Adaptive e-Learning Systems with Learning Portfolio for IT Education

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Modern Good Practice Project

- Our project is one of Modern Good Practice (MGP) which is supported by Ministry of Education, Culture, Sports, Science, and Technology in Japan.
- The purpose of MGP is to facilitate innovation of university education such as improving the quality of teaching and learning.
- Our project is a three-year project which started in 2005.

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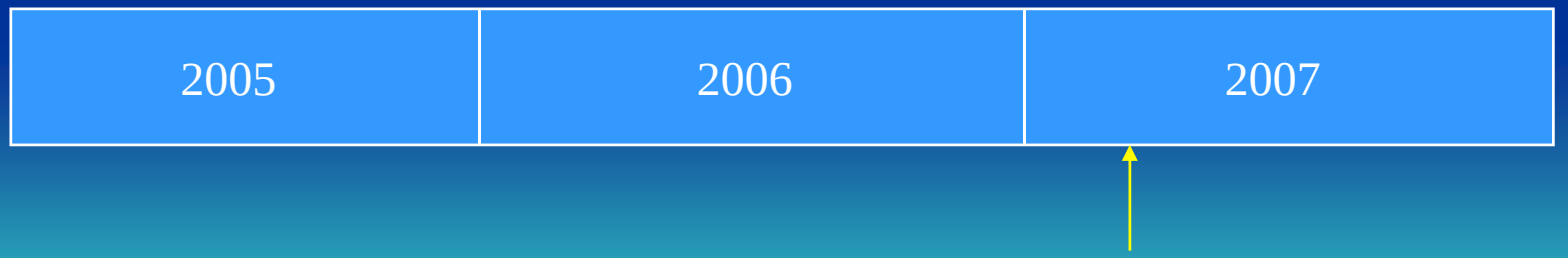
Our Project Mission

1. Development of framework of adaptive e-Learning systems for IT education

   "POLITE" (Portfolio Oriented e-Learning for IT Education)

2. Development of instructional material using SCORM
3. Implementation of POLITE in actual classroom use



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Our project focuses on Application Specialist education

- a person who is able to find any problem for customers
- a person who is able to solve the problem with IT

Application Specialist is described in ITSS (IT Skill Standard) released by METI.

Skill & Knowledge for Application Specialist	
	-requirement analysis -modeling -programming -communication

Needs of Adaptive e-Learning Systems for IT Education

(1)Providing an adaptive learning environment for each student's level of understanding

- the university will have more variety in student career interests/needs than ever. (the number of graduating high school students will be the same as the entrance quota number of universities.)

(2) Providing a virtual systems development environment

- learner needs to learn modeling and programming through practice of trial and error. (Application Specialist is educated in a system similar to the old apprentice system.)

(3) Monitoring learning results for each individual student

- gap analysis between ITSS (goal) and learning results

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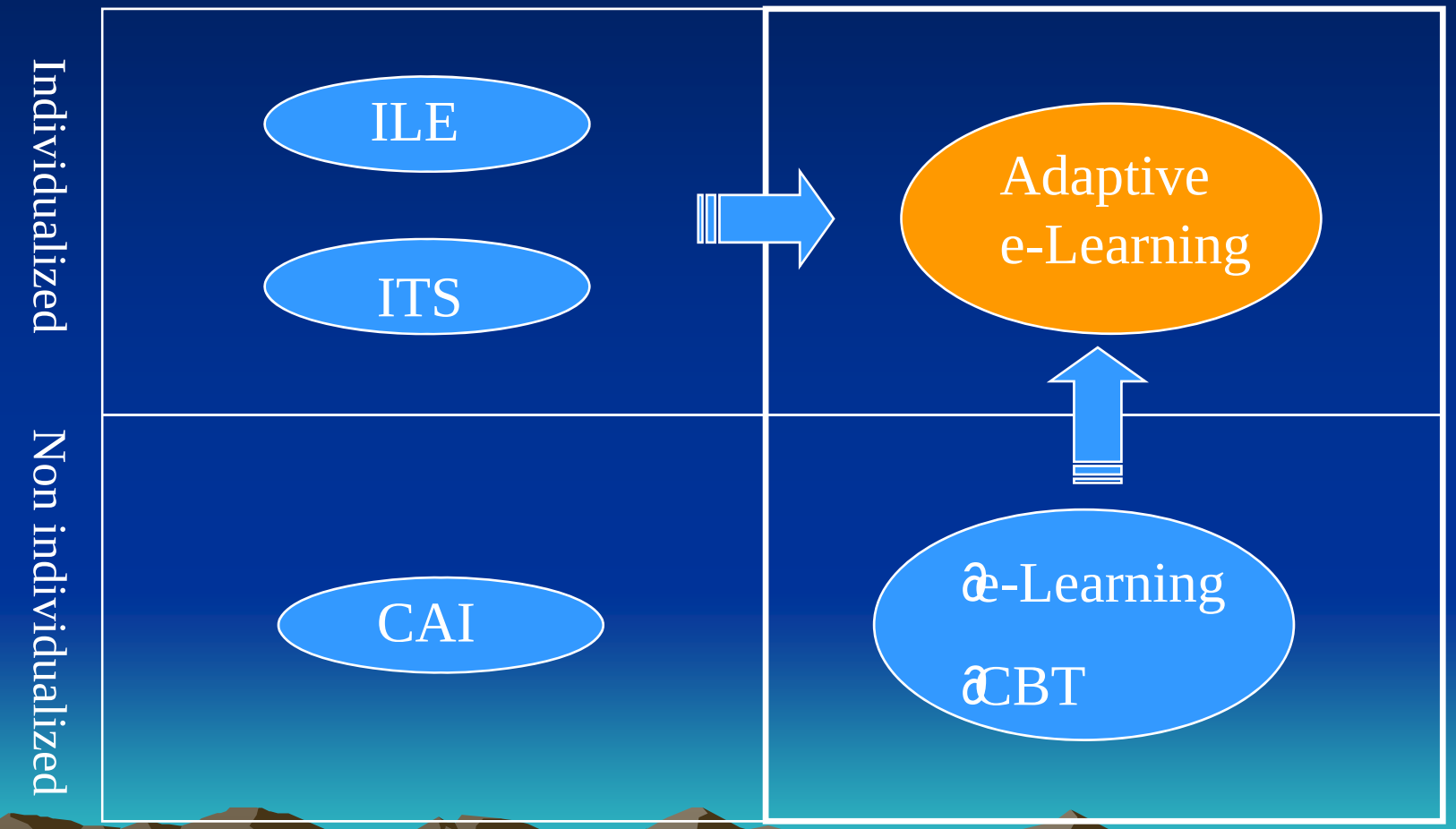
e-Learning category: Where are we?



