Implementing Elearning System For General Information Technology Course At Van Lang University, Period 2017 - 2020

Minh Nguyen Thu Nguyet, Nhi Tran Thi Yen, Tung Do Thanh and Huy Nguyen Quoc

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Nguyen Thu Nguyet Minh[1], Tran Thi Yen Nhi[1]

Do Thanh Tung[1], Nguyen Quoc Huy[1]

[1] Van Lang University, Vietnam

Correspondence: Tran Thi Yen Nhi, E-mail: nhi.tty@vlu.edu.vn

Abstract

Van Lang University's General Information Technology course has been implementing eLearning from 2017 to 2020. The course is divided into 3 phases and from level 2 to level 4 of the eLearning training program (Dung, 2020). At every phase, there are improvements in education methods, supporting functions, and above all, system optimization, from functions that support distance learning to course management and others. It ensures the best learning environment for students and helps teachers teach and post results more efficiently. During the eLearning program's developmental phase, different education methods have been used to suit different needs and constitute 20% and up to 100% of the time. During the whole time, the program is receptive to teachers and students' feedback to improve and has already received encouraging results.

Keywords: eLearning, LMS Moodle, MS Teams, LMS

1. The current situation of general information technology education

Elearning has been created and developed extensively for over more than 10 years, and it is no longer a new term in the educational system of developed countries. The 4.0 technology revolution, the growth of Vietnam's tech infrastructure, fast Internet connection with low price, and a young demographic enabled the fast growth of eLearning. Universities demonstrated interest in eLearning through distance learning programs and normal programs that incorporated this new technology.

Before 2016, the General Information Technology course was conducted entirely in class during the whole training time. Teaching entirely in a classroom has many difficulties: communication between students and lecturers, extra materials provision, collecting and managing students' works, fair results announcement, and managing attendance. Paper tests prove to be a hazard to grade fairly and archive.

2. Solution

From 2016 to 2018, Van Lang University conducted a pilot experiment in eLearning training in General Information Technology. At the university, the eLearning model system consists of Learning Management System (LMS); Learning Content Management System (LCMS); Virtual Classroom in real-time; Forum to connect lecturers and students; Courseware: curriculum, study guide, books, and online materials, teaching slides, videos, multiple-choice questions bank, practice exercises; Study support.

Regarding the Learning Management System, the university is implementing LMS Moodle (Oproiu, 2015)

and Virtual Classroom platform MS Teams, which UNESCO recommends for distance learning (Response, 2020). As for the Virtual Classroom platform, the current course uses Microsoft Teams with integrated Microsoft Office 365 (Microsoft, n.d.), and all students and lecturers received login information that is synchronized with every website that supports learning of the university. Before implementing MS Teams, the course evaluated and analyzed alternatives like MS Teams, Hangouts, Zoom, and Classroom. (Iftakhar, 2016)

Tabel 1.

A statistic table that shows the results of study performance with the implementation of Elearning from 2017 to 2020 (Willis, 2017)

Functions	Google Classroom	Microsoft Team	Hangouts Meet	Zoom Meet
Program Installation		X		X
Screen Sharing		X	X	X
Raising hand		X		X
Chat Room for all	X	X	X	X
Personal chatroom		X		X
Announcemnent Board	X	X		X
Submitting assignment	X	X		
Schedule in Calendar	X	X	X	
Assignment Quiz	X	X		
Grades	X	X		
Material	X	X		

The online training system – Elearning of the course has been implemented through 3 phases from 2017 – 2020.

- Phase 1 (2017-2018): implementing Elearning level 2, study materials are provided through online access through https://hoctructuyen.vanlanguni.edu.vn/. At this stage, teaching and learning are still conducted entirely in the classroom.

- Phase 2 (2018-2019): implementing Elearning level 3 with 80% of the course is in class, and 20% is online. Study materials, written exercises, multiple-choice questions, and discussions are being conducted online more.

