

Bloom's Digital Taxonomy

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Have our classrooms changed that much?

Synopsis:

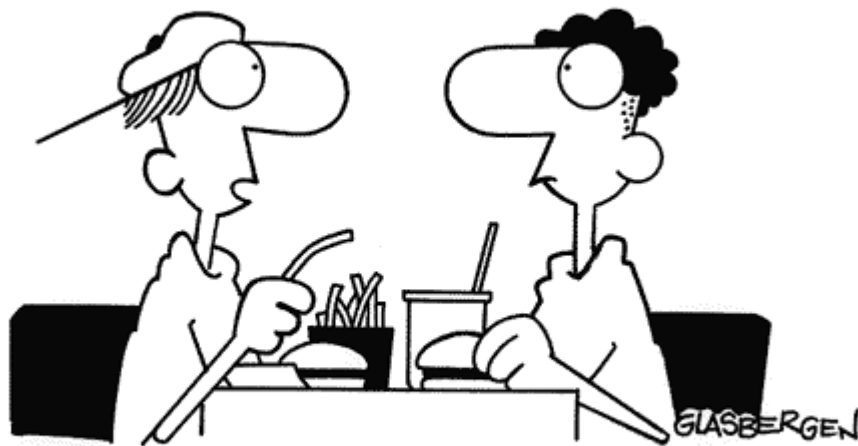
This is an update to Bloom's Revised Taxonomy [2] to account for the new behaviours, actions and learning opportunities emerging as technology advances and becomes more ubiquitous. Bloom's Revised Taxonomy [2] accounts for many of the traditional classroom practices, behaviours and actions but does not account for the new processes and actions associated with web 2.0 technologies and increasing ubiquitous computing.

The Original taxonomy and the revised taxonomy by Anderson and Krathwohl [2] are both focused within the cognitive domain. As a classroom practitioner, these are useful but do not address the activities undertaken in the classroom. This Digital Taxonomy is not restricted to the cognitive domain rather it contains cognitive elements as well as methods and tooling. These are the elements that as a practitioner I would use in my classroom practice. Like the previous taxonomies, its is the quality of the action or process that defines the cognitive level, rather than the action or process alone.

While Bloom's in its many forms, does represent the learning process, it does not indicate that the learners must start at the lowest taxonomic level and work up. Rather, the learning process can be initiated at any point, and the lower taxonomic levels will be encompassed within the scaffolded learning task.

An increasing influence on learning is the impact of collaboration in its various forms. These are often facilitated by digital media and are increasingly a feature of our digital classrooms.

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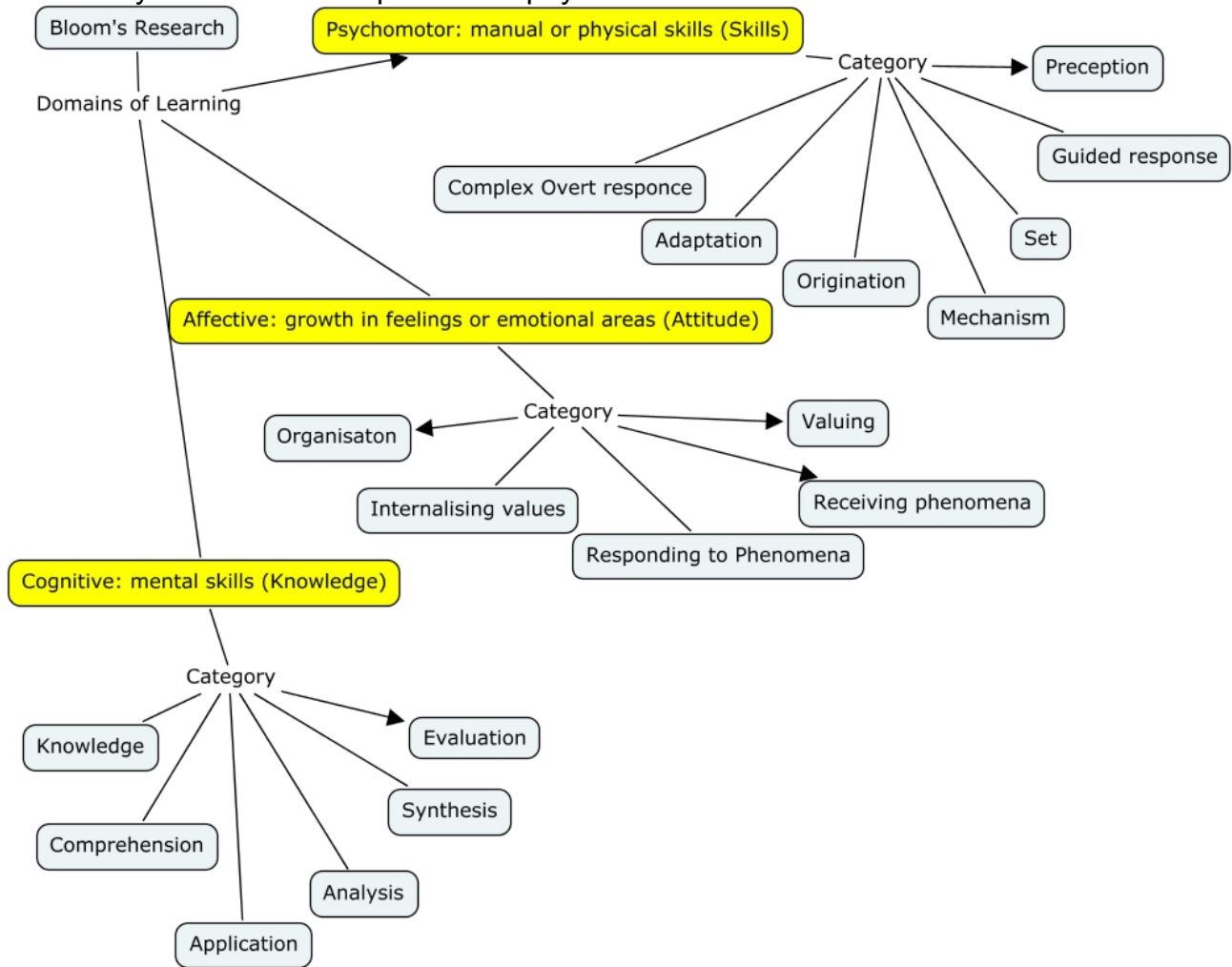
**“I forgot to make a back-up copy of my brain,
so everything I learned last semester was lost.”**

Introduction and Background:

Bloom's Taxonomy

In the 1950's Benjamin Bloom developed his taxonomy of Educational Objectives. He proposed that learning fitted into one of three psychological domains:

- Cognitive – processing information
- Affective – Attitudes and feelings
- Psychomotor – manipulative or physical skills



Bloom's Taxonomy, which Benjamin Bloom is best known for, looks at the cognitive domain. This domain categorises and orders thinking skills and objectives. His taxonomy follows the thinking process.

Simply; You can not understand a concept if you do not first remember it, similarly you can not apply knowledge and concepts if you do not understand them. It is a continuum from Lower Order Thinking Skills (LOTS) to Higher Order Thinking Skills (HOTS). Bloom describe each category as a noun. They are arranged below in increasing order, from lower order to higher order.

Lower Order Thinking Skills (LOTS)

- Knowledge
- Comprehension
- Application
- Analysis
- Synthesis
- Evaluation

Higher Order Thinking Skills (HOTS)

Bloom's Revised Taxonomy

In the 1990's, a former student of Bloom, Lorin Anderson with D Krathwohl, revised Bloom's Taxonomy and published Bloom's Revised Taxonomy in 2001 [2].

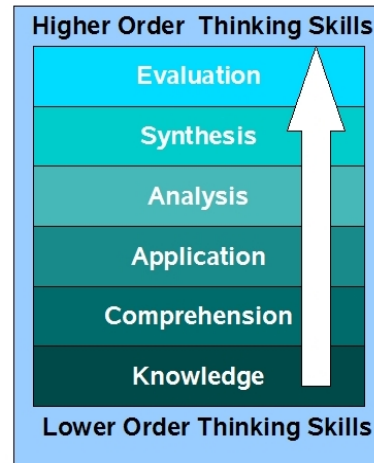
Key to this is the use of verbs rather than nouns for each of the categories and a rearrangement of the sequence within the taxonomy. They are arranged below in increasing order, from lower order to higher order.

Lower Order Thinking Skills (LOTS)

- Remembering
- Understanding
- Applying
- Analysing
- Evaluating (Revised position)
- Creating (Revised position)

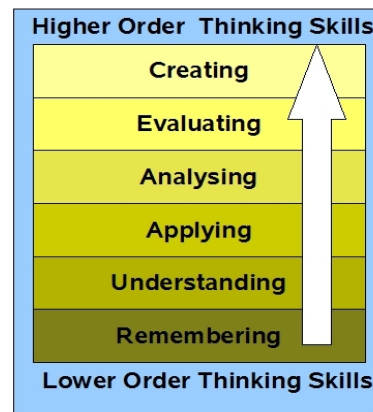
Higher Order Thinking Skills (HOTS)

Anderson and Krathwohl considered creativity to be higher within the cognitive domain than evaluation.



Drawing 1: Bloom's Taxonomy

Drawing by A Churches



Drawing 2: Bloom's Revised Taxonomy

Drawing by A Churches

Bloom's Revised Taxonomy Sub Categories

Each of the categories or taxonomic elements has a number of key verbs associated with it



Lower Order Thinking Skills (LOTS)

- **Remembering** - *Recognising, listing, describing, identifying, retrieving, naming, locating, finding*
- **Understanding** - *Interpreting, Summarising, inferring, paraphrasing, classifying, comparing, explaining, exemplifying*
- **Applying** - *Implementing, carrying out, using, executing*
- **Analysing** - *Comparing, organising, deconstructing, Attributing, outlining, finding, structuring, integrating*
- **Evaluating** - *Checking, hypothesising, critiquing, Experimenting, judging, testing, Detecting, Monitoring*
- **Creating** - *designing, constructing, planning, producing, inventing, devising, making*

Higher Order Thinking Skills (HOTS)

The elements and actions cover many of the activities and objectives we undertake in our classroom practice, but they do not address the newer objectives, processes and actions presented by the emergence and integration of Information and Communication Technologies (ICT) in to the classroom and their impact on the lives of our students.

This revision is fundamentally based on the revised taxonomy proposed by Anderson et al [2], but is more inclusive of digital technologies and digital cognitive objectives.

Bloom's as a learning process.

Bloom's in its various forms represents the process of learning. It has been simplified in some case like the three story intellect (Oliver Wendell Holmes and Art Costa), but it still essentially represents how we learn.

Before we can **understand** a concept we have to **remember** it

Before we can **apply** the concept we must **understand** it

Before we **analyse** it we must be able to **apply** it

Before we can **evaluate** its impact we must have **analysed** it

Before we can **create** we must have **remembered, understood, applied, analysed, and evaluated.**

Some people may argue about that you do not require some of the stages for each and every task, action or process; some too may argue about the necessity to reach the creation level for all activities. This is the choice of the individual.

