Learning for Gen Next: A Guided Inquiry Approach

Dr Ross J Todd

Director, Center for International Scholarship in School Libraries
Associate Professor, School of Communication & Information
Rutgers, The State University of New Jersey
rtodd@rutgers.edu
www.cissl.rutgers.edu
www.twitter.com/RossJTodd
Program Goals

• Gen Next: the changing educational environment and the National Curriculum

• An understanding of current research in relation to student information seeking and learning in complex and diverse information environments

• An understanding of the principles of guided inquiry as a pedagogical framework for constructivist learning

• Strategies for designing instructional interventions for guided inquiry, and instructional exemplars
The Education Landscape of Australia

Increasing acknowledgement of:

• the complexity and diversity of student learning;

• intellectual quality as key learning outcome;

• engagement with, and ownership of learning;

• integratedness of disciplinary knowledges and skills;

• digital media infused environment;

• inclusiveness: educational leaders, learners, knowledge, community, cultural diversity;

• teacher as the most important influence on student learning

• National Curriculum: high standards
Meta-analyses of educational research shows that the most significant impacts on student learning & achievement are:

• role of teacher and quality of instruction;
• developing a supportive learning environment;
• engaging students in discovery, inquiry, thinking, metacognition, and knowledge building

(Visible learning: a synthesis of over 800 meta-analyses relating to achievement: [John Hattie. Routledge, 2009])
National Curriculum: Key Dynamics

- **Authentic & powerful pedagogy**: frameworks that support intellectual engagement, connectedness to the wider world, supportive classroom environments, and recognition of difference.

- **Intellectual quality**: developing higher-order thinking, deep understanding, deep knowledge, substantive conversations, critique of knowledge and engaging with problematic knowledge.

- **Social, cultural & personal agency**: respect for different values, knowledges, global awareness, social and ethical values, self-confidence, risk-taking, independence, interdependence; 21st C life skills – careers and living.
<table>
<thead>
<tr>
<th>Intellectual Quality</th>
<th>Personal Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intellectual Agency</td>
<td>Self Confidence</td>
</tr>
<tr>
<td>Deep knowledge</td>
<td>Willingness to take risks</td>
</tr>
<tr>
<td>Deep understanding</td>
<td>Trying new ideas and practices</td>
</tr>
<tr>
<td>Problematic knowledge</td>
<td>Independence</td>
</tr>
<tr>
<td>Higher order thinking</td>
<td>Autonomy</td>
</tr>
<tr>
<td>Meta-language</td>
<td></td>
</tr>
<tr>
<td>Substantive communication</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social and Cultural Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respect for different values, cultural knowledges and viewpoints</td>
</tr>
<tr>
<td>Team building, collaboration, negotiation and decision making: inclusivity</td>
</tr>
<tr>
<td>Knowledge integration: conceptual coherence and integration</td>
</tr>
<tr>
<td>Connect with current and future lives</td>
</tr>
<tr>
<td>Social and ethical values</td>
</tr>
</tbody>
</table>
My Graduation Speech

"I want to thank Google, Wikipedia, and whoever the hell invented copy and paste. Thank you."
The Google Generation  (British Library Research)

Ross Todd - Guided Inquiry: Overview & Instructional Framework

Information behaviour of the researcher of the future
11 January 2008

A ciber briefing paper

UCL
The Google Generation: Research tells us

- Horizontal information seeking and “power browsing”
- Use of simple search strategies, limited information assessment
- Squirreling behavior: stockpiling content in the form of downloads
- Fact foraging, fact finding, and fact fooling
- Superficial effort in knowledge construction: stockpiling of retrieved facts with limited intellectual engagement: transport not transformation
- Pedagogy of knowledge construction largely absent in context of research tasks – rarely explicitly developed, supported, sustained
- Limited engagement with multiple perspectives, interrogating conflicting information, information analysis, developing arguments, positions, conclusions, implications
- Focus on product construction rather than knowledge construction
- Culture of finding rather than construction: celebrating the found, not the understood
THE CHALLENGE: Ban those “Bird” Units

• Many types of research assignments using library or web-based sources contribute little or nothing to learning

• Very little evidence of construction of new knowledge

• Stockpiling of descriptive facts

• Rarely guided and sustained throughout the research project

• Rarely equip students with the range of information and technical competencies necessary to complete the task

