Design Case for a mini-MOOC

On Learning How to Recognize Plagiarism

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Design Case for a mini-MOOC:

Indiana University Online Tutorial and Tests on How to Recognize Plagiarism

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Overview

- History of IU Plagiarism Tutorial and Test: 2002 - 2012

- Widespread cheating documented: 2012-13

- New Tests Developed: 2013
  - Primary Level: Undergrads & High School
  - Advanced Level: Master's & Doctoral

- Redesign 2015 – 2016:
  - Based on First Principles of Instruction (Merrill, 2013), and
  - Addresses known issues with current MOOC.

History of IU Plagiarism Tutorial and Test:

2002 - 2014

Initial Tutorial and Test

- Requested by IST Department Chair for master's and doctoral students

- Designed and developed in Frick's advanced production class in IST in spring 2002

- Since used as part of new student orientation

Website in 2003

EDUCATION HOME • SITE MAP • SEARCH

IU Definition

IST Policy

Overview

Cases

Examples

Practice

Test

Tutorial Site Map

Resources

Tutorial Home

Instructional Systems Technology Department

How to Recognize Plagiarism

Tutorial Home

This tutorial site was developed by the Instructional Systems Technology (IST) Department at Indiana University Bloomington to offer our students a chance to learn to recognize plagiarism. Because of the seriousness of plagiarism, all IST students are required review and practice this tutorial. After using this tutorial, we recommend that students take the test and complete it with 100% accuracy in order to assure themselves of their own understanding.

The IST department assumes that all IST students have completed this tutorial and understand plagiarism. The confirmation certificate is available at the end of the test to each student who successfully scores 100% on the test. If an IST student desires, you can submit your confirmation certificate, which will be kept in your folder as evidence that you have confirmed for us your understanding of plagiarism and how to recognize it. Whether or not you do so, you will be held accountable for understanding and avoiding plagiarism.

This tutorial does not attempt to teach citation and reference styles.

The examples, practice, and test use APA style, but the purpose of the tutorial is not to teach APA style itself.

Website in 2003

Plagiarism Test

Please note: If the student version contains BOTH word-for-word and paraphrasing plagiarism, you should check word-for-word.

Item 1

In the case below, the original course material is given along with a sample of student work. Determine the type of plagiarism by clicking the appropriate radio button.

Original Source Material	Student Version
The concept of *systems* is really quite simple. The basic idea is that a system has parts that fit together to make a whole; but where it gets complicated - and interesting - is how those parts are connected or related to each other. There are many kinds of systems: government systems, health systems, military systems, business systems, and educational systems, to name a few. References: Frick, T. (1991). *Restructuring education through technology.*	Systems, including both business systems, and educational systems, are actually very simple. The main idea is that systems have parts that fit together to make a whole. What is interesting is how those parts are connected together.

View in WayBackMachine

https://web.archive.org/web/20030803034602/
http://www.indiana.edu/~istd/

We did it for ourselves, but ...

- Other departments at IU started using it

- Other universities and schools also started using it —world-wide

- No advertising—folks found our website on the Web

- *How to Recognize Plagiarism* has morphed into a:
  - Mini-MOOC Tutorial
  - Mini-MOOCTest

(mini-MOOC: Massively Open Online, but not an entire course—i.e., a mini-course)