- Phase 3 (2019-2020): implementing Elearning level 4 with online classes take up to 50%-100% of the entire course. The reverse classroom model system is being implemented dynamically. Resources and study activities on the Elearning system are plentiful.
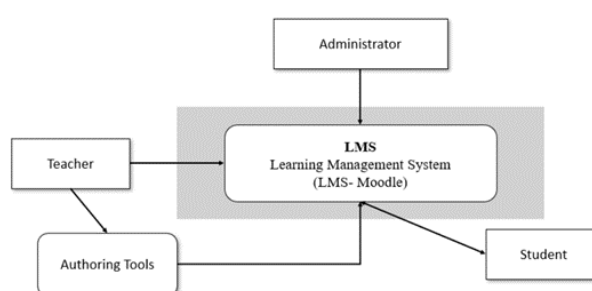
2.1 Phase 1 (2017 – 2018)

Diagram 1. Implementing Elearning system phase 1 (2017 - 2018)

The basic system consists of:

- Learning Management System (LMS)

- Courseware: curriculum and study guide

The implementation of phase 1 in 2017-2018

The traditional method of teaching is conducted 100% entirely in class. Students have to attend class according to the study schedule they received and under the lecturers' management with this method. Outside of class, students can work on their assignments and read more advanced materials to prepare for the next class.

Learning Management System: use the page hoctructuyen.vanlanguni.edu.vn, with LMS Moodle 3.1 (Moodle™, 2020). In this phase, the LCMS system has not been perfected, so lecturers provide study materials and slides as LMS attachments. The LMS system allows students to upload their assignments and get feedback and grades, but they cannot know their component grades and final grades. Due to the nature of the course, many component grades have different importance; therefore, lecturers have to store and manually process them, which takes an incredible amount of time for lecturers with a big class. Attendance check at the end of a class is stored on a lecturer's personal sheet, which proves to be a nuisance to manage student attendance and classroom performance for the Academic Department.

2.2 Phase 2 (2018 – 2019)

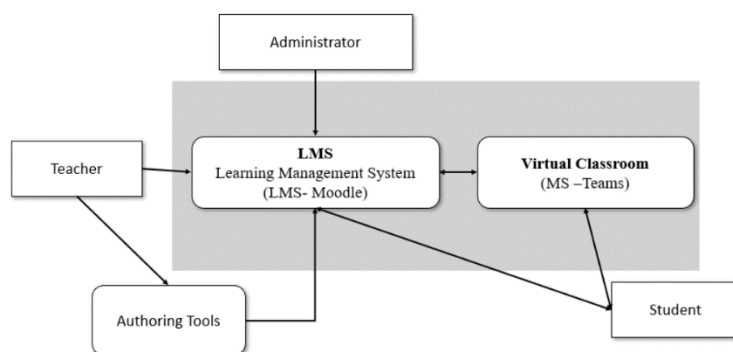*2.2.1 System model of phase 2*

Diagram 2. Implementing Elearning system phase 2 (2018 - 2019)

The basic system consists of:

- Learning Management System (LMS)

- Learning Content Management System (LCMS) is not finished yet

- Virtual Classroom in real-time

- Communication system, announcement, study forum

- Courseware: curriculum, study guide, electronic books and materials and study slides, videos, multiple-choice questions bank, practice exercise, Study support forum.

2.2.2 Implementing LCMS and LMS phase 2

Phase 2 is implemented for 2018-2019, Elearning level 3. A blended classroom is implemented in this stage. It is a type of model system that implements study activities in a combination of offline and online. Offline classes will constitute 80% of the course, and virtual classrooms conducted through MS Teams will constitute 20% of the

course. With this model, study activities are conducted on three dimensions: at home, in class, and in a virtual classroom. To prepare for this stage, all lecturers of the course receive training from Microsoft Vietnam experts in Office 365, teaching online through MS Teams. (lEugenia Y.Huanga,Sheng WeiLin,Travis K.Huang, 2012)

