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“Am I Making Sense Here?”: What Blogging Reveals about Undergraduate Student Understanding

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Abstract

Educational researchers are interested in whether what is learned in the classroom is transferred to new situations. This qualitative case study explores how computer-mediated communication, specifically web logs (blogs), can extend learning and facilitate transfer of learned concepts. Participants blogged for seven weeks about concepts related to nutrition. Data included blog posts and comments and interviews. These data were analyzed inductively for emergent themes addressing our research questions. Four themes were identified: (a) concepts contextualized to participants' daily lives; (b) barriers to applying learned concepts; (c) sources of "expert" knowledge; and (d) unanswered questions revealing gaps in understanding. Implications for using blogs to support actor-oriented learning environments are presented, along with directions for further research.

Introduction

What we know about how people learn challenges the prevalence of the lecture model for teaching undergraduate courses (Beichner & Saul, 2004; Bransford, Brown, & Cocking, 2000; Fox & Hackerman, 2003). Educational research points to the importance of learner-centered environments, yet classrooms today look much like they did 100 years ago (Lagemann, 2002). New technologies are often viewed as a way to transform classrooms but typically reinforce traditional methods of teaching and learning by delivering static information rather than supporting learner construction of new knowledge (Cuban, 1986). Technology integration for large undergraduate courses has typically meant computer-human interaction, such as visual displays, online tutorials, or online tests, rather than human-human interaction through computer networks. Computer-mediated communication (CMC) tools, on the other hand, can extend the

time available for human-human interaction not possible in large lecture courses. CMC conversations are ideal venues for educators to observe and participate in student meaning-making processes. Insights gained from conversations can serve as starting points for designing further instruction. The goal of this study is to explore how students' online conversations, in the form of web logs (blogs), can ultimately improve teaching by providing insights as to how students are making meaning of new information.

Conversation as Learning Made Visible

Stahl's (2006) social theory of computer-supported collaborative learning positions learning not as a knowledge-*acquisition* process but rather a knowledge-*creation* process. That is, knowledge is not transmitted from one person to another, but instead knowledge is created through conversation with others. Stahl outlines how individual knowing is an interpretation of the meaning that is first made while in communication with others. From this theoretical standpoint, learning is, in essence, a *meaning-making process*. Analyzing this process in context, as Stahl (2003) suggests, provides evidence of the learning:

The fact that collaborative learning *necessarily* makes learning visible provides the methodological basis for empirical analysis by researchers. Researchers of collaborative learning are not restricted to indirect evidence of learning (such as pre-test and post-test differences) because they can analyze and interpret the making of meaning as it unfolds in the data at the group level and in individual trajectories of utterances... (p. 35)

This definition of learning makes it possible for researchers to investigate the meaning-making process as it occurs.

Transfer of Learning

A topic of great concern to educators is whether what is learned in the classroom is transferred to new situations once the course ends. Lobato (2006) points out that "nearly all learning theories presume that as people learn, they are continually using prior knowledge" (p. 435). Traditional constructs of transfer, however, rely on the transportation metaphor of transfer as "the passive carrying over of knowledge from one situation to another once learners recognize the similarity between situations" (Lobato, 2006, p. 432). Transfer has traditionally been measured through a change in performance on a transfer "task" given to learners after an instructional intervention, and Lobato (2006) explains that "When performance improves, the researcher infers that students have generalized some aspect of the learning experience to the transfer tasks" (p. 436).

Lobato (2006) critiques this classical transfer approach and its assumption that transfer is related to the degree to which the original (learning) and new (transfer) situations are similar. One problem with the classical transfer approach is that it is the expert observer who is privileged, as "what counts" as evidence of transfer is defined in advance and therefore detached from any actual experience of the learner. Lobato (2006) explains that this is "problematic because knowledge cannot be isolated from practice and meaningfully studied" (p. 434). Research in this tradition has isolated performance on transfer tasks from the students' construction of meaning on the tasks, "suggesting that knowledge is theoretically separate from the situations in which it is developed or used, rather than a function of activity, social interactions, culture, history and context" (Lobato, 2006, p. 434).

