

Learning online using WIKI Technology: A pilot study in a pediatric clerkship



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Introduction - WIKI

- A wiki is a website that allows users to add/edit/delete content.
 - wikis make a good group workspace since all page revisions are automatically saved, all changes are logged and time stamped, and can be restored if necessary.
 - wikis allow different access for different users. For example some users might have full access, others just allowed to leave comments, others denied any access.

Introduction - WIKI

- Wikis are currently very popular in educational research as they are considered a form of knowledge construction.
- Learners share in the creation and understanding of the knowledge discovered & presented while using the wiki.

Background

- During the pediatric clerkship at Jefferson Medical College students research clinical case vignettes. The vignettes are based on the 20 topic areas identified in the COMSEP curriculum.
- Each topic area is referred to as a module and 10 clinical case vignettes are included in each module.

Background

- Each week students are assigned three modules (30 case vignettes) to review and be prepared to discuss them in a small group session.
- Each small group session covers one module and averages an hour long. Students report spending about 2 hours to prepare for each session.
- This format has been in place since 2000.

Objectives

- To investigate the feasibility & outcomes of a learning experience using wiki technology.
- Specifically: to transfer one module (newborn) to a wiki format and compare the outcomes of past small group encounters to the wiki encounter.

WIKI – Pilot Study

- Prior to our pilot study a question was posted on the listserv of each of the core clerkship national organizations (Medicine, Obstetrics, Family Medicine, Surgery, Psychiatry, Neurology and Pediatrics) about the use of wikis in their programs.
- Only one response described using a wiki in a clerkship: this was for discussion of surgery cases with a student discussion leader and faculty moderator.

WIKI – Pilot Study

- Two responses described having clerkship students post directly on Wikipedia (the largest most popular wiki site).
- One mentioned use of a wiki in a basic science course and that “it seemed like a total waste of time” to the course director since the syllabus was online along with podcasts of the lectures.

WIKI – Pilot Study

- This is an early attempt to evaluate the benefits and limitations in a specific educational context of an emerging Web2 technology.
- Our pilot study was to evaluate the use of a wiki as an alternative method of learning the content covered in the clinical vignettes.

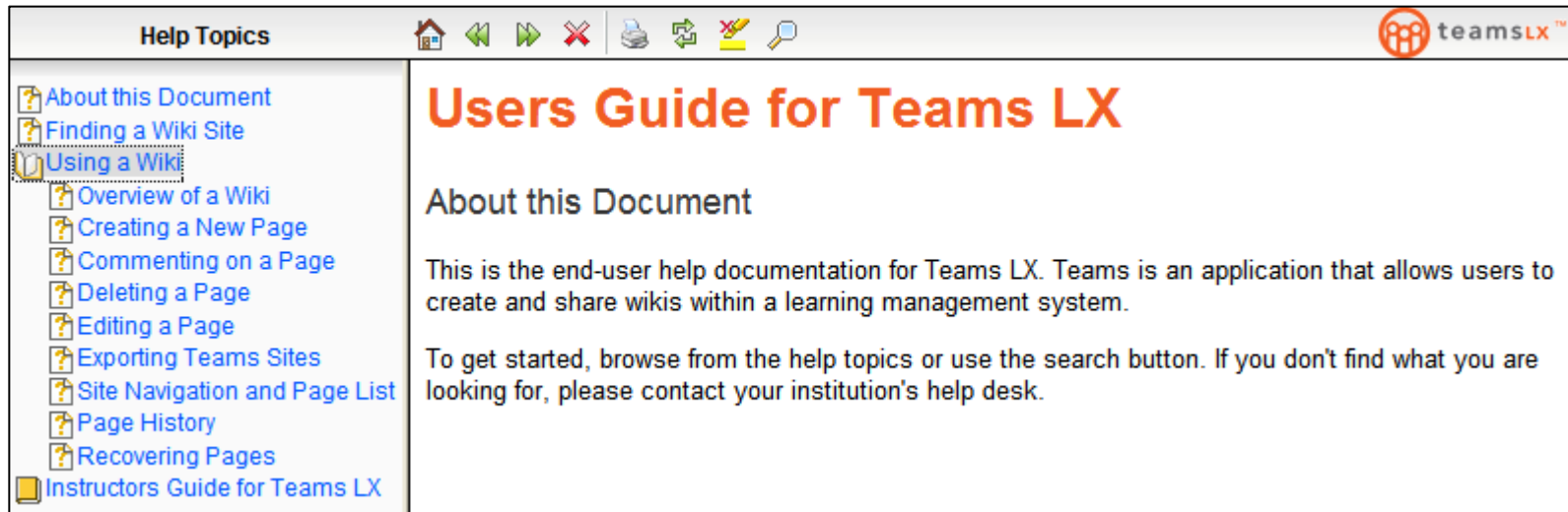
WIKI – Pilot Study

- One week of the clerkship
- Jefferson campus site
- Voluntary participation

- Qualitative and quantitative data collected:
 - Overall student experience
 - Identification of positive and negative aspects to the wiki format
 - Functionality and performance of the wiki
 - Efficiency of the wiki format for this style of learning

