# An Intelligent System For Smart On-Line Training Courses

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*Abstract:* - This paper proposed an intelligent diagnosis system for managing the Virtual Educational Enterprises in the e-learning community through the on-line training system that supports a Web-based training model. The online training system is centered in reusability, accessibility, durability and interoperability of course content and environments of virtual education. The structuring model for dynamic composition of these components is based on the concept graph knowledge representation model. The multi-agent architecture as a middleware for open WEB systems is developed for sequencing and delivery of e-courses. A basic problem faced by the E-Learning community systems is how to produce and deliver quality content for online training experiences, being able to compose, revise and update this content in an efficient way. This arise the issues of interoperability (content from multiple sources working equally well with different learning systems) and reusability (content developed in one context being transferable to another context), which are imperative to the sustainability of the work on Web Based Education (WBE). Online Training Management System is covered in this study range from those that manage resources in training centers as virtual educational enterprises through systems that manage e-course training to those that manage the delivery of multimedia training over local area and wide area networks and the Internet and intranets. It also includes systems that provide virtual e-courses according to quality criteria. The advantages of the proposed intelligent system for trainers and educational enterprises are reducing the training cost. These costs are related to trainers' salaries, meeting room cost, trainer travel, and meals are quantifiable; the reduction of time being away from the job by employee. Learning times be reduced, delivery of content is possible, self-learning reduces stress and increases trainee satisfaction, interactivity, and help trainee to get quick reference materials.

*Key-Words:* - Intelligent Tutoring System ITS, e-course, e-learning community, UML diagram, Virtual Educational Enterprise, on-Line Training, content standards,

## 1 Introduction

"Unified Modeling Language (UML) is a set of modeling conventions that is used to specify or describe a software system in terms of objects. The UML does not prescribe a method for developing systems - only a notation that is now widely accepted as a standard for object modeling" (Wei-Tsong Wang , IIM, NCKU, 2007). An intelligent is used to give appropriate learning guidance to assist the students in improving their study and grade online class participation for the teacher.

Chris Anson (1999) and Liz Pittman (2000), propose the following questions:

- What are the effects of online communication when it replaces traditional classroom-based interaction?
- How might the concept of a classroom community change with the advent of new technologies? What is the future of collaborative learning in a world in which "courseware" may increasingly replace "courses"?
- What are the consequences of increasing the distance between students and teachers?
- How will the conditions of virtual Educational Enterprises change as a result of increasing access to students via telecommunications?
- Will educational institutions as physical entities disappear?
- What new roles will teachers, as expert responders, play in an increasingly electronic world?

- Could technology reduce the need for the physical presence of instructors, opening the door to more part-time teachers?

**The Study Problem:**

As the technology is complicated in difference fields of work, so the corporations attempt to train and qualify the staff members continuously so as to catch the development on those fields (Abu Al Saud 1998). Several corporations depend on the computer equipments for the training operation. This type of training has been developed and depends on the effective multi-media use (voice, photos, text, video …etc) which make dealing with each trainee separately and allow him to continue in training according to his interest. This type of training may help in catching the information in faster rate and that achieves the objective of training. Therefore, the distant training course program would be prepared based on the multimedia as e-courses to be put in the net-server and provide the trainee with it.

*Most training centers could not have the ability to transfer those e-courses in the right and effective way across the internet to the trainee.*

**The questions of the study** would be answered in three axes. The first axis is by reviewing the theoretical concepts of the study. The second axis deals with the scope of the study. The third axis covers the analysis of the results and the discussion.

- What is the status quo of the sites of distant training according to the international standards for distant training?
- What are the types of distant training using computers and internet? To what extent the distant training centers depend on the synchronous and un-synchronous training?
- What are the methods to make the e-courses available for trainees?
- What are the elements for processing the e-courses across the internet? What are the basic data for the webpage in the distant training centers internationally?