Exponential Growth in Usage
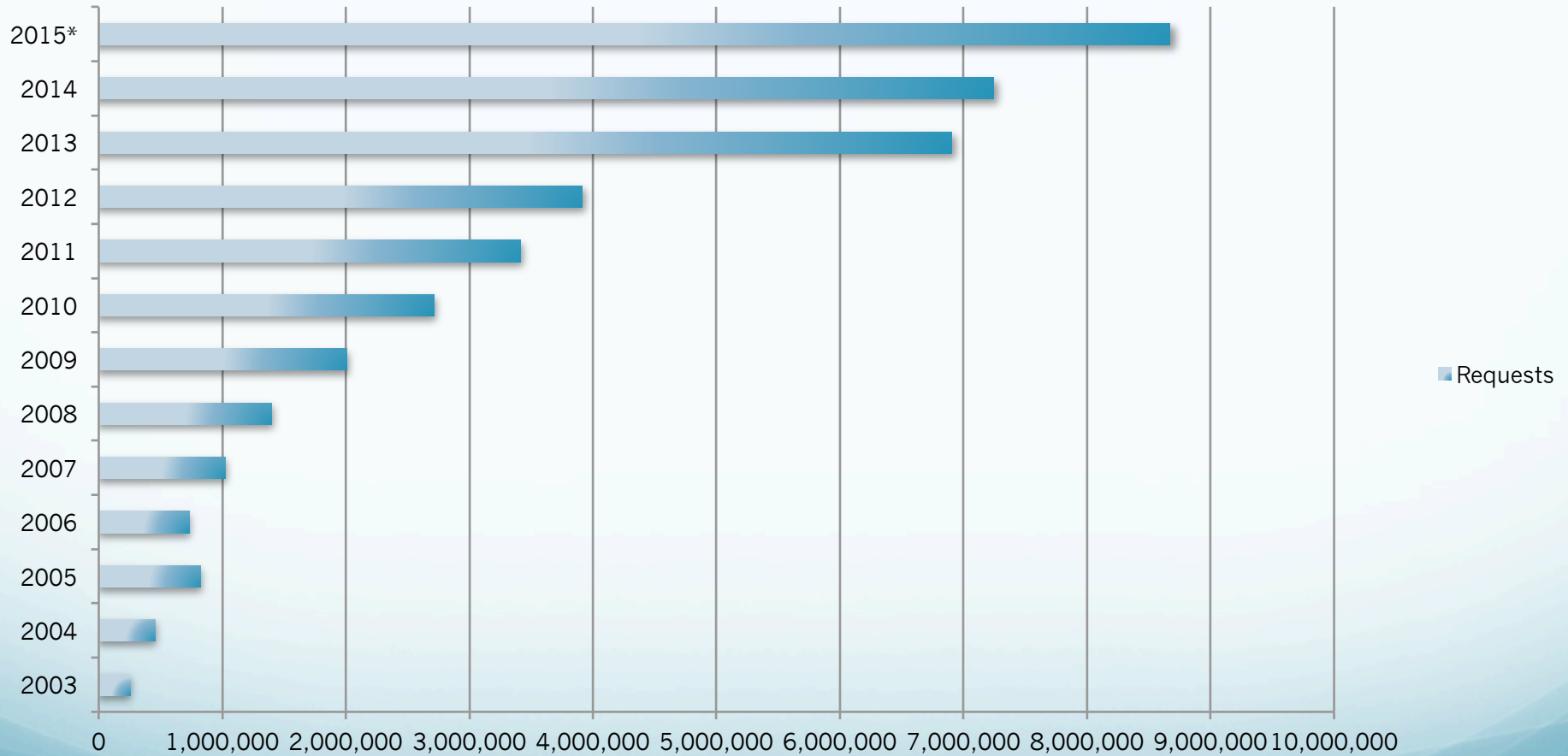
* 2015: website requests for first 9 months only

Widespread Cheating Documented

2012-13

Website Log in 2012

Listing files with at least 0.1% of the requests, sorted by the number of requests.

```
no.:    reqs:  %reqs: Gbytes: %bytes: file
---: -------: ------: ------: ------: ----
  1: 784,538: 20.04%:   0.63:  1.85%: https://www.indiana.edu/~istd/plag.phtml
  2: 661,811: 16.90%:   3.96: 11.66%: https://www.indiana.edu/~istd/certificate.phtml
  3: 300,865:  7.68%:  10.85: 31.93%: https://www.indiana.edu/~istd/plagiarism_test.html
```

