

This stage is where the product is put on the test by actual users. There are two stages of the implementation: Alpha-testing is the in-house testing of the product; for example you select a group of (pharmacy online learning department staff and academic staff), Quality process, Managers and Operators and ask them to review the course for you. Beta-testing is the first real implementation of the course with real users anew students he/she are learning. The feedback from these users is essential for the improvement of the course.

Evaluation:

In the ADDIE model, evaluation is a systemic process that determines the quality and effectiveness of the instructional design as well as the final product. Evaluation is an ongoing activity conducted at each phase of the ADDIE model. Evaluation consists of two parts: formative and summative. Formative

evaluation is part of each proceeding phase and determines effectiveness and quality of each stage. Summative evaluation consists of tests for criterion-related referenced items and provides opportunity for feedback from the users and assesses learner outcomes [8,9].

Formative Evaluation:

Formative evaluation involves gathering information during the early stages of the design process with the focus on finding out whether efforts are unfolding as planned, uncovering any obstacles, barriers or unexpected opportunities hat may have emerged, and identify mid-project adjustments and corrections which can help insure the success of the project. The feedback gathered during formative evaluation is designed to fine-tune the implementation of the program, gather reaction and identify what is not working [9].

Finding and Discussion

The design of the system which includes the UML model diagrams such as (Use case, sequence diagram, and class diagram). UML Diagrammed software is used to draw necessary diagrams that play important role in the development stage. Use case diagram, as shown in (Fig. 5) which describes the main overall interaction between an E-Learning Process Network (EPN) prototype and the learner (user) also between (EPN) and the Admin.
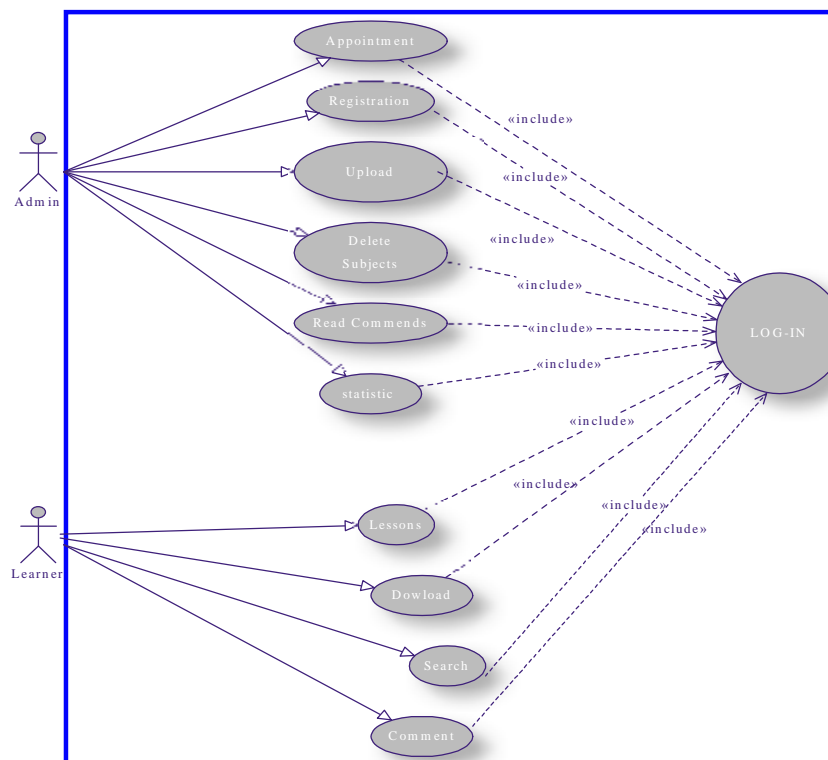
Use Case Diagram for E-Learning

Figure- 5: Use Case Diagrams for E-Learning

The admin who do the upload delete or update for the materials and view the subjects or materials details, the admin can not access his page or do his operation without the login to the system by his learner name and the password that the system need it to verify him. The admin can do the registration for the learner, the learner can brows, upload, download, search, and comment.