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Purpose of e-Learning

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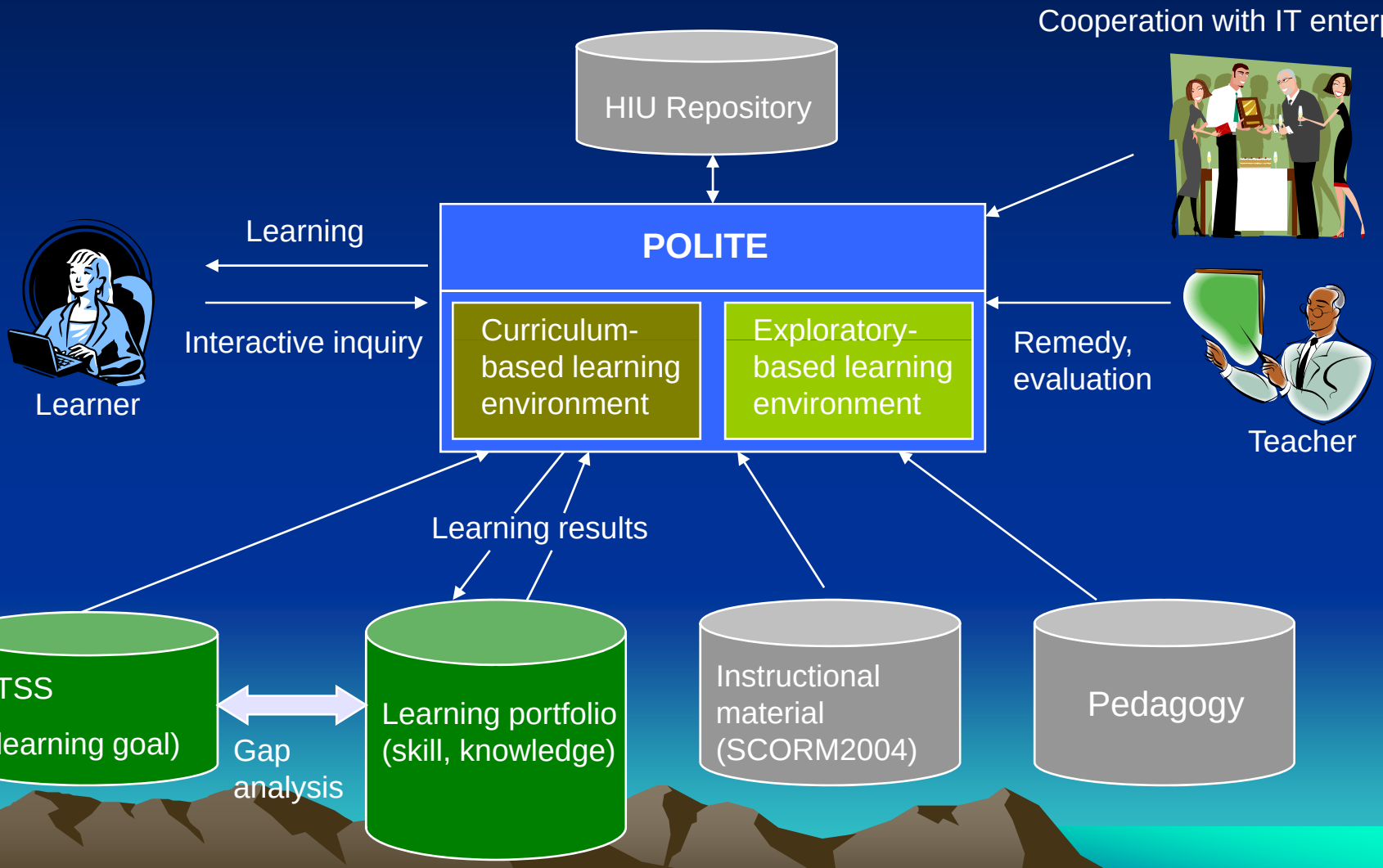
POLITE Systems Conceptual Model



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The Characteristics of POLITE