**1.3 The Importance of the Study:**

The importance of this study is derived from the importance of the internet itself now and in the future, as it is considered as developing and supporting force for fast and effective management, because of its ability to communicate directly the managers of their subordinates at any level at any time and train them in any level of management at any time during the day, week or the year. Also the physiological factors of the higher-level managers as they are shy to go to the traditional training centers:

- The study would help in formulating e-courses with multimedia systems on which could the development of human resources depend.
- The possibility of transferring the content of the e-courses of the local and international courses and attract many of the managers and potential managers to get use of such courses at any time and this raising the level of training.
- Reducing the time needed for transfer operation and understanding the contents of the e-course, which result in reducing time for training and reducing the costs of training consequently

**The Study Objectives:**

*The study aims to fulfill the following objectives:*

1- Identify the expected advantages from use of e-courses and from preparing the electronic training courses needed for the trainee such as the university lecturers and other from the leaders and higher management staff.
2- Determine the different types of distant training using the computer networks and the internet.
3- Presenting the methods which make the e-courses available for trainees.

4- Study the status quo of the distant training centers, and know the basic data for the web page in them.
5- Identify the dependence of the distant training centers on synchronous or asynchronous training.
6- Clarify the required elements for the transfer of e-courses across the internet.
7- Present a model with using UML to manage e-courses to realize the following:
    - Shortness in the time for student.
    - Availability to working any jobs.
    - Kept all data secret**.**

## 2. Methodology of the Study

The methodology of the study is designed to include the field survey covering the centers of training which has got websites. It was identified through searching the National Centre for Education Research Databases and Publications were also sourced. References within the research gathered. Some readings were sourced in hard copy through the library networks and throughout websites. Approximately 100 sites were visited. Only those offering flexible delivery or online courses were reviewed. A total of 52 sites were reviewed.

**The literature was analyzed the sites:**

- listed on Utilizing Yahoo, Alta Vista and Excite, searched the web using the phrase online + learning, online + **training, Distance + training**
- Which were reviewed in the Online Services Literature Review?

***Sites were evaluated according to:***

- Their current offerings of online or flexible delivery courses.
- The quality of their course information.
    - Range of course offerings.
    - Range of levels offered.
    - Site navigability.

**Sites that allowed evaluation of example course material were evaluated by**:

- Alternative modes of delivery.
- Support and guidance for new online learners.
- The communication support was available.
- The material was merely a learning guide or actually delivered a learning experience.
- The use of relevant graphics, animations and other enhancements.

**Content Analysis Methodology:**

. The standards were derived from the international standards provided from the research center of Northern Territory University in Australia (2001) that offer many flexible and on-line courses, TAFE div of Swinburne university that offer small business modules contain both learning guide and learning material (www://webct.vetonline.vic.edu.au , university of California that offer online courses in Education, Pensylvania State University World Campus that offer many online courses and available to International Students. The content analysis covered the web pages of the training centers (Annex No.1).

## 3. The Study Framework

There are different meanings for the Virtual Educational Enterprises and e-learning community. These contain large areas which are used interchangeably. These terms are: ***Computer Mediated Conferencing (CMC), Distance Education, Flexible Delivery, Flexible Learning, Online Delivery, Online Learning, Online Training, Open Learning, Virtual Learning, Web Based Training, Web Training, Web Based Education.*** Each of these terms is used to describe some or all of the processes of facilitating training, education and assessment using the Internet and related technologies. **"Distance** education is flexible. It is adaptable to learner's conditions anywhere and at any time (cited Roy 1997:11)" (G. Carter 1999 quoting Holmberg 1995).

**'Virtual** reality depends on the interaction among students or trainers with information or other person, immersed in cyberspace, using computers and telecommunication technologies.' Gayol & Schied (1997:3). 'Virtual learning means better ways of teaching and learning by integrating information technology into the classroom and at-a distance like an electronic village' Thomas Athey 1997:2-4" (G. Carter 1999).

This study we will use the term '**Online Training'** to be included these terms and to describe the issue of '**Flexible training'** which concerned with the Internet. Cecilie Murray describes that as "the online learning is conceived of a rich, dynamic resource that promotes interactivity amongst a community of learners. It can be web-based or use videoconference.