- ~ 785,000 test evaluations (plag.phtml)
- ~ 662,000 "passed" the test (received Certificate)
- But ~ 301,000 viewed the test (plagiarism_test.html)
- Clear evidence of use of browser BACK button to pass

Instructors Reported Cheating

- Sent e-mail about YouTube video with answers to IU Plagiarism Test

- In July, 2013, the **order** of 10 test items was changed
  - New answer key soon appeared in YouTube video comments
  - Every time we changed the item order, a new answer key was posted soon afterwards

New Tests Developed

June - Aug. 2013

New Test Item Pool Created

Used computerized classification testing (CCT) to determine mastery or non-mastery in recognizing plagiarism and non-plagiarism

- More difficult questions than before
- Very large item pool
- Variable-length CCT
  - Items randomly selected, administered one at a time
  - Test ends as soon as decision made with 95% confidence
  - 8-12 items typically required for mastery decision
  - As few as 4 items needed for nonmastery decision
  - Gazillions of unique tests ($> 3 \times 10^{24}$)
- Done in conjunction with a planned research study

Trial by Fire

- Launched new CCT on recognizing plagiarism on August 16, 2013

- Approximately 90,000 CCT administrations in 5 days

- Just over 5,000 people passed the CCT

- Complaints via e-mail
  - Test too hard, different from before
  - Small percentage of users reported technical problems
    - Could not register
    - Unable to complete test (crashed)

IRB Concerns about Minors

- Some minors were taking the new test (under 18 years of age)

- Several parent complaints to IRB about the new test

- New test turned off on 5th day

- Old 10-item test restored

- Interim solutions considered

Interim Changes to Old Test and Tutorial

Aug. – Sept. 2013

Direct Feedback Loop between Users and Developers

- Link to send e-mail to developers on almost every web page

- E-mail auto-forwarded to a Google Group (private)

- Helped developers:
  - Understand user concerns
  - Analyze trends

Changes in Original 10-item Certification Test

- More new items created

- Easier than the CCT test for grad students

- Went live Labor Day weekend, 2013

- **One** attempt allowed for each Certification Test
  - To prevent multiple attempts at same test
  - 10 items randomly selected
  - Feedback on **types** of mistakes provided after test (to make it harder to build answer keys)
  - Billions (not gazillions) of unique tests

Changes in Original 10-item Test

- Specific items missed and number correct no longer provided after test
  - Only **one** attempt allowed for each unique test
  - To make it harder to create answer keys for cheating
  - But users complained; could no longer use BACK button strategy; wanted to know which questions they missed

- Instead, **types of errors** made were described in test feedback; and practice tests with feedback on questions missed were created

- Only **one** attempt allowed for each unique test, to prevent BACK button strategy for improving test outcome

Further Test Enhancements

- If a test was passed, a unique Certificate was:
  - E-mailed to student
  - Displayed in browser for printing or screen capture

- Each Certificate contained:
  - User name
  - Unique test ID
  - IP address of device used
  - Date and time
  - Test duration

Tutorial Enhancements

- New **practice** tests added
  - 3 items randomly selected
  - 1,100+ unique practice tests
  - Similar to Certification Tests
  - Can be repeated many times

- Specific feedback given for each question on practice test
  - Correct or not
  - If not, explanation of why

WayBackMachine Oct. 2013

https://web.archive.org/web/20131008050656/https://www.indiana.edu/~istd/

Meanwhile: Changes to Advanced-Level CCT

Aug. 2013 – Jan. 2014

Met with IRB Director and Agreed on Changes

- There is no practical way to control who accesses the tutorial and test—anyone can

- Main issue was minors who might access the tests

- Agreed to change introductory screens to clarify choice between
  - Advanced level test (for research)
    - Harder items
    - Variable-length CCT
  - Primary level test (not for research)
    - Easier items
    - For undergrads and those under 18
    - Newly created 10-item tests with random selection

Advanced-Level CCT Changes

- Introductory screens changed and IRB approved

- Minors routed to easier Certification Test

- Implemented advanced test
  - Dec. 2013, when usage was lighter
  - Ready for big surge in early 2014