- **Learning portfolio:** Each student's knowledge and skill are recorded in the learning portfolio.
- **SCORM2004:** Instructional material is designed based on SCORM2004. POLITE provides adaptive instructional material (beginner, intermediate, advanced levels) .
- **Virtual systems development world:** Modeling and programming are supported.
- **Reuse:** Instructional material is stored in the repository.
- **Cooperation with IT enterprise and students**

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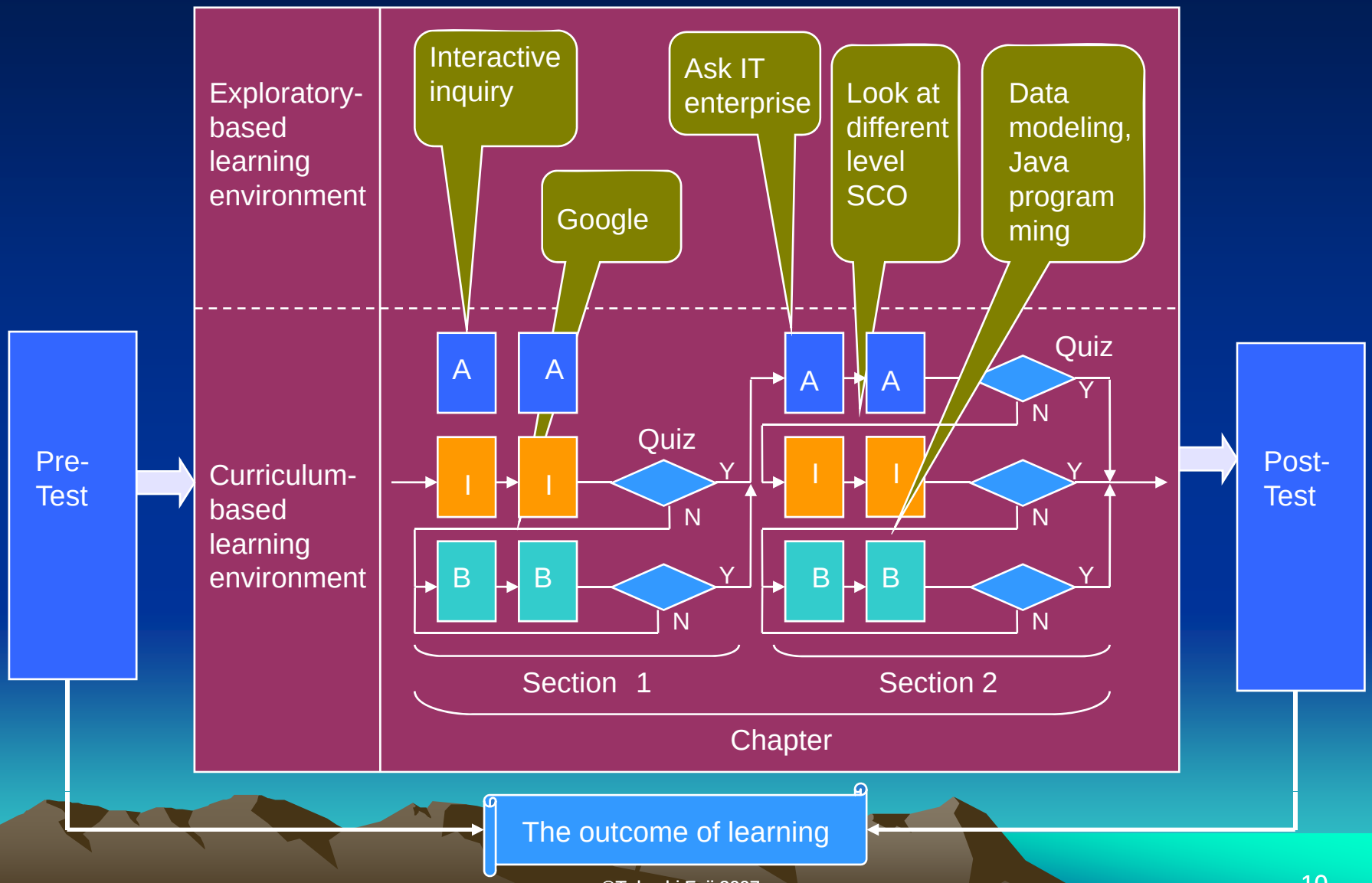
Adaptive Learning Process



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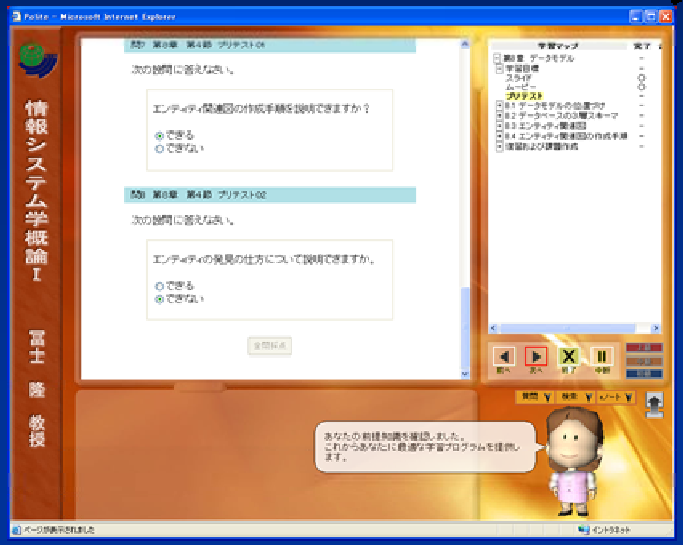
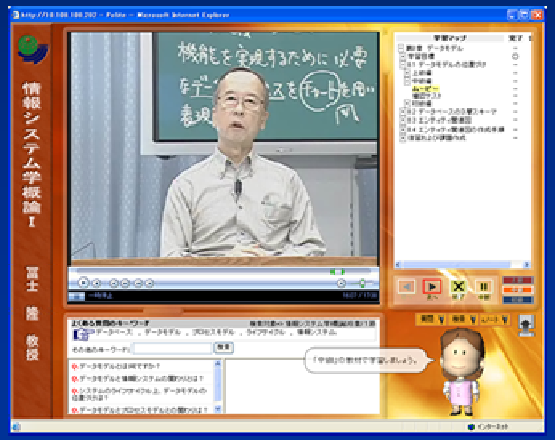
Quiz Sample