• Expert-based measures of level of knowledge vs conceptual change measures
“Transport” Approach to Knowledge Construction

- Gathering facts, then more facts, then more facts
- Stockpile of facts, even though facts were sorted, organized and grouped by end of task.
- Remained on a descriptive level throughout
- Limited intellectual engagement with the ideas
- Surface knowledge
- Saw the collection of facts as the end of the research
”Get the material from the Net, I read it. Write down some good sentences, make a few changes and read through it again. Making my own, sort of! Then I think - Replace here and there. Pick certain words and make my own text by adding new words. I recognise the text if I read it several times. Use those expressions that fit in.” (Kris)

”I borrowed a book on sharks, picked out words from the book, from the text. I jotted these down in a little notebook as rough notes, then I rewrote it and then I painted a front page and then I put the whole thing into a booklet and the job was done.” (David)
“Transform” Approach to Knowledge Construction

• Initial: superficial sets of properties

• Moved beyond gathering facts:
  - building explanations
  - address differences in information
  - organizing facts in more coherent ways

• Interpret information

• Establish personal conclusions and reflections

• Collecting facts was the beginning and not end

• Facts were the basis for personal choice: choice of deep questions to research
Great Minds at work?

Learning habits

Please Be safe.
Do not stand, sit, climb or lean on zoo fences.
If you fall, animals could eat you and that might make them sick.
Thank you.

Please
Don't throw your cigarette ends on the floor.
The cockroaches are getting cancer.

Building Effective Inquiry
Guided Inquiry

Carefully planned, closely supervised, targeted intervention(s) of an instructional team to guide students through curriculum based inquiry units that gradually lead towards deep knowledge and understanding.

KNOWLEDGE OUTCOME

It is underpinned by stimulating encounters with information – encounters which capture their interest and attention, and which motivate and direct their ongoing inquiry.

INFORMATION FOUNDATION
1. Qualitative exploration of search process of high school seniors (1983)
2. Qualitative study of original sample after 4 years of college (1988)
3. Longitudinal study (1988)
4. Qualitative and quantitative study of high, middle and low achieving high school seniors (1989)
5. Validation Study: 385 academic, public, and school library users in 21 sites (1989)
6. 1990-2012: 50 research studies

"I expect you all to be independent, innovative, critical thinkers who will do exactly as I say!"
If I’d known they wanted me to use all this info— I would never have asked for it!
### Information Search Process

#### Carol Kuhlthau

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Initiation</th>
<th>Selection</th>
<th>Exploration</th>
<th>Formulation</th>
<th>Collection</th>
<th>Presentation</th>
<th>Assessment</th>
</tr>
</thead>
</table>

#### Feelings

<table>
<thead>
<tr>
<th>(affective)</th>
<th>uncertainly</th>
<th>optimism</th>
<th>confusion</th>
<th>clarity</th>
<th>sense of</th>
<th>direction/</th>
<th>satisfaction or</th>
<th>discourage</th>
<th>doubt</th>
<th>confidence</th>
<th>disappointment</th>
</tr>
</thead>
</table>

#### Thoughts

<table>
<thead>
<tr>
<th>(cognitive)</th>
<th>vague</th>
<th>focused</th>
<th>increased interest</th>
</tr>
</thead>
</table>

#### Actions

<table>
<thead>
<tr>
<th>(physical)</th>
<th>seeking relevant information</th>
<th>seeking pertinent information</th>
<th>documenting</th>
</tr>
</thead>
</table>

---

**Zone of Intervention:** the critical point / need for instruction

**GUIDED INQUIRY**
Students develop capacity to:

• pose insightful and purposeful questions (Formulation)
• apply strategies to uncover meaning and make reasoned judgments (Collection)
• think beyond the immediate situation to consider the ‘big picture’ before focusing on the detail (Exploration)
• suspend judgment about a situation to consider alternative pathways (Exploration)
• reflect on thinking, actions and processes (all stages, Assessment)
• generate and develop ideas and possibilities (Collection)
• analyze information logically and make reasoned judgments (Collection)
• evaluate ideas and create solutions and draw conclusions (Collection)
• assess the feasibility, possible risks and benefits in the implementation of their ideas (Collection, Assessment)
• create meaningful representations of their deep knowledge
PROJECT

