

Using ICTs to support higher order thinking

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What are the identifiable characteristics (pedagogy) of learning sequences or tasks that foster higher order thinking through e-learning communication tools?

Background

The online communication tools that will be the basis for this research project are embedded within a secure learning management system, Janison Toolbox. Most courses at senior secondary level have a Janison site that serves several functions: as a repository of additional resources, as a venue for students to interact informally and as a means to complete individual and collaborative communication tasks.

While the discussion forum and memo tools are now an established aspect of practice, the Web2 tools, Blogs and Wikis, are only recent additions. This research will have two main foci: to build on our previous action research to substantiate the capacity for online communication to stimulate thinking and to explore what is required to maximise the Web2 tools for learning.

Wikis

There seems to be a plethora of debate about the value of wikis and their capacity to enable all to contribute, edit and collaboratively construct. This unique capability sees the wiki described as a democratizing tool (Fountain 2005) which suggests significant possibilities for the e-learning classroom. There are those who believe that any attempt to confine a wiki to a given secure community is heretical to the spirit of its openness, while others, particularly in education, believe that any (secure) group who collaboratively builds knowledge using the wiki environment has the potential to benefit from that interaction.

In the distance education environment there is always the problem of finding effective ways for students to productively interact with each other. To shift from a teacher centred instructional mode we require online tools that support students to build on their understandings and strengthen their knowledge by articulating their ideas in a group that is prepared to challenge, inform and debate. It appears that the wiki may have a valuable part to play in this process given that its strength appears to be the communal development of a product. It may prove to be the perfect compliment to the asynchronous forum, which works well for a dialogue that has a strong element of debate, and the Blog which seems better suited to individual reflection and the more informal exchanges that might ensue as a result.

Based on the work of Fountain (2005) we have raised the following questions in speculating what might be the necessary preconditions for a successful wiki-based activity:

- Is it helpful for students to have participated in prior online activities together?
- Does it help if students have got to know each other in the online learning community?
- How useful is a wiki tutorial and a test space for an introductory activity?
- What guidelines are required for acceptable collaboration?
- What support is required to familiarize students with the process of writing in a wiki?
- What is required during teleconference lessons to support the wiki task as it progresses?
- What activities are best suited to the wiki environment?
- Will students be inhibited by the fact that only one user can 'save' at a time?

The wiki activities designed for the purposes of this research will have a limited life span. The students will be required to work in the wiki for the time that it is expected they should take to complete a given collaborative assignment. This will give a very different context for observation from one in which the learning community uses the wiki space as their complete learning experience and 'record of practice' (Grant 2006). However, even though a specific wiki task is set

as an assessment task, the students will have the freedom to negotiate their way through the given parameters of the assignment and produce a product that reflects their collaborative interpretation. Interesting to observe will be the extent to which students collaborate and take advantage of the overwrite/editing function of the wiki. In a case study of Yr 9's undertaking a collaborative wiki task, researchers found the students operated according to the dominant paradigm of learning with its focus on individualized process and written production (Grant 2006). Rather than taking the opportunity to let the product evolve by all contributing to its construction, from the outset, the students assigned sections of production to individuals and once completed, these students protected their material to the point where disputes arose if suggestions were made to improve accuracy and even spelling errors. In this case the researchers gave no direction as to how the students might interact so it is our intention to add this dimension in the lead up to the task and monitor it during the process via the weekly teleconference. The teachers will discuss the uniqueness of the wiki and monitor student 'discomfort' and any comment or response that reflects unease around surrendering 'ownership' of contributions. It is also planned to negotiate some guidelines of fair play for a space.

Two wiki tasks will be conducted for the purposes of this research:

Phase 1 2006: Stage 1 Economics

Phase 2 2007: Stage 1 History

What is discovered by the researchers during phase 1 will shape the approach taken during phase 2.

Blogs

Another important focus of the research will be an investigation of course and user blogs as a means of encouraging shared reflection and thereby stimulating metacognition. In attempting to define the possibilities for blogs in the learning environment it is logical to mirror the way blogs function in the 'real world' (beyond the LMS) where they are generally published by individuals and tend to reflect an informal, personal style (Walker 2003). While the evolution of the blog began as primarily a text based communication, it now involves multi media as either part of the narrative or a dominant feature of it. Walker suggests that blogs range from the confessional online diary to a means of documenting specific topics, events or activities. Translating these purposes into the classroom could make it a useful tool for some of the following:

- metacognitive reflection about one's learning
- a record of general reflection, ideas and musings
- responses to engagement with new concepts/facts
- an opportunity to share this with others and receive feedback
- a way for students to look back over an eight or nine months, to see their distance travelled - the attitudes that have changed, the uncertainties that have clarified and the knowledge gained.

