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Designing AI-Engaged Assignments to Teach Disciplinary Knowledge

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Overview

- Defining Critical AI Literacy
- Identifying “sticky” concepts
- Writing-to-Learn, Writing-to-Engage, and Writing-to-Communicate
- Designing AI-Engaged Writing Activities
- Hands-on Working Time
- Assessing AI-Engaged Writing Processes
- Wrap-Up Discussion

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Critical AI Literacy

- Not rejection, not embracing, but **engaging AI**
- The ability to examine the risks and benefits of generative AI technologies for communication and knowledge building, with attention to effects on individuals, organizations, communities, and cultures.
- Not the responsibility of any one instructor, course, or department
- A little bit goes a long way!

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Identifying “Sticky” Concepts



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Why Start with Concepts?

- Backwards design
- Shifts focus away from products to more portable conceptual learning
- Conceptual learning is related to professional preparation and participation (see Adler-Kassner & Wardle, 2015, 2017)
- Leverage time spent on writing assignments to help students learn essential knowledge for future participation in disciplines and professions

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What Are “Sticky” Concepts?

- A concept that can be difficult for students to learn (they get “stuck”), but that you hope will “stick” with them moving forward.
 - Basic, e.g., how to use articles (a, an, the) in English
 - Thresholds or learning bottlenecks, e.g., the role of “noise” in communication processes

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Example “Sticky” Concepts

- Rhetorical situations are shaped by audiences, exigencies, and social and material constraints (rhetoric).
- All writers have more to learn (writing studies).
- Close reading is an active process of interpretation that can be represented through writing (literary studies).
- Experimental uncertainty is unavoidable in physical measurements and a necessary part of scientific knowledge-building (physics).

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Activity 1 Sticky Concepts & Levels of Understanding

- First, complete page 1 of “Difficult Concepts and Levels of Understanding” (5 minutes)
- Second, explain to a partner what makes your concept difficult for students and how you know when they understand it (10 minutes)
- Finally, map complete, developed, partial, and little/no understanding on pages 2+ of the handout.