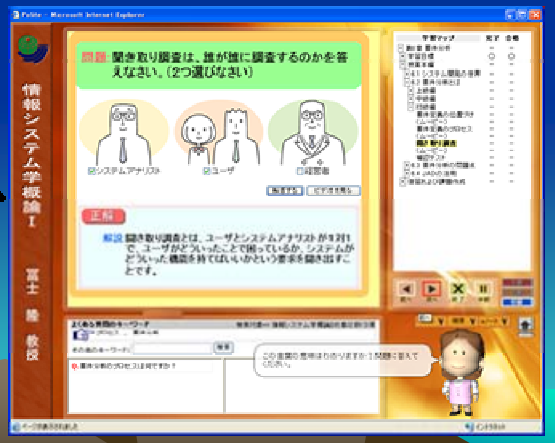
Advanced

上級



Intermediate

中級



Beginner

初級

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Learning Portfolio for IT Education

Skill		Course (knowledge & skill)	Foundations of Information systems 1	Programming Language 1	∂∂∂∂
Plan	Finding competitive advantage	1	⬭		⬭
	∂∂∂∂				
Analysis	Requirement analysis	0	⬭		⬭
	Modeling	2	⬭		⬭
	∂∂∂∂				
Design	Design database	1			⬭
	∂∂∂∂				
Construction	Programming	3		⬭	
	∂∂∂∂				

Skill level: “0” none; “1” knowledge; “2” be able with help; “3” be able without help; “4” be able to teach

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Skill Level

- Level “0” means learner does not have the skill.
- Level “1” means learner has general knowledge of the skill.
- Level “2” means learner can do it with help.
- Level “3” means learner can do it alone.
- Level “4” means learner can teach the skill to another learner.

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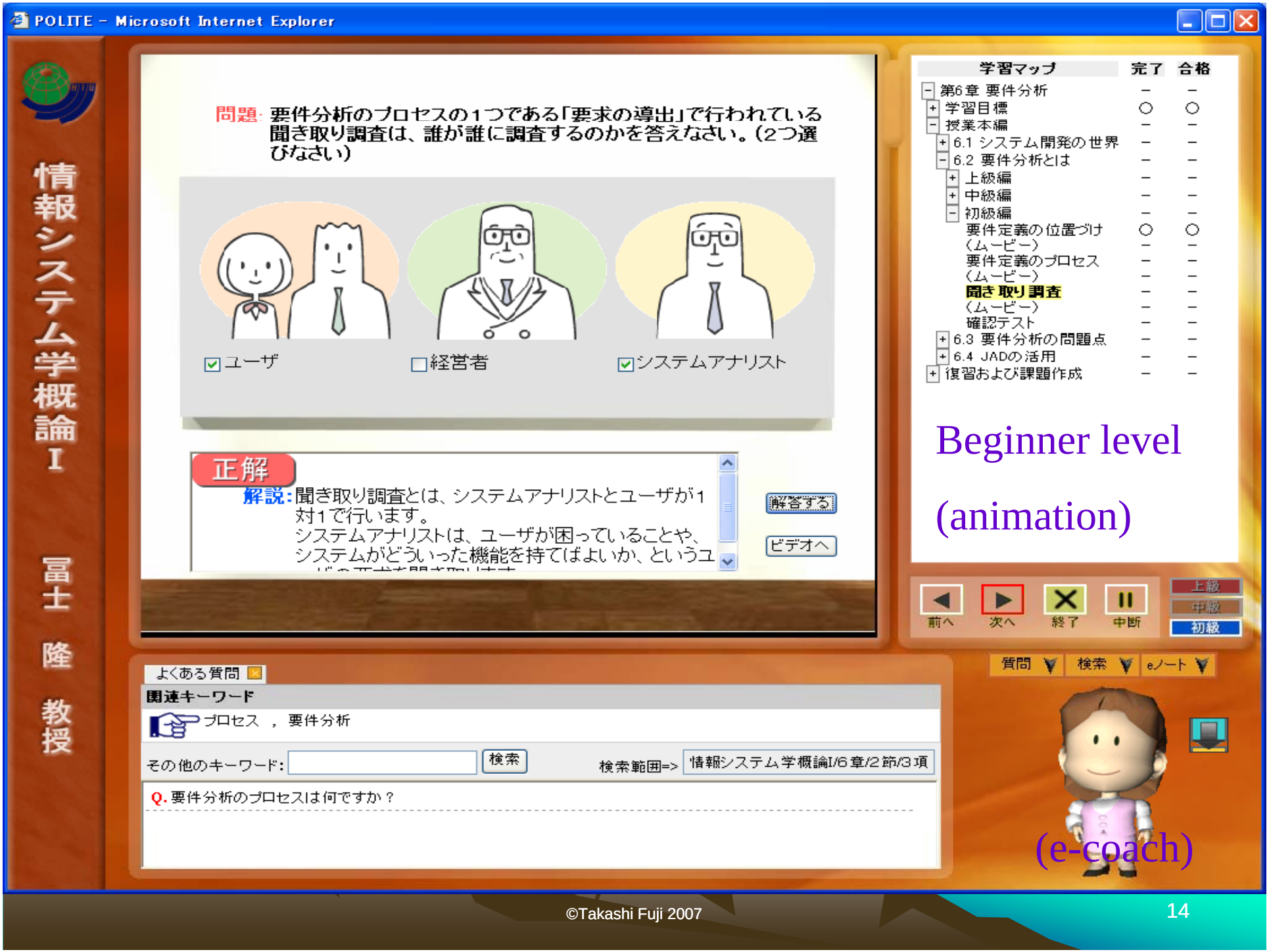

