A New Way to Connect Instructional Design Theory with Online Learning Outcomes

Teaching and Learning Process Analytics (TALPA)



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I was a college dropout in 1968

- I was very frustrated with my education at this point
- I didn't know what I wanted to do with my life
- I had learned a lot from several very excellent teachers, but most of my teachers were so-so

I wondered:

- What makes an effective teacher?
- What makes learning better?

Two big questions I've been trying to answer since 1972, when I started my Ph.D. studies

- 1) What instructional methods are more likely to result in successful student learning?
- 2) What educational research methods will help answer this question empirically in a convincing scientific way?

OVERVIEW

What I've learned in this quest, now 53 years later

Today I plan to illustrate:

- Learning journeys
- Temporal maps of learning journeys
- Teaching and Learning Process Analytics (TALPA)
- How the Indiana University Plagiarism Tutorials and Tests (IUPTAT) was designed with First Principles of Instruction (FPI)
- How IUPTAT was set up with GA4 to create temporal maps of learning journeys
- How Google Analytics 4 (GA4) was used to define key events—i.e., parts of IUPTAT designed with FPI
- How GA4 was used to do TALPA to obtain the findings I'm about to show you

TALPA results from Dec. 30 thru Jan. 26, 2025.

There were 6.66 times as many Achievers who chose IUPTAT instruction that was designed with First **Principles as there** were Achievers who did no FPI-designed instruction.



Initially I'll briefly compare 2 studies on teaching-learning processes and learning outcomes

- My dissertation, completed in 1983: Nonmetric Temporal Path Analysis (NTPA): An Alternative to the Linear Models Approach for Verification of Stochastic Educational Relations
- A study I did earlier this week, just for this webinar
- Today I'll focus mostly on the recent study

A METAPHOR

Oregon Trail: 2,170 miles long (3,492 kilometers)



Oregon Trail Routes: Mid-1800s



Travelers rode in Conestoga wagons pulled by oxen, rode horses, and walked. Typically took 4-6 months or longer to go from from Kansas City to what is now Portland, Oregon, about 2,170 miles.



Nowadays in 2025:





Go to MCI airport in Kansas City, board plane, and take off



Land at the Portland airport (PDX) about 5 – 6 hours later, with a stop in Denver enroute



This is a metaphor for educational research in 1983 compared with now in 2025

1983 study: NTPA



2025 study: TALPA





Educational research tools then and now: for real—NOT a metaphor

1983 study: NTPA



Tandy-Radio Shack Model 3 desktop computer—for one person at a time; VAX 11/780 mini-computer—shared by ~ 100 users at a time at IU

2025 study: TALPA



Google Data Center: Thousands of computers running in parallel (a.k.a. cloud computing)—shared with millions of users via Internet

The 1983 and 2025 studies that I'll be comparing have similar aims

- Both use variants of Analysis of Patterns in Time to investigate student learning journeys
 - 1983: Nonmetric Temporal Path Analysis (NTPA)
 - 2025: Teaching and Learning Process Analytics (TALPA)
- Both provide strong empirical evidence to show connections between instructional methods and student outcomes.
- Both provide empirical results that traditional quantitative measurement and statistical analysis cannot do as well (linear models approach such as multiple regression analysis and ANOVA).

THEN AND NOW: 1983 VS. 2025

Then and Now: Overall Findings

1983 NTPA (My Ph.D. Dissertation)

Students were engaged (ontask) 97% of the time when direct instruction was occurring; only engaged 57% of the time when *non*-direct instruction was occurring.

2025 TALPA (today's Webinar)

Students who chose *any* instruction designed with First Principles were 6.6 times more likely to be achievers than were students who did *not* choose any FPIdesigned instruction.