Class conduct procedure
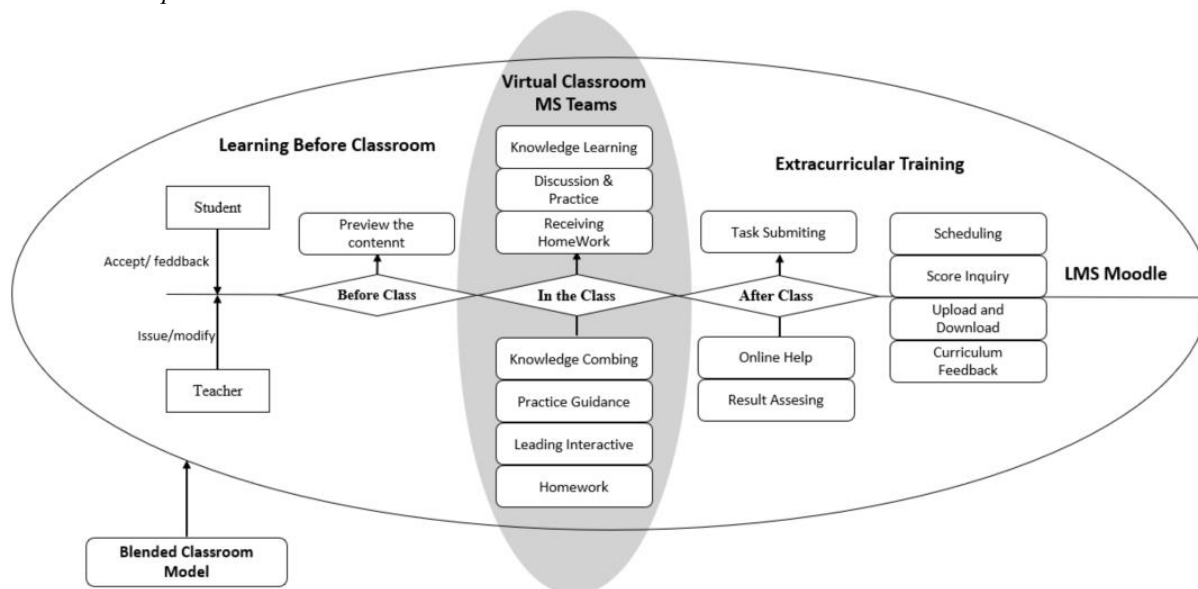
Learning Management System (LMS) using LMS Moodle 3.1. This LMS includes an assignment, quiz, grade report, grade calculator, and attendance.

Diagram 3. Class conduct procedure of phase 2

Assignments - Practice

Assignment system with varying practice exercises and clear time constraint starts to receive submission along with time finished and time late. Not only that, but it also improves in feedback system through the usage of Rubric and specific measurements. To develop these measurements, the course has based on these criteria:

- Program outcome standards

- Learning objectives: knowledge, skill, and mindset

- Missions and activities that need evaluation

- Evaluation standard for activities (detailed description)

- Achievement standard (ranking the criteria)
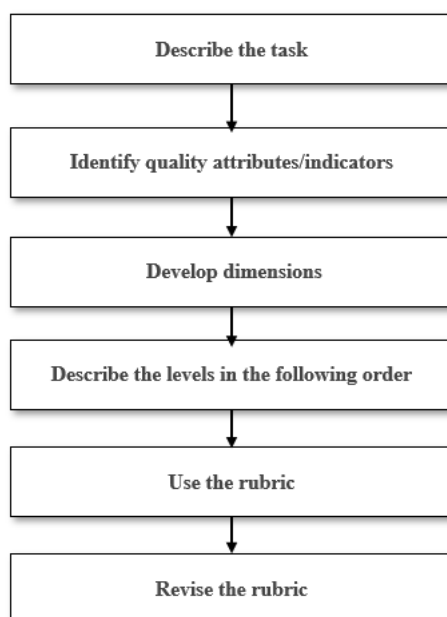
Rubric design procedure

Diagram 4. Rubric design procedure

Quiz

The course stresses the importance of creating questions that best reflect the ability of the learner. It has six modules and 4460 questions. These questions are created in various question forms like Calculated and Calculated Simple, Calculated Multichoice, Drag and Drop onto Image, Drag and Drop Markers, Drag and Drop into Text, Embedded Answers (Cloze), Essay, Numerical (numbers as an answer, inaccuracies are tolerated), Select Missing Words, Short Answer, True/False. The quiz acts as a way to evaluate the students and the course itself. It helps the students solidify their knowledge and memorized previously mentioned concepts. It is designed specifically for each specific module, and students are required to repeat the quiz five times after each lesson and concept. The students can check their work during and after the test, and the system will show them a statistic of the parts they do well and the parts they do not so they can formulate a better learning strategy next time.