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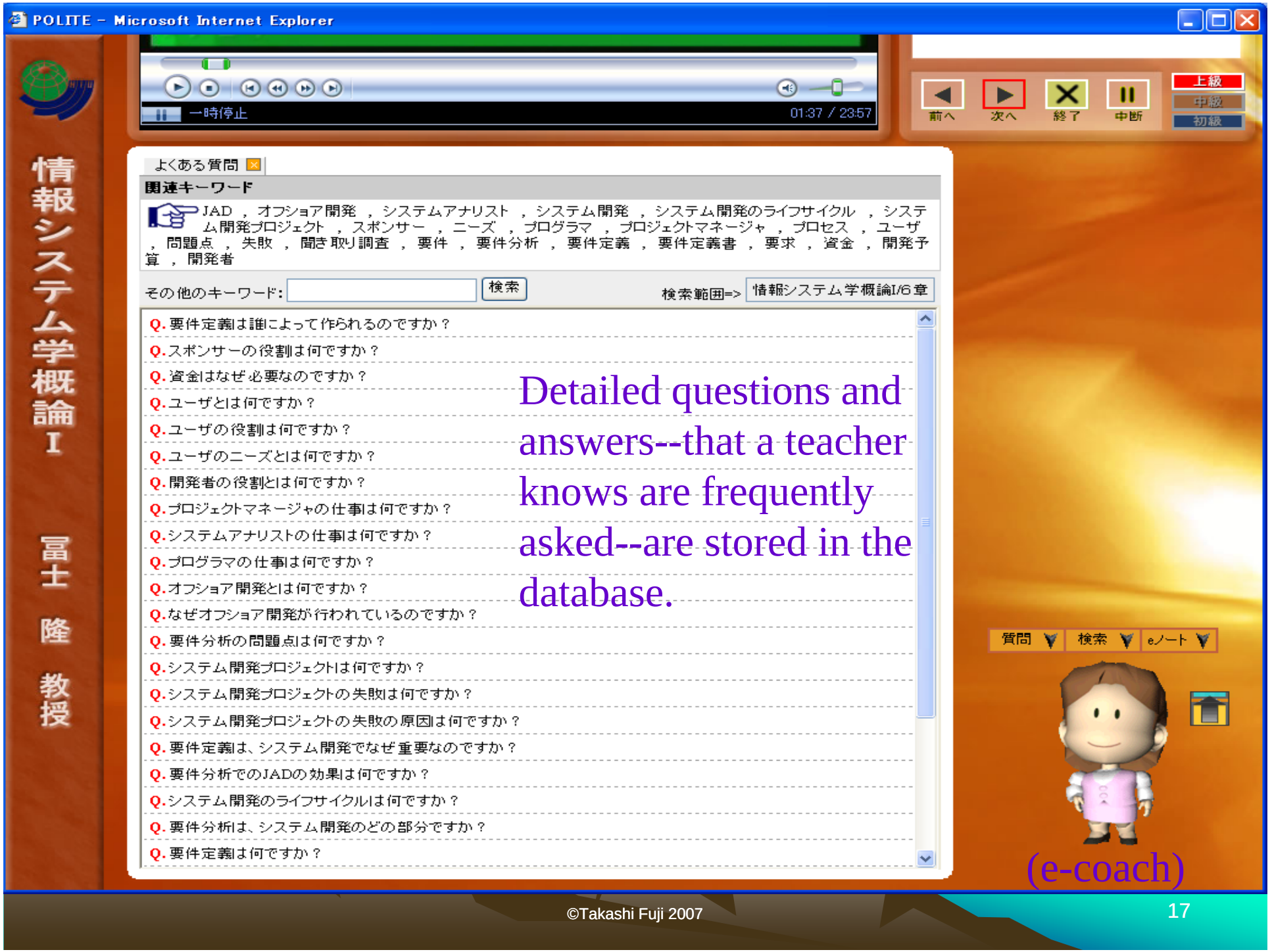
POLITE - Microsoft Internet Explorer
情報システム学概論 I
富士 隆 教授
6. 要件分析
要件分析:顧客要求事項を明確にする工程
既存システム
ユーザ
調査
伝票
業務内容
要望
SCC
分析
要件の整理
要件定義書
Copyright 2006 SCC(Software Consultant Corporation) ALL Rights Reserved
位置
一時停止
01:37 / 23:57
学習マップ
完了
合格
第6章 要件分析
学習目標
授業本編
6.1 システム開発の世界
6.2 要件分析とは
上級編
確認テスト
ムービー
中級編
初級編
6.3 要件分析の問題点
6.4 JADの活用
復習および課題作成
Advanced level
(video or PP)
前へ
次へ
終了
中断
上級
中級
初級
よくある質問
関連キーワード
システム開発のライフサイクル , プロセス , 聞き取り調査 , 要件分析 , 要件定義 , 要件定義書
その他のキーワード:
検索
検索範囲=>
情報システム学概論I/6章/2節
Q.システム開発のライフサイクルは何ですか？
Q.要件分析は、システム開発のどの部分ですか？
Q.要件定義は何ですか？
Q.要件定義書は何ですか？
質問
検索
eノート
(e-coach)



