

Pedagogy + Technology Matrix

Teaching Content	Instructional Focus	Possible Instructional Application	Possible Assessment Application	How technology helps
Declarative knowledge – facts; anything that has to be memorized	Memorization	<ul style="list-style-type: none"> • Games • Drill & Practice <ul style="list-style-type: none"> ○ Anatomy (text publisher) ○ Hot Potatoes • Pre-post testing 	Presentation Test	Limits distraction from learning task; improves retention, addresses multiple learning preferences
Intellectual Skills				
Concept knowledge – categories of things that have attributes making them alike	Providing examples and non-examples, identify attributes	<ul style="list-style-type: none"> • Concept Mapping <ul style="list-style-type: none"> ○ Bubbl.us • Video <ul style="list-style-type: none"> ○ Teacher Tube • Images <ul style="list-style-type: none"> ○ Flickr 	Presentation Representation Test	Illustrations can be generated by learner, concrete, supports transfer
Principle Knowledge – rules, laws, generalizations, axioms, etc.	Illustrations in different contexts, generalize to many instances	<ul style="list-style-type: none"> • Simulations • Virtual Worlds • Games • Concept Mapping 	Illustration Depiction Model Test	Rehearsal, experiential learning, trial and error
Procedure Knowledge – steps that follow an action towards a pre-determined end.	Provide steps, re-order, practice, order	<ul style="list-style-type: none"> • Video • Images • Webcams 	Illustration Depiction Model Test	Observation, rehearsal, trial and error
Problem Solving – Using Existing knowledge and skills to solve an	Presentation or introduction of the problem, analysis	<ul style="list-style-type: none"> • WebQuests • Simulation • CoP 	Document Narrate Create	Observation, rehearsal, experiential learning, trial and error, feedback,

unfamiliar problem	of problem, means-end or difference reduction			documentation of processes
Interpersonal Skills				
Collaboration - individuals work independently to contribute to a goal	Assign tasks, accountability, clear procedure, strategy for oversight of parts as relate to the whole	<ul style="list-style-type: none"> • Social network • CoP • Discussion, chat, whiteboard • IM, SMS 	Self-Assessment Peer-Assessment As appropriate for content learning.	Distributed intelligence, feedback, peer review, documentation of processes
Cooperation – requires interdependence to achieve a goal	Assign roles, accountability, clear procedure	<ul style="list-style-type: none"> • Social network • CoP • Group work area (w file manager, etc.) 	Self-Assessment Peer-Assessment As appropriate for content learning.	Distributed intelligence, feedback, peer review, documentation of processes

Blooms + Assessment + Technology

The charts in this document build upon Bloom’s Cognitive Taxonomy, Revised (Anderson & Krathwohl, 2001). Additions and expansions included: expanding the knowledge dimension, including the instructional focus, and including possible Web 2.0 tools¹ that could be used within an assessment strategy. Tools must be used intentionally with clear criteria and instructional outcomes in order to successfully be used for assessment purposes. Strategies for ensuring the effective use of tools for assessment include:

- Clearly attached, stated, and aligned objectives with activity, product, or outcome of instructional event.
- Development of rubrics that describe levels of achievement.
- Learner constructed rules, conventions, protocols, or grading schemes.
- Identified levels of attainment. This accommodates different entry-level knowledge and skills of the learner. If using this approach, you cannot excuse the learner for **not** learning course content, but learners may be able to use the tools differently to demonstrate their learning (see levels of tool utilization). Consider attainment levels related to:
 - Grades. “In order to get an A, B, C, D, F you will be expected to do...”
 - Proficiency: novice, intermediate, approaching expertise.
 - Academic goals. Students take courses for a variety of purposes and depending on the course, outcomes may vary for different populations. For example, many courses are designated for non-majors, students may audit courses, courses may be offered as pass/fail, or individuals may be non-degree seeking.
- Identified levels of tool utilization. Using a tool proficiently may not be related to the instructional objective. Therefore careful consideration should be given to how tool use relates to assessment. Choices of tool, or level of tool use can alleviate student’s cognitive load if they are novices, while allowing a more expert user to go beyond the basics, and not hold them back. One simple way to determine student ability is to pose the following to them:
 - Novice – I’ve never used the tool before and don’t know what I am doing.
 - Intermediate – I’ve used the tool but I am not sure I could teach others to use it.
 - Expert – I don’t have to think about how to use this tool and could easily teach others to use it.