Lobato (2003) offers an alternative transfer perspective, one that is *actor-oriented*. This is defined as “the personal creation of relations of similarities, or how the actors see situations as similar” (p. 18). Lobato (2003) suggests a shift from the observer (expert) viewpoint to the actor (learner) viewpoint “by seeking to understand the processes by which individuals generate their own similarities between problems” (p. 18) and goes on to explain:

One assumes that learners are making connections between situations nearly all the time, guided by aspects of the situation that they find personally salient. Consequently, the critical issue is to figure out which connections they make, on what basis, and how and why those connections are sometimes productive. (p. 19)

From this perspective, Lobato (2006) further suggests researchers should be:

[S]crutinizing a given activity for any indication of influences from previous activities and by examining how people appear to construe situations as similar using ethnographic methods, rather than relying upon statistical measures based on improved performance. (p. 436)

The evidence for transfer, then, becomes the understandings that “students could have developed given the instructional treatment” (Lobato, 2003, p. 18). Rather than pre-determining what should transfer, Lobato (2006) argues, the “what” itself should be the subject of the research inquiry. From alternative transfer perspectives, this “what” may include an analysis of individual knowledge, patterns of participation across situations, or transformation that occurs across forms of social organization (Lobato, 2006).

Stahl’s (2006) social view of learning is consistent with Lobato’s actor-oriented approach to understanding transfer. Blog conversations make learning visible, thus becoming a venue for analyzing “what” may have been transferred from a course to students’ daily lives.

Computer-Mediated Communication

Conversations that take place in asynchronous online environments, such as blogs, can be observed in “real-time” as they unfold. Blogs are persistent—able to be read repeatedly. Blog transcripts become artifacts of the meaning-making process, documenting the actor-oriented transfer of knowledge process to which Stahl (2003) and Lobato (2003) refer and providing clues as to what has been transferred.

Many college students are members of the “millennial generation” and grew up with digital technologies that enable collaborative, convenient, and on-demand information exchange (Lenhart, Madden, & Hitlin, 2005; Oblinger, 2003). They are accustomed to disclosing personal experiences to the outside world through social networking sites, text messaging, blogs, and instant messaging (Lenhart & Madden, 2005; Lenhart & Madden, 2007). Blogs are the most recent iteration of personal web pages. These are characterized by frequent updates, which are displayed with most recent posts at the top of the blog page. Bloggers can easily personalize these online spaces and incorporate digital images, video, and links to other web pages. Personal journals are the most common genre of blogs.

The body of empirical studies on blogging in educational contexts is limited but growing. Initial studies show that blogging can support reflective thinking, critical thinking, and collaboration, allowing students to take ownership of their learning (Bouldin, Holmes, & Fortenberry, 2006; Boulous, Maramba, & Wheeler 2006; Oravec, 2003; Shaffer, Lackey, & Bolling, 2006). Research suggests that people tend to be more candid and reflective when using these tools (Joinsen, 2001; Shaw & Pieter, 2000). Research integrating computer-mediated

communication (CMC) technologies such as blogs into traditional undergraduate lecture courses remains limited.

Purpose of the Study

College students have the opportunity for more autonomous decision-making about how to feed themselves and make choices that will affect their lifetime risk of chronic disease and socioeconomic status. These factors may contribute to unhealthy lifestyle behaviors affecting both physical and psychosocial health. We chose the introductory nutrition course as a source of study participants because of our university's interest in preventing attrition and promoting healthy living among undergraduates. By providing an informal learning environment in which students can talk about and reflect upon issues they have learned in a formal setting, we hope to gain a greater understanding not only of how students apply learned concepts to their daily lives but also the health and wellness practices of college freshmen.

One way to understand transfer of learning from an actor-oriented perspective is to examine how students currently talk about concepts covered in a previous course. Creating an opportunity to talk online, such as blogging about concepts after a course ends, provides a way to document and analyze what has been learned from the actor's perspective. In this initial pilot study, we explored the blogging conversations in the context of the nutrition science field over a seven week, post-course period. As with most naturalistic, interpretive studies, two main questions guide our analysis: (1) What happened in the blog conversations? and (2) How are participants making meaning of nutrition science concepts?

Method

A qualitative case study (Merriam, 1998) was our strategy to explore the blog conversations. Naturalistic case study research emphasizes a focus on meaning in context and "has proven particularly useful for studying educational innovations, for evaluating programs and for informing policy" (Merriam, 1998, p. 41). Yin (2003) points out that case study is a research strategy rather than a method, defining it as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (p. 13). Rather than attempting to isolate and investigate variables impacting blog conversations, it was more appropriate to first describe and interpret the conversations as part of the context itself.

Because methods used in qualitative case study research are inductive rather than deductive, researchers generally avoid prior commitment to theoretical models (Yin, 2003). Interpretation emerges through analysis and is grounded in the data rather than theoretical literature (Strauss & Corbin, 1998). Literature is used as theoretical background for the study, but a specific conceptual framework is not selected prior to the collection and analysis of the data. Rather, the description of the case is linked to the relevant literature after data have been analyzed (Merriam, 1998; Yin, 2003).