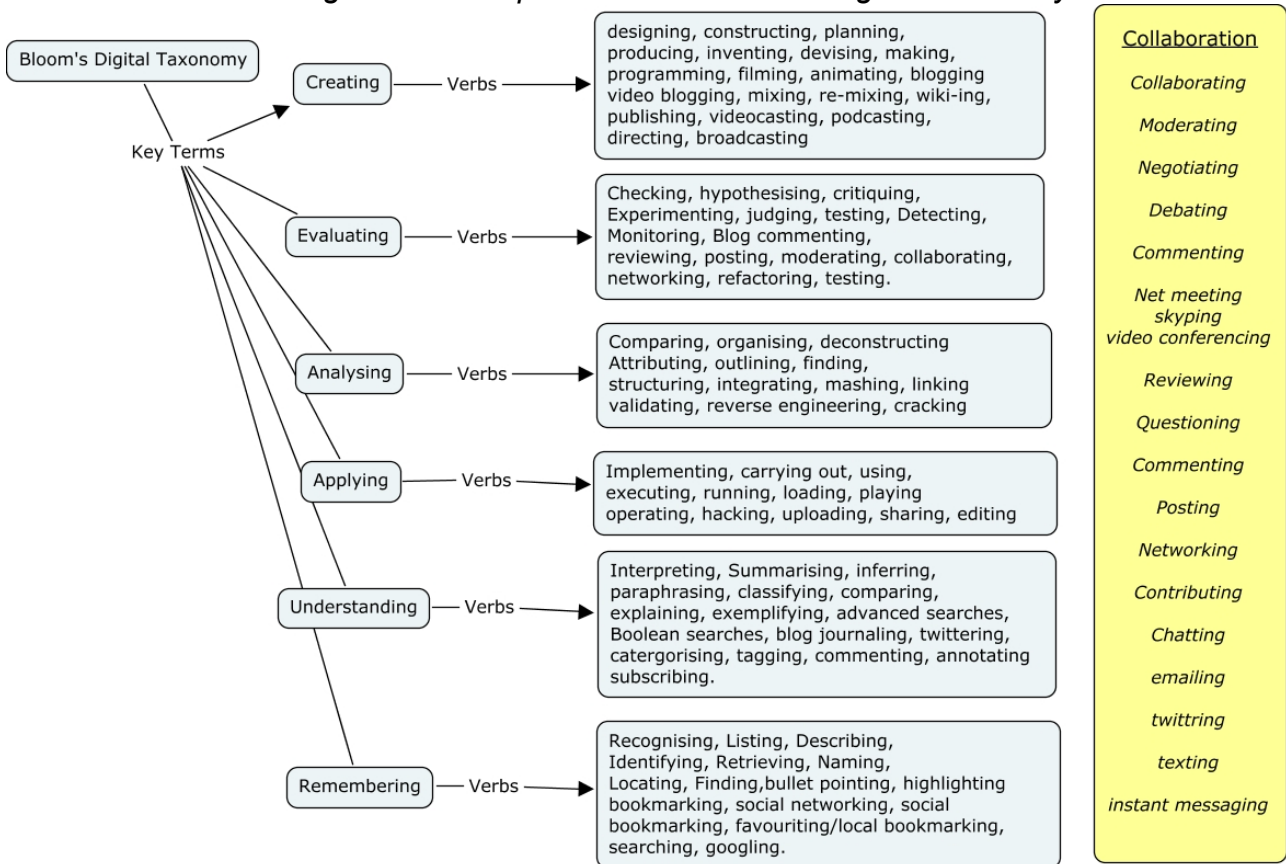
Is it important where you start? Must I start with remembering?

I don't think it is. The learning can start at any point, but inherent in that learning is going to be the prior elements and stages.

Bloom's Digital Taxonomy

Bloom's revised digital taxonomy map

Drawing 3: Mind map of Bloom's Revised Digital Taxonomy



Drawing by A Churches created using C-Map Tools

Key:

Elements colour in black are recognised and existing verbs, Elements coloured in blue are new digital verbs

Bloom's Digital Taxonomy and Collaboration.

In Drawing 3, Collaboration is included as a separate element as well as some elements being shared. Collaboration can take many forms (see above) and value of the collaboration can vary hugely. This is often independent of the mechanism used to collaborate. Also collaboration is not an integral part of the learning process for the individual, you don't have to collaborate to learn, but often your learning is enhance by doing so. Collaboration is a 21st Century skill of increasing importance and one that is used throughout the learning process. In some forms it is an element of Bloom's and in others its is just a mechanism which can be use to facilitate higher order thinking and learning.

Remembering

The following are some of the key terms for this aspect of the Taxonomy.

- Recognising
- Listing
- Describing
- Identifying
- Retrieving
- Naming
- Locating
- Finding

Anderson and Krathwohl's taxonomy – Remembering

1. **Remembering: Retrieving, recalling or recognising** knowledge from memory. Remembering is when memory is used to produce definitions, facts or lists, or recite or retrieve material.

This element of the taxonomy does infer the retrieval of material. This is a key element given the growth in knowledge and information.

The digital additions and their justifications are as follows:

- **Bullet pointing** - This is analogous with listing but in a digital format.
- **Highlighting** – This is a key element of most productivity suites, encouraging students to pick out and highlight key words and phrases is a techniques for recall.
- **Bookmarking or favouriting** – this is where the students mark for later use web sites, resources and files. Students can then organise these.
- **Social networking** – this is where people develop networks of friends and associates. It forges and creates links between different people. Like social bookmarks (see below) a social network can form a key element of collaborating and networking
- **Social bookmarking** – this is an online version of local bookmarking or favourites, It is more advanced because you can draw on others bookmarks and tags. While higher order thinking skills like, collaborating and sharing, can and do make use of these skills, this is its simplest form - a simple list of sites saved to an online format rather than locally to the machine.
- **Searching or “googling”** - Search engines are now key elements of students research. At its simplest for (here) student are just entering a key word or phrase into the basic entry pane of the search engine. This skill does not refine the search beyond the key word or term.

Key Terms - Remembering:

Recognising, Listing, Describing, Identifying, Retrieving, Naming, Locating, Finding, Bullet pointing, Highlighting, Bookmarking, Social networking, Social bookmarking, Favouriting/local bookmarking, Searching, Googling

Remembering and Digital Activities

Remembering*	Possible Activities
<p>Recalling specific information (Recall or recognition of specific information). Recognising, Listing, Describing, Identifying, Retrieving, Naming, Locating/Finding, Bullet pointing, highlighting, bookmarking, social networking, Social bookmarking, favouriting/local bookmarking, Searching, googling,</p>	<p>Quiz/Test (Online tools, WP, Cue sheets) Flashcards (Moodle, Hot potatoes, scorm objects) Definition (WP – bullets and lists, simple Mind maps, wiki, Moodle Glossary) Fact (WP – <i>bullets and lists</i>, Mind maps, internet, discussion boards, email) Worksheet/book (WP, Mind map, Web, clozed activities) Label (WP, graphics tools) List (WP – <i>bullets and lists</i>, Mind map, Web publishing – <i>personal web page, blog journal</i>) Reproduction (WP – <i>note writing & dication</i>, web publishing personal web page, blog journal, graphics tools, Chatrooms, email, discussion boards) Bookmarking internet browsers, web 2.0 tools del.icio.us Social Networking - facebook, myspaces, bebo Basic Searches - search engines google</p>

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"YOUR MOTHER AND I FOUND OUT YOU'VE BEEN BLOGGING.
 WE DON'T KNOW WHAT THAT MEANS, BUT WE'D LIKE YOU TO STOP."

Bookmarking and Social Bookmarking Rubric

Bloom's Taxonomic Level: Remembering

Key Words:

Recognising, identifying, retrieving, naming, locating, finding, bookmarking, social networking, Social bookmarking, favouriting/local bookmarking

Introduction:

This is a rubric for the Bookmarking, Favouriting and Social Bookmarking. This is examining the process of recording and remembering key sites and URL's.

Level	Bookmarking/Social Bookmarking/Favoriting
1	Add site to Bookmarks Toolbar or Favorites(Internet Explorer)/Bookmarks(Firefox) or Adds URL to social bookmarking site but does not add tags or comments. Locally stored bookmarks lack structure or organisation.
2	Add site favorites(Internet Explorer)/Bookmarks(Firefox). Sites are organised into folders, Folders are appropriately named. Adds URL to social bookmarking site. Students sometimes adds either tags or comments. Sites added irrelevant of value or validity.
3	Adds URL to a social bookmarking site. Student adds comments or Tags. Some duplication of tags eg singular and plural. Tags are mostly suitable keywords. Some limited filtering on basis of validity. Comments are simple
4	Adds URL to a social bookmarking site. Student adds Detailed comments or appropriate keyword Tags. Little duplication of tags. Sites bookmarked on the basis of validity. Comments are appropriate and useful

Exemplars:

Level 1

Add site to Bookmarks Toolbar or Favorites(Internet Explorer)/Bookmarks(Firefox) or Adds URL to social bookmarking site but does not add tags or comments. Locally stored bookmarks lack structure or organisation.

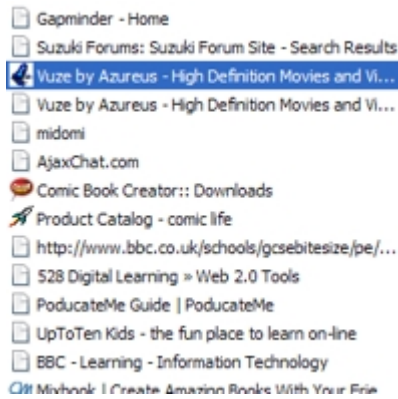


Illustration 1: FireFox - Bookmarks - Unstructured – level 1.

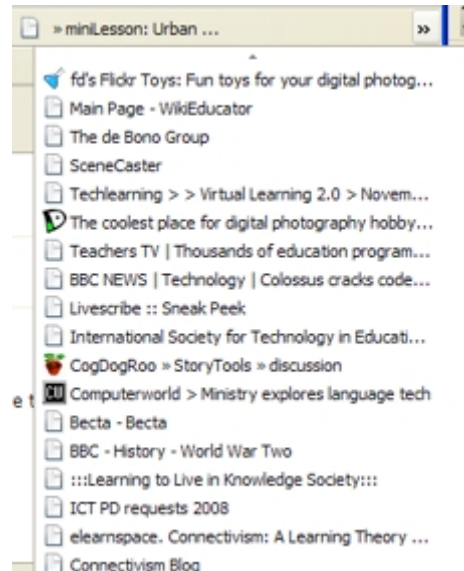


Illustration 2: FireFox - Bookmarks toolbar - Unstructured - level 1

Level 2

Add site favorites(Internet Explorer)/Bookmarks(Firefox). Sites are organised into folders, Folders are appropriately named. Adds URL to social bookmarking site. Students sometimes add either tags or comments. Sites added irrelevant of value or validity.

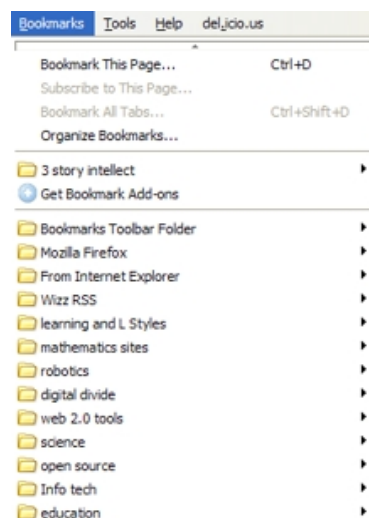
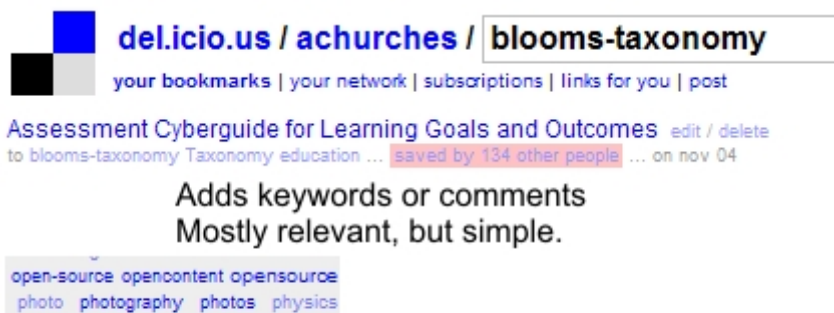


Illustration 2: Firefox - Bookmarks - Structured Folders appropriately named - Level 2.