Choose a country from the list provided and research how a tsunami affected that country. Include physical, geographical and economic effects. Use note cards to record information and sources. Write a 2-3 page paper using at least 4 sources, including two sources from the WWW.
AUTHENTIC LEARNING TASK

• You are a member of a team of relief workers to help victims of a tsunami. Your job is to help plan the government’s recovery program.
• Read descriptions, interviews, and personal accounts of tsunami victims on the Internet. From these accounts, determine how the tsunami affected physical, geographical, and economic conditions of people.
• Use current sources to find information and data on recovery efforts.
• Create graphic organizers (including charts, graphs) that document your findings.
• Write a report to your government agency that explains and justifies relief measures you recommend and sets priorities for action.
• Use citation; create a reference list of sources used.
Implementing G.I. Key Design Strategies

✓ Focus on identifying and solving real-world problems

✓ Initiated though compelling situations which provide challenge and opportunity. INSPIRATION

✓ Connect with students’ background knowledge

✓ Exercise some choice over the topics, specific questions they want to answer and how to present their new understandings.

✓ Instructional activities involve the students in thinking, acting, and reflecting, discovering and linking ideas

✓ Instructional activities model and provide opportunity to experience the knowledge construction process.

✓ Opportunities for sustained dialogue and feedback
• Where/when born, died, lived
• Education/Jobs/Career
• Challenges overcome
• Qualities that led to greatness
• Awards/Commendations
• Political offices held
• Best remembered for what
• Connection to NJ
Walt Whitman
(Camden)
Considered by many to be the most influential poet in U.S. history

- Walt Whitman died on March 26, 1892 in Camden.
- Walt Whitman lived in Camden, New Jersey.
- Walt Whitman was born in Long Island, New York.
- Walt Whitman left school early to become a printers apprentice.
- Walt Whitman was in the civil war and helped his brother cure a wound.
- Walt Whitman worked as a printers apprentice.
- Walt Whitman was a kind person and was extremely smart.
- Walt Whitman was received with no awards.
- Walt Whitman was remembered by his fine poetry.
Instructional Interventions

• Class blog: personal viewpoint on greatness
• Creative writing: My dream of greatness
• Sharing writing on class wiki
• Class blog: synthesis of responses: what seems to be the idea of “greatness” in the class
• Matching personal dreams with NJ database: search skills
• Building background knowledge: life and times of people of interest; selecting focus
• Creative knowledge building interventions: putting ideas together; Using variety of analytical methods; Forming evidence-based opinions / viewpoints; Developing conclusions & positions; positing actions, implications and solutions; reflecting on these in terms of original knowing
• Wiki to share final products: group review and reflection
Lonely, Nervous, Brave, Determined, Sassy
Daughter of parents who filled their house with music
Music must have filled her loneliness when her father died
Moved to New York for a better life.
Who loved the night magic of Harlem,
Who loved the celebrities and begging for autographs with her friends
Who really loved singing and scatting
Who loved her Aunt that took care of her as a child.
Who felt loss, when her mother died
Who felt anger when she was put in an orphanage
Who felt trapped in those walls but they couldn’t keep her down
because she felt the pull of her song
and the night magic of Harlem.
Who felt nervous and fear at auditions
Who feared not being able to sing because she had no one to care for her
Who feared dying from diabetes and possibly going blind,
Who feared whom she would pass her singing crown down to
Who wanted to see someone take over her singing crown
Who would have liked to have spent more time with her late parents
Who wanted to work with the best bands
Who changed the world of jazz and swing
Who was very proud of her awards and achievements
She was “The First Lady Of Song”;
she was “Sassy” and a Legend of Jazz
Born in Virginia, grew up in New York,
adopted by the world.
Ella was great
Fitzgerald
Information Search Process  Carol Kuhlthau

Tasks | Initiation | Selection | Exploration | Formulation | Collection | Presentation | Assessment
---|---|---|---|---|---|---|---
Feelings (affective) | uncertainly | optimism | confusion | clarity | sense of direction | satisfaction or disappointment
| optimism | frustration | doubt | clarity | sense of direction | confidence | satisfaction or disappointment
Thoughts (cognitive) | vague | focused | increased interest
Actions (physical) | seeking relevant information | seeking pertinent information | documenting
Zone of Intervention: the critical point / need for instruction

GUIDED INQUIRY
Curriculum Integration

Ross J. Todd

Curriculum Integration presents a curriculum integration matrix for 21st century learning in complex and diverse information environments. It outlines how Guided Inquiry as an instructional framework in 21st century schools can be developed and implemented to enable students to learn meaningfully from diverse and complex information sources.

