

# Developing Production Process of e-learning Courses: A four Phase Model

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## Abstract

There is little evidence in literature survey about production of e-learning courses. There are many problems that face the model of producing e-courses on National E-Learning Center (NELC), some examples of these problems: (e-courses production tools are complex - production time is very long – fixing errors in e-courses content is hard).

This paper aims to propose a new model for developing production process of e-learning courses to solve the shortcomings in NELC model. The proposed model consists of four phases: arbitration, begin production, evaluate e-course, and activating e-course.

The proposed model is applied in “NELC”, and the results show that the e-course production process with the proposed model takes an average of 4 weeks instead of 12 months in the NELC model.

**Keywords:** E-course, E-learning, production process, model, four phase, NELC.

## 1. INTRODUCTION

There are many definitions for the concept of E-learning, one of its definitions is According to U.S. Department of Education defines in its White Paper on Educational Technology (2000) that " E-learning is the learning and teaching activities mainly conducted through the Internet, which make full use of the learning environment with new communication mechanisms and rich resources provided by modern information technology, so as to achieve a brand-new mode of learning" [2].

Another definition is “the use of new multimedia technologies and the internet to improve the quality of learning by facilitating access to resources and services” [11].

The E-learning has the following major advantages [4]:

- Access: anytime, anywhere concept makes education and training more available to learners.
- Cost: Reducing education and training costs.
- Efficiency: Avoiding scheduling of classrooms and booking instructors.
- Empowerment: putting the responsibility for learning in the hands of learners.
- Business: Using fast, effective learning as a competitive edge.
- Convenience: Letting time-pressured students learn at the best time and place.

- Content: Increasing the scope of offerings [14].
- Speed: Responding to constant and rapid changes [2].

In section two will show some researchers attempts to produce e-course production model, explain the advantages and disadvantages of every model, section three display all the problems in every phase of the production process in Egyptian universities, mapped to the model of “MIS” , section four create surveys to collect data and analyses the results, section five shows the new model which consist of group of software and recommendations to solve these problems in the e-course model, the results will be offered in the final section.

## 2. LITERATURE REVIEW

Converting course to e-course is one of the main challenges are facing universities today, Therefore, they require tools to facilitate the creation of digital content for teachers and make the production process sustainable.

There is shortage in researches about the difficulties and problems facing e-course production in Egypt so we used experts to analyze production model phases.

The production of E-learning courses in Egyptian universities through certain work cycle are as shown in figure 1 [49]:



**Figure 1:** Stages of production e-learning courses in traditional model.

Phase I: providing course

First: the “terms of the selection decision”:

Collaborate between both of the National E-learning Center and E-learning center at the university to choose courses that will be produced by University Center accordance with the conditions and specifications listed in choosing courses standards.

Second: Documents required:

In the case of the availability of the terms and conditions mentioned, then the E-learning center provide required documents and contracts as a prerequisite for admission and entering the scientific arbitration stage.

Phase II: Arbitration the course

Scientific arbitration of the course is done by two arbitrators in the specialty from outside the university and they are selected by the National E-learning Center from a list containing "4" professors who proposed by the manager of the production center at the university. Arbitration is process through the rubrics for evaluation of the scientific content of the course.

Phase III: Develop a time plan and start production

In the case of a recommendation of the arbitrators to accept to produce the course and the approval of the National E-learning Center to start production according to time plan. As the cooperation between the production team and the author is very critical for the implementation of the production process in a timely manner. Then the contract is signed with the author in this stage.

Phase IV: Evaluation of E-Content

After the completion of the production process the production center send the E-course to the National E-learning Center to judge the E-content by its experts, and then send the recommendations to the production center at the university.

Phase V: make adjustments and upload the course

If there are any modifications the production center starts correcting them and then upload the E-content to the learning content management system on the National E-Learning Center server.

Phase VI: final arbitration and publishing

After finish correcting the modifications and uploading the E-course to the National E-Learning Center server, there start the final arbitration, and then in the case that arbitration experts allow the E-course to be published and activation. The E-course is activated by training the students and professors to use the E-course.

After discussions and meetings with experts from (NELC) the problems that face this model are:

- Long time taken to produce e-course.
- Very hard to reproduce or fix errors in e-courses.
- Low payment for team members.
- Bad communication skills between team members.
- The professor does not Collaborate in activating the course.
- Tools that been used are many problems especially with Arabic language

Figure 2 is designed to show the timeline for producing an e-course in the traditional model, it displays the average time of the operations rather than the actual time, in most cases this plan is exceeded by a very large margin, sometimes up to three years.

