# Organising Collaborative Learning Spaces for knowledge construction: Deep Learning and Online Behaviour

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**Abstract:** This study examines how wiki technology can be used to create an environment for deep learning, encourage reflections and develop positive online behaviour during group project work. The paper highlights (1) how the wiki spaces could be organized to support the project groups to focus on depth of learning; (2) how the use of wiki support students' learning; and (3) what online behaviour were needed when using wiki. It was found that the organized spaces were able to scaffold the learning, allow students to take responsibility of their spaces and improve readability of the pages. The students were also able to benefit from the work of the other project groups. The students articulated that wiki as a collaborative environment was able to support them in their process of learning, spirit of collaboration and sharing of knowledge, as well as motivation and engagement for learning. They expressed that integrity and teamwork were the two most important online behaviour needed in shared collaborative learning environment.

**Keywords**: Wiki, collaboration, reflections, learning spaces, online behaviour, science

## Introduction

Wiki is a social software tool which allows users to contribute and edit the web pages collaboratively [1]. It supports hyperlinks and has simple text syntax for creating new pages and cross links between internal pages on the fly. Each wiki page provides a space for students to construct their knowledge collaboratively.

This study describes how the wiki spaces could be organised for project work. The purpose for organizing the space on the pages was to provide a group space for each project group as well as individual for each of the students in the class. It was found that the organized space was able to provide a structure to scaffold the students in research, focus on depth of learning, allow students to take responsibility of their spaces, to communicate with the owner of the pages and to improve the readability of the pages. All the students were able to benefit from the work of others as they could see each others' work.

The student reflections on their learning experiences were analysed to understand how wiki could support learning and what online behaviour were needed when using wiki as a tool for learning. It was found that wiki was able to support them in their process of learning, spirit of collaboration and sharing of knowledge, as well as motivation and engagement for learning. They expressed that integrity and teamwork were the two most important behaviour needed in shared online collaborative learning environment.

## 1. Wiki as a learning environment for project work

According to Byron [2], wiki is great for collaborative class projects, as it allows students to meet virtually at their convenience and work on projects together. He found that although the potential for abuse exists, he had yet to encounter it. Similarly, in our project no vandalism or abuse at the learning spaces was observed. Unfortunately, he observed that students seemed unwilling to "poach" on other students' work. Generally, this behavior would be true for our students. Hence, this study decided to provide each student a space to comment on the groups' work instead of directly correcting or improving the content. The group members would then correct or improve their work after reading the comments and suggestions given to them by their peers.

Reo [3] mentioned that wiki provides a shared medium to foster student collaboration and consensus building as they construct knowledge together. This social constructivist nature of wiki lends itself as a support tool for group projects [3]. In his study, he found that collaborative work in wiki is made easier when students have some kind of familiar structure to "scaffold" their work. In our study, the learning spaces were organized to scaffold the project groups in their learning and to support the readability of the knowledge constructed.

Chen [4] observed that one of the pedagogical challenge common in project work is that students see what they have produced but they do not see what they have learned. At the same time, wiki had a potential educational value to promote deeper learning [4]. In our study, the content of the group projects could be read by all the students in the class. As each group researched in detail on a different topic, everyone in the class was able to learn from all the topics beyond their scope of research.

## 2. The Context

In this study, we report on the science project work for the topic "The human heart and the circulatory system". The activity was carried out in a class of 40 secondary two students (14 year old) over 3 months. Students worked collaboratively in groups of 3 or 4 to research on a subtopic as shown in Figure 1. Subsequently, they contributed their researched information to share with their classmates using wiki collaborative tool. The rest of the students in the class reflected on their own learning and provided feedback to each other.

## 3. Design of the Wiki Environment

In this study, the wiki learning spaces were organized to provide a structure to scaffold the students. Figure 1 shows how the wiki pages were organized. The purpose of organizing the space on the pages was to provide a personalized space for each of the group, as well as for each of the students in the class. It was also intended to hold the students responsible for their research information, in other words, ownership of their spaces. At the same time, it was also a space to communicate with the owner of the topic of that page.

