A SOFTWARE TOOL FOR
WEB-BASED DISTANCE LEARNING
SYSTEMS DESIGN

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Objective

A flexible softw...... e learning syst...... two parts:

Demonstrated by:
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the first part present...... attempt to introduce a software to......l for development of a web-based distance-learning course.

The second part covers the design of a fuzzy decision making system to deal with vague information.

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Computer-Based Learning Systems:

Advances in computer and information technology ... for

Stu... traditional ... s:
- li... ns,
- limi... and
- insufficie... ed instructors

> The development of computer systems has opened up new possibilities for education and training.

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Computer-Based Learning Systems:

Due to the progress of computers and communications technologies,
it is possible to handle transmission of text, image and voice through internet.

The use of internet has the advantage that it is not restricted to the time and place.
People can study at any time and any place as they wish.

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Computer-Based Learning Systems:

Real educational processes deal with uncertainty in knowledge and decision

Most ... annot provid ... te learners. These sys ... us to handle

Fuzzy Set Theory
incorporates precise techniques for solving such problems.

vague information the knowledge representation and decision making

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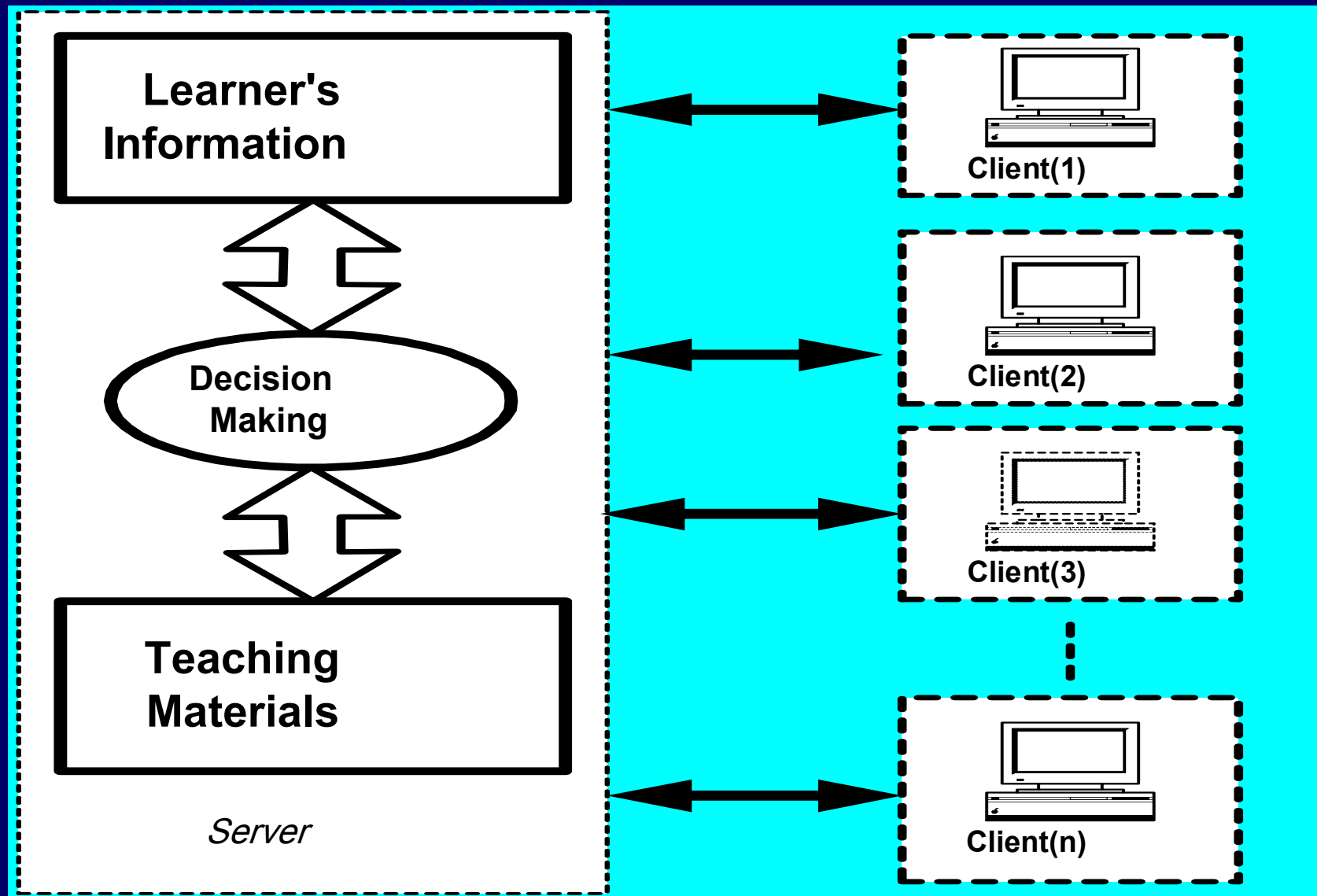December, 2003