- More detail provided at AECT featured research session:
  - *Facilitating Variable-Length Computerized Classification Testing In Massively Open Online Contexts Via Automatic Racing Calibration Heuristics*
  - Friday Nov. 7: 9:15 a.m., 2nd Level, Grand 7

Tutorial and Test Enhancements

Aug. 2014 – Sept. 2014

Enhancements in 2014

- Added important feature for validating Certification Test (Primary Level)

- Instructors can check validity of Certificates, especially those with same Test ID's but different student names and e-mails

- Students can retrieve their (lost) Certificates

Test Certificate Validation: Example

Result of validation check

Test ID: 603743101511114423

The Certificate for e-mail afbarrett@gmail.com is valid for Andrew Barrett with unique Test ID 603743101511114423.

E-mail in the record matches the e-mail specified. The plagiarism test was passed on 2014-10-31 08:59:02 and took 9.3 minutes.

Enter an e-mail address (to send the Certificate to--e.g., patsmith@indiana.edu): [ ]

Send my Certificate to the above e-mail address, and then view it.

or

View this Certificate now, so you can print it or save it on your computer.

Enhanced Instruction and Feedback on Tests

- Identified 15 patterns of plagiarism and provided new examples in tutorial—to help students better understand their mistakes

- If test is not passed, more specific feedback now provided on what specific patterns were missed on test

- Color coding added throughout tutorial to help students identify specific components of plagiarism and non-plagiarism

Example of New Feedback

Results of Certification Test # 5316567233184482945

You have not answered enough questions correctly (9 required) to pass

We do not provide specific feedback on each question in the Certification test for security reasons.

For further information about kinds of mistakes you made on this Certification test, click on each link below plagiarism or not:

- **Crafty Cover-Up**
- **Dippy Dupe**
- **Severed Cite**
- **Correct Quote**
- **Proper Paraphrase**

Click a button below to learn more.

Learn how to recognize plagiarism

Try practice tests with feedback on each question

See rules used for judging plagiarism in the tests

Or Take a new Certification Test

Example of "Crafty Cover-Up" Pattern with Color Coding

Plagiarized Version:	Correct Version: Not plagiarized
Merrill (2002) claims that learning is promoted when first principles of instruction are implemented. Students should solve authentic problems, arranged from simple to complex. For each problem, existing knowledge should first be activated, then new knowledge is demonstrated to the learner, new knowledge is applied by the learner, and new knowledge is integrated into the learner's world.	Merrill (2002) claims that learning is promoted when first principles of instruction are implemented. Students should solve authentic problems, arranged from simple to complex. For each problem, existing knowledge should first be activated, then "new knowledge is demonstrated to the learner, ... new knowledge is applied by the learner, and ... new knowledge is integrated into the learner's world" (p. 43).
Reference:	Reference:
Merrill, M. D. (2002). First principles of instruction. *Educational Technology Research and Development, 50*(3), 43-59.	Merrill, M. D. (2002). First principles of instruction. *Educational Technology Research and Development, 50*(3), 43-59.
Explanation: This is **word-for-word plagiarism** because seven or more words are copied from the source, and quotation marks are missing. The **locator** for the *full* in-text citation is **also missing.** Part of the text is properly paraphrased and includes the in-text citation and reference, but another part is still word-for-word plagiarism.	**Explanation:** Merrill is credited by use of quotation marks around his words (punctuation and ellipses added), full in-text citation with the locator, and by the full bibliographic reference. Merrill's ideas are paraphrased properly, since the in-text citation and reference are included.