An online learner accesses learning that provides resources and links to other learners through a set of collaborative communication tools (e-mail, web forums, chats, interactive, whiteboard." (C. Murray 1999). Trainees should be able to access training 'where, when and how' they want it. 'Flexibility Learning' is given the following characteristics by the EdNA Advisory Group (EdNA2000:6):

- learning as an open-ended,
- continuous aspect of life-long learning;
- interaction between trainer and trainee within dynamic and best-fitting schedules of exchange;

### 3.1 Flexible Online Training

Gilly Salmon and Ken Giles (1998) discusses that there are three types of technology are involved in computer conferencing:

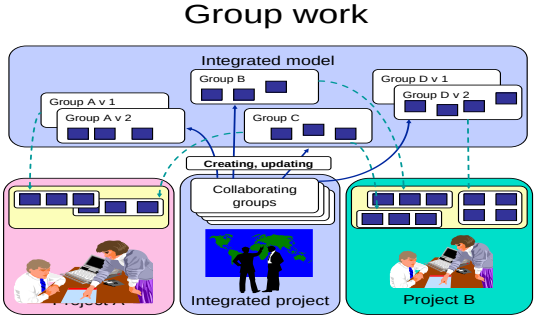
- a terminal or personal computer,
- telecommunications system to connect the computers to a central computer,
- a central server and software system to store and organize the texts and messages"

There are many ways to use these basic configurations. As Tom Barron (1999) explains "One organization's web-based training (WBT) might be asynchronous courseware downloaded from a centralized website to learners' desktops, accompanied by bulletin-board Q & As. Another version of WBT might feature two-way audio in an instructor-led format, accompanied by live document sharing by dozens or even hundreds of learners."(Barron 1999)

The software packages appear to provide the appropriate features to allow trainer to 'deliver' a full and comprehensive flexible learning experience to learners. The of assessment of flexible online learning competency-based

programmes, is an important one. The assessments include:

- identification and analysis of the methods used;
- security issues (how can an RTO be sure that evidence of competency is genuine);
- methods used to auspice and mentor assessment; and methods used to ensure validity, reliability




Multimedia is seen as an important plank in the flexible delivery platform. **Marc Hequet** discusses the need for a sound instructional basis for good multimedia resources:

"Interaction is one of the most important components of any learning experience (Dewey 1938; Vygotsky 1978). "Moore (1989) made the distinction between three types of interaction: learner-content, learner-teacher, and learner-learner. Hillman, Willis and Gunawardena (1994) argued that the learner has to interact with the medium. **The four major factors influencing interaction in this course were: Gilly Salmon (1998)** structure; class size; feedback provided to the

students, and participants' prior experience with CMC."

Chris Anson (1999) offer technologically enhanced "independent study" courses." "Although many studies and testimonials affirm the ways that internet chat lines, listservs, email, and other "virtual spaces" can actually increase the social nature of communication, there is no doubt that the physical isolation of each individual from the others creates an entirely different order of interaction."

### 3.2 The Differences Between on-line Training and Traditional Training

The fundamental differences between 'traditional training and on-line training facilitated by the new technologies are in ***Ian Hamilton, quoted in Training Agenda Vol 5 No 4, November 1997 addresses the broad issues:***

"**Flexible delivery** has to be thought about very broadly. It might mean a teacher going into the workplace; delivery via the Internet or by satellite; or, simply, materials being delivered in the mail. "New technologies are not mass technologies in the sense that television broadcasting has been. They're direct communications with individuals." Liz Pittman (2000)

**J.G. Schutte (1996)** divided 37 social statistics students into two groups, one taught in a traditional classroom and the other taught 'virtually' on the World Wide Web. The 'virtual' group used e-mail, Hyper news discussion, Internet relay chat mIRC and the Internet. "Student success was ultimately measured by the students' performance in mid-term and final examinations with the 'virtual' students scoring an average 20% better than their peers in the 'traditional' classroom. **Schullte** found that "It was hypothesized that face-to face professor-student interaction is crucial to test performance. However the data indicate the reverse, that virtual interaction produces better results."

Marc Hequet sees potential for multimedia learning resources to replace traditional training in some circumstances:

- "To the extent that multimedia provides just-in-time need-to-know information about how to do a job – to the extent that it acts as performance support – multimedia can all but replace training.
- A multimedia environment often means information on demand. Ideally, trainees can run the program on their computers when they need it.
- Multimedia: Trainees can pick and choose. They don't have to sit through the whole course."