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System Design

The world wide web (www) technology is very suitable for building distance learning systems.

Using the web as both a library and a virtual classroom is a logical way to set up distance learning.

The proposed system software is to be established on a web server.

Learners can access the server from a personal computer (client) connected to the server.

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System Layout

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Objective

The proposed software tool can be accessed by the course instructor, learners and guests.

Guest:

can view course outline of available courses, and can go through the registration process to attend any course.

Learner:

can access the teaching materials of any course in his list.

Instructor:

can add and update the teaching materials.

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Instructor Page:

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Learner Page:

Web-based Distance Learning

Course: Intelligent System Design (630452)

Learner Name	Ahmad Ali
Learner Level	A

- **Overview**
- **Table of Contents**
- **Instructor**

- ◁ **Unit** ▷

- **Abstract**
- **Normal**
- **Details**
- **Test**
- **Pause**

Backward Chaining

Forward-chaining is a good inference technique if we are working with a problem that requires us to begin with information and then derive logical conclusions. In other problems, we begin with a hypothesis (goal) and attempt to prove it by gathering supporting information. This requires a goal-driven reasoning which is called backward chaining

Example

Consider the following set of rules:

R1: IF A AND C THEN E
R2: IF B AND C THEN E
R3: IF A AND D THEN C
R4: IF E THEN F

Assume the initial content of the database is

(A D)

Test Time: *00:00*   ◁ ▷   EXIT   Help?   Search

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Teaching Materials:

- **Each educational unit consists of several pages of HTML text and JPEG images.**

- **Each page consists buttons such as;**
  - **NEXT:** a request to view the next page.
  - **BACK:** a request to view the previous page.
  - **DETAILS:** more details about the given materials.
  - **SEARCH:** searching words and phrases in T.M.
  - **E-MAIL:** authorized learner is automaticallylisted in the mailing list related to this course. learner can communicate with the instructor and learners.
  - **TEST:** either self test or unit test.
  - **EXIT:** a request to stop learning.

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Decision Making Module

Check if the learner is authorized to access the learning system or not.

Check the learner information, to provide appropriate teaching materials to each learner.

Manage the teaching materials.

Check the learner's degree of understanding.

Analyses the collected information about each learner to update his/her knowledge level.