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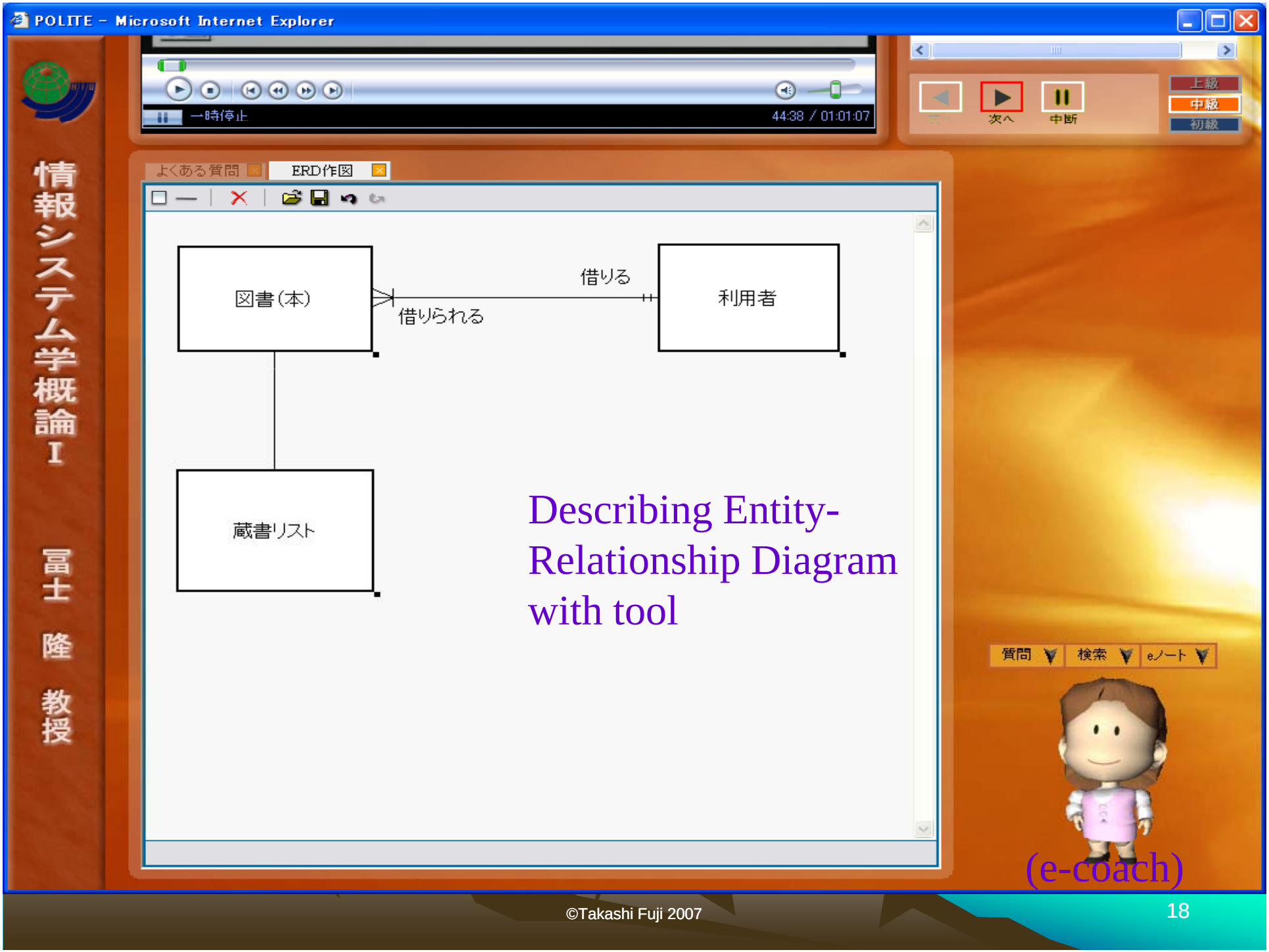