Grade Report

The component grades of the six modules have different weights. In order to help students monitor their performance better, this function is highly important in changing study activities and improving study performance for the best result. As for the lecturers, they can be aware of the students' progress so they can make appropriate changes to their teaching. After finishing a particular study mission (practice exercise or quiz), the results will be updated immediately through Grade Report with these component grades:

Progress Grade 40% consists of typing speed (2%), Submission of Module 2 Assignment (2%), Internet Module 6 Assignment – Online submission (2%), MS Word Assignment – Online submission (2%), Excel Assignment Online (2%), Slide Design Test (20%), Final Writing Assignment on MS Word – Module 3 (5%), Final Excel Assignment – Module 4 (5%)

Final Grade 60% consists of: Final Test (40%), Quiz Test Module 1 (3.3%), Quiz Test Module 2 (3.3%), Quiz Test Module 3 (3.3%), Quiz Test Module 4 (3.3%) Quiz Test Module 5 (3.3%), Quiz Test Module 6 (3.3%)

Attendance

This attendance managing function is implemented in this stage to help lecturers manage their classrooms better and be more proactive with their teaching. Students can follow their attendance performance through the dashboard. Each class will include time and attendance status to help students be proactive. Currently, this attendance check system is implemented through two methods: students self-report themselves, or the lecturers will call upon them, depending on the nature of the class. Other than reporting each individual's attendance performance, the system will help the lecturers keep track of the list of students who lack the adequate criteria to finish the course and make the work easier.

Sway – Rich Media

LCMS includes study materials and slides as an attachment on the system, which constitutes Rich Media. The online slides will be published as websites with rich media such as text, image, GIF, video, and game,… This will provide an entirely new learning experience for students. Students can easily access it from everywhere without having to download it. By implementing Microsoft Sway into Rich Media design to support teaching, the course helps lecturers understand what content the students love to decide the content appropriate to the students' ability and growth objectives. Referential examples: Bit.ly/vlgiuaky; Bit.ly/vlom3; Bit.ly/vlom4.

2.3 Phase 3 (2019 – 2020)
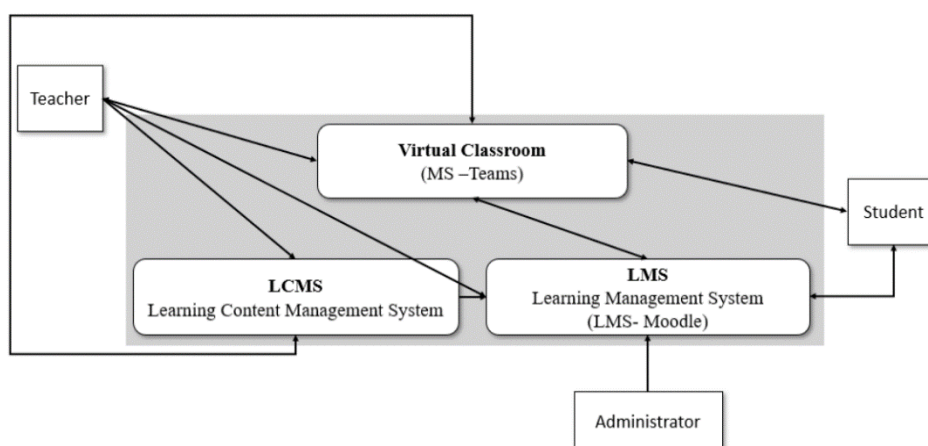
2.3.1 System model of phase 3

Diagram 5. Implementing Elearning system phase 3 (2019 - 2020)

Elearning system consists of:

- Learning Management System (LMS)

- Learning Content Management System (LCMS) is not finished yet

- Virtual Classroom in real-time

- Communication system, announcement, study forum

- Courseware: curriculum, study guide, electronic books and materials and study slides, videos, multiple-choice questions bank, practice exercise

- Study support channels

- Flip Classroom model system

2.3.2 Implementing LMS and LCMS phase 3

Phase 3 is implemented in 2019-2020, Elearning level 3. The Flip Classroom model system is put into usage in this phase. This model ensures 100% of the course duration will be conducted online. It reverses the usual order of a lecture: students have to read their lecture and do homework before class, and they can have access to their material on all digital devices and be more proactive regarding time and space. Therefore, when class starts, lecturers and students can now only focus on case study problem solving, research, and group discussion. With this model, study time is distributed across all phases: before, during, and after class. Knowledge distribution and teaching methods are diversified through LCMS system with videos, Rich Media, online discussion, peers-to-peers, and student-to-lecturers interaction. To prepare for this phase, all lecturers have to undergo Elearning and Flip Classroom training from Thinking School.