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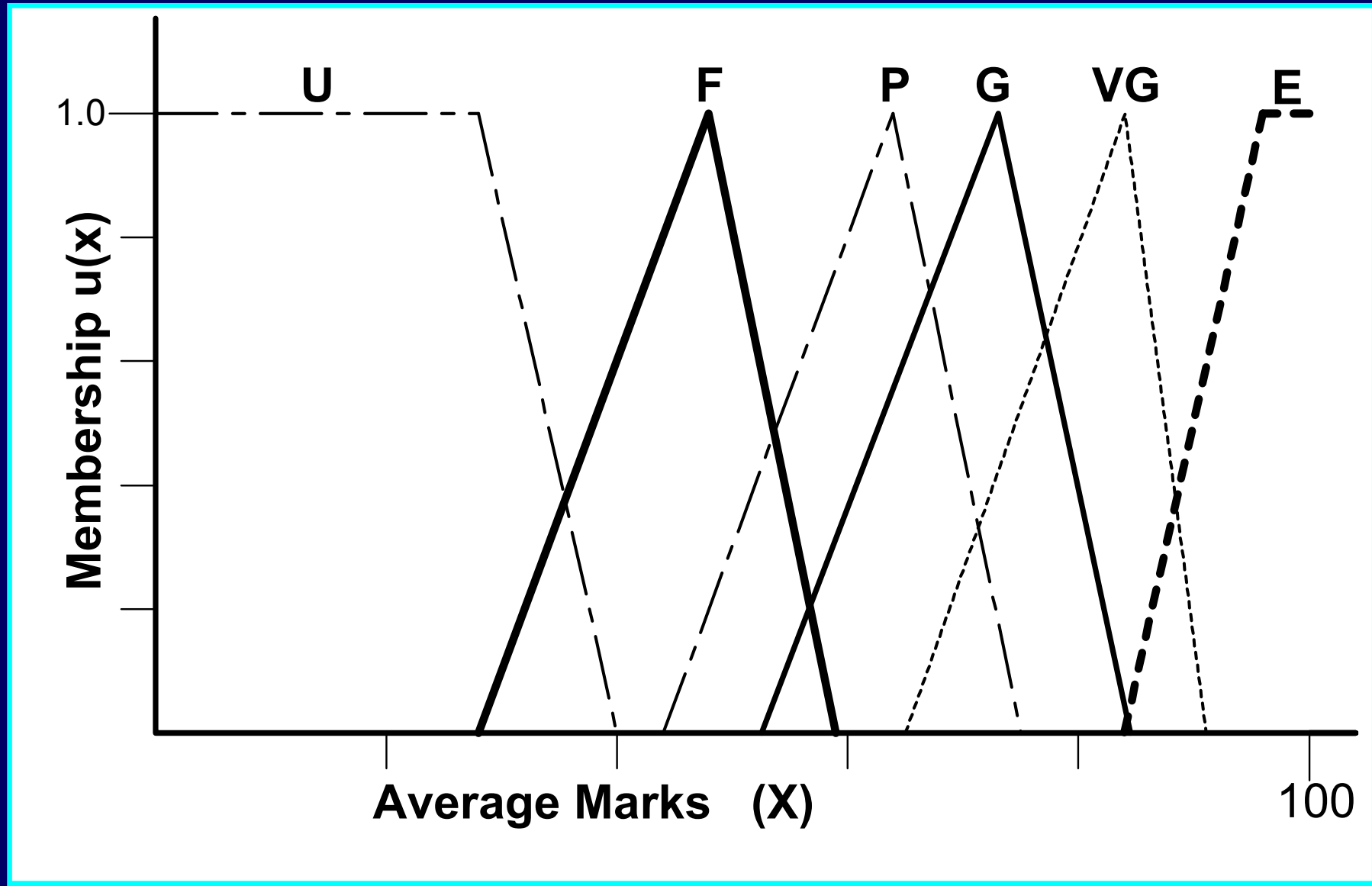Philadelphia University, 2-4
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Fuzzy Set Theory and Learning

Human thinking and reasoning involve vague information; therefore, educational systems should be able to cope with such vagueness.

Vagueness is related to the following source:

- Information provided by the learner.
- The current knowledge level of the learner.
- The evaluation of the leaner level.
- The experience of the instructor.
- The objective behind the course materials.

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Fuzzy Set Theory:

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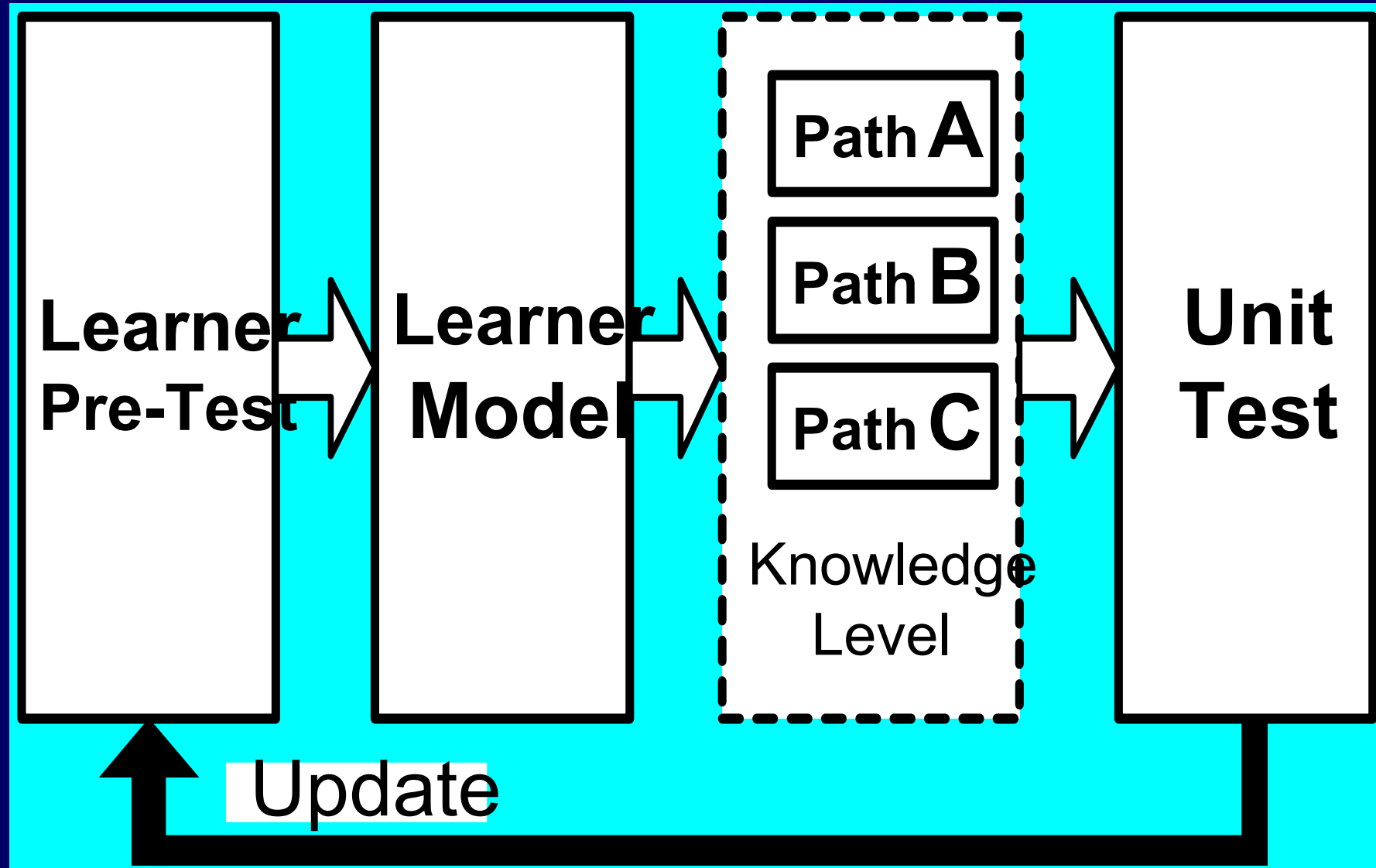Philadelphia University, 2-4