It is suggested that blogs are successful in promoting interactivity that is more conversational; a mode of interaction more conducive to active learning and higher order thinking (Williams and Jacobs 2004) and it is this contention that we hope to test through our research. We could apply the tools that Williams and Jacobs used to test the value of blogs in the higher education sector.

During a Blogging Master Class (2006) James Farmer was unequivocal in his view that the power of the blog was its emphasis on the individual first and the group as secondary. For this reason Farmer was sceptical about the value of group blogs and argued that it is only through focussing on the individual that one will be able to sustain a learning community. This is an important point for teachers wishing to foster collaborative learning communities. The research conducted by Grant

into collaborative wikis demonstrated the power of the dominant educational paradigm to influence the way students function given its emphasis on assessment of individual process and product. This dilemma suggests two avenues for building interactively:

- Using the individual blog as a strategic compliment to a more collaborative task using either a group blog or some other tool such as asynchronous discussion or a wiki. In this instance the blog acts as a personal sounding board, a chance to reflect, debrief and reform a focus to go back into the fray.
- Find a place for a variety of online tools based around interaction (including blogs) and use them to strategically within the course to. This approach is becoming accepted practice within some senior secondary courses and is gradually establishing a culture that more than one form of online interaction is valued.

Entries are dated in the Janison blog which makes it harder to search by topic heading for students who are looking for a clue to finding another student with a similar topic focus. This could be off putting and may make the forum with its headings a more effective quick reference guide to student collated resources/ideas.

Discussion Forums

Many teachers (particularly Science and SOSE) have integrated the online discussion forum into courses and action research has been undertaken over a number of years by teachers to determine the most appropriate ways to structure forum-based activities and the extent to which these activities stimulate student thinking. Our findings concur with much of the literature available on this theme.

To date the following strategies have been identified for improving discussion forum activities:

- The guidelines for discussions that evolved from 2003 research and the Gilly Salmon strategies remain useful resources for teachers setting up forums for the first time.
- Forum tasks need to be properly integrated with other learning to validate their purpose.
- Tasks need to be carefully planned to ensure the most useful questions are asked and that the timing within the term is appropriate. For example, Women's Studies runs several forums early in the year to encourage students to use the terminology specific to the subject and thereby help students to more quickly grasp certain concepts. Scheduling the forums at this time also familiarizes students with the site and gives them a *forum-free* period from then until the end of the year when they complete a forum as a summative task.
- School-based students need additional support and encouragement to use the forum. Most are less inclined to enjoy the interaction for its own sake as they usually have an extensive social life within their own school. Student responses from Women's Studies also indicate that some feel intimidated by the more mature postings made by older students. This means that personal teacher contact, clear expectations and constant encouragement are important.

The following is an outline of some of the ways that forums have been used so far at senior secondary level:

- Debate a provocative question.
- Debate a provocative question and expect students to use (and cite) information from other sources to argue their position.

- Read a newspaper article and use the forum to respond to the article in the style of a letter to the editor (provide an example). Discuss each other's responses.
- Students present a summary of their research on a topic for debate.
- Provide a test question with 5-6 different answer/responses collected from student tests (include an exemplary response). Students discuss which answer they consider the clearest. The aim is for students to improve extended responses to exam questions.

For the purposes of this research the aim is to use a forum as the basis of a final summative task in Stage2 Women's Studies. It will be necessary to extract student responses in a form that will be appropriate for SSABSA moderation.

Research Phase 1: Using the wiki in Stage 1 Economics

In stage 1 Economics, students are required to participate in a collaborative task. The aim of the research was to see if the communication tools in Janison could be used to allow the students to interact with each other and work collaboratively on the task.

In fact, the task involved students in using three communication tools. Students used:

- the discussion forum to choose a topic, plan their approach to the task and communicate with each other about their progress.
- the wiki as the means for completing the collaborative task presentation.
- the group blog to reflect on their learning.

The task and its requirements were mailed out to students and the teleconference lesson was used for further discussion about working collaboratively and using the Janison communication tools.