Number of Learning Journeys Observed

1983 NTPA

25 in central Indiana schools

2025 TALPA

13,309 in 122 countries

Context

1983 NTPA

Face-to-face (in-person classrooms)

2025 TALPA

Online (at a distance)

When

1983 NTPA

1981 – 82 fall and spring semesters (~ 32 weeks)

2025 TALPA Dec. 29, 2024 – Jan. 25, 2025 (4 weeks)

Content to be learned

1983 NTPA

Math and reading curriculum at public elementary school levels

2025 TALPA

Recognizing plagiarism and taking Certification Tests: IUPTAT—Indiana University Plagiarism Tutorials and Tests

Who and where

1983 NTPA

Mildly disabled children in central Indiana elementary school classrooms

2025 TALPA

Adults: 91% at undergraduate and graduate levels in college, plus 9% from high school; in 122 countries worldwide

Coding of learning journeys done by

1983 NTPA

Trained classroom observers using Academic Learning Time Observation System (ALTOS)

2025 TALPA

Google Analytics 4 for classifying key events as First Principles of Instruction (via JavaScript embedded in webpages)

1983 NTPA

Trained classroom observers coded target student and instructor moves.

The observer followed a target student throughout the school day. CATEGORIES FOR REAL-TIME CODING OF

TARGET STUDENT, INSTRUCTOR AND FOCUS

1. Classification: Learner Moves (for target student, and only coded in Math and Reading)

Categories:	EW.	Engaged - Written Response	Priority Hierarchy			
	EO.	Engaged - Oral Response	1.	EO.	EW	
	EC.	Engaged - Covert Response	2. 3. 4.	EC ED NI,	2.0	
	ED.	. Engaged - With Directions About Task . Non-Engaged - Interim . Non-Engaged - Wait				
	NI.				NW,	NO
	NW.					
	NO.	Non-Engaged - Off-task				

2. Classification: Instructor Moves (only coded when instructional move is relevant to target student in math and reading)

Categories:	AM.	Academic Observational Monitoring	Pri	ority	y Hierarchy
	AF. AQ. XN. XP. SD. TF. NU.	Academic Feedback Academic Questioning Explanation - Need Explanation - Planned Structuring/Directing Task Engagement Feedback Null	1. 2. 3. 4. 5. 6. 7.	XN XP AF, AM SD TF NU	AQ
Classificati	lon:	Focus of Instructor Move			

Categories: TS. Target Student

3.

- GR. Group (of which Target Student is a member)
- NU. Null

1983 NTPA Trained classroom observers coded target student and instructor moves.

The observer recorded moves on a paper coding form, minute by minute, creating a temporal map.

REAL-TIME CODING SHEET									
TIME	1. LEARNER MOVES	INSTRUCTOR 2. MOVES 3. FOCUS	NOTES						
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Code only in reading/

math related tasks

UTUM 1

2025 TALPA: GA4 did the coding of student moves within IUPTAT online instruction

```
<!-- Google tag (gtag.js) -->
<script async src="https://www.googletagmanager.com/gtag/js?id=G-
0234HE7Y3S"></script>
<script>
window.dataLayer = window.dataLayer || [];
function gtag(){dataLayer.push(arguments);}
gtag('js', new Date());
gtag('config', 'G-0234HE7Y3S');
</script>
```

JavaScript was executed when a Web page was viewed by a student, recording time and page location. The JavaScript was embedded in HTML Dreamweaver Templates used for creating IUPTAT webpages.

2025 TALPA: GA4 created a temporal map for each student and stored it in the cloud (Google data centers)

			Web Page URL at			
User View Time		#	https://plagiarism.iu.edu		Page: User Action	
With the trade of the trad	06:21:32 a.m.	1	/index.html		IPTAT Welcome: selects "Take Certification Tests".	
Bit Registrice Registrice Registrice Bit Registrice Registrice Bit Registrice Registrice Bit Registrice Registrice Bit Registrice	06:22:28 a.m.	2	/certificationTests/index.html		Take Certification Test: selects "Undergraduate and Advance High School Student".	
Benchersprecken Flagskandersken: Benchersbergersken Flagskandersken: Benchersbergersken: Benchersbergersken:	06:22:35 a.m.	3	/mainLogin.php		Login for Certification Test: selects link to register.	
Benergicity Fegigurant: Location and trais Benergicity Fegigurant: Sector and the sector and the sect	06:22:37 a.m.	4	/register.html		Register for Certification Test: selects link "I am an undergraduate".	