¹ **Web 2.0 Applications** – Tools that are strictly web-based, typically free to the user, support collaboration and interaction, and are responsive to the user (O’Reilly, 2005).

An Overview of Bloom's Taxonomy, Revised²

Instructional Focus	Knowledge Dimension	Cognitive Process Dimension					
		Remember	Understand	Apply	Analyze	Evaluate	Create
Memorization	Factual Knowledge	Recognition Recalling	Interpreting	Executing	Differentiating	Checking	Generating
Providing examples and non-examples, identify attributes	Conceptual Knowledge	Recognition Recalling	Exemplifying Classifying Summarizing Comparing	Executing	Differentiating	Checking	Generating
Illustrations in different contexts, generalize to many instances	Principle Knowledge	Recalling	Summarizing Comparing	Executing	Differentiating	Checking	Generating
Provide steps, re-order, practice, order	Procedural Knowledge	Recalling	Explaining	Executing	Differentiating	Checking	Generating
Presentation or introduction of the problem, analysis of problem, means-end or difference reduction	Problem Solving	Recognition Recalling	Comparing Explaining	Executing Implementing	Differentiating, Organizing, Attributing	Critiquing	Planning
Assign tasks, accountability, clear procedure, strategy for oversight of parts as relate to the whole	Collaboration		Comparing Explaining	Executing Implementing	Organizing Attributing	Critiquing	Planning, Producing
Assign roles, accountability, clear procedure	Cooperation		Comparing Explaining	Executing Implementing	Organizing Attributing	Critiquing	Planning, Producing

² In part from Anderson, L. W., & Krathwohl, D. R. (Eds.). (2001). *A taxonomy for learning, teaching and assessing: A revision of Bloom's Taxonomy of educational objectives. Complete edition*. New York : Longman.

Examples of Web 2.0 Applications³ + Bloom's Taxonomy, Revised

Instructional Focus	Knowledge Dimension	Cognitive Process Dimension					
		Remember	Understand	Apply	Analyze	Evaluate	Create
Memorization	Factual Knowledge	Clickers- Fill in the blank Quiz	Slideshow	Games	Games	Simulation	Simulation Animation
Providing examples and non-examples, identify attributes	Conceptual Knowledge	Clickers- Matching Quiz	Bookmarking Slideshow Concept Mapping	Presentation Animation	Concept Mapping Visualization	Bookmarking	Simulation Animation
Illustrations in different contexts, generalize to many instances	Principle Knowledge	Clickers- Multiple choice Quiz	Podcast Slideshow	Games Mashups	Concept Map Polling/Surveying	Bookmarking	Animation Podcast
Provide steps, re-order, practice, order	Procedural Knowledge	Clickers - Ordering Quiz	Concept Mapping	Games Simulations	Concept Mapping Visualization	Video	Video Vlogging
Presentation or introduction of the problem, analysis of problem, means-end or difference reduction	Problem Solving	Polling/ Surveying	Concept Mapping Video Presentation	Games Simulation	Polling/Surveying	Video Bookmarking	Vlogging Publication Presentation
Assign tasks, accountability, clear procedure, strategy for oversight of parts as relate to the whole	Collaboration	Blog Wiki RSS	Wiki Concept Mapping Discussion	Virtual Worlds VCOP	VCOP Concept Mapping	Blog VCOP Wiki	Publication Presentation
Assign roles, accountability, clear procedure	Cooperation	Blog Wiki RSS	Wiki Discussion	Virtual Worlds	VCOP	Blog VCOP Wiki	Publication Presentation

³ See <http://elearningtools.wetpaint.com>