WIKI – Implementation

- Jefferson uses the Blackboard Course Management System
- Learning Objects publishes a wiki tool called TeamsLX



The screenshot shows a web browser window displaying the 'Users Guide for Teams LX'. The browser's address bar shows 'teamsLX'. The page has a navigation menu on the left with the following items: 'About this Document', 'Finding a Wiki Site', 'Using a Wiki' (highlighted), 'Overview of a Wiki', 'Creating a New Page', 'Commenting on a Page', 'Deleting a Page', 'Editing a Page', 'Exporting Teams Sites', 'Site Navigation and Page List', 'Page History', 'Recovering Pages', and 'Instructors Guide for Teams LX'. The main content area is titled 'Users Guide for Teams LX' and contains the following text:

Users Guide for Teams LX

About this Document

This is the end-user help documentation for Teams LX. Teams is an application that allows users to create and share wikis within a learning management system.

To get started, browse from the help topics or use the search button. If you don't find what you are looking for, please contact your institution's help desk.

WIKI – Implementation

- 14 Students participated (of 25 in the clerkship)
- 5 groups of 3 students; 1 group of 2 students
- Newborn module, 10 clinical case vignettes
- Each group assigned 2 clinical vignettes

WIKI – Implementation

- Students were supplied with the wiki user guide
- Instructed to collaborate on answering the assigned questions
- Instructed to develop a “challenge” question related to their vignette that would be answered by a different group
 - The idea behind the challenge question was to develop a dialog between the two groups

WIKI – Implementation

- Timeline

Day 1

- Phase 1: student's only have access to their own vignettes
- Wiki opens with clinical case vignettes assigned to each group

Day 3

- Each group's answers to the vignettes and the challenge question due

WIKI – Implementation

- Timeline

Day 4

- Faculty review and feedback posted for each group

Day 5

- Any revisions to vignette answers or to the challenge question due

WIKI – Implementation

- Timeline

Day 6

- Phase 2: students have access to review all vignettes and answers

Day 8

- Group response to assigned challenge question due

WIKI – Workload


- Small Group
 - Students participating in the traditional small group discussion format individually review all 10 case vignettes and must be ready to discuss them in the small group session.
- Wiki
 - Students participating in the wiki pilot study review 2 case vignettes by working in groups. Each group posts their responses to the 2 case vignettes and writes a new question to be answered by a different group.

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 **GroupB**

Case 5 ([permalink](#))

last edited by Soo Hyun Kwon on Wednesday, 04/04/2007 7:06 PM

A mother with no prenatal care and a history of heroin use during pregnancy delivers a healthy, 40-week, appropriate-for-gestational-age infant. Outline the appropriate diagnostic and management steps that need to be taken by the healthcare team from the time of the mother's arrival at the hospital to her discharge.

ANSWER :

1. All prenatal routine blood tests : Maternal blood type screen, antibody screen, Rh type, Rubella status, Syphilis screen, Hepatitis B surface antigen, GBS screen
2. History of high risk behavior : maternal screen for HIV, gonorrhea, chlamydia, hepatitis C
3. Screen for Maternal substance abuse : maternal history of drug abuse, maternal urine testing, and testing of newborn urine and meconium
4. Diagnose prenatal opioid exposure based on positive opioids in maternal or neonatal specimen
5. Mother needs to be transitioned and maintained on opioid (preferably methadone) due to the possibility of opioid withdrawal.
6. Routine management of newborn : drying the infant, clearing the airway of secretions using bulb syringe or suction catheter, providing warmth, APGAR scores, physical exam, erythromycin ointment, vitamin K1 oxide IM, umbilical cord care, interaction between mother and infant
7. Monitor newborn closely for symptoms of neonatal abstinence syndrome (NAS) from the discontinuation of opioids from the maternal circulation. Symptoms apparent usually within 48 hours after birth : irritability, hyperactivity, poor feeding, vomiting, diarrhea, dehydration, increased sweating, salivation, tremors, seizures, nasal stuffiness, sneezing, fever, mottling, and temperature instability
8. CBC and blood culture for unknown GBS status, blood glucose/accucheck.
9. Neonate Abstinence scoring system for the assessment of clinical items to objectively measure the severity and guide the management of NAS. Below is the Finnegan Scoring System developed by Dr. Loretta Finnegan - Dr. Lane says Dr. Finnegan was a neonatologist in the Pediatrics Dept here at Jeff.