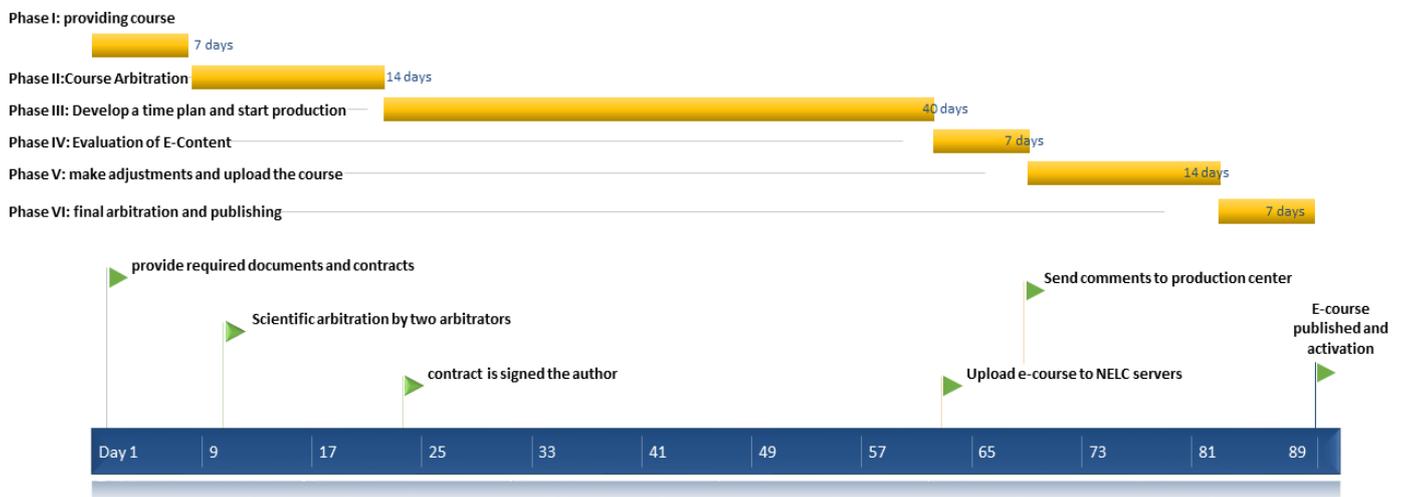


Figure 2: E-course production timeline in traditional model

Some other system used for produce e-course outside Egypt.

(Nivardo Ibarra, etal, 2014) has been proposed (BP4ED) the best practices online for e-learning development [30].

List of disadvantages of the model:

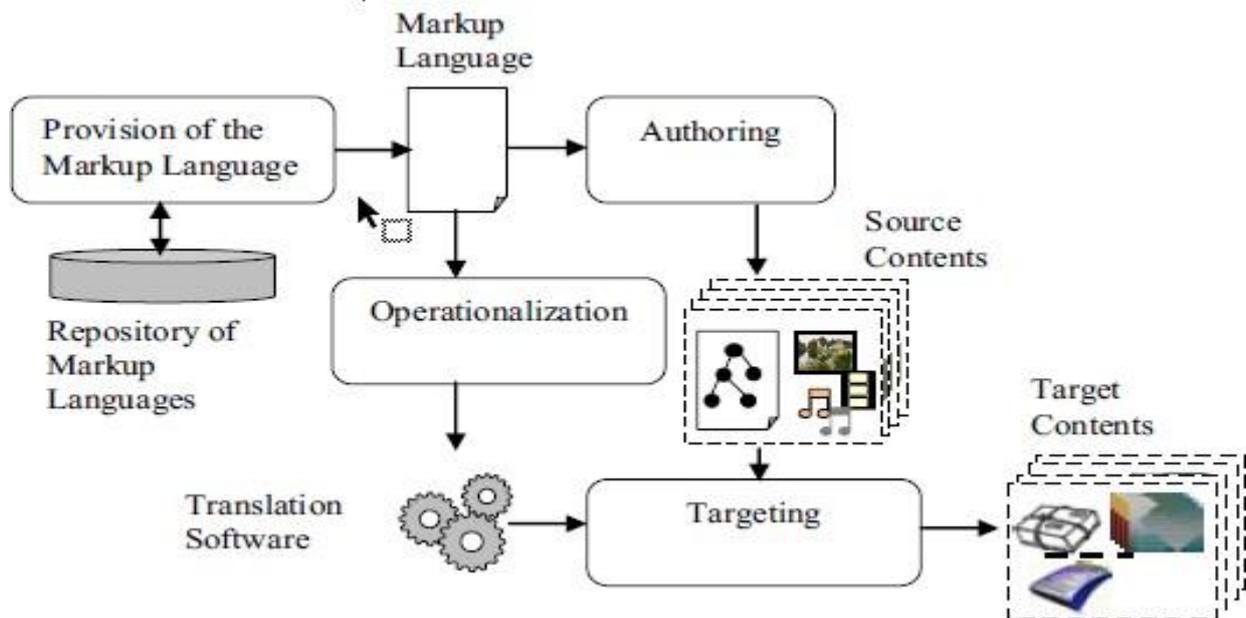
1)The tool is online only.