## 4. Models of On-Line Training in Virtual Educational Enterprises

**Taylor (1998**) places the term in context in his 'Models of Distance Education' in which he postulates four generations of development:

1. First Generation – The Correspondence Model (print).
2. Second Generation – The Multi-media Model (print, audiotape, videotape, computer-based learning and interactive videodisk).
3. Third Generation – The Tele-learning Model (Audi conferencing, videoconferencing, audio graphic communication, broadcast TV/radio and audio teleconferencing)
4. Fourth Generation – The Flexible Learning Model (interactive multimedia, internet-based access to WWW resources, computer mediated communication [CMC]). Computer mediated conferencing (CMC) includes information retrieval, electronic mail, bulletin boards, and computer conferencing." as quoted by Gilly Salmon and Ken Giles (1998).

### 4.1 Distributed Learning Models By Using UML

The main reason for choosing e-learning as a delivery method is that users want to learn at their own place and at a

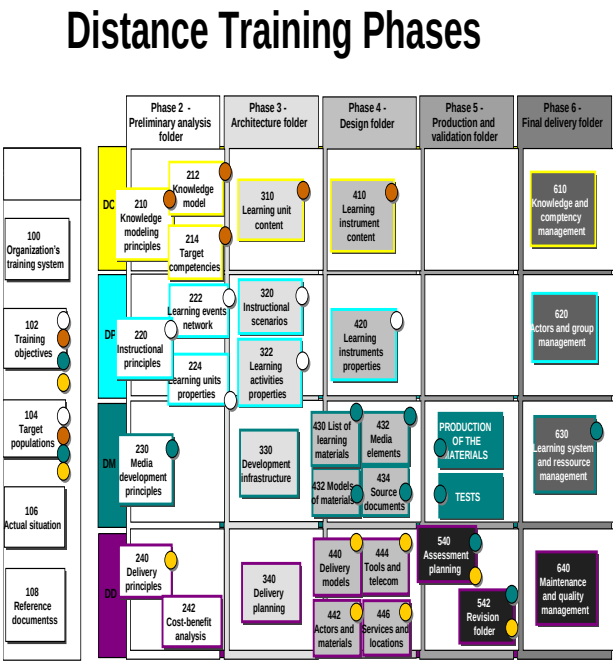
time and location that is convenient to them. The ITS covered this problem.

### *4.1.1 Functional Requirement:*

- Manage topics for a course
- Manage courses information
- Manage professors information
- Assign courses to professor
- View course
- View courses calendar
- View professor

### *4.1.2 Non function requirement:*

- Reliability
- Efficiency
- Portability
- Traceability of requirements
- Backward-compatibility
- Cost-effectiveness
- High-performance
- Modifiability
- Maintainability
- Understandability
- Adaptability
- Reusability




## 5. Presentation and Discussion of the Study Findings

The study of the distant training centers which present e-courses with multimedia transferred from the Internet will not be quality enough because the training centers are concerned by producing the multimedia systems without paying attention to the management process, thus leads to their shortages and incapability to be in competition.

E-training systems is faced the problem of producing and delivery of material content for online training quality, which able to compose, revise and update this content in an correct way. The interoperability (content from multiple sources working well with different learning systems) and reusability (content developed in one context being transferable to another context in other languages for example), which are to the sustainability of the work on WBE

Chizmar and Williams (1997), when planning their flexible delivery programs were guided by Chickering and Gamson's (1987) Seven Principles for good teaching practice. Their Seven Principles, which succinctly summarize decades of research on undergraduate teaching and learning, implore teachers to:

[1] encourage contacts between students and faculty
[2] develop reciprocity and cooperation among students
[3] use active learning techniques
[4] give prompt feedback
[5] emphasize time on task
[6] communicate high expectations, and
[7] Respect diverse talents and ways of learning."

Eric Whitehouse (1997) Tim Kilby (1999) describes the features of a 'Web-based Performance support system' in terms of its potential benefits: WBTIC Web-Based Performance Support Systems http://www.webbasedtraining.com/about.aspx

- Web based could collect, manage, and retrieve not in an organized form, yet available for incorporation into a unified performance support system.

- Valuable components of a web based training for enhancing human performance.
- Web-based training would be a key component; designed in smaller, task-specific informational that could be completed in short order.