Date: _____														
System	Signs and symptoms	Score	24	2	4	6	8	10	12	14	16	18	20	22
Metabolic/vasomotor/respiratory disturbances														
	High-pitched cry	2												
	Continuous high-pitched cry	3												
	Sleeps <1hr after feeding	3												
	Clonus >3hrs after feeding	2												

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 **GroupB**
Answer to Group F's Challenge Question ([permalink](#))

last edited by Soo Hyun Kwon on Friday, 04/06/2007 7:51 AM

The first part of the question was : **After diagnosing neonatal jaundice in the infant described in Case 10, how would you evaluate the infant during the follow-up visit?**

This neonate is likely still in the hospital nursery at 48 hours of life and with a total bilirubin (TB) of 13 mg/dL should not be sent home on DOL#2, since the 95th percentile for TB at 48 hr of life is 12 mg/dL. This neonate therefore meets the criteria for hyperbilirubinemia and should be considered for initiation of phototherapy, with serial TB checks.

Initiation of phototherapy is based upon hour-specific TB values, gestational age, and the presence or absence of risk factors (including isoimmune hemolytic disease, G6PD deficiency, asphyxia, lethargy, sepsis, acidosis, or albumin <3.0 g/dL. All of these conditions increase the risk of brain damage due to detrimental effects on albumin-bilirubin binding, the blood brain barrier, and susceptibility of neurons of CNS to damage by bilirubin.

(see graph below)

- ◆ For infants at low risk (□38 weeks gestation and without risk factors), phototherapy is started at the following TB values.

-24 hours of age: >12 mg/dL

-48 hours of age: >15 mg/dL

-72 hours of age: >18 mg/dL

(Therefore, this term infant may not have an indication for phototherapy at 48 hr pending risk factors and TB trend.)

Neonates in this category with TB values 2 to 3 mg/dL below the recommended levels can be treated with fiberoptic or conventional phototherapy at home.

- ◆ For infants at medium risk (□38 weeks gestation with risk factors or 35 to 37 6/7 weeks gestation without risk factors), phototherapy is started at the following TB values.

- 24 hours of age: >10 mg/dL

- 48 hours of age: >13 mg/dL

- 72 hours of age: >15 mg/dL

- ◆ For infants at high risk (35 to 37 6/7 weeks gestation with risk factors), phototherapy is initiated at the following TB values.

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Quick Links
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Case 7 ([permalink](#))

last edited by John Detrolio on Thursday, 04/05/2007 10:17 PM

The mother of a newborn infant asks your advice about breast-feeding versus bottle-feeding her baby? Write a script for what you would tell her. How would your advice change if the mother were (a) Hepatitis B positive, (b) HIV positive, (c) RPR positive, and (d) Hepatitis C positive?

Answer:

Breast milk is considered the ideal human infant food because it contains complete nutrition (with the possible exception of vitamin D and fluoride), has antimicrobial properties, and offers psychological advantages to mothers and infants. As long as the baby is exposed to at least 15 minutes of sunlight per day, and drinks fluorinated water (more than adequate in most tap water), in a healthy baby, breast milk can be considered most economical and nutritious for a healthy baby. It is also associated with lower infant morbidity and mortality, not only due to a restriction in diarrhea associated with contaminated water used in formula preparation, but also because it contains high concentrations of **immunoglobulin A, which reduces viruses and bacteria intestinal wall adherence, and macrophages, which inhibit E. coli growth.** Additionally, breastfeeding has been associated with slightly enhanced performance on tests of cognitive development.

Other studies have begun to suggest decreased rates of sudden infant death syndrome in the first year of life and reduction in incidence of insulin-dependent (type 1) and non-insulin-dependent (type 2) diabetes mellitus, lymphoma, leukemia, and Hodgkin disease, overweight and obesity, hypercholesterolemia, and asthma in older children and adults who were breastfed, compared with individuals who were not breastfed. In the first 6 months, water, juice, and other foods are generally unnecessary for breastfed infants. Vitamin D and iron may need to be given before 6 months of age in selected groups of infants (vitamin D for infants whose mothers are vitamin D-deficient or those infants not exposed to adequate sunlight; iron for those who have low iron stores or anemia). Fluoride should not be administered to infants during the first 6 months after birth, whether they are breast or formula fed. During the period from 6 months to 3 years of age, breastfed infants (and formula fed infants) require fluoride supplementation only if the water supply is severely deficient in fluoride (<0.3 ppm).