Cost

1983 NTPA

3-year funded grant for approximately \$1.2M in 1980 U.S. dollars, preceded by a 4year grant for approximately \$1.9M: Computer-Assisted Research into Teaching-Learning Outcomes (CARTLO)

2025 TALPA

\$0 U.S. dollars in 2025, using personal computer at home and GA4 with remote data centers

Interval for observing and coding learning journeys

1983 NTPA

2 semesters, or about 32 weeks

2025 TALPA

4 weeks

Time preparing for data analysis

1983 NTPA

About 8 months, including software development for data entry from paper-andpencil coding forms; and data entry on computer

2025 TALPA

Several days, including definition of key events in GA4, and defining segments for overlap analysis. No software development needed; no data entry on computer needed

Time for each analysis

1983 NTPA

Use of Scientific Information Retrieval System on IU VAX 11/780 minicomputer and SPSS: a few minutes each run

2025 TALPA

Use of Google data centers (cloud) and GA4 Explore Tools: a few seconds each run

1983 NTPA Results

Student	<i>p</i> (DI)	<i>p</i> (EN)	<u><i>p</i>(</u> DI ∩ EN)	<u><i>p</i>(</u> DI ∩ NE)	$\underline{p(ND \cap EN)}$	<u><i>p</i>(</u> ND ∩ NE)	<u><i>p</i>(</u> EN DI)	<u><i>p</i>(</u> EN ND)
1	0.50	0.80	0.46	0.04	0.34	0.16	0.92	0.67
2	0.39	0.49	0.37	0.02	0.12	0.49	0.95	0.20
3	0.27	0.56	0.26	0.01	0.30	0.43	0.97	0.41
4	0.34	0.69	0.34	0.00	0.35	0.31	1.00	0.53
5	0.48	0.73	0.47	0.01	0.25	0.26	0.98	0.49
6	0.40	0.75	0.39	0.01	0.35	0.25	0.98	0.59
7 - 25	•••	•••	•••	•••	•••	•••		•••
Mean	0.432	0.741	0.416	0.015	0.324	0.243	0.967	0.573
(SD)	(0.144)	(0.101)	(0.139)	(0.010)	(0.114)	(0.104)	(0.029)	(0.142)

2025 TALPA Results

There were 6.66 times as many Achievers who chose IUPTAT instruction that was designed with First Principles as there were Achievers who did no FPI-designed instruction.



Generalizability of findings

1983 NTPA

Narrow: central Indiana, mildly disabled children, ages 6-12, moderate confidence in findings (consistent with past ALT research)

2025 TALPA

Worldwide: adults ages 14 to 70+ years old; high confidence in findings (consistent with previous IUPTAT findings from 2019 through 2024)
REDESIGN OF IUPTAT IN 2015

Using First Principles of Instruction as the Design Theory

First Principles of Instruction (David Merrill, 2020)



Five First Principles

- 1) Acquire knowledge and skill via a problem-solving strategy in the context of real-world problems or tasks;
- 2) Activate an existing mental model as a foundation for new skills;
- 3) Observe a demonstration of the skill to be learned that is consistent with the type of skill being taught;
- 4) Engage in the application of their newly acquired knowledge and skill that is consistent with the type of content being taught; and
- 5) Reflect on, discuss, and defend their newly acquired skills. (p. 4)

Indiana University Plagiarism Tutorials and Tests (IUPTAT): How to Recognize Plagiarism

- Certification Tests and randomized administration of tests developed in 2013-14—to address problem of student cheating
- Instruction designed using First Principles of Instruction in 2015
- Redesigned IUPTAT went live on January 2, 2016
- Test item pools expanded in 2017-18
- Now trillions of randomized 10-item Certification Tests
 - Easier tests for undergraduate and advanced high school students
 - Harder tests for graduate students
- Since 2016 through January 28, 2025, Certification Tests were passed by more than 1,302,272 students from 222 countries and territories worldwide