Australian Council of Educational Research Press 2010
Focus of Instructional Interventions

• **Resource-based capabilities:** These are abilities and dispositions related to seeking, accessing and evaluating resources in a variety of formats, including people and cultural artefacts as sources. They also include using information technology tools to seek out, access and evaluate these sources, and the development of digital and print-based literacies.

• **Thinking-based capabilities:** These are abilities and dispositions that focus on substantive engagement with data and information, the processes of higher order thinking and critical analysis that lead to the creation of representations/products that demonstrate deep knowledge and deep understanding.

• **Knowledge-based capabilities:** These are the abilities and dispositions that focus on the creation, construction and sharing the products of knowledge that demonstrate deep knowledge and understanding.
• **Reading to learn capabilities**: These are the abilities and dispositions related to the transformation, communication and dissemination of text in its multiple forms and modes to enable the development of meaning and understanding.

• **Personal and interpersonal capabilities**: These are the abilities and dispositions related to the social and personal aspects of learning about self as a learner, and the social and cultural participation in inquiry learning.

• **Learning management capabilities**: These are the abilities and dispositions that enable students to prepare for, plan and successfully undertake a curriculum-based inquiry unit.

• **Developed from Ohio, Delaware and Australia studies (25,000 students) (Todd, Hay)**
• Building engagement; Developing curiosity and motivation
• Understand real world relevance and importance of the enquiry
• Dealing with emotions: doubt, uncertainty
• Task organization, time, process and effort management; Know when, where, and how to get help and guidance
• Understanding knowledge requirements of task: task analysis rubrics Your expectations in terms of CCS
• Establishing existing / prior knowledge: novice knowledge (what I know about) - Central concepts and relationships: concept mapping, mind mapping, Venn diagrams
• Choosing and justifying broad topics - WITH ENGAGEMENT

• Selecting sources to help topic selection

• Using technology tools for topic selection

• Developing openness to new ideas, diverse perspectives

• Engaging in inquiry through reflection: I didn’t know that; I agree / disagree; I wonder that; Questions I have
<table>
<thead>
<tr>
<th>Topics of interest to me</th>
<th>Intriguing factors</th>
<th>Positives</th>
<th>Negatives</th>
<th>Rank 1-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Rank your topics on a scale of 1 – 5 (1 = of little interest; 5 = very interesting)
Circle your two most interesting topics


Explain your choice in your conference with your class teaching team
• Building a bigger picture, establishing interconnections

• Encountering multiple viewpoints and perspectives;
  • dealing with conflicting knowledge;

• Respecting and appreciating diverse cultural knowledges

• Verifying and clarifying existing ideas

• Working constructively with sources such as Wikipedia
Building Background Knowledge Framing / Testing / Questioning Ideas

I didn’t know that!

Questions I have???

I agree / disagree

I wonder ....