- 2) No templates available.
- 3) Complex not necessary, there are more familiar tools like (word and excel).
- 4) The product of the system is only used within the system.
- 5) Only one template to create content.

(Pablo Moreno-Ger, et al, 2006) has been proposed (DocBook) a Descriptive Markup model to Facilitate the Production of e-Learning Contents [03].

The products and activities involved in the document-oriented production process model sketched in Figure 3.

They present the DocBook system that they develop as a web based system to build an educational content.



**Figure 3:** DocBook model for production of e-Learning contents (adapted from [03]).

DocBook model disadvantages could be summarized as:

- 1) The markup language is not so easy to use by teachers.
- 2) It cannot help in massive production.
- 3) It is not easy to find errors and fix it.
- 4) It cannot be used with our learning management system (MOODLE) as the product is not (SCORM).
- 5) It has no solution to produce the quizzes and insert questions, which are essential for the educational process.
- 6) The template layout is not compatible with the template known in Los produced by Egyptian universities production teams.

To sum up, the most problems that face e-course production are Lack of concept E-learning, long time of production, low payment for team members, lack of required skills to produce the course, using manual ways in production and Lack of Infrastructure.

### 3 Classification to e-course production problems according to MIS

Management Information Systems (MIS) consists of three dimensions (Management, Organization, Technology) as shown in figure 4 [50].



**Figure 4:** MIS encompasses three factors people, organization and technology

The e-course production problems (presented in the previous section) are classified according to Management Information Systems (MIS) as follows:

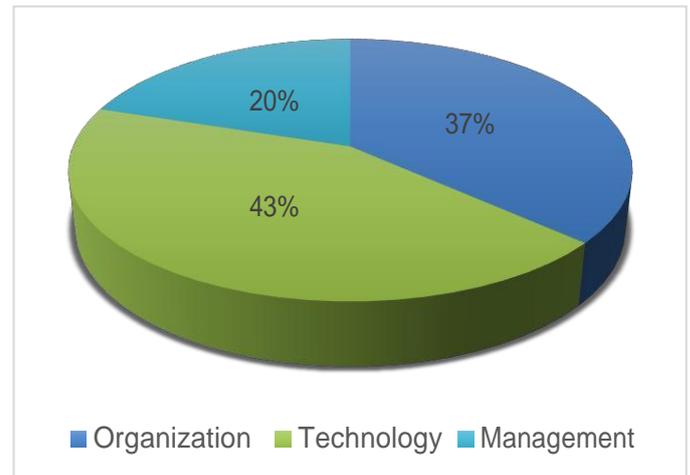
Management:

- Lack of concept E-learning between professors that makes them not desires to convert the courses [4].
- Professor explains his material wrong to the team members that cause to reproduce the course again.

- The instructional designer doesn't search in learning objects repository [6].
- The team members may not have the required skills to produce the course [15].
- The coordinator has to motivate the students [16].
- Lukewarm attitudes by the side of staff and students in the e-learning processes [4].

- Internet service or power cuts affect activates the course [12].
- There is no Instructional material (books, CD-ROMs) [12].

Figure (5) depicts the percentage of the problems for each MIS dimensions.



**Figure 5:** E-course production problems mapping to MIS

Also, classification of E-course production problems of the NELC (traditional model) is mapping to the MIS and categorizing to the model phases, as shown in table 1.