Level 3

Adds URL to a social bookmarking site. Student adds comments or Tags. Some duplication of tags eg singular and plural. Tags are mostly suitable keywords. Some limited filtering on basis of validity. Comments are simple.



Adds keywords or comments
Mostly relevant, but simple.

Some duplication of Tags.
eg. open-source & opensource
photo & photos

Illustration 4: Del.icio.us Bookmarks - Comments or Tags, some duplication of tags - Level 3.

Level 4

Adds URL to a social bookmarking site. Student adds Detailed comments or appropriate keyword Tags. Little duplication of tags. Sites bookmarked on the basis of validity. Comments are appropriate and useful.



Adds Keywords and Comments. Comments/Notes
are detailed & structured.

Tags are not duplicated. Relevant and structured
Tagged sites are relevant and valid.

Illustration 5: Del.icio.us Bookmarks - Detailed Comments and Appropriate Tags, No duplication of tags - Level 4.

Understanding

The following are some of the key terms for this aspect of the Taxonomy.

- Interpreting
- Summarising
- Inferring
- Paraphrasing
- Classifying
- Comparing
- Explaining
- Exemplifying

Anderson and Krathwohl's taxonomy – Understanding

2. Understanding: Constructing meaning from different types of function be they written or graphic.

The digital additions and their justifications are as follows:

- **Advanced and Boolean Searching** - This is a progression from the previous category. Students require a greater depth of understanding to be able to create, modify and refine searches to suit their search needs.
- **Blog Journalling** – This is the simplest of the uses for a blog, simply a student “talks” “writes” or “type” a daily or task specific journal. This shows a basic understanding of the activity report upon. The blog can be used to develop higher level thinking when used for discussion and collaboration.
- **Categorising & Tagging** – digital classification - organising and classify files, web sites and materials using folders, using Del.icio.us and other similar tools beyond simple bookmarking. This can be organising, structuring and attributing online data, meta-tagging web pages etc. Students need to be able understand the content of the pages to be able to tag it
- **Commenting and annotating** – a variety of tools exist that allow the user to comment and annotate on web pages, pdf files and other documents. The user is developing understanding by simply commenting on the pages. This is analogous with writing notes on hand outs, but is potentially more powerful as you can link and index these.
- **Subscribing** – Subscription takes bookmarking in its various forms and simple reading one level further. The act of subscription by itself does not show or develop understanding but often the process of reading and revisiting the subscribe feeds leads to greater understanding.

Key Terms - Understanding:

Interpreting, Summarising, Inferring, Paraphrasing, Classifying, Comparing, Explaining, Exemplifying, Advanced searches, Boolean searches, Blog journalling, Twittering, Categorising and tagging, Commenting, Annotating, Subscribing

Understanding and Digital Activities

Understanding	Possible activities
<p>Explaining/defining ideas or concepts (Understanding of given information).</p> <p>Interpreting, Exemplifying, Summarising, Inferring, Paraphrasing, Classifying, Comparing, Explaining, Advanced searches, boolean searches, blog journalling, twittering, categorising and tagging, commenting, annotating, subscribing</p>	<p>Recitation (WP, Mind map, flashcards, presentation tools)</p> <p>Summary (WP, Mind map, web publishing – <i>blog journals & simple page construction collaborative documents, wiki</i>)</p> <p>Collection (WP, Mind map, web publishing – <i>blog journals & simple page construction collaborative documents, wiki</i>)</p> <p>Explanation (WP, Mind map, web publishing – <i>blog journals & simple page construction collaborative documents, wiki</i>)</p> <p>Show and tell (WP, presentation – <i>online & desktop based, graphics, audio tools - audacity sound recorder & podcasting tools, video tools, Mind map</i>)</p> <p>List (WP, Mind map)</p> <p>Label (WP, Mind map, Graphics, online tools - ajaxdraw)</p> <p>Outline (WP, Mind map)</p> <p>Advanced and boolean searches - advanced search features - google etc</p> <p>Blog journalling - bloglines, blogger etc</p> <p>Diary/Journal (blogging, Myspaces, bebo, facebook, bloglines, blogger)</p> <p>Categorising and tagging - Del.icio.us etc</p> <p>Tagging, comments annotating - -noticeboards, discussion boards, threaded discussions, adobe acrobat reader, blog readers, firefox, zotero</p> <p>Subscribing - aggregators - bloglines, firefox extensions</p>

Advanced Searching Rubric

Bloom's Taxonomic Level: Understanding

Key Words:

classifying, comparing, advanced searches, boolean searches, categorising and tagging

Introduction:

This is a rubric for the using advanced and boolean searches. This search requires an understanding of the keywords, boolean logic, advanced search features, structuring and refining searches and suitable search engines.

	Advanced searching	Boolean Searching
1	Can select a search engine to use for the search. Uses the basic search page Enters keyword(s). Executes the search	Can select a search engine to use for the search. Enters keyword(s). Keywords are mostly appropriate. Executes the search
2	Can select a suitable search engine to use for the search. Uses basic search page. Enters appropriate keywords and Uses speech marks for phrases. Executes the search Can navigate through the result pages. Recognises features of search engine like sponsored links.	Can select a search engine to use for the search. Enters multiple appropriate keywords without refinement. Executes the search
3	Can select a suitable search engine to use for the search. Uses the Advanced search page and options. Refines the search using some of the features of the advance search This may include: Domain, country, language, file type, location in page. Enters appropriate keyword(s). Executes the search. Modifies the keywords or terms to refine the search. Can navigate through the result pages. Understands the weighting system used by the search engine. Recognises features of search engine like sponsored links.	Can select a suitable search engine to use for the search. Enters multiple appropriate keywords with boolean refinements " and or not " Modifies the keywords or terms to refine the search. Modifies simple search engine settings to enhance the search. Executes the search. Can navigate through the result pages. Understands the weighting system used by the search engine.
4	Can select a suitable search engine to use for the search. Uses the Advanced search page and options. Refines the search using most of the features of the advance search This may include: Domain, country, language, file type, location in page. Uses exact match, phrase and exclude fields Enters appropriate keyword(s). Executes the search. Modifies the keywords or terms to refine the search. Can navigate through the result pages. Understands the weighting system used by the specific search engine. Recognises features of search engine like sponsored links.	Can select a suitable search engine to use for the search. Enters multiple appropriate keywords with boolean refinements " and or not " Modifies the keywords or terms to refine the search Modifies the search engine settings to enhance the search. Executes the search. Can navigate through the result pages. Understands the weighting system used by the search engine.

Exemplar

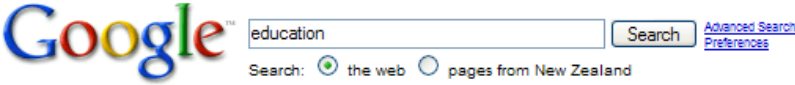
Advanced Searching

Level 1

Criteria:

Can select a search engine to use for the search. Use basic search page. Enters keyword(s).Executes the search

Web [Images](#) [News](#) [Groups](#) [Books](#) [Mail](#) [more](#) ▼



education [Advanced Search](#) [Preferences](#)
Search: the web pages from New Zealand

Web Results 1 - 10 of about 1,050,000,000 for

[New Zealand Ministry of Education](#)
Building a world-leading education system that equips all New Zealanders with the knowledge, skills and values to be successful citizens in the 21st century ...
[www.minedu.govt.nz/](#) - 18k - [Cached](#) - [Similar pages](#) - [Note this](#)

[Schools](#) [School terms & holidays](#)
[Early Childhood](#) [Topical Issues](#)
[Job Vacancies](#) [Useful links](#)
[Contact us](#) [General Publications](#)

[More results from minedu.govt.nz »](#)

[Education - Wikipedia, the free encyclopedia](#)
Education encompasses teaching and learning specific skills, and also something less tangible but more profound: the imparting of knowledge, ...
[en.wikipedia.org/wiki/Education](#) - 122k - [Cached](#) - [Similar pages](#) - [Note this](#)

[Education](#)
Give your c
Study at M
manukau.a
Auckland

[Distance](#)
Study Dist
from home
[www.stotts.](#)

[A Creativ](#)
Drumming

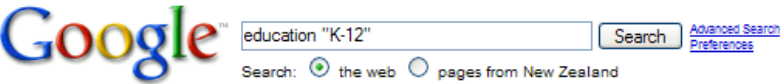
Note: Huge search return> 1 billion pages

Level 2

Criteria:

Can select a suitable search engine to use for the search. Use basic search page.
Enters appropriate keywords and uses speech marks for phrases. Executes the search
Can navigate through the result pages.
Recognises features of search engine like sponsored links

Web [Images](#) [News](#) [Groups](#) [Books](#) [Mail](#) [more](#) ▼



education "K-12" [Advanced Search](#) [Preferences](#)
Search: the web pages from New Zealand

Web Results 1 - 10 of about 1,860,000

[K-12 Education](#) Sponsored Link
[www.NationalAcademies.org](#) Free Online Access to New Research on K-12 Education

[K-12 Education in the Yahoo! Directory](#)
Includes links to elementary, middle, and high schools, teaching and student resources, curriculum standards, as well as sites devoted to reading, ...
[dir.yahoo.com/Education/k_12/](#) - 16k - [Cached](#) - [Similar pages](#) - [Note this](#)

[K-12 Lesson Plans in the Yahoo! Directory](#)
Comprehensive site for education professionals teaching grades K-12 with lesson plans, tips, articles, and resources. [www.educationworld.com](#); A to Z Teacher ...
[dir.yahoo.com/Education/k_12/teaching/lesson_plans/](#) - 17k - [Cached](#) - [Similar pages](#) - [Note this](#)
[More results from dir.yahoo.com »](#)

[After Schoo](#)
Acting, Creat
K - HS Classe
ImagineProje

[Education -](#)
Find local ed
with the finds
[www.finda.co](#)

Note: Large search return> 1 million pages, also sponsored link.

Level 3

Criteria:

Can select a suitable search engine to use for the search.

Use Advanced search page and options.

Refines the search using some of the features of the advance search This may include: Domain, country, language, file type, location in page.

Enters appropriate keyword(s). Executes the search. Modifies the keywords or terms to refine the search.

Can navigate through the result pages.

Understands the weighting system used by the search engine.