Results of Changes

- Less cheating now (based on observations of test logs)

- No new test answer keys found on Web (gazillions of unique tests now possible due to random selection from large item pools)

- Students now know that their instructors can check the validity of their Certificates

- Far less e-mail expressing concerns about lost Certificates, since students themselves can now check validity and get new copies of their Certificates

- Fewer test attempts needed to pass (passing rate has increased 141% in 3 months, Aug. – Oct., 2014)

Future Changes Planned

2015

Future Plans

- Redesign tutorial and tests using First Principles of Instruction

- Record temporal maps on how students use various parts of the tutorial and how they perform on tests

- Do APT (Analysis of Patterns in Time) to identify uses of tutorial and associated learning outcomes —i.e., when more first principles and academic learning time are experienced, is the subsequent likelihood of mastery greater?

- Plan to be ready by summer 2015

Major Redesign in Progress

Based on First Principles of Instruction

June 2015 – Present

Need for Changes

- Many students still complained that they never received their Certificates by e-mail after passing a test.

- Occasional errors in the computer-adaptive test for graduate students—never resolved. Likely causes:
  - Session timeouts when users take too long to answer a question or excessive time interval between questions,
  - Possible incompatibility with certain devices or browsers, often fixed by a reboot of the device,
  - Unexpected termination of execution of scripts on the Google app server, Python and/or jQuery implementation.   ???

- **Failure rate for passing a test still about 85%--on average 7 attempts needed to pass a test.**

- **Some students complain instruction is not sufficient for passing a test.**

- **We intend to do extensive research on effectiveness of First Principles of Instruction and related studies.**

Immediate Changes to Address "Lost" Certificates

- Users are now required to **register before taking a test.**

- Implemented Aug. 1, 2015

- Users now must enter a valid e-mail address, a test password, and their real names.

- Answer 4 questions on why they are using the tutorial (optional)

- Data are also stored in MySQL database.

- Test cannot be taken until user goes to e-mail and clicks on a link to **authenticate** their registration.

Results of Immediate Changes

- 94% of registration attempts are successfully authenticated by users going to the e-mail account registered, and clicking on a link to authenticate their registration.

- Small % of users cannot receive e-mail because it is blocked by their service provider (typical for HS students whose district blocks mail from outside the district).

- We now recommend using an e-mail address at Google, Yahoo, etc. Commercial ISPs generally don't filter mail sent from IU, but may still classify it as Spam/Junk.

- A lot of bounced e-mail! Surprising how many users don't know or mistype their e-mail address. Approx. 100-150 bounces per day during peak usage months.

- Explains why many users never received Certificates in the past—they submitted invalid/unknown e-mail addresses!

Results of Immediate Changes (cont'd)

- The predominate reason for use of the tutorial and tests: a required assignment by their instructors.

- Many more HS users than we previously thought!

- 65,000+ *successful* registrations: Aug. 1 – Nov. 1

- 52,000+ Test Certificates issued for passing an Undergrad & Advanced HS test

- A small number of grad students continue to experience tests not working—note that the Google app server and scripts had not been changed.

Design Resources

- Used Merrill's new book on First Principles of Instruction (2013) as a primary resource

- First Principles of Instruction:
  - Authentic problems/tasks: organized from simple to complex
  - Activation: help students connect what they already know with new learning
  - Demonstration: provide examples of what is to be learned
  - Application: provide practice with explanatory feedback
  - Integration: help students incorporate new learning into their personal lives

Design Constraints

- Make instruction as parsimonious as possible
  - We know from web logs and e-mail comments that user's primary aim is to pass a Certification Test ASAP
  - Because if users fail to pass a test, they use the current tutorial sparingly in order to learn just enough to pass a test.
  - Must be flexible and easily navigable so users can be in control.

- Design team all volunteers with wide range of design expertise and experience. No budget.

- Criteria for the new design implementation:
  - Users are not too surprised by changes.
  - Maintain good will of target audience—both instructors and students.
  - Introduce changes gradually.
  - Avoid implementation of major changes during peak usage periods (Aug. – Oct.; Jan. – March; May – June).

