

Korean TVET Case: Interactive and Differentiated E-Learning Using Emerging Technologies



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Online Lifelong Education Institute,
KOREATECH



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1. Online Lifelong Education Institute(OLEI), KOREATECH

- **Hub of Online Vocational Training for Workers**
 - Funded by Korean Ministry of Employment & Labor
 - Has developed 238 free online courses in IT & Engineering, and provided them to current workers and job seekers
 - Has contracts with 180 small & medium-size companies, offering e-learning courses tailored for each of them
 - Disseminates some online learning contents to individual vocational training centers

1. Online Lifelong Education Institute(OLEI), KOREATECH

- **“e-koreatech” Portal Website (<http://www.e-koreatech.ac.kr>)**
 - Launched in April, 2015
 - Areas : Mechanics, Electronics, Mechatronics, ICT, Design, Materials, Architecture, Chemistry, Job Basics & Core
 - Types : Certificate course(6-week), Non-certificate course, College credit course, E-Marketplace
 - Approx. 70,000 enrolled students & 730,000 visitors(Year 2015)
 - 25% course completion rates on average



1. Online Lifelong Education Institute(OLEI), KOREATECH

- “e-koreatech” Portal Website (<http://www.e-koreatech.ac.kr>)

기관소개	지식 나눔	원격지원	온라인실습실	과정이수체계도	고객센터
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배우고 싶은 강의를 검색하세요.

e-koreatech 모든 과정 보기
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▶

기술을 배운다, 미래를 만든다

기술·공학 이러닝 “e-koreatech”을 통해 언제, 어디서나 미래를 만드세요!

로그인 하시겠습니까?

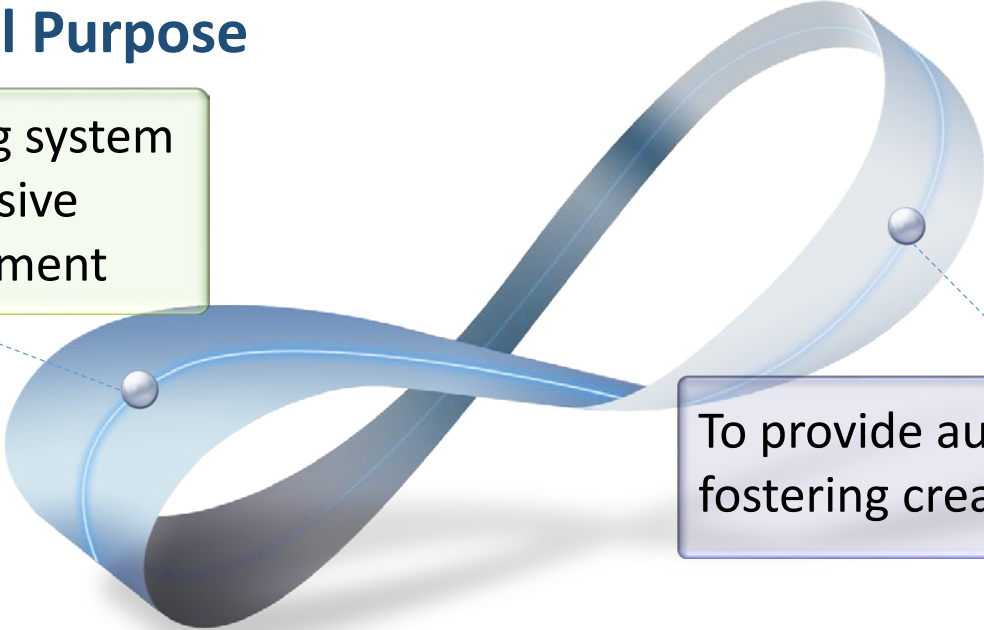
<p>평생능력개발</p> <p>학습자의 체계적인 기술·공학 분야 직업능력향상을 위한 경기학습 과정입니다.</p>	<p>비형식</p> <p>특정 기술 및 주제에 대하여 단시간 내 학습할 수 있도록 형식의 제한없이 만든 과정입니다.</p>	<p>e-koreatech 마켓</p> <p>다양한 지식의 공유와 나눔을 위해 개인 또는 중소 이러닝 개발사의 이러닝 콘텐츠가 유통되는 이러닝 시장입니다.</p>	<p>학점은행제</p> <p>교육부 장관 명의 학점 취득이 가능한 기술·공학 분야의 이러닝 콘텐츠입니다.</p>
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2. Virtual Training(VT)