**Table 1:** Problems in (NEIC) traditional model, mapping to the model of MIS

	Traditional Model	Technology	Management	Organization
1	Providing course		<ul style="list-style-type: none"> <li>• Lack of concept E-learning</li> <li>• Lack of E-Content Quality</li> <li>• Lack of expertise</li> </ul>	<ul style="list-style-type: none"> <li>• Manual transporting papers</li> <li>• Long time delivering documents</li> <li>• Small cost benefits</li> </ul>
2	Arbitration the course	<ul style="list-style-type: none"> <li>• Arbitrators hard communication</li> </ul>	<ul style="list-style-type: none"> <li>• Personal differences</li> </ul>	<ul style="list-style-type: none"> <li>• No policy</li> <li>• Losing the Evaluation</li> </ul>
3	Develop a time plan and start production	<ul style="list-style-type: none"> <li>• Lack of Infrastructure</li> <li>• Internet service cuts off</li> <li>• Hardwares are not suitable</li> <li>• No antivirus</li> <li>• Not enough space on the server</li> <li>• tools' problems</li> <li>• communications problems</li> <li>• lack of required skills</li> </ul>	<ul style="list-style-type: none"> <li>• Attendance delayed</li> <li>• wrong explaining materials</li> <li>• No LO repository</li> </ul>	<ul style="list-style-type: none"> <li>• Not using of LO repository</li> <li>• Team member's salary</li> </ul>
4	Evaluation of E-Content	<ul style="list-style-type: none"> <li>• Internet service cuts</li> <li>• No communications</li> </ul>	<ul style="list-style-type: none"> <li>• Comments miss understanding</li> </ul>	
5	Adjust and upload the course	<ul style="list-style-type: none"> <li>• Internet service cuts</li> <li>• Uploading content many times</li> <li>• difficult to modify content.</li> <li>• No communications.</li> </ul>	<ul style="list-style-type: none"> <li>• Miss understanding of modification.</li> </ul>	
6	Finish Arbitration and publish	<ul style="list-style-type: none"> <li>• Internet service cuts</li> <li>• No Instructional material</li> <li>• No labs for students</li> <li>• small bandwidth</li> </ul>	<ul style="list-style-type: none"> <li>• Not motivation to students</li> <li>• Lukewarm attitudes</li> <li>• No Collaborate in activating</li> </ul>	<ul style="list-style-type: none"> <li>• No policy to activate</li> <li>• No evaluation activation</li> </ul>

#### 4. RESEARCH METHODOLOGY

##### 4.1 Data collection

Two surveys have been created based on the classification of the production problems also mapped to model of MIS one for team members and one for center managers, the questions of the survey has been modified and enhanced for four times to be fully understandable for the team members and fully mapped to MIS.

A website has been created to collect the answers from the team members and the center managers.

The survey has been applied to over 750 team members working in course productions centers. In addition, to over 19 center managers.

The results have been filtered to ignore the incomplete results and unknown members.

##### 4.2 Data Analysis

Examining the collected responses and using descriptive statistical methods, statistical Package (SPSS) version 21 Windows software program to analyze the data collected.

##### 4.3 Reliability analysis

To measure the reliabilities of the sample and Reliability of questions, we used Cronbach's alpha. Both surveys have high values of Cronbach's alpha results, which are around 0.8 being close to one.

##### 4.4 Descriptive analysis

The author used statistical Package (SPSS) version 21 Windows software program to analyze the data collected and build the descriptive analysis as shown in the table blow.

Table 2 presents the name of every problem, and the sum of the weight it got from the samples answer, the impact factor indicates the sum divided on the max weight multiply in 100 to get the percentage of the weight of the problem and the author arrange the problems depending on their impact factor.

**Table 2:** Descriptive analysis of e-course production problems

Column1	N	Sum	Mean	Std. Deviation	impact factor
<b>Technology dimension</b>					
reusing L.O.	75	263	3.5067	1.13153	70
antivirus deleting files	75	256	3.4133	1.32638	68
lost files by any mean	75	243	3.24	1.33396	65
developing content tool	75	236	3.1467	1.27017	63
course development time	75	231	3.08	1.40231	62
course author work	75	225	3	1.16248	60
new training needs	75	219	2.92	0.95521	58
finding errors	75	209	2.7867	1.08171	56
internet speed	75	205	2.7333	1.2118	55
communications ways	75	198	2.64	1.07351	53
modifying developed course	75	196	2.6133	1.10151	52
arbitrators hard communications	75	186	2.6067	1.10421	49
work pressure errors	75	175	2.3333	1.14294	47
Work computer	75	141	1.88	1.07753	38
<b>Organization dimension</b>					
activating course	75	263	3.5067	1.13153	70
payroll	75	254	3.3867	1.38421	68
NELC work rules	75	227	3.0267	1.22996	61
course papers	75	228	3.04	1.28862	61
collaboration rules	75	216	2.88	1.39458	58

Column1	N	Sum	Mean	Std. Deviation	impact factor
choosing courses standards	75	218	2.9067	1.042	58
university work rules	75	211	2.8133	1.22688	56
Producing course content	75	211	2.8133	1.33248	56
university payment rules	75	199	2.6533	0.99313	53
NELC course rubrics	75	134	1.7867	1.10641	36
<b>Management dimension</b>					
NELC Personal conflicts	75	218	2.9067	1.01573	58
concept of E-learning	75	211	2.8133	1.31204	56
Personal conflict	75	195	2.6	1.26277	52
team members communications	75	188	2.5067	1.18975	50
easy instructional design	75	157	2.0933	1.042	42