Students were also given a timeline to complete the 3 main sections of the task:

- using the discussion forum to decide a topic and how to proceed;
- writing a wiki to collaboratively present the group's findings; and
- writing a blog to reflect on their learning and the process used.

Students were placed into groups of 4 and the teacher monitored each group's progress via the website and through class discussion.

Outcomes

Overall, the attempt to incorporate a wiki was successful. Each group was able to complete the task and produce a wiki, although with varying degrees of success. Students who made the time to get involved were able to effectively use all the communication tools to complete the task.

Feedback was obtained from the students using the reflection blog and a questionnaire. Most students reported that they enjoyed the task and using the subject website. They liked having the opportunity of working with other students and thought the discussion forum was useful.

A minority said they had difficulty with either the task itself or using the website. Problems in using the website included:

- lack of access to the internet
- lack of participation by some members of the group
- difficulties in using some part of the website e.g. discussion, wiki

The wikis produced, while informative and containing a lot of information, were rather 'bland' as they contained large amounts of text without any graphics, tables etc. Also, there was little evidence of collaboration as there were hardly any links to other pages or modifications by students of other student's work. This result confirms the Grant (2002) research in that students planned who would be responsible for presenting particular information and rather than collaboratively build, they individually presented discreet sections. By collating and pasting information into the wiki, there was no opportunity for students to analyse or evaluate the contributions of others and so little opportunity for higher order thinking.

Recommendations to support phase 2 of wiki research

The assessment task needs to be carefully structured to provide the students with some 'scaffolding' to complete the task. This could include

- providing an example wiki to show students what can be done.

- providing guidelines on how to construct the wiki need to be included to facilitate the production of a more 'layered' outcome e.g.:
 - the opening page of the wiki should be an introductory paragraph followed by a series of links to other topics/headings within the task
 - students must address at least 3 out of say 5 topics each. This would prevent students from doing only one topic each and not reading/modifying other students work
 - students can only present one paragraph (of 250 words) on each topic. This would again prevent one student from monopolising all the information in one area of the task
 - part of the marks scheme should be for evidence of collaboration i.e. modification of another students work or linkages to other pages

The Janison website is an effective tool to facilitate a group collaborative task, however, there remain issues of access to the internet for school-based students.

Students should be familiar with the website before they begin this more complex and demanding task. This could be achieved by providing resources that they are required to access and/or running other communication activities.

Before the Phase 2 component of wiki research is embarked upon early in 2007, the teachers will work together to address these recommendations.

Phase 2 of wiki research 2007

In preparation for repeating the use of a wiki in Stage 1 Economics, the recommendations from the previous trial were taken into account and the following was undertaken:

- a wiki exemplar on a similar topic was provided on the website to illustrate how the content might look
- students expected to add and/or alter information provided by others and told that this activity would be assessed
- headings were provided to prevent students from presenting all the information on the topic. The expectation was that they would contribute the bulk of their findings to one.

Students were again expected to use the discussion forum as the space to plan, organise themselves and participate in general chat about the task. For final reflection they also used the blog as had been done during the first phase.

At the conclusion of phase 2 the following was evident:

- There was an improvement in the quality of information which was supported by relevant images, diagrams and maps. Students also embedded many more links this time round.
- While the exemplar wiki supported understanding of the tool, some students still found the technical side of using the wiki troublesome.
- With the clear expectation that students alter/add to all sections of their group's production, students this time, felt comfortable about this aspect of the process.

- Some students commented on the quality of other group's work via the forum, indicating that students were observing the gradual building of each wiki.

Conclusion

Distance education teachers have access to a range of synchronous and asynchronous e-learning tools and are therefore in a position to make strategic choices about the most suitable tool for any particular activity. In this case the wiki has been chosen for a specific assessment task which it could be argued, gives minimal opportunity for the students to become truly confident wiki users, manipulating information and continuously building and refining it. To this end, using the wiki for one particular assignment is quite different from employing the wiki as the site for the learning interaction for an entire course.

However, in the distance education setting the wiki is a useful tool where collaboration is required and further trials will see it used at Stage 2 level subjects. In further trials we will continue to augment the wiki activity by completing other aspects of the task via forums and blogs.

Research Phase 1: Using the discussion forum for a SSABSA moderated task in Stage 2 Women's Studies

The aim was to determine the feasibility of using online discussion as the basis of a task, the final product of which is moderated by SSABSA. We also wanted to see the extent to which a collaborative task such as this would stimulate higher order thinking in student responses.