How to Access IUPTAT

In your Web browser go to:

https://plagiarism.iu.edu

Authentic problems, organized from simple to complex

Learn through Instruction

<u>Menu</u>: for explanations, video cases, examples, practice, reflection, and tests--organized by difficulty levels

- Basic Level
 - View video case (one minute)
 - <u>Watch 2 examples</u> that demonstrate *non-plagiarism*.
 - <u>Watch 2 examples</u> that demonstrate plagiarism.
 - <u>Answer one practice question</u> at a time with immediate feedback.
 - Reflect on what you've learned.
 - Try practice test: 4 questions
- Novice Level
 - View video case (one minute)
 - <u>Watch 2 examples</u> that demonstrate *word-for-word plagiarism* and how to fix them.
 - Answer one practice question at a time with immediate feedback.
 - Reflect on what you've learned.
 - Try practice test: 4 questions
- Intermediate Level
 - View video case (one minute)
 - <u>Watch 2 examples</u> that demonstrate *paraphrasing plagiarism* and how to fix them.
 - Answer one practice question at a time with immediate feedback.
 - Reflect on what you've learned.
 - <u>Try practice test</u>: 4 questions
- Advanced Level
 - <u>View video case 1</u> (one minute)
 - View video case 2 (one minute)
 - Watch 2 examples that demonstrate both word-for-word and paraphrasing plagiarism and

Activation

Instruction: Novice Level

A Video Case

Grace and Gina discuss how to properly quote someone else's words and to cite the author(s). Click the one-minute video below to view this case.



Demonstration

Instruction: Examples for Novice Level

Word-for-word plagiarism, and how to fix it so it is not plagiarism.

Click on each video to watch.

Example 1. When quoting from an electronic book where there are no page numbers but locations.



Emotions Structure Memories

Emotions can organize and give meaning to experience. They can, therefore, serve as the architect or orchestra leader for the mind's many functions.



Application

Practice 1 of 4: Novice Level

Answer the question below by clicking or touching your choice. Then click or touch the 'Evaluate my answer' button to get detailed feedback if your answer is incorrect.

Question 1

In the case below, the original source 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
A naïve mental model in the context of computer programming is that a computer is an intelligent system, and that giving directions to a computer is	One kind of mental model for the computer is the naïve model. According to van Merriënboer (1997), "A naïve mental model in the context of computer
like giving directions to a human being. Reference	programming is that a computer is an intelligent system, and that giving directions to a computer is like giving
Van Merriënboer, J. J. (1997). <i>Training</i> complex cognitive skills: A four- component instructional design model for	directions to a human being." Reference
technical training. Englewood Cliffs, NJ: Educational Technology.	Van Merriënboer, J. J. (1997). <i>Training</i> complex cognitive skills: A four- component instructional design model for technical training. Englewood Cliffs, NJ: Educational Technology.

Application (cont'd)

computer is an intelligent system, and that giving directions to a computer is like giving directions to a human being.

Reference

Van Merriënboer, J. J. (1997). *Training complex cognitive skills: A fourcomponent instructional design model for technical training.* Englewood Cliffs, NJ: Educational Technology. to van Merriënboer (1997), "A naïve mental model in the context of computer programming is that a computer is an intelligent system, and that giving directions to a computer is like giving directions to a human being."

Reference

Van Merriënboer, J. J. (1997). *Training complex cognitive skills: A fourcomponent instructional design model for technical training.* Englewood Cliffs, NJ: Educational Technology.

Which of the following is true for the Student Version above?

- Word-for-Word plagiarism
- The text is not plagiarized.

<u>Hints</u>

Feedback on Question 1 of 4

Question 1 answer is incorrect. Please see the feedback below.

Original Source Material:

A naïve mental model in the context of computer programming is that a computer is an intelligent system, and that giving directions to a computer is like giving directions to a human being.

Reference

Van Merriënboer, J. J. (1997). *Training complex cognitive skills: A fourcomponent instructional design model for technical training.* Englewood Cliffs, NJ: Educational Technology.

Explanation:

The student version is **word-for-word plagiarism** because seven or more words are copied from the source, and

Student Version:

One kind of mental model for the computer is the naïve model. According to van Merriënboer (1997), "A naïve mental model in the context of computer programming is that a computer is an intelligent system, and that giving directions to a computer is like giving directions to a human being."