Read

View

Listen

Connect

### BATAVIA INFORMATION SHEET (Sue Healey, Tintern Grammar, Melbourne)

<table>
<thead>
<tr>
<th>Question</th>
<th>Internet 1</th>
<th>Internet 2</th>
<th>Internet 3</th>
<th>Australian Encyclopaedia</th>
<th>Oxford Dictionary of Aust. History</th>
<th>Amazing Australian Shipwrecks</th>
<th>Western Australia: Home of America’s Cup</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>What date did Batavia leave Holland?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>March/October 1628</td>
<td>1628, 1629</td>
</tr>
<tr>
<td>How many soldiers, crew, passengers were aboard?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>268, 302, 310</td>
<td></td>
</tr>
<tr>
<td>What date did B. run on to the reef?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1628, 1629</td>
<td></td>
</tr>
<tr>
<td>Name the group of Islands where it was wrecked?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>60 (p.25)</td>
<td>50, 70, 75, 64</td>
</tr>
<tr>
<td>Which Dutch captain were these islands named after?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>70 (p.29)</td>
<td></td>
</tr>
<tr>
<td>How many km off W. A. coast?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>125</td>
<td></td>
</tr>
<tr>
<td>How many men, women and children were kills during mutiny?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>125 men</td>
<td></td>
</tr>
<tr>
<td>How many of the mutineers were punished?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>125 m, w, &amp; c</td>
<td></td>
</tr>
<tr>
<td>How many of the mutineers were punished?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hanged</td>
<td></td>
</tr>
<tr>
<td>What was the punishment?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Marooned</td>
<td></td>
</tr>
<tr>
<td>By Dutch law, how can a person be sentenced to death?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>deported</td>
<td></td>
</tr>
<tr>
<td>What was given to the two marooned on the mainland?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Food, water, guns</td>
<td></td>
</tr>
<tr>
<td>What year was the Batavia rediscovered?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1961</td>
<td>1963</td>
</tr>
<tr>
<td>In which city are the remains now displayed?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Questions</td>
<td>Source 1 eg encycl</td>
<td>Source 2 eg Poor quality web site</td>
<td>Source 3 eg High quality web site</td>
<td>Source 4 eg Newspaper</td>
<td>Source 5 High quality print source</td>
<td>What I can say? Evidence for my statement?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------</td>
<td>----------------------------------</td>
<td>---------------------------------</td>
<td>----------------------</td>
<td>-------------------------------------</td>
<td>------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>who</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>what</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>when</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>where</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>why</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>how</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>result</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
• Focusing the knowledge building task

• Developing the focus question(s) and formulating personal knowledge outcomes

• Develop real world justifications for research choices

• Constructing the abstract / knowledge plan / statement of intention of the inquiry

• Planning the structure of the inquiry

• Feedback loops
Key Ideas

• Teaching students to ask the right questions is one of the greatest skills we can instruct.
• Thinking is not driven by answers but by questions.
• The skill of question formulation is neither systematically nor effectively taught at many levels of education.
• At the heart of inquiry, students:
  • produce their own questions
  • improve their questions
  • strategize on how to answer the question
  • develop the knowledge building skills to answer the questions
  • understand the real world value / implications of their questions in the answers they create
  • Produce their own questions, ongoing
• Students are able to ask relevant and meaningful questions
• Have the intellectual, technical and informational competencies to construct answers to their own questions
• Able to build new questions based on the answers to their own question
• Use their questioning skills in other areas outside of immediate learning contexts

The problem of questioning: no set rules and processes; relies on inner thoughts, experiences, emotions of questioner; spontaneous, reactionary, nebulous

Guided in its development
Questions: Give critical support for reading comprehension and reflection

• **Text-to-Self Connections:** Have you a similar experience? Heard of or read this before? What does this information mean to you? Have you felt like the character in the story?

• **Text-to-Text Connections:** similar ideas; different ideas; conflicting ideas

• **Text-to-World Connections:** (Stretch thinking beyond particular to larger life issues) What is the author’s purpose? What is the author’s opinion on this issue? Do you agree / disagree with it?
Creating a Question Web

• Students work collaboratively on building background knowledge of topic / class theme
• Webbing the range of questions can help them narrow down a topic to a topic for a personal inquiry
• Start with general brainstorming on questions: record subtopic and questions in oval
• Brainstorm for more questions based around original question(s); expand web as questions flow
• Useful to model this strategy beforehand
• Focus students not on what they know, but what they might want to know in form of questions
Write your topic in the centre starburst. Record questions you have about this topic in the surrounding ovals. Continue to develop questions about these questions to further explore and refine your topic.
Year 7 Discovers Ancient Egypt

**ANCIENT EGYPT BIG QUESTION:**
How has Ancient Egyptian culture taught us important lessons today?

**Contributing Question (examples):**
- What was the purpose of mummification in Ancient Egypt? Do people today practice mummification and why?
- What are the similarities and differences between the way of mummification in Ancient Egypt and the modern technique of preserving?

**Government/Pharaohs**

**Hieroglyphics/Artifact**

**Animals/Transport**

**Pyramids**

**Clothing, Jewellery**

**Gods/Religion**

**Contributing Question (examples):**
- What animals were used and why were they so important to the Egyptians?
- How did the Nile River help the Ancient Egyptians become such a powerful civilization?