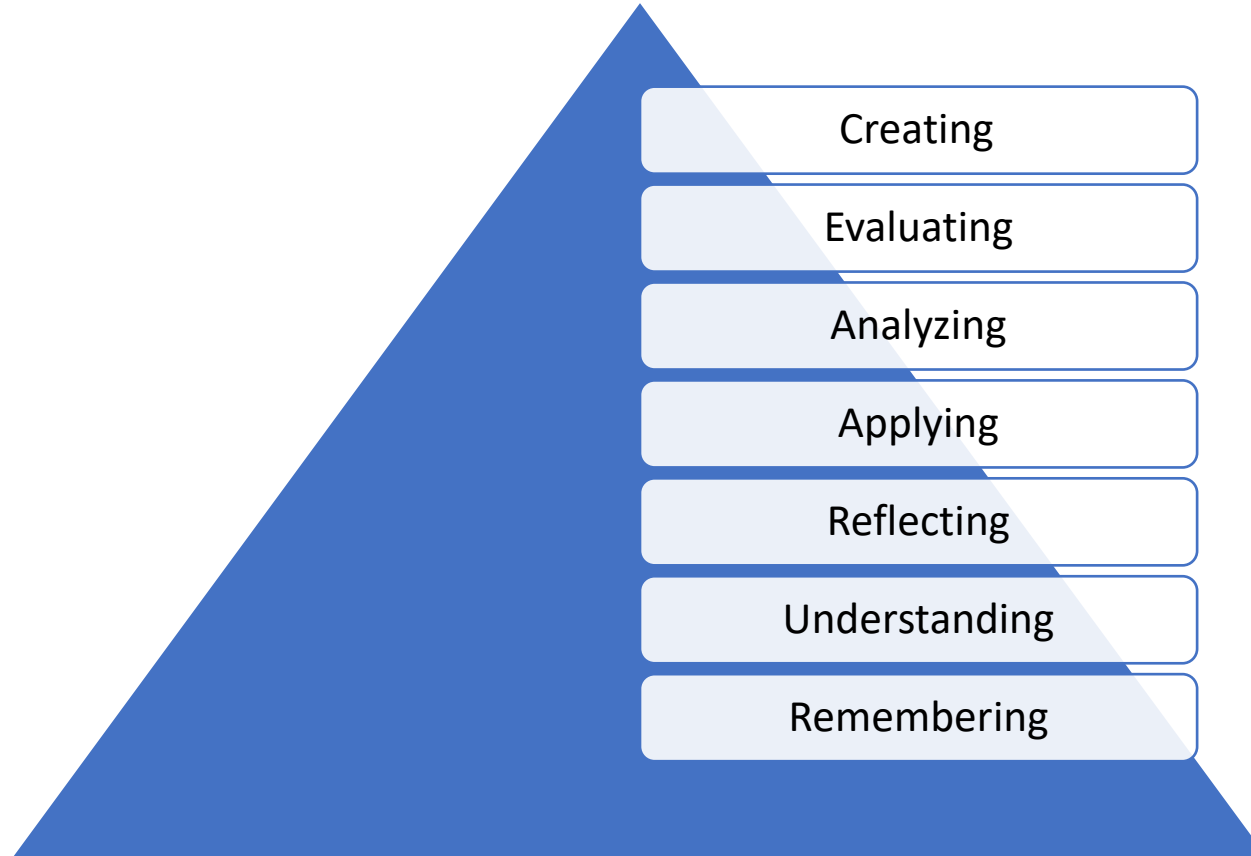


Writing-to-Learn, Writing-to-Engage, and Writing-to-Communicate (Palmquist, 2020)



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Bloom's Taxonomy



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Writing-to-Learn

- Used to help students learn new material
 - On Bloom's taxonomy: remembering, understanding, reflecting, early attempts at applying
- Generally informal and low stakes
- Points for completion, or not graded
- Can build towards high stakes writing, or stand alone

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Examples of WTL

Takes a variety of forms

- Teaching to peers
- Journal for lab work
- Paraphrasing
- Blogging
- Mini-responses
- Visual representation of data
- Microthemes
- Entrance/Exit Slips
- Social annotation
- Reflective writing
- Leading discussions

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Writing-to-Engage

- Used to deepen students' understanding of content
 - On Bloom's taxonomy: reflecting, applying, analyzing, early attempts at evaluating
- Still informal but focused on issues in the discipline
- Can be low stakes or high stakes, or “in between”

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Examples of WTE

- Data analysis
- Apply a theory, method, or technique
- Evaluate alternatives
- Reflect, compare, or critique, including peer feedback
- Proposals, progress reports

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Writing-to-Communicate

- Culminating representation of knowledge, skills, and abilities that helps students see how to contribute to the discipline
 - On Bloom's taxonomy: applying, analyzing, evaluating, creating
- Formal, final product
- Authentic audiences
- Significant portion of the course grade

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Examples of WTC

Takes the form of recognizable genres with currency in a field, discipline, profession, or community

- Research article
- Recommendation report
- Lab report
- Scientific poster
- Public service announcement
- Editorial
- Encyclopedia entry
- Infographic
- Critique
- Teaching materials
- Case study
- Job materials
- Technical instructions
- Conference-style presentation

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Break (20 minutes)



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Designing AI-Engaged Writing Activities



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WTC with AI as Tool

- Assign AI a role and a goal
- Offer constraints to prevent it from acting unexpectedly
- Give step-by-step instructions
- Explain your reasoning so it understands the purpose of a specific goal
- Iterate: refine your prompt and correct responses to improve the final product

(Adapted from Mollick, 2023)

AI as Tool: Writing Center Example

- **Role & Goal:** I am a peer consultant for a writing center, and I want your help to conduct a consulting session with my client. You will act as a writing expert who will provide me questions to ask of my client.
- **Reasoning:** You should understand that these questions should help us engage the client and lead them to improve their written piece.
- **Constraints:** I will provide you with the answers that the client gives in response to your questions, but I cannot provide the actual written piece. We need to ensure that the feedback given to the writer is specific to the academic discipline of [insert discipline].