## 8. Conclusion

The proposed Dynamic Intelligent System For Managing e- Courses in The e-Learning Community depends on the main architecture of managing e-courses consists of *Online Training Management System that is covered in this study range from those that manage resources in training centers as virtual educational enterprises through systems that manage e-course training to those that manage the delivery of multimedia training over local area and wide area networks and the Internet and intranets. It also includes systems that provide virtual e-courses according to quality criteria.*

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Appendix A

**Sample of e- learning community sites**

*Virtual Educational Enterprises support*

*e-courses*

***Reviewer's Recommendations for creating an ultimate online***

***Learning experience***

**e-course sites**

Launceston Senior Secondary College (TAS)

1. http://cybercourses.ggu.edu/help/help.html#path
2. http://cybercourses.ggu.edu/index.html
3. http://netscan.sscnet.ucla.edu/csoc/cinc/
4. http://www.aace.org/
5. http://www.california.edu/
6. http://www.imsproject.bangor.ac.uk/ims/ims.html
7. http://www.lotus.com/home.nsf/welcome/learnspace
8. http://www.masie.com/list/
9. http://www.newschool.edu/
10. http://www.sctcorp.com/

**INTERNET SUPPORTED COLLABORATIVE LEARNING LINKS**

1. http://product.blackboard.net/
2. http://www.imsproject.org/
3. http://www.wgu.edu/wgu/index.html
4. http://www.calcoastuniv.edu/ccu/
5. http://www.uophx.edu/uop/_campus.htm
6. http://www.forbes.com/forbes/97/0616/5912084a.htm
7. http://www.csudh.edu/
8. http://support.blackboard.net/asp/docs.asp
9. http://coned.byu.edu/is/courses/323434340002/public/busm340.htm
10. http://www.ucsf.edu/
11. http://online.sfsu.edu/
12. http://ifets.gmd.de/news.html
13. http://ifets.gmd.de/periodical/cfp_july00.html
14. http://ifets.gmd.de/periodical/vol_3_99/v_3_99.html
15. http://www.info.cornell.edu/CUHomePage/CornellStream.html
16. http://courses.memphis.edu/
17. http://www.people.memphis.edu/~profweb/atyourside/start.htm
18. http://www.staffs.ac.uk/
19. http://home.ulh.ac.uk/ldu/elen/index.html
20. http://www.shu.ac.uk/
21. http://webct.prenhall.com/
22. http://webware.Princeton.EDU/howard/slides/future/
23. http://horizon.unc.edu/TS/contents/1999-05.asp
24. http://zeus.gmd.de/ifets/
25. http://www.aace.org/conf/index.html
26. http://cybercourses.ggu.edu/
27. http://www.adapttrain.org/
28. http://www.hbsp.harvard.edu/products/hbr/index.html
29. http://www.cren.net/
30. http://www.educause.edu/
31. http://agora.unige.ch/tecfa/edutech/edutech2.html#PEDAGOGY
32. http://www.hbs.edu/it/
33. http://www.olin.nf.ca/landonline/
34. http://www.edna.edu.au/EdNA/
35. http://www.jansol.com.au/
36. http://www.covis.nwu.edu/
37. http://www.admin.ox.ac.uk/po/
38. http://www.csv.warwick.ac.uk/alt-E/
39. http://www.exed.hbs.edu/programs/dis/index.html
40. http://www.bbc.co.uk/home/today/
41. http://www.sevc.com/
42. http://www.openhouse.org.uk/virtual-university-press/vuj/welcome.htm
43. http://gsb-iis.stanford.edu/m395/syllabus.htm
44. http://www.biz.colostate.edu/html/acad/grad/gradcourses.html
45. http://www.utexas.edu/world/lecture/
46. http://helios.hud.ac.uk/workspace/
47. http://www.ukoln.ac.uk/services/elib/
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49. http://www.utexas.edu/world/lecture/
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51. http://www.openhouse.org.uk/virtual-university-press/vuj/welcome.htm
52. @learning Corporation (www.learningnetwork.com)
53. ACTV (www.actv.com)
54. ALEKS Corporation (www.aleks.com)
55. Asymetrix Learning System, Inc (www.asymetrix.com)
56. Blackboard, Inc (www.blackboard.com)
57. Contigo Software (www.contigo.com)
58. COSE (www.staffs.ac.uk)
59. ImaginOn (www.imaginon.com)
60. i-mind Education Systems (www.imind.com)
61. invest Learning (www.investlearning.com)
62. Janison Ltd (www.janison.com)
63. JDH Technologies (www.jdhtech.com)
64. KnowledgeSoft, Inc (www.knowledgesoft.com)
65. Lotus LearningSpace (www.lotus.com)
66. MC2 Learning Systems, Inc (www.mc2.sfu.ca)