● Definition

Teaching in virtual learning environments for special needs of training – i.e., for practicing to manage special industrial equipment or hazardous work situations

● Educational Purpose



To build learning system replacing expensive high-tech equipment

To provide authentic training for fostering creative technicians



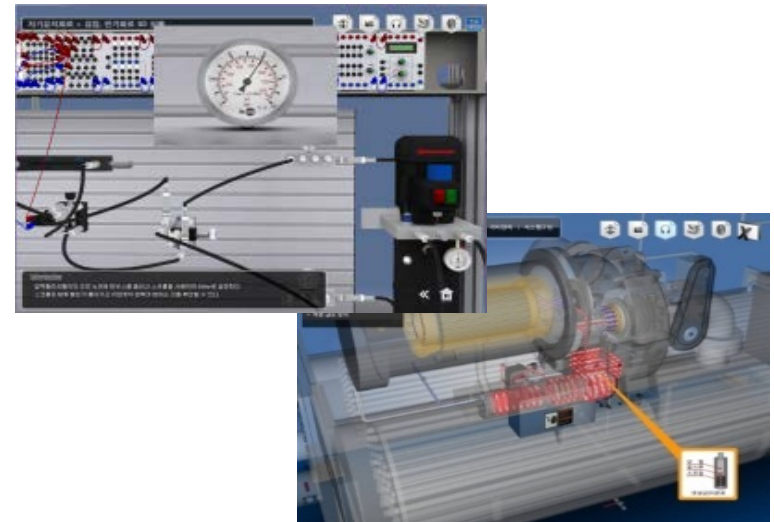
2. Virtual Training(VT)

● Benefits of VT

Real Training Environment



Virtual Training Environment



- Difficult to have costly and macro-size equipment
- Limited place to practice
- Unable to disassemble & reassemble equipment
- Difficult to train about emergent work situations

- **Replace costly & macro-size real equipment**
- **Able to do online practices on networks**
- **Able to disassemble & reassemble equipment**
- **Able to train about dangerous work situations**

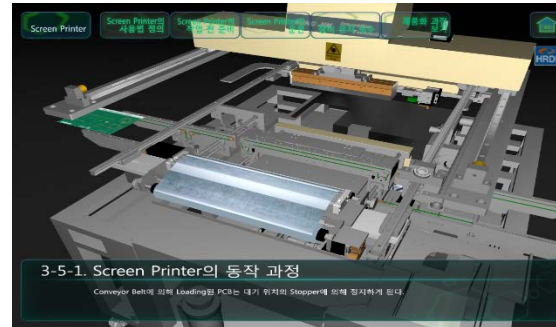
2. Virtual Training(VT)

Types of VT Contents

Component



Scenario



Practice



- Understand the inner structure of equipment
- Disassemble the parts of equipment

- Turbo Refrigerator
- Hybrid Automobile
- Clean Diesel Automobile
- Wind Generator System

- Operate equipment following a scenario
- Learn about the procedure of operating equipment

- Absorptive Water System
- Concrete Construction
- SMT In-Line System
- Solar Battery Manufacture Process

- Practice equipment operation to produce various results
- Change the conditions of practice for users' needs

- EHC Servo Control
- Siemens PLC
- Proportional Hydraulic Control
- Semiconductor Manufacturing

2. Virtual Training(VT)

- **Dissemination of VT Contents**
 - Has developed 31 VT contents since 2007
 - Has offered them to 141 public or private training centers including TVET colleges and Meister/specialized high schools
 - Has taught 24,418 students at the training centers