**Contributing Question (examples):**
- How do the pyramids still influence our knowledge of Ancient Egypt?
- Did the Ancient Egyptians actually build the pyramids, or was it another civilization, or perhaps a myth?
<table>
<thead>
<tr>
<th></th>
<th>Is</th>
<th>Did</th>
<th>Can</th>
<th>Would</th>
<th>Will</th>
<th>might</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Surface questions</td>
<td>Digging questions</td>
<td>Digging deeper Q</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Who</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Why</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Example of Proposal 1: Due 24 February

<table>
<thead>
<tr>
<th>1. Research Question</th>
<th>Sub-Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Will the computer change the way we are schooled?</td>
<td>a. What are the positive and negative aspects of computers in learning?</td>
</tr>
<tr>
<td></td>
<td>b. Could current problems in teaching be solved by computers?</td>
</tr>
<tr>
<td></td>
<td>c. Will schools become obsolete?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Key words/terms</th>
<th>Definitions of Key words/terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Information superhighway</td>
<td>a. A vast network of shared information through computer, television, satellite.</td>
</tr>
<tr>
<td>b. cognition</td>
<td>b. The act of learning and thinking.</td>
</tr>
<tr>
<td>c. virtual reality</td>
<td>c. Computer or other electronic software that allows the user to experience a simulated environment.</td>
</tr>
<tr>
<td>d. multimedia</td>
<td>d. The incorporation of many types of media such as graphics, text, audio, and video into one resource.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3a. Working Bibliography: Titles</th>
<th>3b. What do I need to find them again? (e.g., Call number, Internet address)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Road Ahead</td>
<td>001 GAT</td>
</tr>
<tr>
<td>The Virtual School</td>
<td><a href="http://www/virtuallschool.yaleuniv.edu">http://www/virtuallschool.yaleuniv.edu</a></td>
</tr>
<tr>
<td>The Children’s Machine</td>
<td>PRO 371.3 PAP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Submitted by:</th>
<th>Approved by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student</td>
<td>Teacher</td>
</tr>
<tr>
<td></td>
<td>Date</td>
</tr>
</tbody>
</table>
• Selection of sources: pertinent, complex information rather than superficial information matched to specific focus;

• Collecting data from disciplinary specific modes of inquiry: interviews, surveys, experiments, observation, journaling

• Transforming other people’s ideas into personal knowledge

• Use of a variety of analytical methods

• Forming evidence-based opinions / viewpoints

• Develop conclusions & positions; posit actions, implications and solutions; reflect on these in terms of original knowing
<table>
<thead>
<tr>
<th>LOOK FOR...</th>
<th>HOW CAN I...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronological order/stages</td>
<td>represent/display data?</td>
</tr>
<tr>
<td>Pro’s/con’s</td>
<td>classify/categorize?</td>
</tr>
<tr>
<td>Main ideas/supporting evidence</td>
<td>generalize?</td>
</tr>
<tr>
<td>Causes/effects</td>
<td>find exceptions?</td>
</tr>
<tr>
<td>Similarities/differences</td>
<td>predict what is next?</td>
</tr>
<tr>
<td>Procedures/steps</td>
<td>imagine what if...?</td>
</tr>
<tr>
<td>Problems/solutions</td>
<td>determine what’s wrong?</td>
</tr>
<tr>
<td>Relationships (human/spatial)</td>
<td></td>
</tr>
<tr>
<td>Themes</td>
<td></td>
</tr>
<tr>
<td>Patterns</td>
<td></td>
</tr>
<tr>
<td>Perspectives</td>
<td></td>
</tr>
<tr>
<td>Best-worst/Most-least</td>
<td></td>
</tr>
<tr>
<td>Connections</td>
<td></td>
</tr>
<tr>
<td>Defining characteristics</td>
<td></td>
</tr>
<tr>
<td>How it works</td>
<td></td>
</tr>
</tbody>
</table>
Knowledge Building: Supporting Tools

- Debate Graph: wiki debate visualization tool
  - http://debategraph.org/

- Argument mapping

- Mindmapping: Online Mind Mapping Software
  - http://www.mindomo.com/

- Concept Mapping / Graphic Organizers
  - http://www.graphic.org/

- http://mywebspiration.com/ Collaborative visual thinking
### The Information Base: AMNESTY INTERNATIONAL