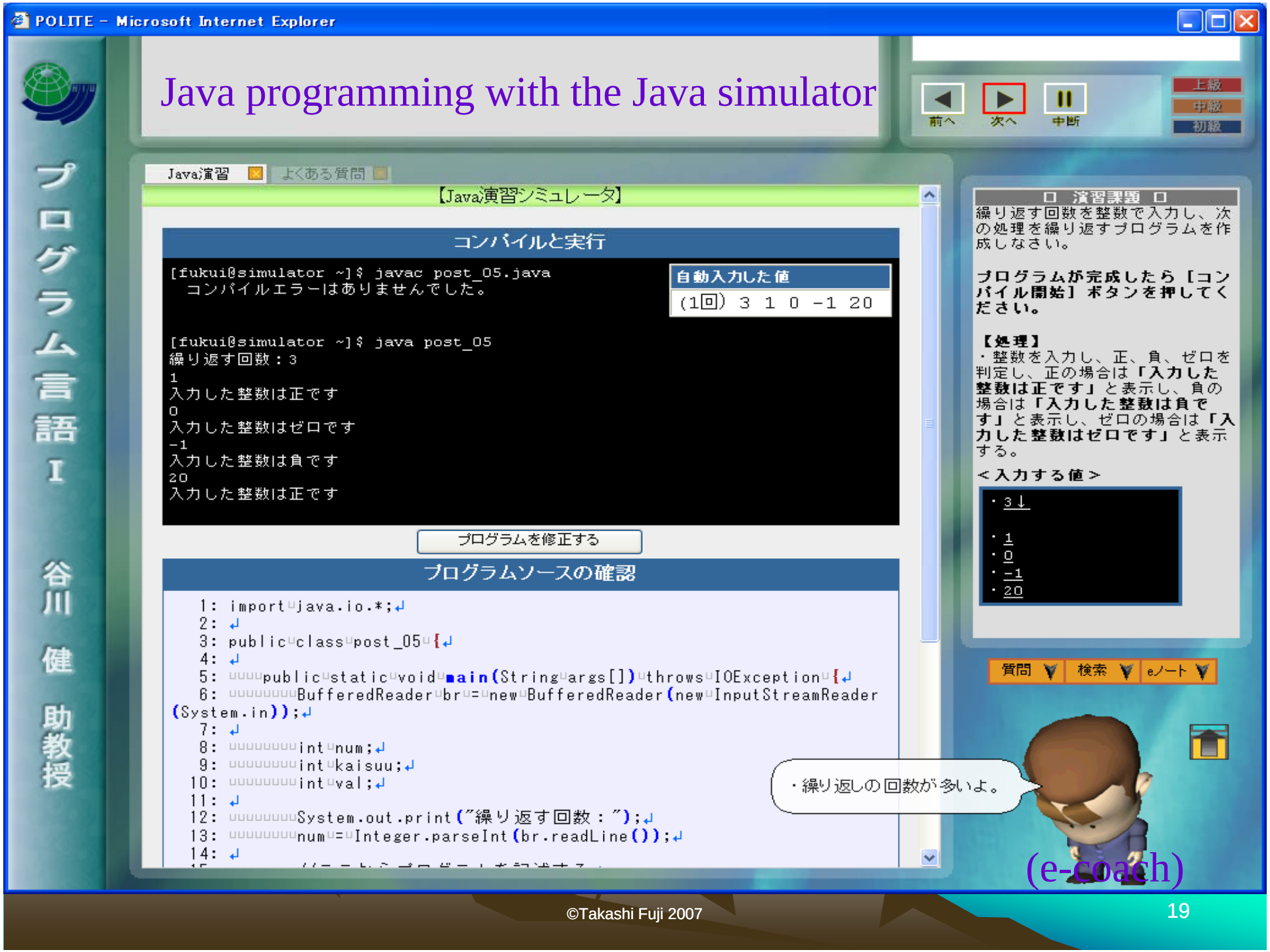
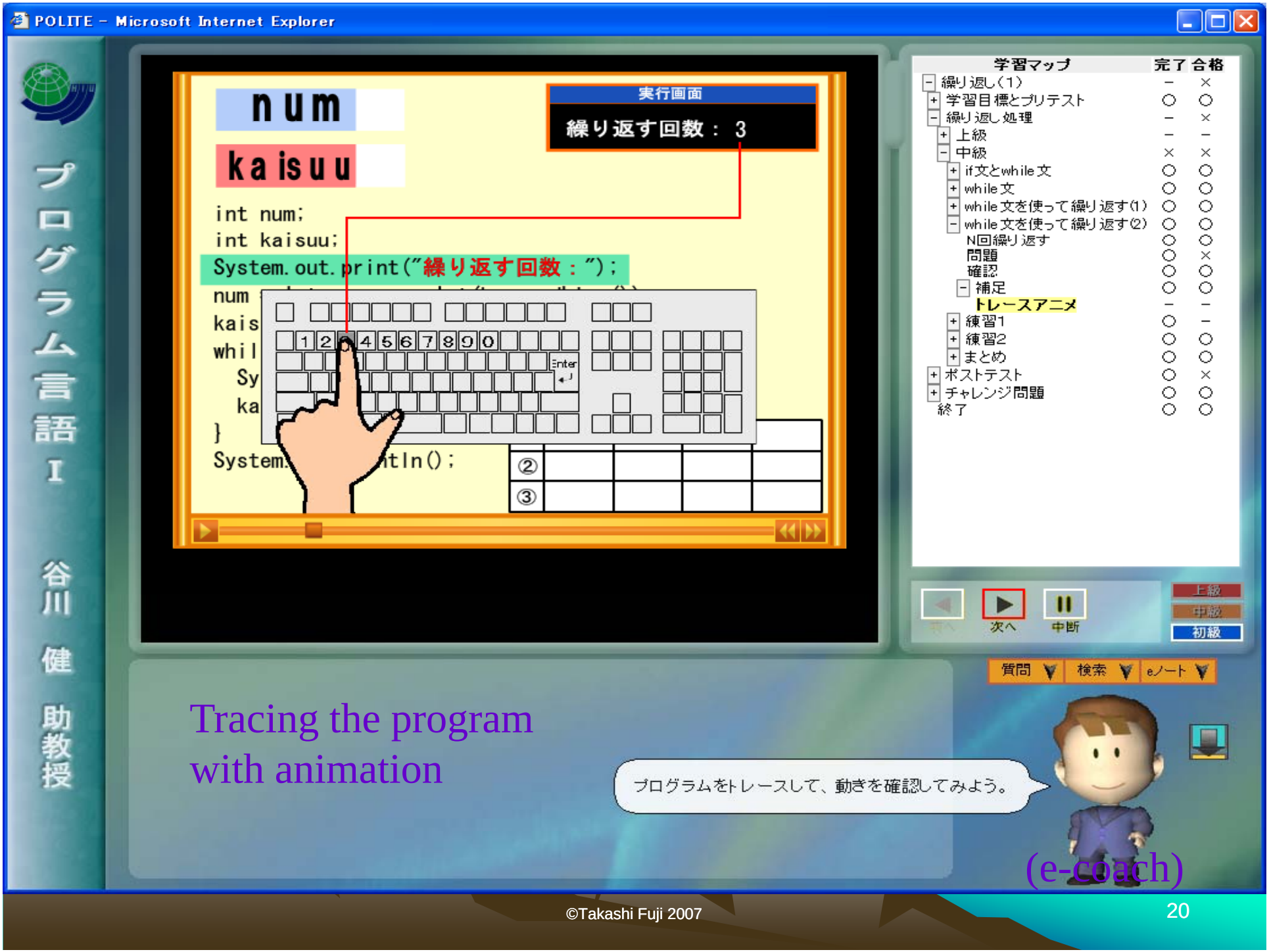