Context and Participants

In December 2006, approximately 150 students were enrolled in an introductory nutrition course at a large southeastern university. The course, which meets for two hours of lecture and

one hour of discussion each week, attracts a wide range of undergraduate majors as it fulfills a general science requirement. All students in the class were invited, in person, by the investigators to participate in the study which would take place the following semester, the spring of 2007. Of the 150 students invited, twelve students expressed interest in the study; 10 were eligible to participate, and 9 students completed the requirements and are described in Table 1. Participants were recruited with a financial incentive.

Table 1

Description of Participants

Pseudonym	Gender	Major	Year	Previous experience blogging
Bertha	F	Nutrition	Freshman	Yes
Blazie	F	Exercise Science	Senior	Yes
Candy	F	Exercise Science	Sophomore	No
Denny	M	Nursing	Junior	Yes
Kat	F	Nursing	Sophomore	No
Maxima	F	Nursing	Sophomore	No
Mountain	F	Nursing	Sophomore	No
Nancy	F	Nutrition	Sophomore	No
Penny	F	Nursing	Sophomore	Yes

During a two-hour, in-person orientation, we helped participants set up their blogs and outlined expectations (Appendix A). Students signed consent forms, chose pseudonyms, personalized their blogs, and asked questions. Blogs were created using the freely available blogging tool Vox (<http://vox.com>), which was chosen because it allowed the posts to be private within a “neighborhood,” and accessible only by participants and researchers (a stipulation of IRB approval). During the orientation participants tested the blog tool by posting an initial entry describing what they had learned in the nutrition course during the previous semester. See Figures 1-3 for blog screen shots.

Blogging took place over seven weeks. Participants were asked to make three posts per week on any topic related to nutrition. They were also asked to comment on five posts made by other participants. Researchers read posts and comments while monitoring participation but did

not participate in conversations. The question of whether and how to facilitate online discussions is an important one (Brescia, Swartz, Pearman, Balkin, & Williams, 2004; Collison, Elbaum, Haavind, & Tinker 2000; Wise, Hamman, & Thorson, 2006). Our goal was to provide an *actor-oriented* environment for which participants felt ownership and the ability to engage in open conversations related to their own interests and experiences (Paulus & Scherff, 2008). Thus, we decided that open, rather than structured, conversations would be most appropriate. We read posts and monitored participation rather than facilitated.

Data Sources and Analysis

Merriam (1998) emphasizes that qualitative design is emergent with a recursive, dynamic process of data collection and analysis. Data sources included blog posts, comments, and interviews. One researcher observed blog conversations as they unfolded and recorded field notes detailing how the participants were engaging with each other as well as any problems or issues that occurred. The blog conversations were then transferred to word processing documents for further analysis. At the end of the seven weeks, we interviewed all six of the nine participants who agreed to be interviewed. These semi-structured interviews (see Appendix B) lasted from 20-40 minutes and were recorded and transcribed.

The researchers collaborated on analysis utilizing an interpretive, inductive approach with constant comparative methods guided by the research questions: (1) What happened in the blog conversations? and (2) How are participants making meaning of nutritional science concepts? Since we were interested in how students engaged with each other during blog conversations, we began by tallying the number of posts and comments. We compared these descriptive findings with the interview data about participation.

Next, we attended to how participants made meaning through their blog conversations. Our analysis proceeded in a modified form of the constant comparative method (Bogdan & Biklen, 2003; Strauss & Corbin, 1998). Merriam (1988) outlines three phases in this type of qualitative data analysis: *intensive analysis*, *developing categories*, and *developing theory*. These roughly correspond to Strauss and Corbin's (1998) steps of *open coding*, *axial coding*, and *selective coding*.

Intensive analysis began as we read and re-read the data independently, each making notes and reflections to isolate the most striking aspects of the data, comparing and noting themes related to how participants were making meaning of nutrition-related concepts in the blog conversations, triangulated with interview data and observational notes.

Each researcher kept a list of the major ideas that cut across the data, searching for regularities and patterns, similar to *open coding* as described by Strauss and Corbin (1998). Units of information (i.e., excerpts from blog conversations) were isolated and labeled in the margins of the paper transcripts in preparation for the next phase of *developing categories*. We held a series of meetings during which we developed our initial lists into categories. Similar to *axial coding*, we next sorted the concrete units into more abstract categories. Through an iterative process of convergence and divergence, we organized emerging categories and subcategories. Finally, through a process of *selective coding*, we developed a tentative theory about how the participants made meaning of nutrition science concepts through blog conversations. From the initial concrete codes, we identified abstract themes. We compared identified themes to the data and to the literature until the final iteration of findings were agreed upon.