System Design

For the system development, Microsoft Visual ASP.NET (under VB.NET) was used in coding college of pharmacy online learning department prototype for the learner side and the web-based prototype for the administrator. The prototype was completely developed with .NET Framework using ASP.NET 2.0 as IDE. SQL server was used as Database to store and retrieve all information. (Figure-6) shows the screenshot of mean page for user and admin ,and (figure-7) show the video page for user after he choose the lesson from lesson page.
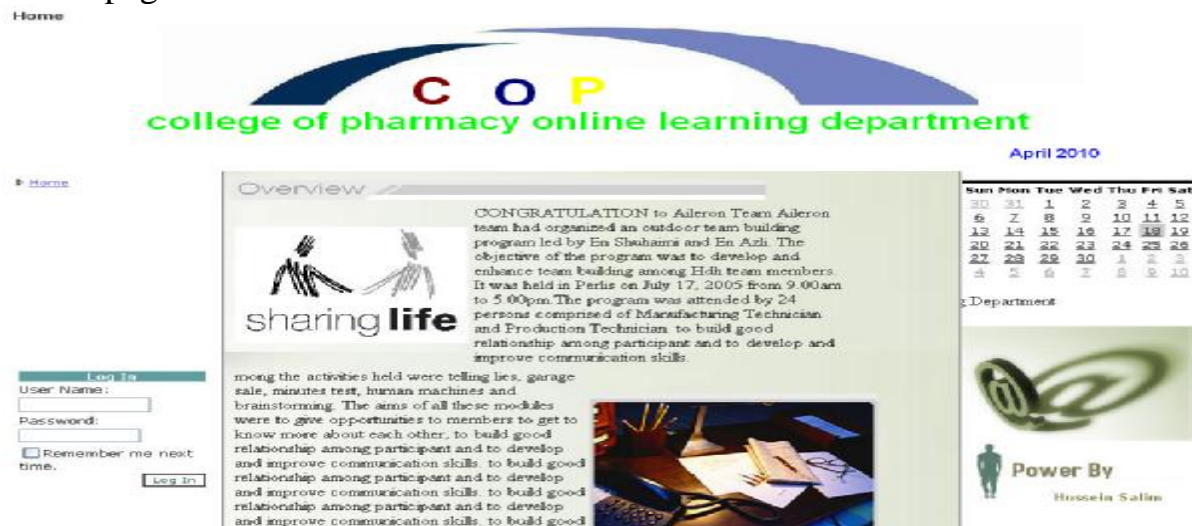

Figure 6: Screenshot of mean page

Figure 7: Video page for user

System Development
       After the system has been developed, it was tested by running the system. The user evaluation of the prototype was conducted on seventeen respondents; each of them was given brief explanation regarding the usage and the user interface of the prototype. The questionnaire was adapted, covers two dimensions: Usefulness, Ease to Use of the prototype, the Statistical Package for Social Sciences (SPSS) version 1.3 is used to perform descriptive statistics analysis for the collected data.

Gender	Frequency	Percentage (%)
Male	11	65%
Female	6	35%
Age		
18-25	8	47%
26-40	7	41%
Above 40	2	12%
System part		
Operation	2	12%
Management	4	24%
Instructors	9	52%
Quality	2	12%

Tabl- 1

As shown in (Table 1), 11 (65 %) of the respondents were male and 6 (35 %) were female. Most of the respondents 8 (47 %) are between the ages of 18-25 years old, followed by 7 (41 %) are between 25-40 years old. The remaining 2 (12 %) are those aged above 40 years old.

Evaluation Result:
       The user evaluation is to measure the passenger satisfaction and effectiveness towards E-Learning Process Network (EPN) prototype. The questionnaire measures the effectiveness of using e-learning system in learning, question in the dimension has a rate from 1 to 5 (1 -> Strongly Disagree, 2-> Disagree, 3-> Neutral, 4-> Agree, and 5-> Strongly Agree).

(Table 2) illustrates the descriptive statistics for all the dimensions, the mean for every dimension is higher than 4.00.

Dimension	Number	Mean
Perceived Usefulness	17	4.1000
Ease to Use	17	4.2733

Table 2

(Table-3) illustrates the descriptive statistics for all items. Most of items with mean more than 4 which indicate that all of the participants agreed on these items, so that mean the participants agreed that EPN has good usability.

Items	Mean
PERCEIVED USEFULNESS	
1. Overall, I am satisfied with how easy it is to use this (EPN).	4.28
2. Did any skills or their job function become enhanced?	3.80
3. Do the learners see a value in the (EPN)?	3.76
4. The (EPN) gives error messages that clearly tell me how to fix problems.	4.08
5. Using the (EPN) would increase the save time.	4.36
6. The (EPN)? Must enhance?	4.32
PERCEIVED EASE OF USE	
7. The information on the (EPN) screens is clear.	4.68
8. It was simple to use this (EPN).	4.45
9. I feel comfortable using this (EPN).	4.48
10. I would find (EPN)? To be flexible to interact with.	4.20

Table 3

Conclusion:

In our system and according to our problem that's need to solve and research objective, the research has heavily getting involved in developing requirements to complete the System Development methodology successfully through managing the requirements with the research objective. E-Learning Process Network (EPN) prototype is our prototype that design to help the new student to learn as quick and to reduce our cost and time.

Study Contribution

The E-Learning Process Network (EPN) prototype by providing college of pharmacy with the necessary information and help them to reduce and manage the time.

Recommendation and Future Work

Due to the time frame that is not sufficiently enough to assure the entire functionalities of the system, future works can be carried out to fill in the deficits that came upon during the work of this project. It would be more suggestive to advice the one who needs to pursue some future works to follow every single step included in the project. E-Learning system for (EPN) the following features that will benefit the users:

1. Learn the students via online and without physically visit.
2. Provides direct, simple access to the focused valuable content via few hardcopy materials.
3. Information regarding this system is trimmed page-to-page navigation down to a minimum and the logout used to leave the user page in anywhere in the system.
4. Reduces the amount of vertical scrolling by simplifying the text to display.

5. Create online learning department and E-library.
6. Provide high speed internet services.
7. Collaborations with international universities.
8. Develop UOM Portal, providing instructors to manage Video Conference, Mobile Learning.

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