Reference

Van Merriënboer, J. J. (1997). *Training complex cognitive skills: A fourcomponent instructional design model for technical training.* Englewood Cliffs, NJ: Educational Technology.

Correct Version:

One kind of mental model for the computer is the naïve model. According to van Merriënboer (1997), "A naïve

Application (cont'd)

Application (cont'd)

Explanation:

The student version is **word-for-word plagiarism** because seven or more words are copied from the source, and while the student version does provide:

- quotation marks around the author's words,
- a full in-text citation with the author and date, and
- the full bibliographic reference,

the locator is missing.

component instructional design model for technical training. Englewood Cliffs, NJ: Educational Technology.

Correct Version:

One kind of mental model for the computer is the naïve model. According to van Merriënboer (1997), A naïve mental model in the context of computer programming is that a computer is an intelligent system, and that giving directions to a computer is like giving directions to a human being (p.145).

Reference

Van Merriënboer, J. J. (1997). *Training complex cognitive skills: A fourcomponent instructional design model for technical training.* Englewood Cliffs, NJ: Educational Technology.

Please also see the item pattern for Question 1: Lost Locator.

After reading the explanation above for the item you missed, click the 'Back' button on your browser so you can correct your mistake, and then re-evaluate your answer.

Integration

Instruction: Reflect on what you've learned at the Novice Level

You should avoid *word-for-word* plagiarism. Think about a situation in your own life where you would want to *directly quote someone else*.

Click in the text box below, and briefly tell us about this. We will not share your comments with others.



Continue to Practice Test at the Novice Level

Certification Tests



Take Certification Tests

Each randomly selected question on a test provides source material from another author and a sample of student writing. You must determine whether the student version is word-for-word plagiarism, paraphrasing plagiarism, or not plagiarism. **Most people find tests to be challenging**, demanding concentration and attention to detail. **Most people fail several tests before they pass.**

Certification Tests require *judgment*, which in turn requires reading comprehension and critical thinking. They require applying concepts and principles. They require paying careful attention to details.

You will know when you pass a test, because on the results page it will say,

Congratulations! You passed a Certification Test by answering at least 9 questions correctly.

You are very likely to pass if you keep trying, take your time, *and* you use successful learning strategies described below.

To pass a Certification Test, you must answer at least 9 out of 10 questions correctly within 40 minutes.<u>**</u>

Item 1

Certification Tests (cont'd)

In the case below, the original source 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
In examining the history of the visionary companies, we were struck by how often they made some of their best moves not by detailed strategic planning, but rather by experimentation, trial and error, opportunism, andquite literally accident. What looks in hindsight like a brilliant strategy was often the residual result of opportunistic experimentation and "purposeful accidents."	When I look back on the decisions I've made, it's clear that I made some of my best choices not through a thorough analytical investigation of my options, but instead by trial and error and, often, simply by accident. The somewhat random aspect of my success or failure is, at the same time, both encouraging and scary.
References: Collins, J. C., & Porras, J. I. (2002). <i>Built to last: Successful habits of visionary companies.</i> New York, NY: Harper Paperbacks.	

Which of the following is true for the Student Version above?

- Word-for-Word plagiarism
- Paraphrasing plagiarism
- \odot This is not plagiarism

Certification Tests (cont'd)



How to Recognize Plagiarism: Tutorials and Tests

Results of Undergraduate Certification Test

Test ID: 722944358565441227

You have not answered enough questions correctly (9 required) to pass this Certification Test.

You did not answer the majority of questions correctly.

Types of questions you missed

Click on each link below to see examples of the kinds of questions you missed and their correct answers:

- <u>Cunning Cover-Up: paraphrasing plagiarism</u>
- Disguised Dupe: word-for-word plagiarism
- Severed Cite: paraphrasing plagiarism

Why don't you tell me which questions I missed and the correct answers? <u>Click here</u> to find out.