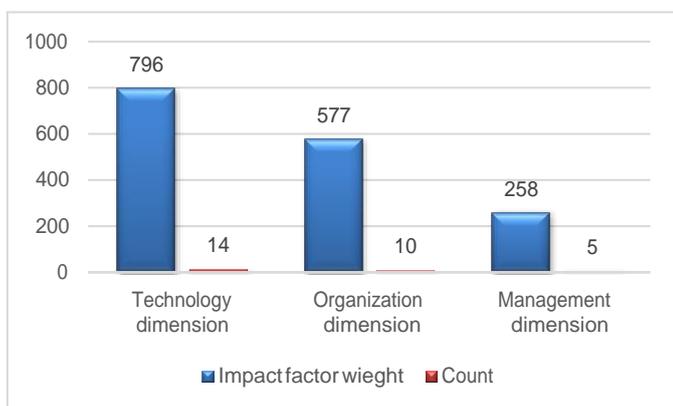
By studying table 2, the authors founded that the most important three problems are

(Reusing L.O. - activating course – payroll)

Moreover, the less important three problems are

(NELC course rubrics - insert course questions - professor's benefits)

Figure (6) presents the total percentage of team member’s problems in the production of E-learning courses in Egyptian universities mapping to MIS.



**Figure 6:** problems of E-learning production courses in Egyptian universities mapping to MIS.

By studying the results for the centers manager’s, the authors founded that the most important 3 problems are

(Production duration. - Easy reproduce production – payrolls)

In addition, the less important 3 problems are

(Personal disagreements - NELC communications ways - antivirus)

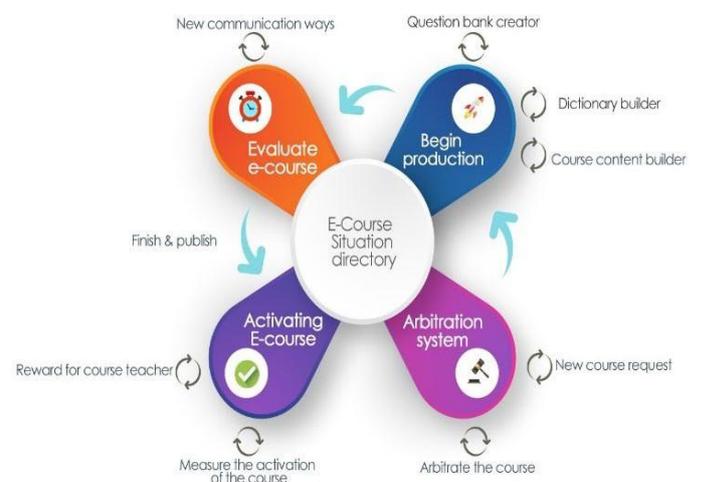
Figure (6) the total percentage of centers manager’s problems in the production of E-learning courses in Egyptian universities, mapping to the model of MIS.

### 5. PROPOSED e-COURSE PRODUCTION MODEL

As presented in the previous sections, there are many shortcomings in The NELC traditional model for producing e-courses. Thus this section will present a proposed e-course production model aiming to solve these problems as shown in figure (7).

The proposed model consists of four phases; the six phases of traditional model were filtered and merged into three phases and a fourth phase (new phase) was added.

Every phase and every step in phases are monitored by “E-course situation directory” which by it the sub center can track the situation of the course production step by step.



**Figure 7:** A proposed E-course production model (synthesized by authors).

## 6. APPLICATION

National E-learning Center is one of five different projects that have been established by The Information & Communication Technology Project (ICTP), The ultimate goal of this project is to establish the National E-Learning Center (NELC) at the Supreme Council of Universities (SCU) to manage and monitor the establishment of e-learning in the Egyptian universities. The NELC role will be confined to putting the policies and regulations and establishing the global e-learning infrastructure in the Egyptian Universities and has (22) Sub-Centers at Egyptian universities, contain all the equipment required, and all the human resources [49].

### Phase 1 Course arbitration:

In this phase the production center begins new request to product an e-course and provide all the required data for this course and suggest four arbitrators in the specialty from outside the university and NELC team check the provided data.

If the course arbitration result says that the course is valid to be converted to electronic format, then the phase two begin.

### Phase 2 begin production:

In this phase the production center begins to convert the course to electronic format using some provided tools like (Dictionary builder - Course content builder - Question bank creator), graphics team should use the LO repository to find any LOs similar to the LOs of the course and reuse them, finally they send a version to NELC team to be evaluated.