Disadvantages include potential HIV transmission, jaundice exacerbation due to increased unconjugated bilirubinemia levels (resolved with a 12 to 24 hour breastfeeding interruption) and its association with low vitamin K levels, contributing to hemorrhagic disease of the newborn. However, this is a moot point since infants now routinely receive vitamin K injections shortly after birth. Later, bacterial flora in the gut will provide adequate amounts in the young infant. Should the parents become weary of this option 2 po doses of vitamin K may prove to be adequate as well.

Although the AAP identifies breastfeeding as the ideal method of feeding and nurturing infants and recognizes breastfeeding as primary in achieving optimal infant and child health, growth, and development, it recognizes obstacles. Most commonly these obstacles include physician apathy and misinformation,


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Data Collection

- Student outcomes data was obtained from:
 - pre-participation questionnaire (attitudes and experience with online learning, learning in groups, learning from peers)
 - post-participation questionnaire (time spent, communication, collaboration, value of learning activity)
 - post-participation questionnaire on the use of the wiki
 - group debriefing
 - one-on-one interview with those students unable to attend the group debriefing

Data Collection

- Faculty outcomes data was obtained from:
 - a log documenting the time spent by JLL and AJF.
 - a notebook of daily reflections JLL kept on the progress and content generated by the students.

Results

pre-participation questionnaire

(n=8)

- No students reported prior online learning experience
- All agreed online learning would be convenient, effective, efficient, enjoyable and help their understanding

Results

pre-participation questionnaire

- All indicated they preferred to study alone and had primarily studied alone in the past.
- All agreed they had enjoyed their past collaborative learning experiences and that discussing information with peers was helpful.
- Only one student indicated they would be uncomfortable accepting information researched and presented by a peer without faculty review.

Results

post-participation questionnaire

(n=14)

- 3.1 out of 4 – wiki is an appropriate tool for this activity
- 3.3 out of 4 – wiki was easy to use
- 3.1 out of 4 – online learning activities are a valuable activity in the clerkship setting

Results

the wiki learning experience

- There was no consistency in whether students read through all the answers to the case vignettes. Some read none, some read all and the rest read a few or ‘skimmed’ through.
- One student wrote:

“Unfortunately, I wish I dedicated more time to reading the other answers, since I feel that information could be of help later on in the block.”

Results

the wiki learning experience

- Students who read through the answers found it helpful:

“I think my classmates presented information very well, with tables, charts, current articles included and I felt that I learned a lot from reading their posts. I think the groups did a very thorough job with their questions.”

“Everyone did a great job answering the questions thoroughly.”

“The other responses that I’ve read were extremely helpful in learning the material, since all of the responses were very complete.”

Results

the wiki learning experience

- One student alluded to the educational concept of constructivism:

“The groups seemed to post their results in a reader friendly format, answering in a way that we could easily extract the knowledge and even build on the knowledge.”

- However one student commented:

“Some groups did a good job of organizing info and putting the important points in bold letters. These were helpful. Other groups put too much information. I felt like I could just as well read UpToDate or my textbook, and at least that might have been better organized. In the end that’s what I did to get a better grasp of material.”

Results

the wiki learning experience

- Students' comments indicate that they had experienced 'deep learning':

"The elearning and awareness that others would be reading my response made me dig a little deeper than I would have on my own, which resulted in more learning."

"I know infant hyperbilirubinemia more thoroughly now than if I had just prepped for the modules as usual."

"I found it helpful to learn a topic in more depth than we would have for classroom modules."

"Since I was focused on only one part of the module, I was able to read more of the literature regarding the topic."

Results

the wiki learning experience

- Several student comments compared learning on line to learning in the live modules. Understanding clinical thinking and what was really important in a case vignette were the two educational elements that were present in the live modules but absent in the wiki format.

“I thought we were putting a lot of information on and not always necessarily emphasizing what was important to know.”

“Meeting with an attending they emphasize what is important.”

Results

the wiki learning experience

- *Comparison comments continued:*

“There were some cases where we needed re-direction – having someone there with clinical experience helps.”

“I got more ideas clinically by listening when sitting around the table with peers and attendings- I was able to see the steps they were going through in their thinking.”

“I prefer the live modules because the attendings are able to impart their personal wisdom and emphasize what’s most important – something beyond what we can get from books. It’s also more memorable.”