Findings

What Happened?

Participants were asked to post 21 times over the seven weeks (three times per week) and comment on 35 posts by others (five times per week). The actual number of posts made, comments received, and comments made are outlined in Table 2.

Table 2

Number of Posts and Comments

Pseudonym	Posts made	Comments received on own posts	Comments made on others' posts
Bertha	24	55	42
Blazie	26	49	35
Candy	26	40	32
Denny	22	44	38
Kat	19	34	24
Maxima	33	52	45
Mountain	19	44	40
Nancy	22	71	55
Penny	25	52	40

All but two participants posted and commented more often than requested. Participants felt that the expectations for duration and frequency of blogging were reasonable. Off-topic conversation occurred, such as roommate problems or how the weather was impacting their sense of well-being. Some participants posted short, non-substantive messages, which frustrated others. Nancy suggested making a requirement that the “blog [post] has to be at least two sentences or something...maybe even that’s too short.” Maxima suggested it “might be more helpful to find a way to get people to stay on track; it was kinda hard not to have anything to comment back on.”

In the interviews, participants reported that blogging as part of a formal course would give them more contact with other students and allow them to ask questions, a phenomenon which Blazie explained, “Instead of sitting in a lecture class and you just listen to the professor talk...if you have this discussion [blog] you can actually ask questions and not be afraid to raise

your hand in class.” Bertha agreed, feeling that blogging “gives students opportunities to get to know each other, and you can be really open and honest with stuff and not have to worry about being ridiculed for something.” Nancy indicated that “it would be a good means of discussion, like another way of doing study groups.” Penny was more skeptical in her views: “There wasn’t too much of people asking questions and someone else knowing the answer. It was mainly just throwing things back and forth and talking about it.”

Meaning-Making Process

We identified four emergent themes from the analysis related to how participants made meaning of the nutrition concepts through their blog conversations. The first theme is that participants wrote about nutrition science from the context of their daily lives as they sought to apply what they had learned. The second theme reflects that participants recognized and were critical of perceived barriers to successfully applying what they had learned about nutrition. The third theme is that, in the absence of instructor participation, the news media was treated as an expert source on nutrition information. The final theme is the prevalence of unanswered questions in the conversation and how these questions indicate gaps in students’ understanding of nutrition concepts.

Applying concepts to daily life. Educators are often concerned about keeping discussions on topic. Our first theme illustrates that the participants did talk about nutrition science topics but from the contexts of their daily lives. Kat reported in the interview that “If I had a question, I would write about it and see if anyone would comment on it and tell me what they know.” Penny wrote about “stuff I actually came in contact with or was thinking about during the day I posted.” Maxima mentioned, “I live in a dorm full of 42 girls, and I started to notice how they eat (noticing the effects of groups or eating disorders) and that would become something to talk about.”

Many posts described the daily practices of exercising, keeping track of food intake, and setting goals. In a post titled “Dieting,” Mountain wrote¹:

ok, so my biggest new year’s resolution is to lose 10 pounds before march. So far, it’s going pretty well, but i’m scared i won’t be able to keep up healthy eating AND exercising. i’m also kind of worried that I’m not getting all the nutrients i need because i’m not necessarily basing my food choices on how healthy they are. i guss maybe taking a multi vitamin would help? i don’t want to have dramatic weight changes in a short amount of time, so i’m trying to make it more of a lifestyle change. that way, hopefully i’ll be able to eat healthy and exercise regularly without getting burned out too fast. anyone have suggestions that might help?

Although Mountain’s ultimate goal is weight loss, she expressed an interest in making a “lifestyle change.” She did not want dramatic weight change in a short amount of time, reflecting an understanding of healthy weight loss. She asked for suggestions from others, acknowledging gaps in her knowledge of how to maintain a healthy weight.

Many participants talked about the daily difficulties of staying motivated to reach their goals. As Kat posted on “Working out”:

In high school, I was on a dance team so I had to work out everyday. Since I have been in college, it is so hard for me to go to the gym on a regular basis. It’s like I need it to be

required so that I can do it...Working out is healthy for your immune system and mine has not been good lately. If anyone has a way to stay motivated, let me know please!

Maxima responded by saying:

the way I stay motivated is by surrounding myself with people who also have that goal of staying fit...I would never exercise if my room mate did not talk about it. Its almost like shes a motivational speaker

Mountain pointed to some of the same issues in her response:

i had the same problem...i loved that i was required to work out for cheerleading in high school, so i finally just had to make myself see the gym as something i'm required to do (by me and for me!) good luck with that!