**SOFTWARE: COURSE MANAGEMENT & DELIVERY**

**SOLUTIONS**

1. @learning Corporation (www.learningnetwork.com)
2. ACTV (www.actv.com)
3. ALEKS Corporation (www.aleks.com)
4. Asymetrix Learning System, Inc (www.asymetrix.com)
5. Blackboard, Inc (www.blackboard.com)
6. Contigo Software (www.contigo.com)
7. COSE (www.staffs.ac.uk)
8. ImaginOn (www.imaginon.com)
9. i-mind Education Systems (www.imind.com)
10. invest Learning (www.investlearning.com)
11. Janison Ltd (www.janison.com)
12. JDH Technologies (www.jdhtech.com)
13. KnowledgeSoft, Inc (www.knowledgesoft.com)
14. Lotus LearningSpace (www.lotus.com)
15. MC2 Learning Systems, Inc (www.mc2.sfu.ca)

**SOFTWARE: COURSE MANAGEMENT & DELIVERY**

**SOLUTIONS**

1. McGraw Hill Learning Architecture (www.mhla.net)
2. PlaceWare (www.placeware.com)
3. SCT (www.sctcorp.com)
4. SoftCom (www.softcom.com)
5. Virtual Learning Environments, Inc (www.vlei.com)
6. WBT (www.wbtsystems.com)
7. WebAssign (wenassign.net)
8. WebCT (www.webct.com)
9. White Pine Software (www.wpine.com)

This list represents a sampling of the biggest and best known of the

Degree-granting schools in the US. The selection is based on Forbes top 20

list of universities offering Internet based courses.

Brevard Community College Cocoa

1. www.brevard.cc.fl.us
2. California State University Dominguez Hills
3. www.csudh.edu/dominguezonline
4. Carnegie Mellon University Pittsburgh
5. www.gsia.cmu.edu
6. City University Bellevue
7. www.cityu.edu

**TOP 20 VIRTUAL EDUCATIONAL INSTITUTIONS**

1. Colorado State University Fort Collins
2. www.colostate.edu/Depts/CE/
3. Duke University's Fuqua School of business
4. www.fuqua.duke.edu/programs/gemba
5. Education Network of Maine Augusta
6. www.enm.maine.edu
7. Indiana University System Bloomington
8. www.extend.indiana.edu A.G.S.,
9. Michigan State University East Lansing
10. www.msu.edu
11. National Technological University Fort Collins
12. www.ntu.edu
13. New School for Social Research New York
14. www.dialnsa.edu
15. New York Institute of Technology On-Line Campus Central
16. www.nyit.edu/olc
17. Nova Southeastern University Fort Lauderdale
18. www.nova.edu
19. Old Dominion University Norfolk
20. www.odu.edu
21. Thomas Edison State College Trenton
22. www.tesc.edu
23. University of Alaska Southeast
24. www.jun.alaska.edu
25. University of Colorado
26. www.jec.edu
27. University of Maryland University College
28. www.umuc.edu
29. University of Phoenix Online Campus Phoenix,
30. www.uophx.edu/online
31. Washington State University Pullman
32. www.eus.wsu.edu/edp

## Appendix (2) :

## UML Diagrams to represent the Dynamic Intelligent system for manging e-courses

- **Use Case Diagram**
  **Activity Diagram**
  **Class Diagram**
  **Object Diagram**
  **State Machine Diagram**
  **Composite Structure Diagram**
  **Sequence Diagram**
- **Communication Diagram**
  **Interaction Overview Diagram**
  **Timing Diagram**
  **Component Diagram**
  **Deployment Diagram**
  **Package Diagram**

***Use case narrative:***

*Use case name*1: Register.

*Participating actor* : student, employee, taller.

*Entry condition*: student submit file to employee management.

*Flow of event*: 1. student submit file to employee management.

2. Employee management checks file and authentication to register.

3. Employee management show list of courses to student.

4. Student chooses courses from list's courses.

5. Employee management write pay note to student.

6. Student payment money.

7. Employee management update list.

*Exit condition* Employee management update list.

**Use case narrative:**

Use case name 2: Transfer.

*Participating actor:* Student, Employee management.

*Entry condition*: Student request transfers file.

*Flow of event*: 1. Student request transfers file.