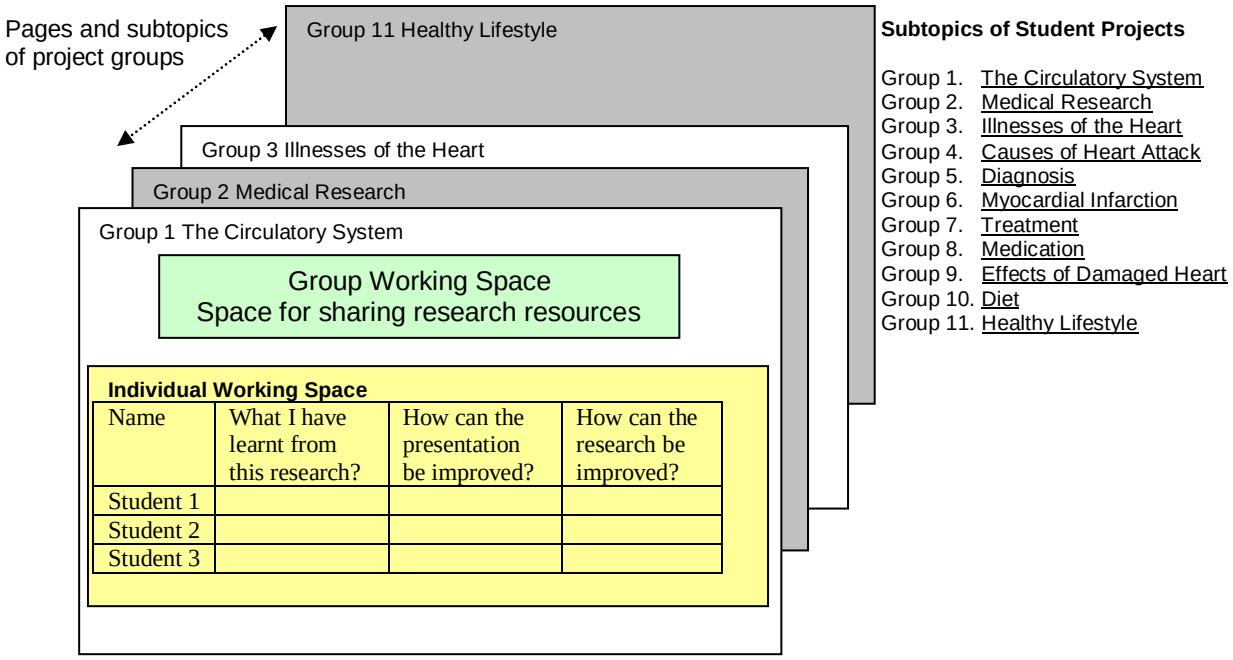


Figure 1: Design of the wiki pages

There were 11 pages allocated to the eleven topics, one for each project group. On each wiki page, there was a group working space and individual working spaces for each of the student in the class. The group working space was for the members of the group to construct their knowledge collaboratively where the members could continue to edit the information and improve on it anytime when necessary.

The individual working space provided a space for each student to reflect on what they have learnt from the topic of that page, feedback on how the presentation and research could be improved. This approach was to encourage everyone in the class to reflect on their learning from each others' project work and feedback on areas that need improvement for each of the group. Subsequently, the group members could decide to improve their information based on peers' feedback. Table 1 shows samples of individual working space from two of the topics.

**Table 1: Samples of individual working space (Feedback from peer)**

| Topic of Project Group | What I have learnt from this research? | How can the presentation be improved? | How can the research be improved? |
|---|---|---|---|
| Student A: Feedback on Causes of heart attack | I learnt more about the possible causes of heart diseases. Thus, I can do something to protect myself from getting heart diseases. | Summarise your points, make it shorter. Add in only the main and required points and not the whole set of information. | Remove redundant info. |
| Student B: Feedback on Illnesses of the heart | Illnesses of the heart can come in unnoticeable ways so we must always keep ourselves healthy by exercising and eating right. | I think the presentation of this page is good. Main points of information are highlighted, further explained and backed up with research. | Concentrate on the different types of heart illnesses and classify them into rare, heredity, and many more. |

The new design of the wiki spaces allowed everyone in the class to have a deeper understanding of all the topics and learnt beyond their own topic of research. In other word, wiki enables the project groups to build up a collection of resources that is easy for everyone to read and all the students in the class can benefit from the work of others.

## 4. How did wiki support learning?

This new design allowed the students to learn from their peers on topics which they did not research on as well as promote student-centred learning in the following ways.