### Phase 3 evaluate e-course:

In this phase the NELC team begin to evaluate the e-course and create report of the mistakes in the developed course and graphics to be corrected by the production center, and use the new communications tools with the sub centers teams.

The sub center team fix the comments and then resend the course again to NELC team to the final arbitration.

### Phase 4 activating e-course:

After finishing e-course production, the production center begins to activate the course by motivate both students and course professor to use it in the education process.

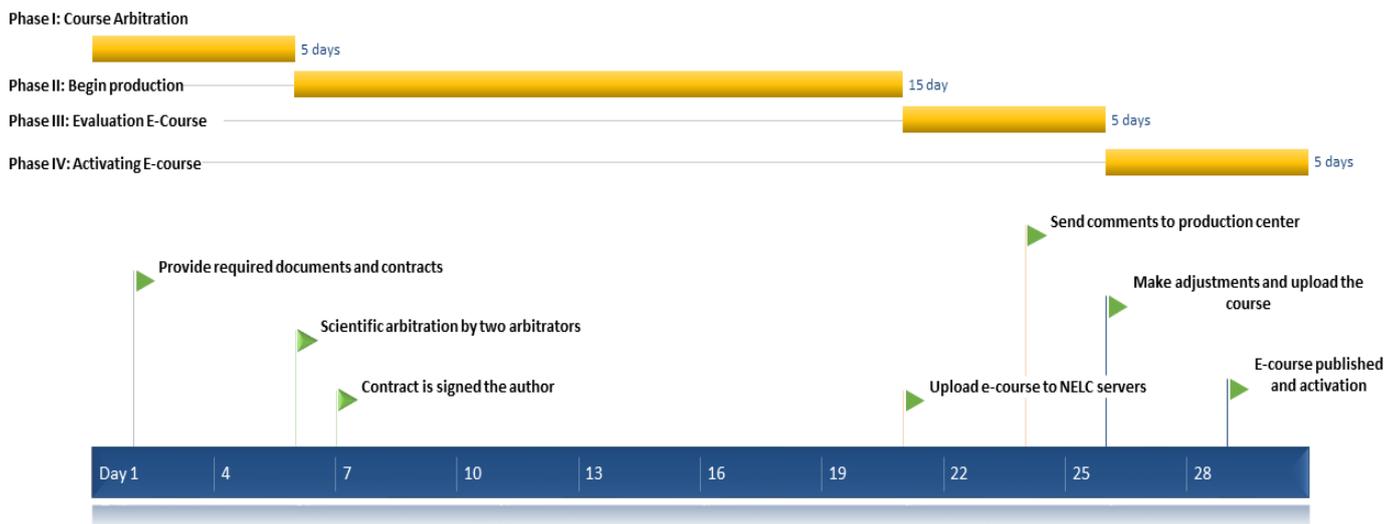
## 7. RESULTS AND DISCUSSION

The proposed model solved many problems that was in the traditional NELC model,

one of the biggest problems facing the process of producing e-courses was the long time to end the production process as was discussed in this paper. Figure 8 shows the significant change in the time required to complete the production process of the course where it was an average of 90 days using the traditional model to average 30 days using the purposed model.

Table 3 indicates the problems that have been resolved based on the problem that presented in table 1.

To solve the problems in each phase, we developed group of tools that solve one problem or group of problems as we will explain here.