Part 1

- Students were provided with background readings via the post and criteria for assessment for the task.
- Students were encouraged to find additional sources that they could be quote from in the forum.
- Two visual texts were provided as the basis for debate
- Students were expected to post their first response by the end of week 1 after discussion of the background readings and the forum in their first lesson.
- Students were expected to make at least 10 postings during the forum period. It was expected that they responded to the postings of others as well as initiate discussion through their own threads.
- Students were allocated a particular group outside their regular lesson grouping. Groups had 6 or 7 members. Students at the same location were also split between groups.
- Students could read the other forums but could only post in their allocated forum. Many referred in their own group, to what was discussed in others.

Part 2

- Students were required to upload images that they found which illustrated a stereotypical construction of what it means to be female in a patriarchal society. They commented on the image they supplied.
- A second forum was provided which used a quotation as the basis for the discussion
- All students contributed to the one forum

Part 3

- Students were required to write a 750 word reflective summary

Outcomes

What the teachers observed

The task was extremely successful in stimulating higher order thinking. Evidence of this was based on the following observations:

The interaction made students think further about an issue under consideration and there were many instances where students reconsidered their own point of view.

Students questioned certain positions that others took on an issue and in this way a range of interpretations were provided on any one text. As part of this process students were seeking further information from outside of the discussion to validate their position and provide evidence for their point of view. This also resulted in the regular appearance of new links, new images and web movies which added breadth and interest to the discussion, ensuring there was always something to comment on and links to be made.

Summary of student views about the task

The students enjoyed having a task such as this at the end of the course as it gave them the chance to apply their knowledge to a real debating situation because as one said 'we now know what we're talking about'. For this reason students also felt more relaxed about contributing ideas and challenging the comments of others.

There was general agreement that the freedom to include new information and take the discussion into new areas was positive because it stimulated thinking in new directions and meant there was always something to comment on. Students also valued the chance to discuss with students from other lesson groupings.

Students were correct in assuming that the forum would make the task of writing a summary very easy. We, as teachers, chose not to review any drafts for the summary and once submitted, it was clear we had made an appropriate decision as all reflected the students' most polished product.

Because the task was different and exciting, they seemed to find it less demanding and enjoyed doing research as the conversation proceeded. Some also liked the opportunity to get new information in a way that was different from the usual research process. In this they were referring to the links, images and ideas contributed by other students.

Many agreed that the free exchange of ideas and different view points would make for a stronger concluding summary/essay.

In a more critical vein the students made the following observations:

- The parameters of the task weren't clear for what could be covered in the forum. More direction was needed to get things going and provide a clear scope for the task.
- Students responses needed to be more precise and succinct - aim for 50 words per posting
- It was not appreciated that some people repeated what had already been said which suggests they were not reading what others had written. This situation could be a result of the expectation that all had to make 10 postings.

- Some thought it difficult to keep track of the forum because there were too many windows open and too many places to go.

Recommendations

It is both possible and highly productive to use a collaborative online task for a SSABSA moderated assignment at Stage 2 level.

The set task needs to be carefully planned so that the students are confident to take the risks required for a rigorous, open debate. Although we provided a variety of readings as preparation, some students felt uncomfortable when they saw the discussion requirements because they didn't appear to be closely connected to the readings. This can easily be overcome in the future by using the lesson to indicate that the readings may provide useful references as the discussion ensues but are not the basis of it.

The process required for the task needs to be clearly articulated in the site and different sections of the task need to be clearly labelled. Some of this had to be edited and refined at the beginning of the forum, when it was realised that the layout was confusing for students.

More specific guidelines for the way to structure a posting are required. More discussion and experimentation is needed to determine the best way of eliciting a reasonable number of postings and still ensure that all are thoughtful, relevant and not written just to fulfil a requirement. One solution from the students was a word limit on the postings and that the expectation should be strengthened for postings to reflect evidence of having read all other postings. This would be evident by their not repeating what had already been said.

The results of this evaluation will form the basis of a refinement of the task for 2007.

SSABSA response

The response from SSABSA moderators to our discussion forum task was overwhelmingly positive. They were particularly impressed with the way the forum provided the opportunity for students to demonstrate what they knew in a dynamic, rigorous manner. That students continued to seek out sources to substantiate their opinions throughout the duration of the activity, was also deemed to make for an excellent assessment task.