Recognises features of search engine like sponsored links

The screenshot shows the Google Advanced Search page. At the top left is the Google logo, followed by "Advanced Search" and a link to "Advanced". Below this is a search bar with the text "education" and a dropdown menu showing "10 results". To the right is a "Google Search" button. Below the search bar are four radio button options for finding results: "with all of the words" (selected), "with the exact phrase", "with at least one of the words", and "without the words". Below these are four input fields, with the first containing "K 12". Further down are various filters: "Language" (English), "Region" (United States), "File Format" (Only, return results of the file format, Adobe Acrobat PDF (.pdf)), "Date" (Return web pages first seen in the, anytime), "Occurrences" (Return results where my terms occur, anywhere in the page), "Domain" (Only, return results from the site or domain, e.g. google.com, .org), "Usage Rights" (Return results that are, not filtered by license), and "SafeSearch" (No filtering selected, Filter using SafeSearch).

Note: Uses the advanced search page – uses the refinements within this page to reduce search. Search result below is 300,000+ pages.

The screenshot shows the Google search results page for the query "education 'K 12' filetype:pdf". The search bar contains the query and a "Search" button. Below the search bar are links for "Advanced Search" and "Preferences". The search results are displayed under the "Web" tab, showing "Results 1 - 10 of about 321,000 English pages for education 'K 12' filetype:pdf". The first result is a sponsored link for "K-12 Education" from www.NationalAcademies.org. The second result is a PDF document titled "New Hampshire Physical Education K-12 Assessment Document" from the New Hampshire Association for Health, Physical Education, Recreation and Dance. The third result is a PDF document titled "Paving the Way to Postsecondary Education: K-12 Intervention ..." from noes.ed.gov.

Level 4

Criteria:

Can select a suitable search engine to use for the search. Use Advanced search page and options.

Refines the search using most of the features of the advance search This may include: domain, country, language, file type, location in page.

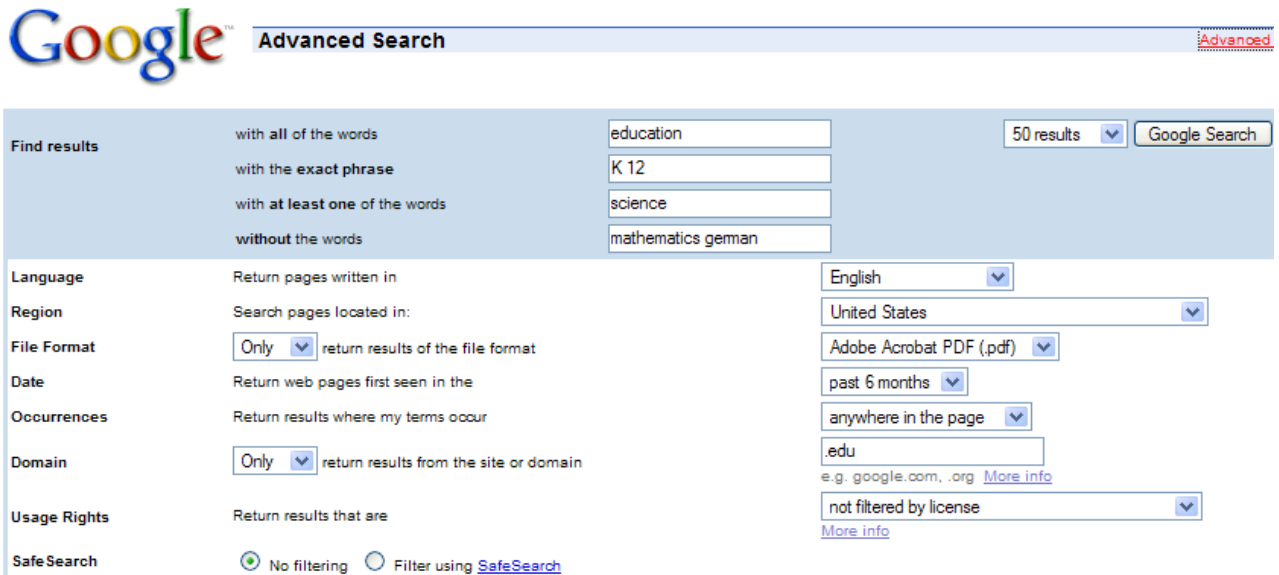
Uses exact match, phrase and exclude fields

Enters appropriate keyword(s). Executes the search. Modifies the keywords or terms to refine the search.

Can navigate through the result pages.

Understands the weighting system used by the specific search engine.

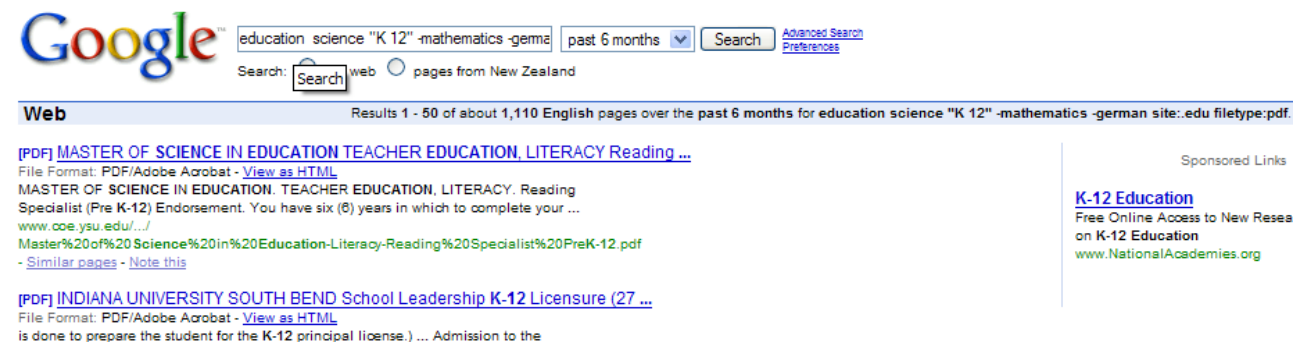
Recognises features of search engine like sponsored links



The screenshot shows the Google Advanced Search page. The search terms are "education", "K 12", "science", and "mathematics german". The results are filtered to 50 results. The search is performed in English, from the United States, for Adobe Acrobat PDF (.pdf) files, published in the past 6 months, anywhere in the page, on the .edu domain, and not filtered by license. The Safe Search option is set to "No filtering".

Notes: uses the advanced search options to refine and modify the search. This includes date or publication, country of origin, language and file format; as well as keyword exclusion and inclusion fields. Also note the change in the results per page.

Web [Images](#) [News](#) [Groups](#) [Books](#) [Mail](#) [more](#) ▼ achurches@kristin.school.nz | [Web History](#) | [My Acc](#)



The screenshot shows the search results for the query "education science 'K 12' -mathematics -german" with filters for "past 6 months" and "filetype:pdf". The search is performed on the web. The results show 1 - 50 of about 1,110 English pages over the past 6 months. The first result is a PDF titled "MASTER OF SCIENCE IN EDUCATION TEACHER EDUCATION, LITERACY Reading ...". The second result is a PDF titled "INDIANA UNIVERSITY SOUTH BEND School Leadership K-12 Licensure (27 ...)".



Blog Journalling Rubric

Bloom's Taxonomic Level: Understanding

Key Words:

Interpreting, summarising, inferring, comparing, explaining, exemplifying, blog journalling, commenting

Introduction:

This is a rubric for the Blog journalling. This is examining the process of recording and reporting events and process using blogging tools. Blog journalling here, is used as a form of reflective practice for class activities and learning rather than for personal journalling.

	Blogging	Understanding	Timeliness
1	Poor spelling and grammatical errors. Short 1 to 2 sentences. Lacks structure or flow. Appears hasty. Written in informal language or txt.	Simple entry lacks insight, depth or is superficial. Entry is short and frequently irrelevant to the events. Does not express opinion clearly. Shows little understanding.	Entries are irregular.
2	Some poor spelling and grammatical errors. Has some structure, but the entry does not flow. May contain a link or image.	Simple entries showing some insight, depth and are connected with events, topic or activity. Entries are short and may contain some irrelevant material. Some personal comments or opinions these may not be on task. Shows some understanding.	Most key events are journalled. Some comments are replied to.
3	Few spelling and grammatical errors. Has structure and the entry flows. Contains appropriate links or images. These are referred to within the text.	Entries show insight, depth and are connected with events, topic or activity. Entries may contain some irrelevant material. Personal opinion is expressed in an appropriate style. Shows a good depth of understanding.	Events are journalled. Most comments are replied to in a timely manner.
4	Spelling and grammatical errors are rare. The journal entry has structure and is well formatted to enhance readability. Contains appropriate links or images. Image sources are acknowledged. Images and links are referred to within the text.	Entries show insight, depth and understanding. They are connected with events, topic or activity. Entries are relevant with links to supporting material. Personal opinion is expressed in an appropriate style and is clearly related to the topic, activity or process. Shows a high level of understanding and relates events, activities & processes to purpose, learning outcomes and objectives.	All events are journalled and the entries are regular and timely. All comments are replied to in a timely manner.

Wiki Editing Rubric

**Bloom's Taxonomic Level: Understanding – Content authoring
Applying – Wiki editing**

Key Words - Understanding:

Interpreting, Summarising, inferring, comparing, explaining, exemplifying, blog journalling, commenting

Key Words – Applying:

Implementing, carrying out, using, executing, operating, uploading, sharing, editing

Introduction:

This is a rubric for the Wiki editing. This is examining the process of showing understanding by developing content via paraphrasing and authoring material on a related topic in a wiki environment. The Authoring component shows application as the student edits the wiki to a suitable standard, making use of the features of the wiki tool and basic principles of design – consistency, repetition, flow, readability.

	Wiki Authoring (Applying)	Content (Understanding)
1	Poor spelling and grammatical errors. Text entered with no enhancements. Lacks structure or flow.	Simple page which lacks insight, depth or is superficial. Entry is short and frequently irrelevant to the topic. Most sections of content are cut and paste or show superficial rewriting. Language used is not representative of the students language. Shows little understanding.
2	Some spelling and grammatical errors. Text entered with limited enhancements. Simple text enhancements are used. The wiki pages has limited structure or flow. The page may contain links or images. Student has a mostly consistent approach to design	Simple page which shows some depth or level of understanding. Entry are short and for the most part relevant to the topic. Some sections of content are cut and paste or show superficial rewriting. The page shows some understanding. The page attempts to address the learning objectives. Information sources are mentioned.
3	Few spelling and grammatical errors. Text is enhanced. The text has structure and the entry flows. Content is arranged in a logical order. The entry contains a appropriate links, files or images. Headings are added using the heading styles. Student has a consistent approach to design	The page shows the student has read and understood the page the page is rewritten by the student. The content has relevant links or images and the links or images may be referred to. The page address the learning objectives. Information sources are acknowledge.
4	Spelling and grammatical errors are rare. The wiki page has structure and is formatted and enhanced to increase readability. Contains a appropriate links, files or images. Image sources are acknowledged and include captions. Images and links are referred to within the text. Headings are added using the heading styles. Wiki features like embedding media, horizontal rules and a table of content are included. Student has a consistent appropriate approach to design and layout.	The page show insight, depth and understanding. The content, links, files, media and images are relevant and connected to the topic. The content is obviously written by the student and the student has shown a good depth of understanding and knowledge. The page clearly address the learning objectives. Information sources are acknowledge in a suitable format.

Applying

The following are some of the key terms for this aspect of the Taxonomy.

- Carrying out
- Using
- Executing
- Implementing
- Showing
- Exhibiting

Anderson and Krathwohl's taxonomy – Applying

3. **Applying:** Carrying out or using a procedure through executing or implementing. Applying related and refers to situations where learned material is used through products like models, presentation, interviews and simulations.