**Figure 8:** Comparing traditional model with the purposed model.

**Table 3: Solutions and suggestions for the problems**

	Traditional Model	Technology	Management	Organization
1	Providing course		<ul style="list-style-type: none"> <li>Lack of concept E-learning ✓</li> <li>Small cost benefits ✓</li> <li>Lack of E-Content Quality ✓</li> <li>Lack of expertise ✓</li> </ul>	<ul style="list-style-type: none"> <li>Manual transporting papers ✓</li> <li>Long time delivering documents ✓</li> </ul>
2	Arbitration the course	<ul style="list-style-type: none"> <li>Arbitrators hard communication ✓</li> </ul>	<ul style="list-style-type: none"> <li>Personal differences ✓</li> </ul>	<ul style="list-style-type: none"> <li>No policy ✓</li> <li>Losing the Evaluation ✓</li> </ul>
3	Develop a time plan and start production	<ul style="list-style-type: none"> <li>Lack of Infrastructure ✓</li> <li>Internet service cuts off ✓</li> <li>Hardwares are not suitable ✓</li> <li>No antivirus ✓</li> <li>Not enough space on the server ✓</li> <li>tools' problems ✓</li> </ul>	<ul style="list-style-type: none"> <li>Attendance delayed ✓</li> <li>wrong explaining materials ✓</li> <li>No LO repository ✓</li> <li>Time member's salary ✓</li> <li>communications problems ✓</li> <li>lack of required skills ✓</li> </ul>	<ul style="list-style-type: none"> <li>Not using of LO repository ✓</li> </ul>
4	Evaluation of E-Content	<ul style="list-style-type: none"> <li>Internet service cuts ✓</li> </ul>	<ul style="list-style-type: none"> <li>No communications ✓</li> <li>Comments miss understanding ✓</li> </ul>	
5	Adjust and upload the course	<ul style="list-style-type: none"> <li>Internet service cuts ✓</li> <li>Uploading content many times ✓</li> </ul>	<ul style="list-style-type: none"> <li>difficult to modify content. ✓</li> <li>No communications. ✓</li> <li>Miss understanding of modification. ✓</li> </ul>	
6	Finish Arbitration and publish	<ul style="list-style-type: none"> <li>Internet service cuts ✓</li> <li>No Instructional material ✓</li> <li>No labs for students ✓</li> <li>small bandwidth ✓</li> </ul>	<ul style="list-style-type: none"> <li>Not motivation to students ✓</li> <li>Lukewarm attitudes ✓</li> <li>No Collaborate in activating ✓</li> </ul>	<ul style="list-style-type: none"> <li>No policy to activate ✓</li> <li>No evaluation activation ✓</li> </ul>

**Phase I: providing course**

E-course situation directory is a tool to show all registered courses and display courses situation filtered by (university, faculty, department, course name, production phases).

Using E-Course situation directory solved these problems:

- 1- Prevent the duplication in e-course production
- 2- Every sub center can monitor the status of the courses produced by them.
- 3- Shows how long every course takes to be converted.
- 4- By using the tool, they discover that some courses take over three years to be converted
- 5- The time every course takes to produce the course lead to make a competition between the universities and one university take the first place of them.

From this competition come very good result in accelerating production process, some universities take, the first positions

like “Helwan University” take the first position over three years.

**Phase II: Arbitration the course**

Arbitration is a tool to digitalize the arbitration process

This tool has three main interfaces to work with every character.

**Sub centers interface**

Every sub center has his account on the system to add new course request and add the course in word format.

**NELC interface**

The NELC team enter the system throw their interface to review the new course data. then choose two arbitrators from the suggested arbitrators and send them official emails, Then the NELC team take the final decision with the course either

(begin production – begin production with comments – rebating arbitration – refuse the course).

#### Arbitrators interface

The arbitrator's role is to review the course and fill the survey with their opinion about the scientific content of the course and if it should have converted to electronic format.

Using this software solve these problems:

- 1- Losing the course content papers by using traditional mail.
- 2- Arbitrators lose the course papers because it sent to them by traditional mail.
- 3- Losing the arbitration form result by using traditional mail.
- 4- Tracking the course states by the subcenter.
- 5- Manual register a course name case that some course produces more than one time.
- 6- The course papers may be lost in the way to NELC.
- 7- The arbitrators may not receive the course papers to study.
- 8- The arbitration result may be lost also.

### Phase III: Develop a time plan and start production

#### Question bank creator

This software is built to convert the questions that the Instructional designer or the course teacher put in word files format and convert them to "XML" format that is used in the "MOODLE" system and also can build the question directly in the software, it can convert thousands of question in just one click and category the question to separate categories based on some rules that are given to the user.

#### Dictionary builder

This software used to create the dictionaries that used in the courses, and create the glossaries in the "MOODLE" system.

Every course produced by the Egyptian universities has a dictionary of its abbreviations or ambiguous words, building this dictionary was complex process, so the author created this software to simplify the building of this dictionary.

Like the questions bank software this software builds a "XML" files which used to insert the abbreviations or ambiguous in the course files throw simple interface.

#### Course content builder

This is the most important software in this solution package.

the software is takes word files which the course's teacher or instructional designer built and then convert these files into "HTML" format using the "HTML" template that the user chooses in the begging, and build the course elements (menus – paging – titles – links – page text – references – page numbers) and then compress all these files into "SCORM" files format without any possible error in the code or in the structure of the files code.

Using this software solve these problems:

- 1- The very long time to insert questions in the "MOODLE" system.
- 2- Limits the language errors in the questions text.
- 3- Anyone can create questions.
- 4- The very long time to create and convert the course content.
- 5- Developers' teams do not have the required knowledge to convert the course content correctly in most cases.
- 6- It takes so long to reproduce the course.
- 7- It takes so long to find errors or mistakes in the course content.
- 8- Very fast production time.
- 9- Eliminate the errors and mistakes in the e-course content (files, dictionary, and question bank).
- 10- Help the team members who has a little knowledge in programming languages.
- 11- Help course's teachers to build their own courses.
- 12- Increase the total number of courses produced by the sub centers teams, which help to increase the payment for these team's members.
- 13- It became so easy to reproduce the course again or solve comments in the course content.