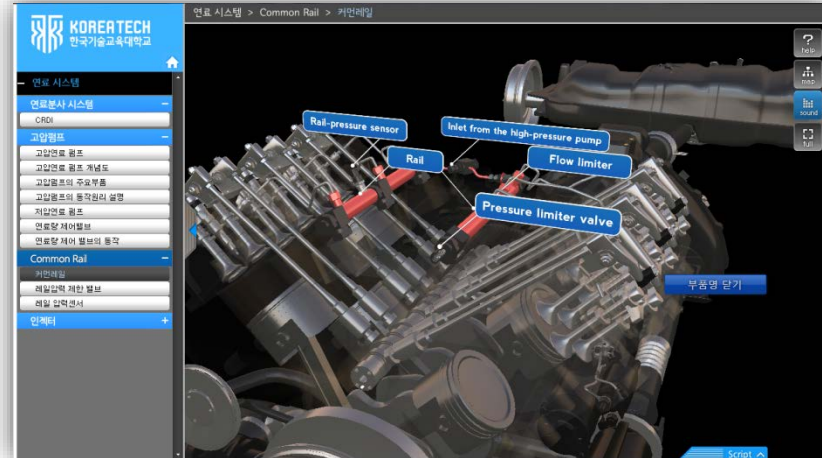
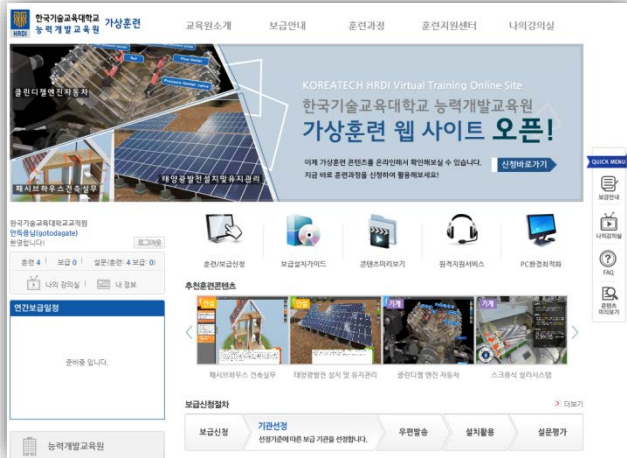
2012학년도 가상훈련 콘텐츠 기증협약식



가상훈련 콘텐츠를 활용한 실험실습교육

2. Virtual Training(VT)

Online VT Platform



- VT homepage available : <http://vt.e-koreatech.ac.kr>
- 8 VT courses available for online study
- 20 VT courses applicable for use with accompanied technologies

2. Virtual Training(VT)

● Outcomes of VT

- Reduced national vocational training costs
- Averaged out 4.45 points in user satisfaction survey

Questions	Average(points)	Year 2013	Year 2014	Year 2015
Total	4.45	4.42	4.64	4.31
Study prompts	4.69	4.82	4.77	4.48
Educational effects of contents	4.63	4.65	4.73	4.52
Adequacy of the content amount	4.19	4.05	4.38	4.14
Relevancy to real work	4.40	4.27	4.75	4.19
Differentiation from other media	4.58	4.52	4.84	4.38
User convenience	4.50	4.46	4.67	4.38
Replacement of real equipment	4.19	4.16	4.31	4.10

3. Online Practice Lab(OPL) for Computer Programming

- Available to C, C++, Python, Java & HTML Programming courses
- Provides practice problems pulled out of a test bank

The screenshot shows a web browser window titled "실습하기 - Internet Explorer" with the URL "http://182.252.177.196/koreatech/CLang1/01/01/03/01_03_51.html". The page content includes:

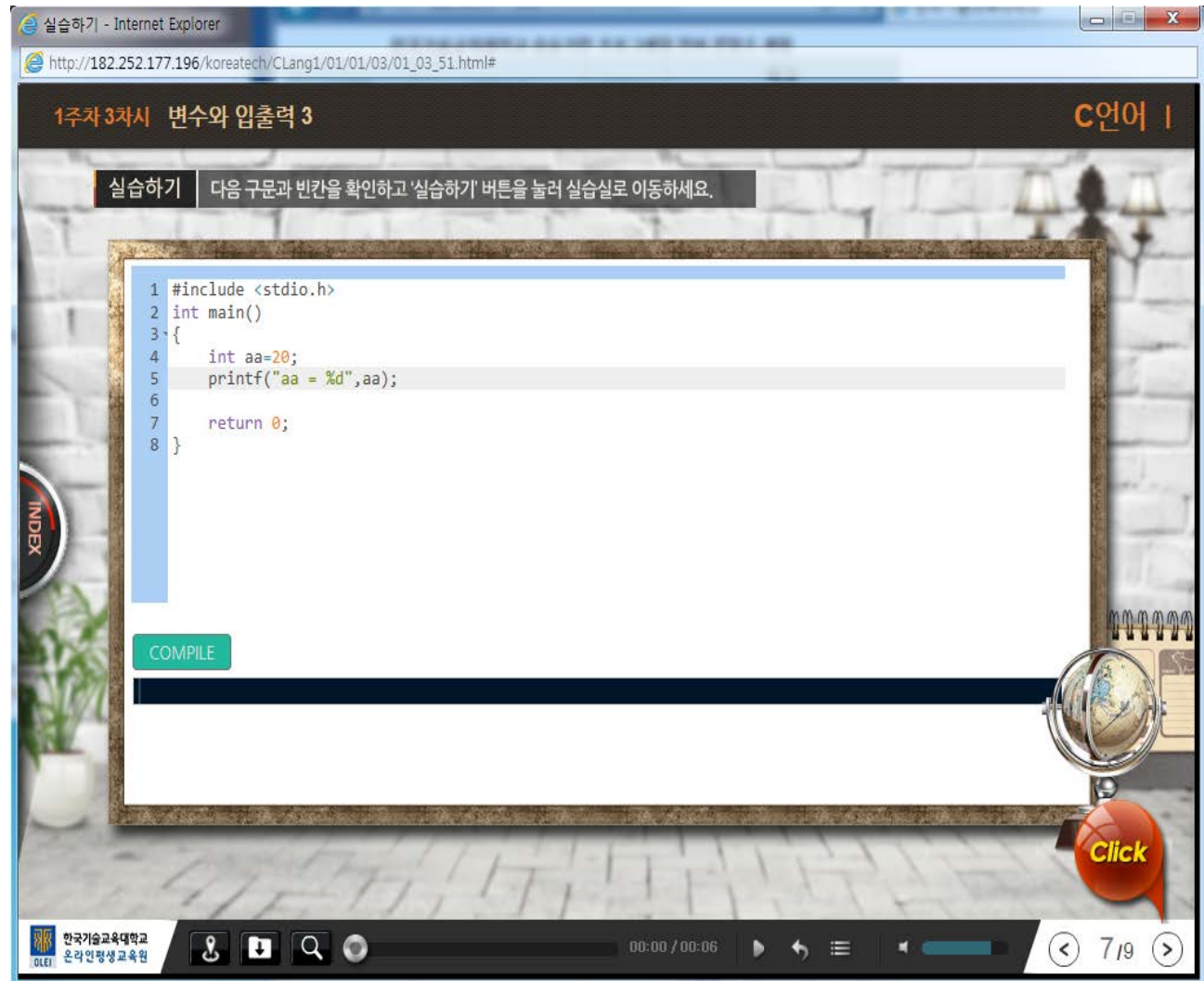
- Header: "1주차 3차시 변수와 입출력 3" and "C언어 I"
- Instruction: "실습하기 다음 구문과 빈칸을 확인하고 '실습하기' 버튼을 눌러 실습실로 이동하세요."
- Question: "다음 프로그램에서 변수 a에 저장된 값을 제대로 출력하려면 빈칸에 무엇을 넣어야 하는가?"
- Code Snippet:

```
#include <stdio.h>

int main() {
    int aa = 20;
    _____
    return 0;
}
```
- Buttons: "실습하기" (Practice) and "실습하기" (Practice) with a dropdown arrow.
- Footer: "한국기술교육대학교 온라인평생교육원" (Korea National University of Technology Online Lifelong Education Center), a progress bar at "00:04 / 00:06", and page navigation "7/9".