The digital additions and their justifications are as follows:

- **Running and operating** - This the action of initiating a program. This is operating and manipulating hardware and applications to obtain a basic goal or objective.
- **Playing** – The increasing emergence of games as a mode of education leads to the inclusion of this term in the list. Students who successfully play or operate a game are showing understanding of process and task and application of skills.
- **Uploading and Sharing** - uploading materials to websites and the sharing of materials via sites like flickr etc. This is a simple form of collaboration, a higher order thinking skill.
- **Hacking** – hacking in its simpler forms is applying a simple set of rules to achieve a goal or objective.
- **Editing** – With most media's, editing is a process or a procedure that the editor employs

Key Terms - Applying:

Implementing, carrying out, using, executing, running, loading, playing, operating, hacking, uploading, sharing, editing

Applying and Digital Activities

Applying	Possible activities
<p>Using information, concepts and ideas in another familiar situation (Using strategies, concepts, principles and theories in new situations).</p> <p>Implementing, carrying out, using, executing, doing, running, loading, playing, operating, hacking, uploading, sharing, editing</p>	<p>Illustration (Corel, inkscape, GIMP, Paint, online tools, Comic creation tools - <i>comic life, historic tale construction kit, hyper comic</i>)</p> <p>Simulation (Floor map, graphic tools, google sketchup, Crocodile software simulating science experiments, Global conflict - Palestine)</p> <p>Sculpture or Demonstration (Presentation, graphics, screen capture, audio and video conferencing)</p> <p>Presentation - impress, powerpoint, google presentation, Zoho presentation, skype, interactive whiteboard collaboration using etools, audio and video conferencing</p> <p>Interview (WP, mind mapper, podcast, vodcast, audacity, sound recorder, collaboration using etools, skype)</p> <p>Performance (Podcast, vodcast, film, audio and video conferencing, VoIP, audio recording, speech, Powerpoint Show, collaboration using etools)</p> <p>Editing - video and sound tools</p> <p>Playing - mmorpg's online games, simulations like Global Conflicts Palestine</p>



A screenshot from *Global Conflicts – Palestine*. This is an 3D interactive game or simulation produced by serious games.
Source: <http://www.seriousgames.dk/img/golden.jpg>

Collaborating Rubric

Bloom's Taxonomic Level: **Applying**

Key Terms:

Implementing, carrying out, using, executing, running, loading, playing, operating, hacking, uploading, sharing, editing

Introduction:

This is a rubric for Collaborating using electronic tools for sharing, editing and uploading materials. The tools would include products like elluminate. The rubric looks at the ability to use appropriately the tool to facilitate the discussion. The rubric does not look at the content or understanding specifically. There are four major areas or aspects of use. These are collaboration features, emotion/expression features, preparation and the users confidence in using and operating the tool.

Collaborating using eTools	
1	<p>The collaborator makes little use of the Collaboration features of the tool. When used of these tools can be distracting or inappropriate.</p> <p>The collaborator has done little preparation of material .</p> <p>The collaborator used some emotion/expression features of the tool like “hands up”, applause, microphone or chat etc. The use of these tools may be inappropriate. The user interrupts or over rides other conversations and adds comments that are not related to the topic or discussion.</p> <p>The user shows little confidence in their use of the tool.</p>
2	<p>The collaborator makes some limited use of the Collaboration features of the tool like screen shots and captures, websites, chat, voice, presentations, recording, video and file upload/sharing. The use of these features is mostly appropriate.</p> <p>The collaborator has prepared some material. The collaborator has selected a limited variety of information types (web based, presentation tools, text, voice, video etc) to share and use.</p> <p>The collaborator uses most of the emotion/expression features of the tool like “hands up”, applause, microphone etc, in an appropriate manner.</p> <p>The user shows some confidence in their use of the tool.</p>
3	<p>The collaborator makes appropriate use most of the different Collaboration features of the tool to enhance and facilitate discussion, this would include (where appropriate) screen shots and captures, websites, chat, voice, presentations, recording, video and file upload/sharing.</p> <p>The collaborator has prepared the material and has it available in a variety of information types (web based, presentation tools, text, voice, video etc) to share and use.</p> <p>The collaborator is appropriate in the use of emotion/expression features of the tool like “hands up”, applause, microphone etc.</p> <p>The user is confidence in their use of the tool.</p>
4	<p>The collaborator makes full and appropriate use of the different Collaboration features of the tool to enhance and facilitate discussion, this would include (where appropriate) screen shots and captures, websites, chat, voice, presentations, recording, video and file upload/sharing.</p> <p>The collaborator has fully prepared the material and has it available in a variety of suitable information types (web based, presentation tools, text, voice, video etc) to share and use.</p> <p>The collaborator has considered the abilities of the other users and the potential limitations of their connections so the content is available to all.</p> <p>The collaborator is appropriate in their use of emotion/expression features of the tool like “hands up”, applause, microphone etc. The uses of these features enhance conversation and facilitates sharing.</p> <p>The user shows confidence in their use of the tool and supports other in their usage.</p>

	Collaboration Features	Preparation	Emotion / expression features	Confidence
1	The collaborator makes little use of the Collaboration features of the tool. When used of these tools can be distracting or inappropriate.	The collaborator has done little preparation of material .	The collaborator used some emotion/ expression features of the tool like “hands up”, applause, microphone or chat etc. The use of these tools may be inappropriate. The user interrupts or over rides other conversations and adds comments that are not related to the topic or discussion.	The user shows little confidence in their use of the tool.
2	The collaborator makes some limited use of the Collaboration features of the tool like screen shots and captures, websites, chat, voice, presentations, recording, video and file upload/sharing. The use of these features is mostly appropriate.	The collaborator has prepared some material. The collaborator has selected a limited variety of information types (web based, presentation tools, text, voice, video etc) to share and use.	The collaborator uses most of the emotion/ expression features of the tool like “hands up”, applause, microphone etc, in an appropriate manner	The user shows some confidence in their use of the tool.
3	The collaborator makes appropriate use most of the different Collaboration features of the tool to enhance and facilitate discussion, this would include (where appropriate) screen shots and captures, websites, chat, recording, voice, presentations, video and file upload/sharing.	The collaborator has prepared the material and has it available in a variety of information types (web based, presentation tools, text, voice, video etc) to share and use.	The collaborator is appropriate in the use of emotion/ expression features of the tool like “hands up”, applause, microphone etc.	The user is confidence in their use of the tool.
4	The collaborator makes full and appropriate use of the different Collaboration features of the tool to enhance and facilitate discussion, this would include (where appropriate) screen shots and captures, websites, chat, recording, voice, presentations, video and file upload/sharing.	The collaborator has fully prepared the material and has it available in a variety of suitable information types (web based, presentation tools, text, voice, video etc) to share and use. The collaborator has considered the abilities of the other users and the potential limitations of their connections so the content is available to all.	The collaborator is appropriate in their use of emotion/ expression features of the tool like “hands up”, applause, microphone etc. The uses of these features enhance conversation and facilitates sharing.	The user shows confidence in their use of the tool and supports other in their usage.

Skype (Audio/Video Conferencing) Rubric

Bloom's Taxonomic Level: Applying

Key Terms - Applying:

Implementing, carrying out, using, executing, running, loading, playing, operating, hacking, uploading, sharing, editing

Bloom's Taxonomic Level: Evaluating

Key Words:

Checking, critiquing, judging, reviewing, posting, moderating, reflecting, Validating.

Introduction:

This is a rubric for audio and Audio/visual conferencing using tools like skype ©. This rubric is looking at two taxonomic levels Applying for the planning, preparation and communication aspects and Evaluating for the reflection.

Key to a successful conference are the aspects of **planning** and **communication**. Planning encompasses the technical aspects – checking connection, preparing tools etc and the content/management aspects – setting up schedules, agenda, key elements rules etc. The communication aspect looks at audio and visual communication in its various aspects and the efficiency with which these are used. It also looks at apply the rules, schedule and plan previously prepared. **Reflection** is crucial to improving the process and learning from the process and content of the conference. So this aspect covers not only personal involvement but also minutes, notes and recordings.

	Preparation and Planning	Communication	Reflection
1	Little preparation is evident. The conference lacks structure. Little consideration for availability/time zones etc are evident	Communication is poor, hard to understand, of task and inarticulate. Use and selection of language does not aid communication. There is little evidence of rules or etiquette, structure or planning.	There is little or no reflection.
2	Some connections are tested prior to the event. A schedule has been communicated. Some goals for the conference are outlined. Some key questions are prepared. Rules and etiquette guidelines are outlined.	Rules and etiquette guidelines are stated. Most communication is clear (speech, visual and written) and mainly on task. The language used is mostly appropriate and all parties will understand (Spoken and written). Slang, regional language and colloquialisms are used. Speech is mostly clear, there are issues with pace and pitch. Volume of speech varies. Most rules and etiquette guidelines are followed. There is some interruption and speaking over people. Some notes are taken these are of a poor quality.	Here is some limited reflection on the conference. Reflection is general and unstructured, Reflection may be of a personal nature. Minutes and notes are distributed. Some areas of Improvement are identified.

	Preparation and Planning	Communication	Reflection
3	<p>User has selected some suitable tools and installed these for use in the conference. (Blackboards, recorder etc).</p> <p>Connections are tested prior to the event.</p> <p>A schedule has been communicated.</p> <p>Goals for the conference are outlined.</p> <p>A plan and some key questions are prepared.</p> <p>Some resources and links are prepared in advance.</p> <p>Rules and etiquette guidelines are defined.</p>	<p>Rules and etiquette guidelines are stated and mostly adhered to.</p> <p>Most communication is clear and articulate (speech, visual and written) and mostly on task.</p> <p>The language used is mostly appropriate and all parties will understand (Spoken and written).</p> <p>Speech is Mostly clear, appropriately paced and pitched.</p> <p>Rules and etiquette guidelines stated are mostly followed.</p> <p>Some notes and or recording are taken.</p>	<p>Parties reflect on the conference.</p> <p>Reflection is completed without put downs, sarcasm or comments of a personal nature.</p> <p>Reflection and review examined appropriately the some following: Preparation, Goals, Key questions, Process, Communications, conversations, Rules and etiquette</p> <p>Where appropriate suitable resources, minutes and notes are distributed.</p> <p>Some areas of Improvement are identified and actioned.</p>
4	<p>User has selected suitable tools, installed and tested these for use in the conference. (Blackboards, recorder etc).</p> <p>Connections are tested prior to the event.</p> <p>A schedule has been communicated and agreed to by all parties.</p> <p>Clear goals for the conference are agreed to by all parties.</p> <p>A plan and key questions are prepared and approved.</p> <p>Suitable resources and links are prepared in advance.</p> <p>Rules and etiquette guidelines are clearly defined.</p>	<p>Rules and etiquette guidelines are clearly defined and adhered to.</p> <p>All communication is clear and articulate (speech, visual and written) and on task.</p> <p>Users select and use appropriate language that all parties will understand (Spoken and written).</p> <p>Speech is clear, appropriately paced and pitched.</p> <p>Suitable standards of etiquette are applied regarding interrupting, turns to speak, use of slang and abbreviation, use of cameras and prepared materials.</p> <p>Goals and plan of conference are clearly communicated and adhered to.</p> <p>Suitable notes and or recording are taken.</p>	<p>All parties reflect critically on the conference.</p> <p>Reflection is completed without put downs, sarcasm or comments of a personal nature.</p> <p>Reflection and review examined appropriately the following: Preparation, Goals, Key questions, Process, Communications, conversations, Rules and etiquette</p> <p>Where appropriate suitable resources, minutes and notes are developed and distributed.</p> <p>Improvements are identified and actioned.</p>

Interactive Whiteboard Rubric

Bloom's Taxonomic Level: **Applying**

Key Terms:

Implementing, carrying out, using, executing, running, loading, playing, operating, hacking, uploading, sharing, editing

Introduction:

This rubric is based on a rubric supplied by Juliette Major of Education Services, Catholic Education Office of Canberra and Goulburn. The Rubric looks at students use of interactive whiteboards from two aspects, Control and Interaction. Control examines how the student uses the interactive whiteboard and the various software features. The Interaction element looks at the development of the resource or notebook and the level of interactivity within it.