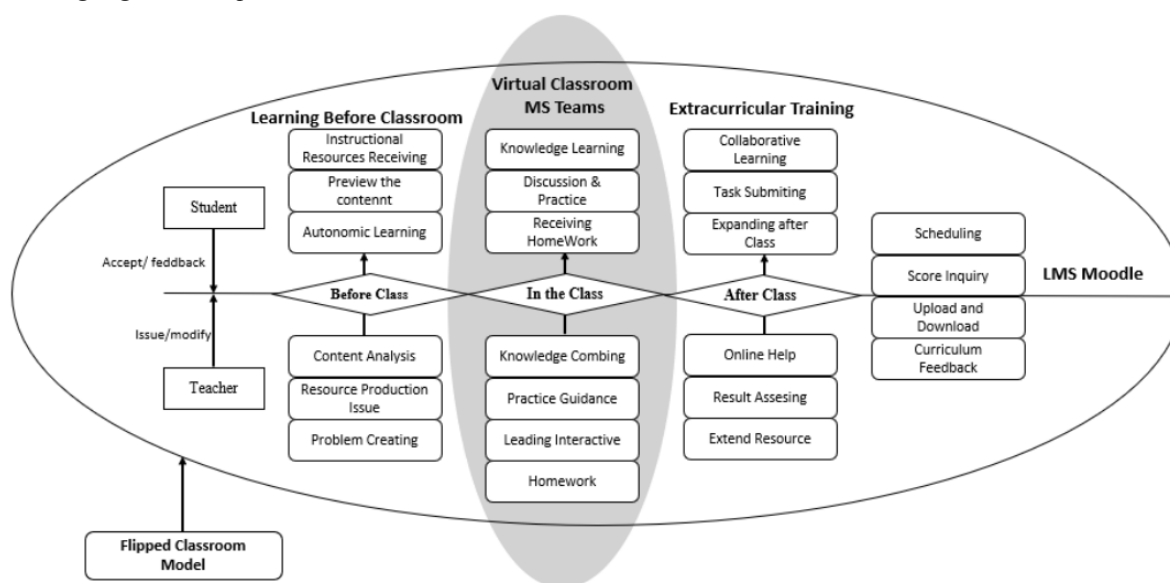*Teaching organization procedure*

Diagram 6. Teaching organization procedure (Han, 2017)

LMS in this phase uses LMS Moodle 3.9 with updated functions and UI/UX design, bringing ease of usage to teaching organization and management on eLearning. The LMS at this phase inherits and develops further the functions that have been implemented in stage 3: Assignment, Quiz, Grade Report, Grade Calculator, Attendance. It also develops the function Dashboard to help students manage their learning process easier.

Dashboard

The dashboard helps students monitor their learning progress. Students can monitor each course's progress and see what tasks to complete to finish the course. This function, along with the Attendance Management function, helps complete the students' learning monitor system. It will enable students to take a more proactive approach to their own learning while lecturers can follow their students' learning journey easier. Dashboard in the Elearning system consists of Course Completion, Attendance Report, Grade Report. The Attendance Report function has been explained in phase 2, so the remaining functions can do the following tasks:

Course Completion – The function that aids students in monitoring their course completion progress along with to-do tasks and completion status.

Grade Report – The function allows the students to see the grade they have accumulated.

The Learning Content Management System has been perfected at this stage: providing study materials, slides, and webpages. The video library is created on learning objectives and diversifies the courseware for students to have a plethora of choices for their individual needs.

Video

High-quality videos are created to satisfy the students' educational needs and feedback. The Rubric criteria measure the quality of the videos.

Tabel 2.
Video criteria

No	CRITERIA	SCORE				
		40	**30**	**20**	**10**	**0**
1	**Content (40 points)**	The content is clear, specific and easy to understand towards the lecture goal . There are illustrative images, specific examples. Very well communicated teaching content .	Content is clear. There are illustrative images, specific examples. Communicate teaching content .	The content has not been directed to the specific goal of the lesson. There are illustrative images, specific examples.	The content has not been directed to the specific goal of the lesson. Do not use illustrations or examples.	The content does not convey the lesson goals.
2	**Voice/ Sound (30 points)**		Loud voice, inspiring. Sound suitable for teaching content and images on video.	Loud voice, Sound suitable for teaching content and images on video.	Small voice, mixed with noise. Sound does not match the subject and images.	Small voice, and much noise.
3	**Image (20 điểm)**			The image is clear, bright and beautiful, making the content clear and conveying emotions.	The image is not clear, the lesson content is not clear.	The image is not sharp, does not convey the lesson content
4	**Design effects, techniques (10 point)**				Attractive effect, attractive, suitable with the lecture content. Use effective, skillful techniques	Do not use effects or effects or use but not match the conten