Certification Tests (cont'd)

Plagiarism Pattern: Disguised Dupe



Definition

A disguised dupe is a **word-for-word plagiarist** who takes text from another author to make it appear as a proper paraphrase, but omits quotation marks to identify what has been taken, and the citation lacks the locator.

Original Source Material:

Five first principles are elaborated: (a) Learning is promoted when learners are engaged in solving real-world problems. (b) Learning is promoted when existing knowledge is activated as a foundation for new knowledge. (c) Learning is promoted when new knowledge is demonstrated to the learner. (d) Learning is promoted when new knowledge is applied by the learner. (e) Learning is promoted when new knowledge is integrated into the learner's world.

Reference

Merrill, M. D. (2002). First principles of instruction. *Educational Technology Research and Development, 50*(3), 43-59.

Student Version:

Merrill (2002) claims that learning is promoted when learners are engaged in solving real-world problems, existing knowledge is activated as a foundation for new knowledge, new knowledge is demonstrated to the learner, new knowledge is applied by the learner, and when new knowledge is integrated into the learner's world.

Reference

Merrill, M. D. (2002). First principles of instruction. *Educational Technology Research and Development, 50*(3), 43-59.

Certification Tests (cont'd)

See decision rule

For a Certification Test item that is similar to this pattern, the correct answer is:

Word-for-word plagiarism

Paraphrasing plagiarism

Not plagiarism

Explanation:	Correct Version: Not plagiarized
The student version is word-for-word plagiarism because seven or more words are copied from the source, but quotation marks are missing . The locator is missing from the in-text citation. However, the full bibliographic reference is included.	Merrill (2002) claims that "learning is promoted when learners are engaged in solving real-world problems, existing knowledge is activated as a foundation for new knowledge, new knowledge is demonstrated to the learner, new knowledge is applied by the learner, and when new knowledge is integrated into the learner's world" (p. 43). Reference
	Merrill, M. D. (2002). First principles of instruction. <i>Educational Technology</i> <i>Research and Development, 50</i> (3), 43- 59.

Certification Test Passed



How to Recognize Plagiarism: Tutorials and Tests

Results of Undergraduate Certification Test

Test ID: 52762421781169712249

Congratulations! You passed a Certification Test by answering at least 9 questions correctly.

The following name will appear on your Certificate: Theodore Wayne Frick

Your certificate will be sent to tedfrick@iu.edu

Click this button to e-mail your Certificate to yourself!

Send my Certificate to the above e-mail address

Certificate Awarded



How to Recognize Plagiarism: Tutorials and Tests

Primary Level Certificate for Undergraduate and Advanced High School Students



Unique Test ID: 52762421781169712249 for Theodore Wayne Frick

A **Primary Level Certificate** indicates that the person listed below has passed a Certification Test intended for undergraduate students and those who are advanced high school students. The person below has passed a test by correctly answering at least 9 out of 10 questions selected randomly from a large inventory. Each question provides source material from another author and a sample of student writing. The test taker must determine whether the student version is word-for-word plagiarism, paraphrasing plagiarism, or not plagiarism. Many questions exemplify subtle forms of plagiarism which represent incomplete or incorrect understanding of plagiarism, carelessness, or attempts to disguise actual plagiarism.

Please read the information below carefully. You can submit this confirmation certificate to your academic department or program area, or to your instructor, if required to do so.