Level	Control	Interaction
1	The user cannot click on the IWB using stylus or hand. Experiences difficulty opening programs on the computer connected to the IWB using the stylus, hand or wireless mouse and keyboard.	The user displays no confidence in using the IWB. User doesn't know how to use the software that accompanies the IWB.
2	The user can click on the IWB using stylus or hand. Can open programs on the computer connected to the IWB using the stylus, hand or wireless mouse and keyboard.	The user displays confidence in using the IWB. User doesn't know how to use the software that accompanies the IWB. User can open websites and software on the computer connected to the IWB.
3	The user can click on the IWB using stylus or hand. Can manipulate programs on the computer connected to the IWB using the stylus, hand or wireless mouse and keyboard. Can enter text using stylus, finger or on-screen keyboard and navigate to these features. Can format text via the IWB	The user displays confidence in using the IWB. User knows how to use the software that accompanies the IWB and the functions for each tool. User can open websites and software on the computer connected to the IWB as well as opens and manipulates new resources using IWB-specific software. This would include modify size, position, lock or unlock status; adding hyperlinks
4	The user can click on the IWB using stylus or hand. Can manipulate programs on the computer connected to the IWB using the stylus, hand or wireless mouse and keyboard and teaches others to do so. Can enter text using stylus, finger or on-screen keyboard and navigate with confidence to these features. Can format text via the IWB, including text recognition, spelling as well as text enhancements with ease	The user displays confidence in using the IWB. User knows how to use the software that accompanies the IWB and the functions for each tool and is able to teach others. User creates new resources using IWB-specific software as the lesson progresses. This would include modify size, position, lock or unlock status; adding and modifying hyperlinks and actions. Appropriately selects advanced features to highlight and enhance the learning process

Analysing

The following are some of the key terms for this aspect of the Taxonomy.

- Comparing
- Organising
- Deconstructing
- Attributing
- Outlining
- Finding,
- Structuring
- Integrating

Anderson and Krathwohl's taxonomy – Analysing

4. Analysing: Breaking material or concepts into parts, determining how the parts relate or interrelate to one another or to an overall structure or purpose. Mental actions include differentiating, organizing and attributing as well as being able to distinguish between components.

The digital additions and their justifications are as follows:

- **Mashing** - mash ups are the integration of several data sources into a single resource. Mashing data currently is a complex process but as more options and sites evolve this will become an increasingly easy and accessible means of analysis.
- **Linking** – this is establishing and building links within and outside of documents and web pages.
- **Reverse-engineering** - this is analogous with deconstruction. It is also related to cracking often with out the negative implications associated with this.
- **Cracking** – cracking requires the cracker to understand and operate the application or system being cracked, analyse its strengths and weaknesses and then exploit these.

Key Terms - Analysing:

Comparing, Organising, Deconstructing, Attributing, Outlining, Finding, Structuring, Integrating, Mashing, Linking, Reverse-engineering, Cracking and Mind-mapping.

Analyzing and Digital Activities

Analyzing	Possible activities
<p>Breaking information into parts/components to explore/develop/construct understandings and relationships (Breaking information down into its component elements).</p> <p>Comparing, organising, deconstructing, attributing, outlining, structuring, integrating, mashing, linking, reverse-engineering, cracking, mind-mapping.</p>	<p>Survey (Web based tools – <i>survey monkey, embedded polls and votes, social networking tools etc</i>, WP, Spreadsheet, email, discussion boards, cellphones and texting)</p> <p>Database (relational; databases using MySQL and Access, Flatfile database using Spreadsheet, wikis, Geographical information systems or GIS - <i>Google earth, Google Maps, Flickr, Arcview/explorer</i>)</p> <p>Abstract (WP, web publishing)</p> <p>Relationship mind maps - Herring or fish bone mind maps, SWOT Analysis, PMI, Venn, 6 Questions - <i>Inspiration, kidspiration, smart ideas, Cmap, Mindmapper, freemind</i> Online tools -</p> <p>Report (WP, DTP, spreadsheet, presentation, web publishing – web page or blog entry,</p> <p>Graph (Spreadsheet, digitizer, online graphing tools)</p> <p>Spreadsheet (Calc, excel, online spreadsheet tools)</p> <p>Checklist (WP, survey tools, online polls, Spreadsheet)</p> <p>Chart (Spreadsheet, digitizer, mind mapping tools online tools - www.gliffy.com)</p>

Data Analysis Rubric

Bloom's Taxonomic Level: Analysing

Key Terms - Analysing:

Comparing, organising, deconstructing, attributing, outlining, finding, structuring, integrating, mashing, linking, reverse-engineering, cracking and mind-mapping.

Introduction:

This is a rubric for data processing, manipulation, presentation and analysis. The rubric is designed for students taking raw data and suitably entering this into a spreadsheet (data processing). The processed data is then manipulated to add value using features like sort, filter, formula and equations. The manipulated data is presented in a suitable format or formats to enable analysis. Students are able to select suitable charts for the data types and suitably label tables, titles, axes, labels and keys. Students can then make accurate analysis of the data and trends, with an awareness of errors and inaccuracies.

	Data processing, manipulation, presentation and analysis
1	Students attempt to arrange data into fields. Most Fields are named. Data entered has some inaccuracies. Students show little understanding of data types. Students make no attempt to manipulate data or manipulation is fundamentally flawed. Students inconsistently and inappropriately make use labels, highlights, font weight and underline. Students select inappropriate visual methods of presenting data. Students make no attempt to analyse data or draw conclusions or the analysis is fundamentally flawed. Students are unaware of errors or inaccuracies. Students make no attempt to links to prior knowledge.
2	Students arrange data into fields. Fields are named. Data entered has some inaccuracies. Students have some understanding data types – continuous and discontinuous. Students can manipulate data with use of formula or equations or sort or filter. Some errors are present in data manipulation. Students use labels, highlights, font weight and underline. Students select visual methods of presenting data. Some presentation methods are suitable for the type of data and purpose of presentation and audience. Students attempts to identify trends to draw conclusions from the data. There are inaccuracies in analysis. Students have little awareness of errors or inaccuracies. Students attempt to make some links to prior knowledge.
3	Students arrange data into fields. Fields are appropriately named. Data entered is mostly accurately. Students recognise data types – continuous and discontinuous – most of the time. Students can manipulate data using formula or equations. Students can use the filter and sort features. The data manipulation makes analysis possible. Some errors are present in data manipulation. Students appropriately use labels, highlights, font weight and underline. Students select visual methods of presenting data. The presentation methods are mostly suitable for the type of data and purpose of presentation and audience. The presentation shows trends. Students identify trends and are able to draw conclusions from the data. There are few inaccuracies in analysis. Students can recognise some errors and inaccuracies in the processed, manipulated and presented data. Students are able to make some links to prior knowledge.
4	Students arrange data into suitable fields. Fields are appropriately named. Data is entered accurately. Students recognise data types – continuous and discontinuous. Students can appropriately manipulate data using suitable formula or equations. Students can appropriately use the filter and sort features. The data manipulation makes analysis possible. Students appropriately and consistently use labels, highlights, font weight and underline. Students can select suitable visual methods of presenting data. The presentation methods are suitable for the type of data and purpose of presentation and audience. The presentation suitably and accurately shows trends. Students correctly identify trends and is able to draw suitable accurate conclusions from the data. Students can recognise errors and inaccuracies in the processed, manipulated and presented data and their analysis. Students are able to relate presented data to other knowledge.

	Data Processing	Data manipulation	Data Presentation	Data Analysis
1	Students attempt to arrange data into fields. Most Fields are named. Data entered has some inaccuracies. Students show little understanding of data types.	Students make no attempt to manipulate data or manipulation is fundamentally flawed.	Students inconsistently and inappropriately make use labels, highlights, font weight and underline. Students select inappropriate visual methods of presenting data.	Students make no attempt to analyse data or draw conclusions or the analysis is fundamentally flawed. Students make no attempt to links to prior knowledge.
2	Students arrange data into fields. Fields are named. Data entered has some inaccuracies Students have some understanding data types – continuous and discontinuous.	Students can manipulate data with use of formula or equations or sort or filter. Some errors are present in data manipulation	Students use labels, highlights, font weight and underline. Students select visual methods of presenting data. Some presentation methods are suitable for the type of data and purpose of presentation and audience.	Students attempts to identify trends to draw conclusions from the data. There are inaccuracies in analysis Students attempt to make some links to prior knowledge.
3	Students arrange data into fields. Fields are appropriately named. Data entered is mostly accurately. Students recognise data types – continuous and discontinuous – most of the time.	Students can manipulate data using formula or equations. Students can use the filter and sort features. The data manipulation makes analysis possible . Some errors are present in data manipulation.	Students appropriately use labels, highlights, font weight and underline. Students select visual methods of presenting data. The presentation methods are mostly suitable for the type of data and purpose of presentation and audience. The presentation shows trends.	Students identify trends and are able to draw conclusions from the data. There are few inaccuracies in analysis. Students can recognise some errors and inaccuracies in the processed, manipulated and presented data. Students are able to make some links to prior knowledge.
4	Students arrange data into suitable fields. Fields are appropriately named. Data is entered accurately. Students recognise data types – continuous and discontinuous	Students can appropriately manipulate data using suitable formula or equations. Students can appropriately use the filter and sort features. The data manipulation makes analysis possible .	Students appropriately and consistently use labels, highlights, font weight and underline. Students can select suitable visual methods of presenting data. The presentation methods are suitable for the type of data and purpose of presentation and audience. The presentation suitably and accurately shows trends.	Students correctly identify trends and is able to draw suitable accurate conclusions from the data. Students can recognise errors and inaccuracies in the processed, manipulated and presented data and their analysis. Students are able to relate presented data to other knowledge.

Evaluating

The following are some of the key terms for this aspect of the Taxonomy.

- Checking
- Hypothesising
- Critiquing
- Experimenting
- Judging
- Testing
- Detecting
- Monitoring

Anderson and Krathwohl's taxonomy – Evaluating

5.Evaluating: Making judgements based on criteria and standards through checking and critiquing..