Each module has many videos, and each video lasts 10 to 15 minutes and is classified into relevant knowledge fields. Each video structure includes objectives about skills and knowledge, content based on the published curriculum and images, sounds, texts, and effects. Learning objectives regarding skills and knowledge are described with keywords from the Bloom taxonomy: Knowledge, Comprehension, Application, Analysis, Synthesis, Evaluation.

3. Results

Tabel 3.
A table of questions and case studies appropriate to the learning objectives according to the Bloom taxonomy

Subject Goal	Subject content		Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
Goal 1	Content 1	1.1	Ques 1					
		1.2		Ques 2				
Goal 2	Content 2	2.1		Ques 3				
		2.2			Ques 4			
Goal 3	Content 3	3.1			Ques 5			
		3.2				Ques 6		
Goal 4	Content 4	4.1		Ques 7				
		4.2				Ques 8		
Goal 5	Content 5	5.1				Ques 9		
		5.2					Ques 10	

The General Information Technology course has implemented the Elearning system in 2017 – 2018, 2018-2019, 2019-2020. The Elearning system started at levels 2 and 3, and now it is currently at level 4, with the percentage of online classes has gone from 0% to 100%. Right now, the course has completed establishing its courseware database, perfected classroom organization, and testing method. The course also initiates many traditional, blended classroom and flipped classroom models with the digitalization trend. The course also does extensive research to improve the user design so that it is more user-friendly and efficient for students to use.

Tabel 1.

A table that summarizes the implementation of Elearning from 2017 to 2020

Stage	School Year	% Online	Model	Virtual Classroom	LMS						LCMS			
					Assigment	Quiz	Grade Caculator	DashBoard	Attedance		Rich Media	Video	Docs	Slide
Stage 1	2017 -2018	0%	General		X								X	X
Stage 2	2018 - 2019	20%	Blended classroom	X	X	X	X		X		X		X	X
Stage 2	2019 - 2020	50 – 100%	Flipped classroom	X	X	X	X	X	X		X	X	X	X

This statistic shows data in the past 3 years with views, submissions, and percentage of students that finished the course. In that, we can see the interaction rate and homework completion rate increase exponentially due to the shift in teaching method. The percentage of students who completed the course still has an average of 90%. This is a highly encouraging result of a physical class transformation to a digital class.

Tabel 5.

A statistic table that shows the results of study performance with the implementation of Elearning from 2017 to 2020

School year	Semester	Student	View	Submit	Pass
2017 - 2018	SEM. 1	2152	43970	0	92%
	SEM. 2	2233	40986	0	88%
2018 - 2019	SEM. 1	4591	180050	10216	87%
	SEM. 2	7417	300083	16327	89%
2019 - 2020	SEM. 1	5369	1305197	88285	93%
	SEM. 2	8882	1953839	136424	90%

4. Conclusion and suggestion

During the whole time of researching and implementing Elearning for General Information Technology, the course realizes each course from each field will have a different demand for an online time from each other. Depending on the demand for the online class of each class, the class can pick appropriate method: ranging from traditional teaching with the support of Elearning in the assignment, test, communication, and advanced learning to making the online class consists more than 50% of the course, especially during the COVID19 global pandemic. Every method's success depends heavily on the lecturers and the learners. The research and implementation of Benjamin

S. Bloom's taxonomy of cognitive understanding level in the development of curriculum, video, digital slides, randomized practice questions aid students in following with their study and improve their results. Further than that, it is also important to design the visual interface in a user-friendly way, actively create content that aids in learning for students like videos, multimedia study book (Rich Media), multiple-choice questions, bank and practice questions that satisfy the educational and future professional needs of the learners.

Besides the advantages and encouraging feedback the Elearning initiative received from the department and school policies, the course also encounters many difficulties like laptops and phones for some students. This has caused many hardships for students to complete their homework, especially when it comes to practice questions. There needs to be a policy supporting students like laptop renting or buying laptop in installment.

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