GOOGLE ANALYTICS 4

Define Key Events Explore: Segment Overlaps

<html lang="en"><!-- InstanceBegin template="/Templates/newplagiarismNOsidebar.dwt" codeOutsic</pre> <head> Embedded <!-- Google tag (gtag.js) --> <script async src="https://www.googletagmanager.com/gtag/js?id=G-0234HE7Y3S"></script> <script> window.dataLayer = window.dataLayer || []; JavaScript function gtag(){dataLayer.push(arguments);} qtaq('js', new Date()); gtag('config', 'G-0234HE7Y3S'); for </script> <meta name="viewport" content="width=device-width, initial-scale=1.0"> <meta http-equiv="Content-Type" content="text/html; charset=UTF-8" /> Coding <meta name="description" content="Tutorials and tests on how to recognize plagiarism: When pr</pre> writing, learn to correctly identify whether the student version is word-for-word plagiarism, <meta name="keywords" content="plagiarism test, plagiarism quiz, avoid plagiarism, certificate</pre> plagiarism, paraphrasing plagiarism, tutorials, mastery tests, certification, practice with e> Instructional principles of instruction, activation, demonstration, application, integration, Indiana Univer Systems Technology" /> <!-- InstanceBeginEditable name="doctitle" --> <title>Mail Certificate Undergraduate Level: How to Recognize Plagiarism: Tutorial and Tests, and <!-- InstanceEndEditable --> <!-- InstanceBeginEditable name="head" --> <!-- InstanceEndEditable --> Learning <link rel="stylesheet" type="text/css" href="css/newplagiarismlite.css" /> k rel="icon" href="https://www.iu.edu/favicon.ico"> </head> <bodv> **Events** <div class="container"> <header> <div class="header"> Skip to main content <div class="fltlft" width="10%"><a href="https://www.iu.edu" title="Indiana University"</pre> (provided by src="https://plagiarism.iu.edu/images/trident-tab.gif" alt="Link to Indiana University Home" r style="display:block;" /></div> <div class="fltlft" width="60%"> GA4) <h1>How to Recognize Plagiarism:
 Tutorials and Tests</h1> </div><div class="fltlft" width="10%"> <!--<p class="accessibility">Skip to main content--> </div>

<!doctype html>

GA4 Setup: Define Custom Events

IPTAT FPI March 2022 Create events G-0234HE7Y3S Q Search Custom events Create Custom event name Matching conditions event_name equals page_view Application > page_location contains /practice event_name equals page_view Demonstration > page_location contains /demonstration event_name equals page_view TestFeedbackGR > page_location contains /evaluateAnswer... event_name equals page_view PassTestGR > page_location contains /mailCertificate...

E.g., Define Custom Event for FPI Application Principle

Configuration			
Custom event name 📀			
Application			
Matching condition	S		
Create a custom event	when another event matches ALL	of the following conditions	
Parameter	Operator	Value	

event_name	equals	•	page_view	
Parameter	Operator		Value	
page_location contains		-	/practice	

Excerpt of Temporal Map of IUPTAT User Learning Journey (key events are blue-flagged)

Application	12:51:10 PM
scroll	12:51:16 PM
scroll	12:55:29 PM
D page_view	12:55:35 PM
TestFeedbackUG	12:55:35 PM
scroll	12:55:40 PM
D page_view	12:55:50 PM
PassTestUG	12:55:50 PM
scroll	12:55:55 PM
□ ▶ page_view	12:56:25 PM

Millions of IUPTAT Temporal Maps Stored at Google Data Centers



GA4 REPORTING TOOLS

GA4 Realtime Overview: Typical a.m.



GA4 Realtime Overview: Typical p.m.



IUPTAT Users for 2024: 201 Countries

Pl	ot rov	NS	Q Search	1	Rows per page	e: 10 💌	Go to: 1	1-10 of 201
		Countr	ry - +	↓ Active users	New users	Engaged sessions	Engagement rate	Engaged sessions per active user
<u>~</u>		Total		452,847 100% of total	453,839 100% of total	700,071 100% of total	70.33% Avg 0%	1.55 Avg 0%
	1	United	States	354,072	354,919	539,438	70.5%	1.52
	2	China		23,929	22,811	32,894	74.53%	1.37
	3	Philipp	oines	18,581	18,135	34,922	76.68%	1.88
	4	Canada	а	11,285	11,127	17,415	71.18%	1.54
	5	Nether	lands	4,452	4,338	6,947	70.42%	1.56
	6	India		3,842	3,688	6,484	73.23%	1.69
	7	Germa	ny	2,852	2,715	1,504	39.41%	0.53
	8	Hong k	Kong	2,515	2,104	3,359	71.61%	1.34