The digital additions and their justifications are as follows:

- **Blog/vlog commenting and reflecting** - Constructive criticism and reflective practice are often facilitated by the use of blogs and video blogs. Student commenting and replying to postings have to evaluate the material in context and reply to this.
- **Posting** – posting comments to blogs, discussion boards, threaded discussions. These are increasingly common elements of students daily practice. Good postings like good comments are not simple one line answers rather they structured and constructed to evaluate the topic or concept.
- **Moderating** – This is high level evaluation, the moderator must be able to evaluate a posting or comment from a variety of perspectives, assessing its worth, value and appropriateness.
- **Collaborating and networking** – Collaboration is an increasing feature of education. In a world increasingly focused on communication, collaboration, leading to collective intelligence is a key aspect. Effective collaboration involves evaluating the strengths and abilities of the the participants and evaluating the contribution they make. Networking is a feature of collaboration, contacting and communicating with relevant person via a network of associates.
- **Testing (Alpha and Beta)** – Testing of applications, processes and procedures is a key element in the development of any tool. To be an effective tester you must have the ability of analyse the purpose of the tool or process, what its correct function should be and what its current function is.
- **Validating** – With the wealth of information available to students combined with the lack of authentication of data, students of today and tomorrow must be able to validate the veracity of their information sources. To do this they must be able to analyse and evaluate the data sources and make judgements based on these.

Key Terms - Evaluating:

Checking, Hypothesising, Critiquing, Experimenting, Judging, Testing, Detecting, Monitoring, (Blog/vlog) commenting, Reviewing, Posting, Moderating, Collaborating, Networking, Reflecting, (Alpha & beta) testing, validating.

Evaluating and Digital Activities

Evaluating	Possible Activities
<p>Justifying a decision, solution, answer or course of action (Judge/evaluate/analyse the value of ideas, concepts, materials and methods by developing/constructing and applying standards and criteria).</p> <p>Checking, Hypothesising, Critiquing, Experimenting, Judging, Testing, Detecting, Monitoring (Blog/vlog), commenting, reviewing, posting, moderating, collaborating, networking, reflecting, (Alpha & beta) testing.</p>	<p>Debate (WP, sound recorder, podcasting or vodcasting, Mind mapping - <i>inspiration, free mind</i>, Chatrooms, IM, email, Discussion boards, video and Phone conferencing [skype, IM] Collaboration tools - elluminate etc)</p> <p>Panel (WP, chatrooms, IM, email, Discussion boards, Video and phone conferencing, Collaboration tools - elluminate etc))</p> <p>Report (WP or web published – <i>Report, blog entry, wiki entry, web page</i>, DTP, Presentation, Camera)</p> <p>Evaluation (WP or web published –<i>report blog entry, wiki entry, web page</i>,, DTP, Mind Map Presentation, camera,)</p> <p>Investigation (Internet, Online tools, camera, WP, GIS[<i>Google earth, Google Maps, Flickr Arcview/explorer</i>])</p> <p>Verdict (WP etc)</p> <p>Conclusion (WP, DTP, Presentation)</p> <p>Persuasive speech (WP, Sound recorder, reason!able -argument software, Mind map - presentation mode)</p> <p>Commenting, moderating reviewing posting - discussion boards, forums, blog, wiki's, twitter, threaded discussions, bulletin boards, chatrooms</p> <p>Collaborating: discussion boards, forums, blog, wiki's, twitter, threaded discussions, bulletin boards, chatrooms, video conferencing, chatrooms, instant messaging, txt and pxt messaging, video messaging audio conferencing</p> <p>Networking - social networking tools, audio and video conferencing, email threads, telecommunications, instant messaging, live classrooms - <i>illuminate</i> etc</p>

Validating Information Rubric

Bloom's Taxonomic Level: **Evaluating**

Key Words:

Checking, critiquing, judging, reviewing, posting, moderating, reflecting, Validating.

Introduction:

This is a rubric for validating information sources. This is the process of referencing and authenticating data from multiple valid sources. With the emergence of Web 2.0 Technologies anyone can publish anything in formats that appear valid. Key elements of validating the information is reporting the information source, accessing multiple information sources and information type, creating linkage between the information sources and making decisions on the validity of information based on this process.

	Validating Information	Referencing & Bibliography
1	Information is gathered from a single source or from undisclosed sources. There has been no attempt to evaluate the accuracy of the information. Information is taken at face value.	No bibliography is provided.
2	Information is gathered from several sources. The information is gathered from a single information type. There is limited linkage of information to validate. The student makes no or limited judgements on the validity of the information.	Students provide the URL of the websites visited or title of the printed resource. There is an attempt to organise the bibliography entries.
3	Information is gathered from several sources (3-4) and information types (2-3). There is linkage of information to validate the accuracy of the material. Several of the information sources are regarded as of high validity for example government and education websites, encyclopaedia, professional journals, primary information sources etc. The student makes some judgements on the validity of the information.	Students provide the some of the key information for both electronic and printed media. This would include some of the following: URL of the websites visited, title, Author, Publisher and or Date of publication. Students attempt to use a recognised bibliography format such as APA or MPA. Bibliography entries show some organisation and there is some referencing throughout the document.
4	Information is gathered from many sources (4 or more) and information types (3 or more). There is linkage of information to validate the accuracy of the material. Most of the information sources are regarded as of high validity for example government and education websites, encyclopaedia, professional journals, primary information sources etc. The student makes valid and supported judgements on the validity and accuracy of the information.	Students provide the key information for both electronic and printed media. This would include most of the following: URL of the websites visited, title, Author, Publisher and or Date of publication/last modification, ISBN Number, Journal title etc. Students use a recognised bibliography format such as APA or MPA. Bibliography entries are suitably organised and referenced throughout the document.

Threaded Discussion Rubric

Bloom's Taxonomic Level: Understanding & Evaluating

Key Words: Understanding

Interpreting, Summarising, inferring, comparing, explaining, exemplifying, discussing, commenting

Key Terms - Evaluating:

Checking, critiquing, judging, testing, commenting, reviewing, posting, reflecting.

Introduction:

This is a rubric for a Threaded Discussion. The rubric is in two parts, the first is for understanding and the second part for evaluating. This is examining the process of replying to a post and discussing using asynchronous threaded discussion tool. This rubric is working against two levels. The simplest format is construction and understanding. This is where material is posted and the students are asked via a focusing or guiding question to display their understanding.

	Reply construction	Understanding
1	Poor spelling and grammatical errors. Short 1 or 2 sentences. Lacks structure or flow. Written in informal language, abbreviations or txt.	Simple reply or comment which lacks insight, depth or is superficial. The entry is short and frequently irrelevant to the key question, original post or concept. Does not express opinion clearly. Shows little understanding.
2	Some poor spelling and grammatical errors. Has some structure, but the entry does not flow. May contain a link or image. The reply contains several sentences. The text construction is mainly formal containing few abbreviations or txt style language.	Simple reply or comment showing some insight, depth and are connected with original post, question, topic or concept. The replies are short and may contain some irrelevant material. Some personal comments or opinions these may not be on task. Shows some understanding.
3	Few spelling and grammatical errors. Has structure and the entry flows. Contains appropriate links, uploaded files or images. These are referred to within the text. Refers to other posts. The reply contains sentences or paragraphs.	Replies show insight, depth and are connected with thread, topic or post. Entries may contain some irrelevant material. Personal opinion is expressed in an appropriate style. Shows a good depth of understanding.
4	Spelling and grammatical errors are rare. The reply has structure and is formatted to enhance readability. Contains appropriate links, uploaded files or images. Sources are acknowledged. Images and links are referred to within the text. Refers to other posts and builds on these.	Replies show insight, depth and understanding. They are connected with thread, topic or post. Entries are relevant with links to supporting material. Personal opinion is expressed in an appropriate style and is clearly related to the thread or post. The reply or post shows a high level of understanding, it shows a depth of understanding in matters relating to and surrounding the original post.

The Evaluation component looks at the reflection and evaluation of other posts, constructing and proposing arguments and questions that relate to the thread and shows the student is evaluating the underlying concepts of the threaded discussion. Evaluation would contain some or most of the following elements, ranging from simple to complex.

Simple	Description	Complex
	<--Refers to posts and thread-->	
	<--Enhances the discussion-->	
	<--Clear and concise-->	
	<--Adds own opinion based on thread-->	
	<--Develops an argument (supportive or opposed)-->	
	<--Develops suitable questions-->	
	<--Critiques other posts-->	
	<--Answers questions and defends stance or position.-->	

Evaluating

	Reference	Clarity	Argument	Critique	Questioning
1	Student does not refer to other posts or the referred posts are irrelevant, inappropriate or unrelated to the thread. The post may be a repeat of prior posts.	The student post shows a lack of clarity on their opinion.	Contains no relevant questions and does not formulate an argument.	Student does not provide any critique of other posts or comments.	The student does not pose any questions.
2	Student does refer to other posts. The reply post is mainly related to the thread.	The post add to the discussion in a limited way. The poster expresses their opinion in a limited mode.	The student has developed a limited argument, using appropriate language. The argument is unsupported.	The student provides a simple critique of posts in an appropriate manner.	The student states simple questions which are related to the topic. Student answer some of the questions posted by their peers
3	Student refers to other posts. The reply post is related to the thread.	The post add to the discussion. The poster expresses their opinion clearly.	The student has developed an argument using appropriate language. The argument is supported by facts, opinions and related materials.	The student is judging other posts on there merits. The student provides a critique of posts in an appropriate manner.	The student structures appropriate questions which are related to the topic and previous posts. The student answers the questions posted by their peers, provides a limited defence of position or stance
4	Student refers to other posts. The reply post is related to the thread.	The post enhances the discussion and is expressed in clear and concise opinion.	The student has developed the argument using appropriate language. This is clearly and appropriately supported by facts, opinions and related materials including links.	The student is judging other posts on their merits. The student provides a detailed critique of posts in an appropriate manner.	The student structures appropriate focusing or challenging questions related to the topic and previous posts. The student answers the questions posted by their peers with depth and shows a high degree of understanding. Can defend his or her position of stance on a topic.

Creating

The following are some of the key terms for this aspect of the Taxonomy.

- Designing
- Constructing
- Planning
- Producing
- Inventing
- Devising
- Making

Anderson and Krathwohl's taxonomy – Creating

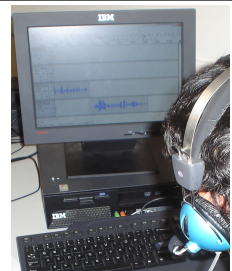
6. **Creating**: Putting the elements together to form a coherent or functional whole; reorganising elements into a new pattern or structure through generating, planning or producing.