“Having time allotted each week to discuss the modules as a group and learn from a physician is more helpful to me.”

Results

the wiki learning experience

- *Comparison comments continued:*
- *Social aspects of the modules also seemed to be important:*
“The (wiki) interface made me feel alone – modules were a time to come back together and re-connect.”

Note: remember the students are comparing the wiki experience to the regular small group sessions.

Results

communication and collaboration

- This is how one student described the collaboration process:
“Most of our collaboration was done on the site itself. If one of us decided to add information we would let the other group member know by email and post it on the site.”
- Another student wrote:
“We divided up the work initially, and then edited and commented on each other’s work – so, in the end it was a collaborative effort.”
- As one student said:
“Email is more familiar; maybe that’s why we used it.”

Results

technical aspects

- There were few technical hitches with the wiki and overall students agreed that the wiki was easy to use.

“I think the learning curve was pretty easy, “

“As far as putting text – that was pretty straight forward. If you want to put pictures or tables you may have to play around with it a bit.”

“We hit some snags because we were unable to edit each other’s responses when something was posted in the comments rather than on the main page.”

Results

technical aspects

- One student commented about the navigation when trying to read the work of the other groups and confusion about where to post the answers to the challenge questions:

“The program is difficult to navigate because you have to keep backing out to the main menu just to get to the next question. The whole challenge question part was confusing because everyone was posting things in different places, and it didn’t really enhance learning”.

Results

efficiency

- Students reported spending about as much time (10 hours) working on this wiki assignment as they did for an entire small group module.
- Faculty, JLL, reported 2 hours for preparing for the activity (emails to students, working with AJF to setup the wiki), 4 hours for reviewing all of the students answers and providing feedback. AJF reported 2 hours to setup with wiki sites for the students and monitoring activity once or twice a day to make sure it was functioning.

Results

efficiency

- Based on what we know from their post-activity questionnaire, this activity would require more time and cover less ground than the small group session.
- Faculty time for activity was 6 hours compared to one hour in the small group session.

Results

faculty experience

- This type of learning exercise required significantly more time of the faculty member.
- Though the written answers showed a great deal of work and depth, it is significant that the students felt the activity failed to provide for the experienced clinical reasoning clerkships aim to build.

Discussion

- Pedagogically it is postulated that, because there is more time to think about and process information – students involved in on-line learning will create their own understanding of content and reconstruct the knowledge leading to deeper learning and meaning.
- Realistically there wouldn't be enough time for them cover the breadth of material in a 6 week clerkship if they spent as much time on each vignette that they did in the pilot study.

Discussion

- In our study, students' comments show they were motivated more by the external fact that their peers would be reading their answers than they were by the internal motivation deep learning might gain them.
- Our thoughts are that students at this point in their careers are already quite pragmatic in how they balance the time they have for studies with other responsibilities.

Discussion

- One unexpected aspect that emerged of the live modules compared to the wiki learning experience was related to clinical thinking.
- Students did not get the same insight into clinical reasoning, the relative importance of clinical information, and contextual application online as they did when discussing the case vignette with an attending.
- This is similar to the findings in the 2002 study by Steele where students preferred face to face learning because faculty pointed out important things, general principles and answered questions, all of which increased understanding.

Discussion

- Despite the common assumption that students are familiar with web technologies our students did not use the wiki as we intended.
- In our opinion it is important to provide a detailed orientation to any on-line learning experience for medical students who are not used to participating and learning in this format.
- A valuable component of the clerkship is the time students spend with faculty and other clinicians learning to distinguish which details to focus on and the practical application of knowledge.

Limitations

- First, the results are based on a single prototype wiki learning project. It is possible that features of the design we chose, rather than the use of the wiki itself, was responsible for our findings.
- Second, bias may have been introduced by doing only one wiki exercise but several live modules; it is possible that students may have adjusted through repetition to the wiki format and that repetition of the live module format biased them in favor of this method.

Limitations

- Third, because we only had 14 students participating we may not have reach saturation (the point at which no additional new ideas or insights are being provided by the addition of new subjects to the informant pool) and the qualitative data may not be a true reflection of this learning experience.
- Fourth, only 8 students completed the pre-questionnaire potentially giving inaccurate results.

Future Directions

- Our participants found the exercise a useful learning experience, but we do not think it is a better alternative to the small group session. For this study it was particularly concerning that a student found the exercise more isolating than the small group session and they missed the interaction with their peers.
- Do wikis have a role in the clinical years?
- Would the web journals, Blogs, be a more useful tool?
- What other web 2.0 technologies might have benefits for clerkship students?
- Your ideas?

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