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AI as Tool: Example, cont'd

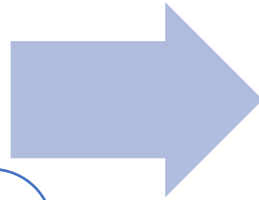
- Step 1: I am a peer consultant for a writing center and have received a [genre] about [topic]. Your first task is to **provide me with questions to better understand the [genre]**. After I answer those questions, proceed to the next step.
- Step 2: Your second task is to **provide me with questions to better understand [the topic]**. After I answer those questions, proceed to the next step.
- Step 3: Your third task is to **guide me through questions about higher order concerns**, such as organization, ideas, and evidence, one at a time. For example, “What does the writer know about the typical organization of this kind of document?”
- Step 4: Your final task is to **guide me through questions about lower order concerns**, such as grammar, spelling, punctuation, and citation. For example, “What citation style should this document use?” Again, go one step at a time. You will be rewarded if you guide me in a friendly, conversational manner. You will be penalized if you simply provide me with a list of questions to ask. We need to make sure that value is being given to the client by helping them to improve their writing in response to their answers.
- Step 5: **Indicate that you understand your tasks** by summarizing them to me. Then, proceed to Step 1.

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Reframing Our Focus: WTL & WTE w/AI

AI as Tool

- Used to create a specific product or follow a determined process
- “Do the work for me” → “Help me do the work”



AI as Object of Inquiry

- Tools are our “sticky” concepts
- Examine code, interface, output, use cases, etc.
- “What do I know? What do I see? What did I learn?”

Techniques for AI as Object of Inquiry

- Dialogue with AI
- Critique output using disciplinary theories
- Compare AI output
 - To textbooks or scholarly literature
 - Across platforms
 - Across students
- Leverage personal experience via reflective writing

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Sample AI-Engaged Activities

- Student as expert
- Critique AI
- Research paper scaffolding
- AI as debate opponent
- AI as theorist
- Additional examples on Box, shared with permission (Aerospace Engineering, First-Year Composition, Human Development & Family Science, Political Science)

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Example: AI as Theorist



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Effective Assignment Design



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Meaningful Writing Projects

- Frame assignments around an **open question or interesting problem with multiple possible answers, solutions, or interpretations**—not a single predetermined answer.

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Meaningful Writing Projects

- **Student choice:** topics, materials, subject matter, interests, etc., within parameters
- **Engagement:** time, effort, faculty, peers, and communities
- **Future Applications:** relations to other courses, personal lives, and/or career aspirations

Not just about you designing assignment with this in mind but how you communicate these elements of the assignment to students

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Transparent Assignment Design

A way of re-designing assignment sheets to emphasize the problem, task, and criteria.

A study showed this approach to assignment redesign increased student confidence, sense of belonging, and mastery of skill with gains especially concentrated in first-generation, low-income, and underrepresented student populations (Winkelmes et al., 2016).

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Transparent Assignment Design

- A way of redesigning assignment sheets to focus on the...
 - **Purpose:** learning outcomes, value beyond the assignment, knowledge and skills
 - **Task:** essential questions; steps or guidelines
 - **Rhetorical Situation:** audience, writer's position, and genre expectations
 - **Criteria for Success:** features, relative importance, and successful samples

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Hands-on Time



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Create an Activity

- Create a draft of an assignment or activity in which students engage with genAI to deepen their understanding of the sticky concept named earlier
- Feel free to collaborate with a partner

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Assessing AI-Engaged Writing Processes



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Some Principles

- Communicate the value of “messy” writing
- Responsibility
- Transparency
- Reflection

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Process Documents that can be Assessed

- Annotated AI output
- A “verification trail” for sources, facts, etc.
- Rhetorical or conceptual reflections on prompting history
- Final products highlighted to distinguish student writing from AI
- Portfolio submission with a process narrative
- Multimodal reflections on AI use (e.g., a podcast)

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Some time-saving techniques

- Read for patterns, both within and across students' work (minimal marking)
- Deliver whole-class comments and ask students to see whether and how the comment applies to them
- Leverage peer learning via peer review using frequent write-review-revise cycles on smaller “chunks” of writing

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Final Discussion



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