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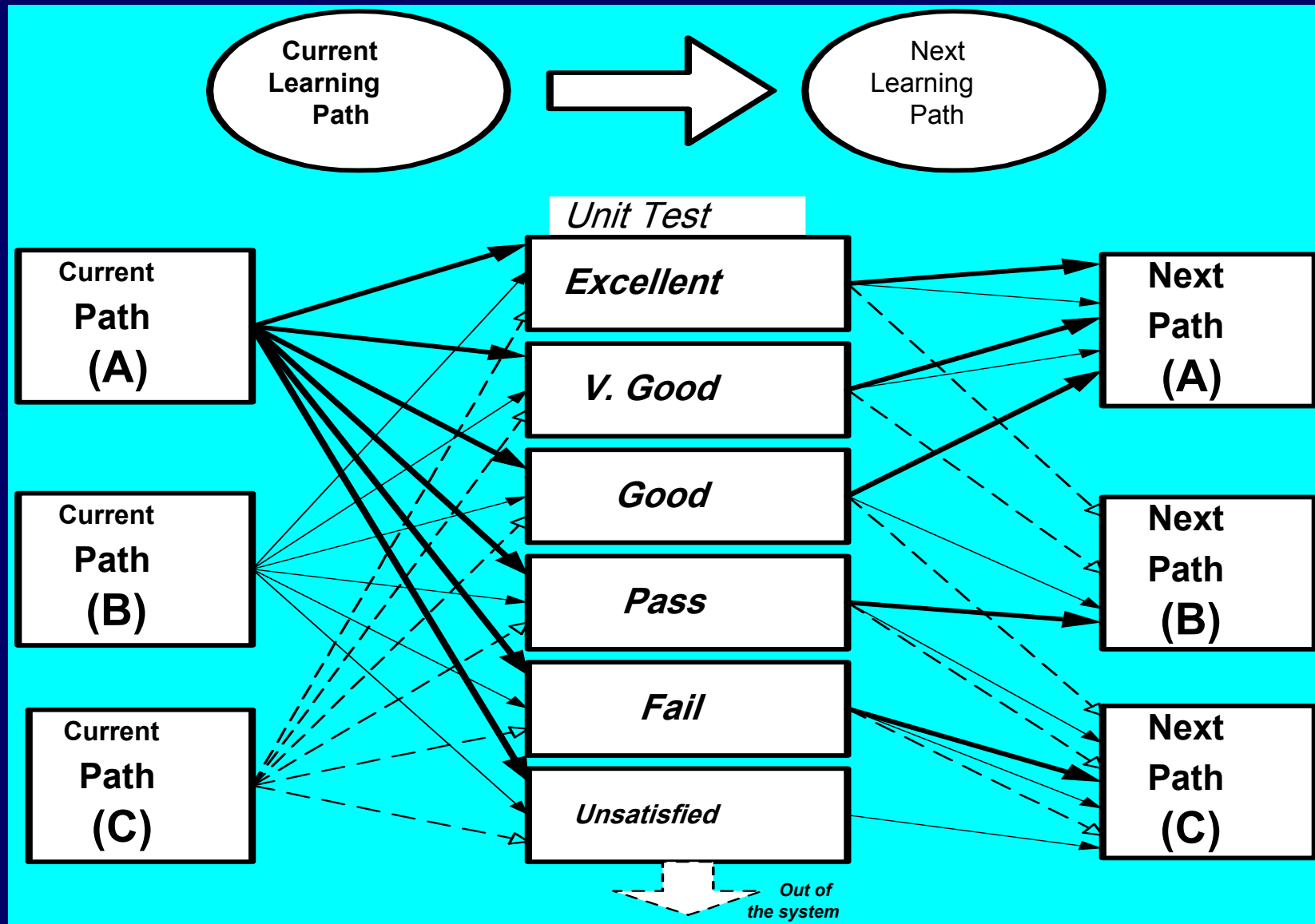
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Learning System:

In modern educational systems, Fuzzy Set Theory concepts can be used for solving problems related to:

- Modeling of the learner.
- Modeling of the instructor experience.
- Identification of the learner knowledge level during each educational unit.
- Modeling of real world environments.
- Algorithms for on-line 3-D graphic generation.
- Real-time control of the changing virtual reality.
- Decision making for learning path selection.
- Overall evaluation of the learner.

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Learning System:

Learner
Pre-Test → **Learner** **Model** → | **Path A** / **Path B** / **Path C** | Knowledge Level → **Unit Test**

Update

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Decision Making

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Learning System:

	CLA	CLB	CLC
TE	NLA	NLA	NLB
TVG	NLA	NLA	NLB
TG	NLA	NLB	NLC
TP	NLB	NLC	NLC
TF	NLB	NLC	NLC
TU	NLC	NLC	OUT

IF CLB AND TVG THEN NLA

Learners Records

Learner No.	C L L	Total contact Time (min)	N L L
1	A	210	B
2	A	255	A
3	A	240	A
4	B	405	B
5	B	390	B

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Learners Records

Learner No.	C L L	Total contact Time (min)	N L L
6	B	375	C
7	B	425	A
8	C	455	C
9	C	520	B
10	C	590	B

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Conclusions

31%   39%   22%   8%

A   B   C   D
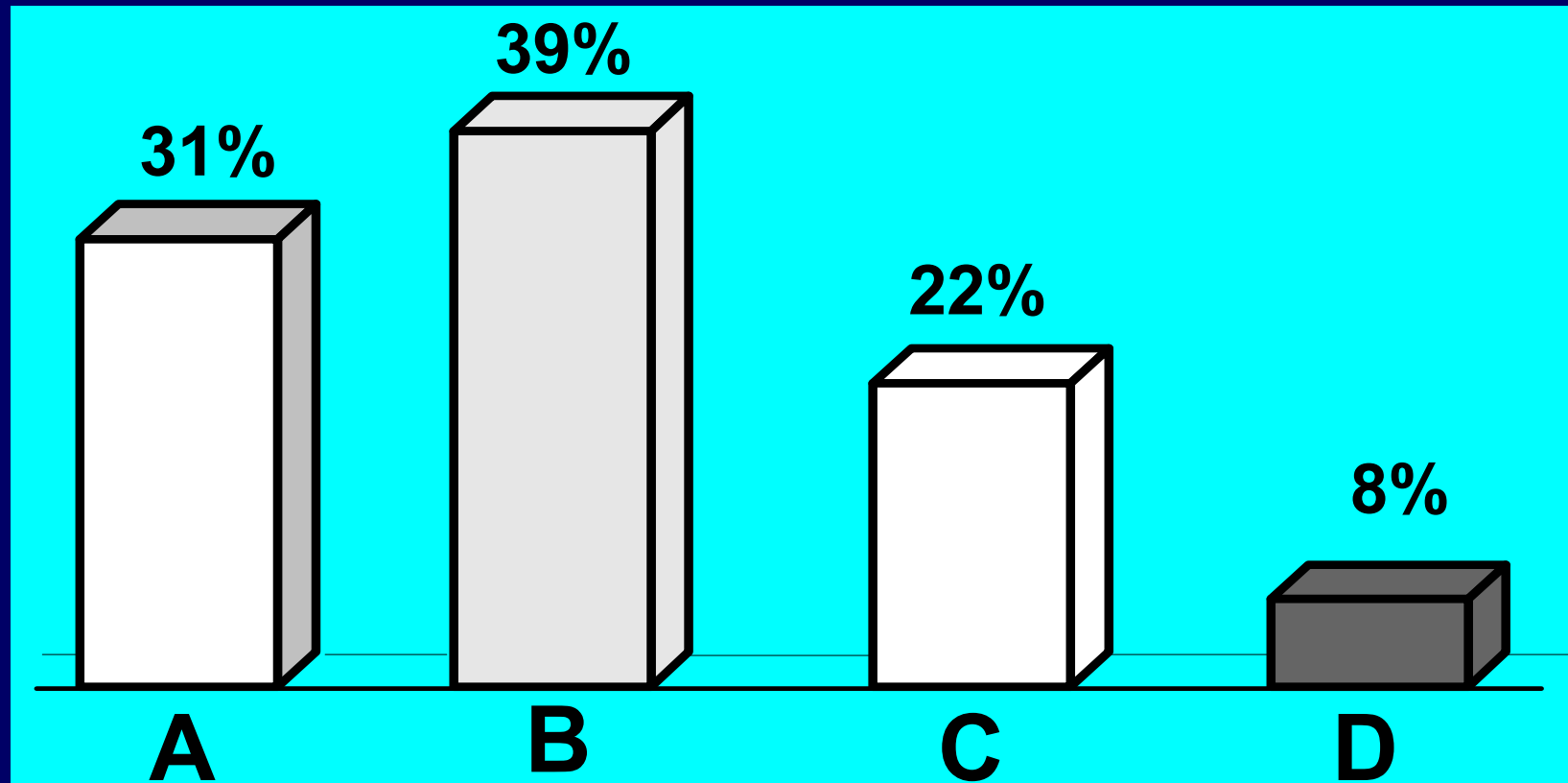
A effective		**B** moderate effective	
C ineffective		**D** moderate ineffective	

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The End

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