Tracking Key Events Defined in GA4 Setup

Key event name 个	Count (% ch	ange)	Value (% change)	Mark as key event 🤅
Activation	29,317	1 334.5%	-	
Application	253,611	1 357.4%	-	
Demonstration	25,202	1 323.9%	-	
Integration	18,706	1 370.2%	-	
MasteryTest	48,928	1 361.3%	-	
PassTestGR	2,326	1 90.3%	-	
PassTestUG	7,751	1 274.4%	-	
PlagiarismPatterns	82,723	1 182.1%	-	
PlagiarismTestGR	31,489	1 89.8%	-	
PlagiarismTestUG	84,631	1 197.1%	-	
purchase	0	0%	0 0%	
TestFeedbackGR	38,291	1 104.5%	-	
TestFeedbackUG	95,038	1 205.7%	-	

DOING TALPA WITH GA4

TALPA Queries

 When *active users* had Tried Any FPI, how often were they Achievers?

2) When *active users* had *not* Tried Any FPI, how often were they Achievers?

GA4 Segment Definition: Tried any FPI

× Tried any F	PI	🔀 Hel	p center
Used any part o	of the FPI tutorials, plagiarism patterns, or decision aid		
Include users w	hen:	_ ►	Ū
Page location	contains /tutorial at any point in time \times		\otimes
Page location	contains /plagiarismPatterns × at any point in time		\otimes
Page location	contains /decide at any point in time \times	Or	\otimes

GA4 Segment Definition: Achievers

× Achievers
Failed at least one Certification Test, then Passed a CT
Include users when:
TestFeedback UG OB
TestFeedback GR Event count > 1 ×
AND
PlagiarismTes tGR Event count > 1 X
PlagiarismTes tUG Event count > 1 ×
And
AND
Include users when:
PassTestUG - + Add parameter
OR PassTestGR - + Add parameter

GA4 Explore: Segment Overlap

- Time interval: last 28 days
- Segment Comparisons:
 - Achievers
 - Tried any FPI
- Values:
 - Active users
 - User engagement
 - Key events

E Variables X	🕄 Settings 🛛 🗙		
EXPLORATION NAME: Demo for TALPA Webinar	TECHNIQUE Segment overlap		
Last 28 days Dec 31, 2024 - Jan 27, 2025	SEGMENT COMPARISONS		
segments +	:: Achievers		
: Achievers	: Tried any FPI		
👬 Failures	+ Drop or select segment		
Demonstration or Application	BREAKDOWNS + Drop or select dimension		
: Tried any FPI	START ROW		
Completed Certification Tests with Feedback			
	SHOW ROWS		
Tried More Complex	25		
	VALUES		
DIMENSIONS +	Active users		
🗱 Event name	👬 User engagement		
: Is key event	Key events		
GA4 Segment Overlap Results



Achievers who Tried Any FPI: 9,634 Active Users



Achievers who had not Tried Any FPI: 1,459 Active Users

Active users overlap			
Tried any FPI			
Achievers Achievers Tried any FP			
Segment set	↓ Active users	User engagement	Key events
1 Tried any FPI	22,899	3y 28d	981,279
2 Tried any FPI ONLY	13,205	1y 113d	451,933
3 Achievers	11,081	1y 321d	544,331
4 Achievers + Tried any FPI	9,634	1y 281d	529,346
5 Achievers ONLY	1,459	40d 20h	14,985
Achievers ONLY			

TALPA Queries

 When *active users* had Tried Any FPI, how often were they Achievers? 9,634

2) When *active users* had *not* Tried Any FPI, how often were they Achievers? 1,459

Odds Ratio: 9,634/1,459 = 6.6 to 1

Conclusion from TALPA Findings

- Adult students who tried any part of the IUPTAT online tutorials designed with First Principles of Instruction (FPI) were about 6.6 times more likely to master the learning objective, when compared with adults who had NOT tried any part of the FPI-designed instruction.
- This empirical scientific evidence illustrates the connection of instructional design theory with online learning outcomes.
- TALPA methodology demonstrates that instruction designed with First Principles is often effective—i.e., likely to result in student learning achievement.

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And Credits

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Credits for IUPTAT Design and Development: https://plagiarism.iu.edu/credits.html

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