### Phase IV: Evaluation of E-Content

#### Task manager system:

This software has three users (NELC team leader – NELC team – sub center teams).

#### NELC team leader interface

The team leader inters the system throw this link "<http://taskmanager.nelc.edu.eg/>". Throw the interface the team leader can review courses being produce in the sub centers in the course status screen and add new task for the NELC team to evaluate this course.

#### Sub centers interface

The sub centers teams throw the system can review the reports NELC team add and then reproduce the course depending on these comments.

Using this software solve these problems:

- 1- Problem of losing the review and comments from the team.
- 2- Team members cannot understand the comments.
- 3- Cannot trace how evaluated the course before.
- 4- Get the most value from the team members.
- 5- It helps to organize the evaluations files between the NELC team and sub centers teams.
- 6- It helps a lot to explain the comments of the NELC teams.

- 7- It helps the team leader in the NELC to organize the model of the NELC team.
- 8- It helps to evaluate everyone in the NELC team members and measure how much he works.

communication between NELC team and sub centers team members.

#### **Activating e-course:**

Low activating e-course is one of the most important problems facing the eLearning because there is no need for the course if no one will access it and get benefit from it, so the author provides a set of rules to help increase the activation value.

- 1- To link between the annual award of the course doctor and the activation value.
- 2- To add some points to the students who will access the e-course and use it.
- 3- Increase the number of lectures for students, which explain how to use the e-courses.
- 4- Use the modern social networks with MOODLE system.
- 5- Observed growth rates of activation of the courses.
- 6- Much more benefit to the students from using the e-courses.

For measuring the activation value, the author provides a software solution called "auto activation", the purpose of this software is to help NELC team to measure the activation value depending on some standard, the system has two users interface (NELC team leader – sub center).

#### **NELC communications ways:**

One of the biggest problems of the team members and NELC team members is that there are not enough communications between them.

To solve this problem, the author developed two ways to communicate with the NELC team members (NELC forums – Live support system).

There should be several ways to communicate with the NELC team because most of the times the sub center teams cannot understand the comments from NELC team as the ways used now not enough.

The forum system plugged in the main site of the "NELC" which can be accessed from here

[http://www.nelc.edu.eg/index.php?option=com\\_kunena&Itemid=103](http://www.nelc.edu.eg/index.php?option=com_kunena&Itemid=103)

Every member of the sub center members has an account and can add posts to the forum, this forum helped a lot in making the members more productive and share the problems solutions between each other's.

Therefore, they should be an online chat 24-hour per day, by using new NELC communications ways, by using these communications ways got these advantages.

1. A large community has created in which technical solutions shared.
2. Many of the problems that team members have been resolved that happened due to a lack of

#### **Suggestions regulations rules to adjust the model**

There are some problems which has been discovered from the survey during data collection, which are not technical problems. A suggestion to solve these problem could be as follows:

#### **Payroll:**

One of the biggest problems facing the E-learning team members that the payroll is not enough for the members to have a decent live and not equivalent to the salaries paid in the companies outside the universities.

So our suggestion is to,

- 1- Raising the payroll of the team members.
- 2- Evaluate the payroll based on the work done by the team member.

#### **New training needs**

The team members should practice on the most recent technologies in the fields of the web development.

Therefore, there should be regular courses for the team member to teach them the new technologies of the web development.

#### **Concept of E-learning**

The concept of E-learning should be split between both students and course teacher.

The first reason that the course teachers do not want to convert their courses into e-courses and the students do not care to access the courses, as they do not know the value of using e-courses.

Therefore, multi-session should be held for teachers and students to acknowledge them with the e-learning concept.

## **8. CONCLUSION AND FUTURE WORK**

This paper presented E-learning concept and its importance. Traditional NELC model has been explained and the problems of each phase in traditional model is mapped to MIS. A survey is chosen to collect data from team members and managers, and then descriptive analysis has been provided to show the highest problems.

A proposed e-course production model has been discussed, which consists of four phases; the six phases of traditional model were filtered and merged into three phases, and a fourth phase (new phase) was added.

The proposed model has been applied in NELC and the results are discussed in details, one of the most important result is the e-course production process with the proposed model takes an average of 4 weeks instead of 12 months in the NELC model.

For the future work, the proposed model will apply to number of case studies in order to generalize the model, and get more benefits from it.

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