3. Online Practice Lab(OPL) for Computer Programming

- Renders a coding editor for practicing to write program
- Runs a compiler (or interpreter)
- Checks grammatical errors for two trials



The screenshot shows a web browser window titled "실습하기 - Internet Explorer" with the URL http://182.252.177.196/koreatech/CLang1/01/01/03/01_03_51.html#. The page content includes a header "1주차 3차시 변수와 입출력 3" and "C언어 I". A navigation bar contains "실습하기" and a message: "다음 구문과 빈칸을 확인하고 '실습하기' 버튼을 눌러 실습실로 이동하세요." The main area features a code editor with the following C code:

```
1 #include <stdio.h>
2 int main()
3 {
4     int aa=20;
5     printf("aa = %d",aa);
6
7     return 0;
8 }
```

Below the code editor is a green "COMPILE" button. The interface also includes a sidebar with an "INDEX" button, a globe icon, and a "Click" button. The footer displays "한국기술교육대학교 온라인평생교육원" and a progress indicator "00:00 / 00:06".



3. Online Practice Lab(OPL) for Computer Programming

- Provides both the instructor's given answer on the left and the learner's input on the right

실습하기 - Internet Explorer

http://182.252.177.196/koreatech/CLang1/01/01/03/01_03_51.html#

1주차 3차시 변수와 입출력 3 C언어 I

실습하기 다음 구문과 빈칸을 확인하고 '실습하기' 버튼을 눌러 실습실로 이동하세요.

정답과 실습창에서 입력한 구문을 확인해보세요.

정답내용

```
#include <stdio.h>
int main()
{
    int aa=20;
    printf("%d",aa);

    return 0;
}
```

입력내용

```
#include <stdio.h>
int main()
{
    int aa=20;
    printf("aa = %d",aa);

    return 0;
}
```

다시 실습하기 결과화면 보기

Click

한국기술교육대학교
온라인평생교육원

00:00 / 00:06

7/19

3. Online Practice Lab(OPL) for Computer Programming

- Shows both compiling results of the instructor's and learner's codes

실습하기 - Internet Explorer
http://182.252.177.196/koreatech/CLang1/01/01/03/01_03_51.html#

1주차 3차시 변수와 입출력 3 C언어 I

실습하기 다음 구문과 빈칸을 확인하고 '실습하기' 버튼을 눌러 실습실로 이동하세요.

실습 결과화면

정답내용

RUN

```
[RUN]
20[DONE] press any key...
```

입력내용

RUN

```
[RUN]
aa = 20[DONE] press any key...
```

INDEX

Click

한국기술교육대학교
온라인평생교육원

00:00 / 00:06

7/9



3. Online Practice Lab(OPL) for Computer Programming

- **Benefits of OPL**
 - Renders a convenient and efficient programming environment
 - Enables students to practice programming anytime they want
 - Promotes instructors to design interactive web-based programming courses
 - Easy to implement problem solving activities
 - Allows the instructor to give immediate feedback to individual students' works

4. “Smart Training” as a New Trend

- **Definition of Smart Training**

- Not simply deploying mobile devices
- Creative use of emerging technologies or incorporation of effective instructional strategies
- Provides differentiated learning adjusted to individual students in order to enhance the training effects
- Has students engaged in collaborative knowledge construction and diverse learning activities

4. “Smart Training” as a New Trend

- **2016 Smart Training Test-Bed Project**
 - Plays the role of test bed for implementing smart training, coordinated with Korean Skills Quality Authority(KSQA)
 - Develops & Implements courses with special instructional designs focusing on:
 - Competency-based practices from novice to advanced
 - Activation of a community of practice
 - Thematic webinars for mentoring
 - Research on the educational benefits and problems/difficulties
 - Recommend the key points for a successful implementation

5. In the Future

- **Research-based Institutional Management**
 - Continues to play the test-bed role for innovating online TVET
 - Conducts learning analytics to know about students' online learning behaviors and to predict their course dropouts
 - Provides e-learning services differentiated to individual learners
 - Creates more interactive online learning environments/systems, by finding effective uses of emerging technologies
 - Activate online communities of practice for vocational training
 - Train teachers on the basis of program evaluation

Contact Information

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e-koreatech

<http://www.e-koreatech.ac.kr>