The digital additions and their justifications are as follows:

- **Programming** - Whether it is creating their own applications, programming macros or developing games or multimedia applications within structured environments, students are routinely creating their own programs to suit their needs and goals
- **Filming, animating, videocasting, podcasting, mixing and remixing** – these relate to the increasing trend to using and availability of multimedia and multimedia editing tools. Students frequently capture, create, mix and remix content to produce unique products.
- **Directing and producing** – to directing or producing a product, performance or production is a highly creative process. It requires the student to have vision, understand the components and meld these into a coherent product.
- **Publishing** – whether via the web or from home computers, publishing in text, media or digital formats is increasing. Again this requires a huge overview of not only the content being published, but the process and product. Related to this concept are also **Video blogging** – the production of video blogs, **blogging** and also **wiki-ing** - creating, adding to and modify content in wikis. Creating or **building Mash ups** would also fit here

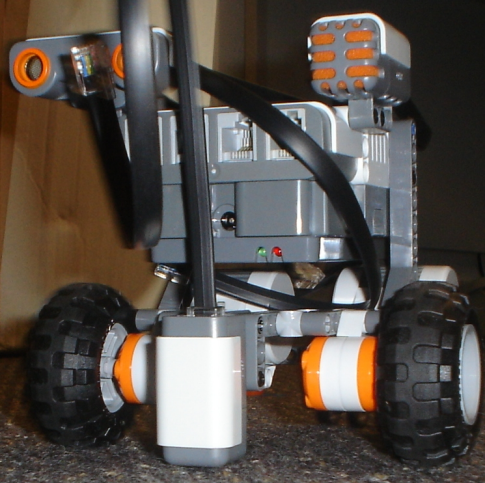
Key Terms - Creating:

Designing, Constructing, Planning, Inventing, Devising, Making, Programming, Filming, Animating, Blogging, Video blogging, Mixing, Remixing, Wiki-ing, Publishing, Videocasting, Podcasting, Directing/producing, Building or compiling mash-ups



Podcasting using Audacity

Creating and Digital Activities

Creating	Possible Activities
<p><i>Generating/creating new ideas, products, or ways of viewing things (Putting together/combining ideas, concepts or elements to develop/construct/build an original idea or engage/stimulate in creative thinking).</i></p> <p>Designing, Constructing, Planning, Producing, Inventing, Devising, Making, Building, Programming, Filming, Animating, Blogging, Video Blogging, Mixing, Remixing, Wiki-ing, Publishing, Videocasting, Podcasting, Directing/producing</p>  <p><i>Lego © NXT Robot, easy to program, adaptable and flexible, a great tool for creativity</i></p>	<p>Film (Movie maker, Pinnacle Studio, Adobe premier elements Online tools www.jumpcut.com, www.eyespot.com, www.pinnacleshare.com, www.cuts.com, www.animoto.com, www.dvolver.com)</p> <p>Presentation (presentation tools - Powerpoint, Impress, Zoho presentation tool, Photostory, Google present. Comic creation tools – comic life, hypercomic, online tools)</p> <p>Story (WP or web published – mixbooks etc, DTP, Presentation, podcasting, photostory, voicethread, Comic creation tools – comic life, historic tale construction kit, Animations – www.dvolver.com)</p> <p>Programming Visual Studio.net (& Express the free version) Lego Mindstorms & Robolab, Scratch, Alice, Game maker</p> <p>Project (WP, Ganttproject for Gantt charts and PERT Charts, Openproj for gantt, Pert and critical pathways) calendars, flow charts [inspiration, freemind, C-Map , smartideas], mind maps)</p> <p>Blogging video blogging - Blogging tool, blogger, wordpress, edublogs, classroom blogmiester, bloglines</p> <p>Vodcast, podcast videocasting screen casting - voice thread, blogging tool, skype, collaboration and classroom tools – elluminate, live classroom</p> <p>Plan(Inspiration, Cmap, free mind, WP, Calendar)</p> <p>New game (Gamemaker, RPGmaker)</p> <p>Model (Sketchup, Blender, Maya3d PLE, autocad)</p> <p>Song (finale notepad, WP, Sound recorder, Audacity, podcasting, recording narration in presentations [photostory 3, powerpoint, impress] Online tools</p> <p>Media product (DTP, Movie maker, Corel, GIMP, Paint.net, Tuxpaint, Alice, Flash, Podcasting -</p> <p>Advertisement (DTP, Corel, GIMP, Paint.net, Tuxpaint, Movie maker, Alice, Flash, Podcasting)</p> <p>Painting (Corel, Paint, GIMP, Paint.net, Tuxpaint online tools - http://www.picnik.com http://www.ajaxwrite.com/)</p>

Podcasting Rubric - Creating

Bloom's Taxonomic Level: Creating

Key Words:

designing, constructing, planning, producing, making, mixing, remixing, publishing, podcasting, producing

Introduction:

Podcasting is a creative process involving several different components. A successful podcast must be planned and scripted. It requires care and preparation to record and construct. Constructing the cast requires high quality speech, care and effort. (This task does not include uploading or posting the casts to websites as often schools restrict this.)

	Planning	Developing Content	Constructing
1	There is little evidence of planning. A script is not developed or is weak.	Much of the content is directly copied. There is little or no original content. The content is inappropriate or inaccurate. Copy written materials are used without permission.	The podcast shows little care or effort. The quality of the production is poor i.e high or low sound levels, background noise, hiss, sibilance, poor cuts and fades long periods of silence, unbalanced etc. The speech lacks fluency, is punctuated by pauses, hums etc The speed of delivery is too slow or rushed. Music or sound effects are of not of an acceptable quality or are inappropriate.
2	A simple plan is created that covers some of the major points of the development process. A script is developed.	Some of the content is directly copied. The copied material is acknowledge appropriately. There is some original content Copy written materials are used and permission has been sort for its use. Some of the content is inappropriate or inaccurate.	The podcast shows some care and effort is taken. The quality of the production is acceptable with some issues regarding quality i.e high or low sound levels, background noise, hiss, sibilance, poor cuts and fades long periods of silence, unbalanced etc. The speech is fluent but has some pauses, hums etc. The speed of delivery is acceptable. Music or sound effects are of acceptable quality and for the most part appropriate.
3	A plan is created that covers the major points of the development process. A script is developed which contains an acceptable level of detail.	Some elements of the content are quoted. The quoted material is acknowledge appropriately. Much of the content is original. Where copy written materials are used and permission has been sort for its use. The student uses royalty free materials like music. The content is appropriate or accurate.	The podcast shows care and effort. The quality of the production is good with few issues regarding quality i.e high or low sound levels, background noise, hiss, sibilance, poor cuts and fades long periods of silence, unbalanced etc. The speech is fluent and the speed of delivery is acceptable. The podcast is enhanced with sound effects and music or the inclusion of images, files (like PDF files)[enhanced podcast].

	Planning	Developing Content	Constructing
4	A detailed plan is created that covers the development process. A script is developed which contains an acceptable level of detail.	Some elements of the content are quoted. The quoted material is acknowledge appropriately. The majority of the content is original. Where copy written materials are used and permission has been sort for its use. The student uses royalty free materials like music. The student creates or generates his own media. The content is appropriate or accurate.	The podcast shows care and effort. The quality of the production is excellent The speech is fluent and the speed of delivery is acceptable. The podcast is enhanced with high quality and appropriate sound effects and music. Podcasts maybe further enhanced by the inclusion of images, files (like PDF files). Sound effects and music make the podcast more captivating and enjoyable.

A student creating music for a podcast using



Sony's Jamtrax, a loop based music tool.

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"BOOKS ARE A FORM OF OUTDATED TECHNOLOGY CREATED IN THE DARK AGES FOR A SOCIETY DEVOID OF COMPUTERS, ELECTRONIC MEDIA OR DIGITAL DATA. IN TODAY'S SOCIETY, GETTING INFORMATION FROM A BOOK IS LIKE CALCULATING MATH ON YOUR FINGERS AND TOES. TO GRADE THIS REPORT, PLEASE POST YOUR COMMENTS ON MY BLOG..."

Digital Publishing Rubric

Bloom's Taxonomic Level: Creating

Key Words:

designing, constructing, producing, making, programming, blogging, wiki-ing, publishing, directing/producing

Introduction:

This is a rubric for applying the Principles of Design in developing a digital document/content. A digital document is not limited to a word processed product, rather it could be a blog or wiki entry, a web page, slide show presentation, DTP product etc.

The digital document must successfully answer the two key questions of design:

- Is it suitable for the Purpose?
- Is it suitable for the Audience?

Then the principles of graphic design are applied. This is broken down into two areas:

Aesthetics:

- **Repetition and Consistency** – design features like use of colour, font selection or type, text layout, text enhancements, alignment, page structure etc are consistently use through out the document, page(s), site, presentation etc.
- **Layout, Shape and Form** – The way the digital document is structured or its layout, its shape and form enhance access to information
- **Colour** – (Volume = sound analog) the use of and selection of foreground and background colours enhances the documents ability to be read, is aesthetically pleasing, appropriate for the audience and the purpose of the document.
- **Flow** – the digital document has a logical flow and progression that enhances understanding and readability and encourages the viewer/listener to read/play on
- **Harmony and balance** – the digital document is balanced, the different elements are in harmony with one another. Images or audio used support purpose of the digital document. The different elements of the page(s) support each other. The whole layout enhances readability.

Function:

- Does it convey information easily? - can you read/listen to it? Understand the message? Logically progress through the document?
- Is it efficient? - Is information easy to access? Convey information easily and quickly?
- Is it suitable? - Does it reflect the intended age group/audience/genre in its use of language, colour (volume), layout, busy-ness, font selection (voice selection) and enhancements (sound effects), image selection and enhancements etc. Is the information accurate or appropriate? (consider fictional writing)

	Aesthetics	Function
1	<p>The layout and the finish shows little care The digital document does not flows. There is little or inappropriate use of design features. Few of the elements of layout, use of colour and text enhancements enhance readability. Some of selections of colours, layout, fonts shape and form are suitable for balance and harmony.</p>	<p>The purpose and the audience of the digital document is unclear. The document is not suitable for the purpose or for the audience. Information is inaccurate, inappropriate and/or is difficult to access. The document is inefficient or hard to read.</p>
2	<p>The layout of the document and the finish is of an acceptable standard. The digital document flows. There is some use of design features. Some of the elements of layout, use of colour and text enhancements enhance readability. The digital document is mostly suitability of the purpose and audience. Some of selections of colours, layout, fonts shape and form are mostly harmonious and well balanced.</p>	<p>The purpose of the digital document is stated. The digital document is appropriate for the purpose. Some of the information is accurate or appropriate. The intended audience is stated. The student has attempted to design the digital document for its intended audience. The some elements or parts of digital document is inefficient.</p>
3	<p>The layout of the document shows care and the finish is of a good standard. The digital document has a logical flow. There is consistent use of some design features. The layout, use of colour, font selection, and text enhancements mostly enhance readability. The digital document is suitability of the purpose and audience. The selection of colours, layout, fonts, images shape and form are mostly harmonious and well balanced.</p>	<p>The purpose of the digital document is stated. The digital document is appropriate for the purpose, it conveys information and shows imagination or care. The information is mostly accurate or appropriate. The intended audience is stated. The digital document is design for its intended audience. The digital document is mostly efficient.</p>
4	<p>The digital document is well laid out, shows care, attention to detail and high quality finish. The digital document has a logical flow. There is consistent and appropriate use of design features. The layout, use of colour, font selection, text enhancements, imagery etc enhance readability and suitability of the purpose and audience. The colours, layout, shape and form show harmony and balance.</p>	<p>The purpose of the digital document is clearly stated. The digital document is suitable and appropriate for the purpose, it conveys information easily and shows imagination and care. The information is accurate or appropriate. The intended audience is clearly stated. The digital document is design for its intended audience. The digital document is efficient.</p>



Students programming a Lego © NXT Robot

Enhancements:

Text elements:

Font type

- Serif or San Serif
- Modern or old style
- Decorative
- Script etc

Font weight

- Outline
- Normal weight
- Bold

Font size

Font style

- Normal
- italic

Font colour

Bullets and Numbering

Reverse Text

Word art

Alignments

- Right aligned
- Centered
- Left aligned
- Justified
- Force justified
- Indented
- Pulled quotes

Underline and strikethrough

Page elements:

Borders

Columns and frames

Shading and Background

headers and footers

Margins

Use of White space

text/image balance

text/media balance

Hypertext and media elements:

Anchors and links

Indexes and tables of content

Alt text

Media

- Sound
- video
- Imagery
- interactive elements
- dynamic elements

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