Design Goals: Interoperability and Practicality

- The new design must be interoperable:
  - Must work on various devices including smartphones, tablets, laptops, and desktops.
  - Must work with all major Web browsers and adapt gracefully to display constraints.
  - Not rely on JavaScript or external Web servers but use:
    - IU servers exclusively, and
    - Standard HTML, CSS, (and PHP as needed).
  - Structured so that future research studies will be possible—e.g., Analysis of Patterns in Time for determining effectiveness of First Principles.
  - Be easy to update in the future.
  - Not overload IU servers in high usage periods.

Design Goals:
Content & Design Elements

- Carry over as much content and successful design elements from current tutorial to be re-used in new design.

- Utilize multi-media as needed to enhance appeal as long as interoperability goals can be met.

- Conduct usability tests to improve content and design elements **before** implementation on the production site.

Design Challenges & Decisions for First Principles of Instruction

- How to create increasingly complex authentic problems?
  - Instead of one level in old tutorial, we now have created 10 levels of increasing difficulty.
  - Each level consists of: activation, demonstration, application, integration, and a mastery test at that level.
  - Show example from current prototype.

  - Starting view prototype to illustrate each principle and issues around it.

Design Challenges & Decisions for First Principles of Instruction (cont'd)

- What to do about the Activation Principle?
  - Since a wide range of users:
    - from middle school students to doctoral level students, and
    - a wide range of ages (14 – 50),
    - provide a common experience for all users.
  - Utilize multi-media to make realistic scenarios.
  - Include diversity for gender, ethnicity, and some age differences.
  - Keep videos short but illustrative of plagiarism cases
  - Videos must be clear on small displays such as smart phones and work over slower connections (e.g., wi-fi).
  - Required new content design. Done!

Design Challenges & Decisions for First Principles of Instruction (cont'd)

- What to do about the Demonstration Principle?
  - We have 15 examples of Demonstration in the current tutorial, plus 17 examples of plagiarism patterns.
  - However, these are not organized by level of complexity (now 10 levels)
  - They are not dynamic demonstrations and require considerable reading and study—hard to focus user attention.
  - Plan to do screencasts for each Task Level, which illustrate plagiarism, focus on critical elements, and show how to correct it.
  - Requires new content to be designed.

Design Challenges & Decisions for First Principles of Instruction (cont'd)

- What to do about the Application Principle?
  - Same problem as for Demonstration, practice with feedback not organized by the 10 task levels.
  - Decided to make new practice items with explanatory feedback—why it is or isn't plagiarism.
  - Make it interactive—should we use HTML only, or make it dynamic via PHP/AJAX. Undecided for now.
  - Include a Mastery Test for each level. Make it isomorphic to Certification tests, but limited to level of complexity.
  - This is assessment of student learning, which could be considered Application or Integration, or both. Not sure which or both?
  - All of this will include largely new content, not in the current tutorial.

Design Challenges & Decisions for First Principles of Instruction (cont'd)

- What to do about the Integration Principle?
  - This has been the biggest design challenge, so far!
    - Considered a blog for user reflection, discussion, and sharing, but high maintenance costs. Rejected.
    - No practical way to judge recognition and avoidance of plagiarism in user's own life—e.g., for incorporating what is learned in a writing assignment or paper. Rejected.
    - Currently plan to incorporate a reflection activity at each level of task difficulty.
      - Implement a simple Web form for users to type in a text box.
      - No computer judgment and feedback on the reflection task in real time.
      - Reflection comments will be stored for later analysis.

Current Status of Design

- Demo of new design prototype (if Internet is available).

- Incorporate test item pool for graduate students on IU server with structure isomorphic to existing undergraduate test.

- Incorporate MOO-TALQ (for Cesur's research study—see next presentation)

- Conduct usability tests and implement by mid-December (ready for peak usage in Jan. – Feb., 2016).

- Employ temporal mapping to track usage patterns (April?)

- Incorporate adaptive tests (next summer?)

Thank you

Visit the current site:

How to Recognize Plagiarism

https://www.indiana.edu/~plag/

History of Recent Changes

https://www.indiana.edu/~plag/recentChanges.html