<table>
<thead>
<tr>
<th>History of Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vision and Goals of Organization</td>
</tr>
<tr>
<td>Significant Achievements</td>
</tr>
<tr>
<td>Barriers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Creating the Text</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transforming the text</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>The Information Base</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>AMNESTY INTERNATIONAL</td>
</tr>
</tbody>
</table>

**History of Organization**

**Vision and Goals of Organization**

“research and action focused on preventing and ending grave abuses of the rights to physical and mental integrity, freedom of conscience and expression, and freedom from discrimination, within the context of its work to promote all human rights”

http://web.amnesty.org/pages/aboutai-index-eng

**Significant Achievements**

**Barriers**
• Representation of new knowledge: what does “good” history, science, economics knowledge like? How is it typically presented in the real world?

• Principles / criteria for applying modes of representation – textual, visual, graphical – discipline requirements

• Structuring ideas into a coherent, integrated body of knowledge

• Using ICT tools to construct appropriate representations of new knowledge

• Using ICT tools, techniques and critical thinking skills to communicate new knowledge in appropriate ways – appropriate to the discipline
Reflection Writing Tasks

Writing task 1 and 2 consisted of the following questions

1. Write the title that best describes your research project at this time.
2. Take some time to think about your research topic. Now write down what you know about this topic.
3. What interests you about this topic?
4. How much do you know about this topic? Check (✓) one box that best matches how much you know. Nothing, Not much, Some, Quite a bit and A great deal
5. Write down what you think is EASY about researching your topic.
6. Write down what you think is DIFFICULT about researching your topic.
7. Write down how you are FEELING now about your project. Check (✓) only the boxes that apply to you. Confident, Disappointed, Relieved, Frustrated, Confused, Optimistic, Uncertain, Satisfied, Anxious or Other.
1. What did you learn in doing this research project? (This might be about your topic, or new things you can do, or learn about yourself)

1. How did the SCHOOL LIBRARIAN help you?

1. How did the TEACHER help you?


- Student Learning through Inquiry Measure (SLIM)
  - SLIM Handbook
  - SLIM Reflection Instruments and Scoring Guidelines
  - SLIM Scoring Sheet
### Holistic Critical Thinking Scoring Rubric

**Faculty and Facione**

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
</table>
| 4     | Consistently does all or almost all of the following:  
   - Accurately interprets evidence, statements, graphics, questions, etc.  
   - Identifies the salient arguments (reasons and claims) pro and con.  
   - Thoughtfully analyzes and evaluates major alternative points of view.  
   - Draws warranted, judicious, non-fallacious conclusions.  
   - Justifies key results and procedures, explains assumptions and reasons.  
   - Fair-mindedly follows where evidence and reasons lead. |
| 3     | Does most or many of the following:  
   - Accurately interprets evidence, statements, graphics, questions, etc.  
   - Identifies relevant arguments (reasons and claims) pro and con.  
   - Offers analyses and evaluations of obvious alternative points of view.  
   - Draws warranted, non-fallacious conclusions.  
   - Justifies some results or procedures, explains reasons.  
   - Fair-mindedly follows where evidence and reasons lead. |
| 2     | Does most or many of the following:  
   - Misinterprets evidence, statements, graphics, questions, etc.  
   - Fails to identify strong, relevant counter-arguments.  
   - Ignores or superficially evaluates obvious alternative points of view.  
   - Draws unwarranted or fallacious conclusions.  
   - Justifies few results or procedures, seldom explains reasons.  
   - Regardless of the evidence or reasons, maintains or defends views based on self-interest or preconceptions. |
| 1     | Consistently does all or almost all of the following:  
   - Offers biased interpretations of evidence, statements, graphics,  
     questions, information, or the points of view of others.  
   - Fails to identify or hastily dismisses strong, relevant counter-arguments.  
   - Ignores or superficially evaluates obvious alternative points of view.  
   - Argues using fallacious or irrelevant reasons, and unwarranted claims.  
   - Does not justify results or procedures, nor explain reasons.  
   - Regardless of the evidence or reasons, maintains or defends views based on self-interest or preconceptions.  
   - Exhibits close-mindedness or hostility to reason. |
“Upon this gifted age, in its dark hour
Rains from the sky a meteoric shower
Of facts, they lie unquestioned, uncombined.
Wisdom enough to leech us of our ill
Is daily spun, but there exists no loom
To weave it into fabric.”