*Process of learning:* It provided a learning space for students "to learn knowledge in a new way: not through books, radios or teachers but through the web pages setup by [their] classmates." Using "wiki was a great idea", as the resources were placed on the website and everyone in the class could "access the information", "look at each other's work", provide "their view on a certain topic" and learn from other groups "in a more detailed [i.e in depth] way". It was able to capture the "overall contribution of information by the class" collectively during the collaboration. At the same time, the constant editing and updating of their research materials allowed the students to have a better understand of their topic. They were also "able to see the good and bad points of the work of others" and helped them to improve themselves. Hence, this design provided a pedagogical change for students to focus on a particular area of topic and encouraged the class to share and learn in a more productive way compared to each group "researching on all the topics of the chapter".

*Spirit of collaboration and sharing*: The students were clear that "wiki is a program where [they] can share [their] learning with one another". At the same time, it gave "the class a sense of belonging because [they] have [their] own learning webpage". The students were proud of the materials they put up on the wiki pages as they felt they "can act as a teacher for that topic." They also learnt "from each other's strength and mistake". They had confident that the research groups would be willing to share "all the things they know about the topic". As the students received email to inform them of any changes made to the pages, they were able to share their latest information on the day they updated it.

*Motivation and engagement for learning:* Wiki can promote motivation and engagement for learning. The students found the materials "fun and exciting as some groups add in videos that can humour yet teach at the same time. It isn't as boring as textbooks and it somehow keeps [them] focus for longer time". They were able to create pages which are "not full of words but fun", using graphics to engage the visual learners. They found that collaborative learning environment is very "different from the normal classroom learning we have back in school" After the experience with wiki, the students preferred to share their research ideas from the wiki pages rather than through PowerPoint presentation as it was "less time-consuming" and allowed the students to study at pages at their "own comfortable pace". In other words, wiki could promote student-centred learning as well as responsibility in personal learning.

## 5. What online behaviours do students need?

Students expressed that integrity and teamwork are the two most important online behaviour needed in shared collaborative learning environment.

*Integrity:* A simple definition for integrity is doing the right thing for the right reason even when no one is watching. In other words, integrity also refers to being honest, truthful and upright. The students felt that integrity was needed because in wiki they could "edit other people's work" and it was important that they did not "delete", "vandalise", "sabotage", "manipulate" or "change the format" of the other groups even if

they “know their password”. This is because they should “respect classmates’ hard work” as they also “would not like others to do the same to them”. At the same time, integrity has to be a community effort, as everyone needs to “ensure that the information is correct” so as not to “mislead our friends”

*Teamwork:* The students recognized that teamwork is another important online behavior when collaborating in wiki environment. The term teamwork usually refers to people working together cooperatively. Teamwork is needed as each group was “given a specific topic to research” and they had to discuss the tasks required before they “distribute the workload evenly among group members” so as “to complete the task on time together”. They realized that they had to update the website regularly” to ensure there are “useful information … so that others can really learn from it”. As each wiki page could “only allow one user at a time to access the space, the rest of the group members have to wait patiently”. Team members “should be considerate and not edit the page for too long”.

## 6 Conclusion

This study was able to share a design which provided a structure to “scaffold” student construction of knowledge in wiki environment which is necessary in shared medium to foster student collaboration [3]. At the same time, this design was able to support readability of knowledge constructed in a collaborative environment. It also addressed the concern of Byron [2] of students’ unwillingness to “poach” on other students’ work by allowing each student to have ownership of their space for feedback.

The wiki pages were organized to allow each project group to focus on a research topic. In this case, each group was able to provide a more in depth research resources. At the same time, these resources created acted as self-directed learning materials for others to learn at their own pace, anytime and anywhere. At the same time, it allowed students to learn from topics that they did not research on and they were able to benefit from each others’ work. This organization addressed the pedagogical challenge of Chen [4] in project work on learning from doing project work.

It was found that shared online collaborative learning environment required students need to practice online behaviour like integrity and trust. In other words, interacting and collaborating in wiki type of learning environment could provide opportunity for students to put into practice their moral, ethical and social values of a learner.

**Future works for this research**: The design could be tried with collaboration between classes and to study the usefulness of the design for subjects other then science.

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