POLITE - Microsoft Internet Explorer
一時停止
44:38 / 01:01:07
次へ
中断
上級
中級
初級
情報システム学概論 I
富士 隆 教授
よくある質問
ERD作図
図書(本)
借りる
借りられる
利用者
蔵書リスト
Describing Entity-Relationship Diagram with tool
質問
検索
eノート
(e-coach)


POLITE - Microsoft Internet Explorer
Java programming with the Java simulator
前へ
次へ
中断
上級
中級
初級
プログラム言語 I
谷川 健 助教授
Java演習
よくある質問
【Java演習シミュレータ】
コンパイルと実行
[fukui@simulator ~]$ javac post_05.java
コンパイルエラーはありませんでした。
自動入力した値
(1回) 3 1 0 -1 20
[fukui@simulator ~]$ java post_05
繰り返す回数：3
1
入力した整数は正です
0
入力した整数はゼロです
-1
入力した整数は負です
20
入力した整数は正です
プログラムを修正する
プログラムソースの確認
1: import java.io.*;
2:
3: public class post_05 {
4:
5: public static void main(String args[]) throws IOException {
6: BufferedReader br = new BufferedReader(new InputStreamReader
(System.in));
7:
8: int num;
9: int kaisuu;
10: int val;
11:
12: System.out.print("繰り返す回数：");
13: num = Integer.parseInt(br.readLine());
14:
□ 演習課題 □
繰り返す回数を整数で入力し、次の処理を繰り返すプログラムを作成しなさい。
プログラムが完成したら［コンパイル開始］ボタンを押してください。
【処理】
・整数を入力し、正、負、ゼロを判定し、正の場合は「入力した整数は正です」と表示し、負の場合は「入力した整数は負です」と表示し、ゼロの場合は「入力した整数はゼロです」と表示する。
＜入力する値＞
・3↓
・1
・0
・-1
・20
質問
検索
eノート
・繰り返しの回数が多いよ。
(e-coach)



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Case Study of Actual Classroom (1)

- Course: “Foundations of Information Systems 1.” 100 students

- 2 groups divided by student number (odd / even)

each group had face-to-face class and POLITE class experiences

Result: POLITE class scores are better than face-to-face class scores.

The average scores on the pre-test and post-test.

	Pre-test	Post-test	Difference
Face-to face	6.9	15.5	+8.6
POLITE	8.1	26.2	+18.1

(Full marks of pre-test and post-test: 50 points.)

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Case Study of actual classroom (2)

- Course: “Programming Language 1.” 50 students

- each class was divided into two groups;

  each group had face-to-face class and POLITE class experience

Result: Face-to-face class and POLITE class scores were approximately the same.

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Feedback from the students

- I was able to concentrate my attention on the lesson with POLITE more than with face-to-face style.
- I was able to learn at my own pace and at my own intellectual level.
- It was easy to understand learning the contents because of useful, comprehensible and detailed “Frequently Asked questions.”
- Since it was possible to learn by repeating material as needed again and again, it was easy to understand the content.

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Conclusions

- We have developed a framework (POLITE) of Adaptive e-Learning Systems with Learning Portfolio for IT education.
- We have used POLITE in our regular classes, and we have gotten feedback/outcome that our developed framework is more effective than the standard face-to-face class.
- We are improving on systems such as mentoring, learning portfolio, and developing other courses on ERP Systems, Software Engineering, Modern Software Technology and so on.

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Can e-learning systems

innovate future education?

Thank you.

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We would appreciate it if you would come to our poster session this afternoon.

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