Participants blogged about staying motivated to stick with an exercise program, prepare healthy foods, control weight, plan meals, and grocery shop. Posts included both struggles and triumphs in staying motivated.

Thus, while participants did talk about a variety of nutrition-related concepts, they did so from the contexts of their daily lives, sharing how they attempted to make meaning of what they learned. This understanding can help educators understand how to make the topics relevant and contextualized to students' lives.

Barriers and social critique. Not only did students frame their nutrition knowledge in the context of their daily lives, they also identified and critiqued constraints of the social contexts in which they live. For example, many posts centered on difficulties of designing and adhering to a healthy diet, indicating a perceived lack of control over eating choices. As Penny shared in her post "Kitchens":

I think [university] housing should make an effort to put more kitchens in the dorms. I know my dorm has a kitchen for every wing but I never use it—I think I would use it if it was actually on my floor. In the apartments last semester I really liked cooking chicken or fish which was a lot healthier than eating at the cafeterias every meal. I wish I could cook more often without carrying stuff to another floor.

Penny addressed an issue common among students living on campus. Without easy access to a kitchen, students often resort to fast food or delivery. Bertha commented that "the kitchen in my dorm is in the basement and it always is so busy, crowded, and smelly." Denny also mentioned cleanliness in his comment, "I'd be paranoid about bacteria in a shared kitchen."

In "Free Food," Kat noted how unhealthy food is used to recruit college students. She described an event on campus with free food: "The options they gave you to pick from were pizza, hot dogs, wings and dressings, and Cokes. Of course, I ate it anyways! No wonder it is so hard for college kids to eat healthy." Students are learning about healthy eating choices on the same campus where they are constrained from making those choices.

Social contexts beyond campus also contributed to this perceived lack of control over eating choices. In Bertha's post, entitled "Sunday dinners," she asked:

[A]fter church on Sundays, I go to my grandma's house and we eat a fairly large dinner instead of going out to eat. I absolutely LOVE home cooked food, and I really pig out when we eat. She always makes really good meals, like chicken, mashed potatoes, corn, green beans, cornbread, and a dessert. Once I get back on campus to my room, I always feel really bad for eating the way I did. Does anyone have any suggestions on how I could remind myself not to eat so much at granny's???

Bertha's post generated five comments from participants. Blazie suggested starting the meal with a salad and packing small containers of food for later in the week. Maxima replied simply by writing "portion control." This particular blog conversation also illustrates the first theme—how a nutrition-related topic (healthy food choices) is discussed within the context of personal experience (dinner at Grandma's house).

Denny's post "Expensive" spoke to the larger financial incentives to eat unhealthy foods: I prefer to not eat meat, while dairy things are ok with me. The problem is I have limited funds and it seems like the most appetizing things are the most expensive...That leads me toward breaking my vegetarian diet when I get low on cash toward the end of the semester. This goes on while unhealthy things are sold for as little money as possible. Fat drenched, calorie-loaded greasy potato chips and McDonald's burgers and fries can each be had for \$1...It's frustrating. There is incentive to be overweight and unhealthy.

The participants realized that applying what they have learned about nutrition is no easy task, especially in light of the constraints and barriers of their social contexts—even the university itself. Educators can use this information as they design further instruction on topics which are to be applied outside the classroom. Educators can also explicitly acknowledge perceived barriers in their instruction.

What counts as knowledge. The third theme relates to what counts as "expert" knowledge in this blogging environment. Blog conversations provide a venue for meaning-making, in part, because of the multiple perspectives being expressed on an issue. As Blazie explained in her interview, "Learning about...the way they see things...like a food that they had tried [which I had as well] that I didn't think anybody else would've tried and then even to see other people's responses...it's a different view." Yet participants were wary about the accuracy of each other's information. As Nancy expressed in her interview, "I'm not gonna take anything for a fact because it wouldn't be my professor telling me, and it would be a good means of discussion, kinda like a study group or something and that would be great...but at the same time I won't be, maybe, as trustful." This example illustrates the different beliefs about knowledge and learning that exist in educational environments. Talking with others has its value, Nancy implies, but eventually the "facts" need to be provided by an expert.

Given there was no instructor or facilitator in the blogs, the participants turned to the news media as an official "expert" source of knowledge. In her interview, Blazie shared that her blog topics came from what she saw in the newspaper, on the Internet, and across television news. The media impacted her posts as well. Her final post included direct quotes from CNN's website on binge eating. Others shared what they had seen in the media as well. In a post labeled "Caffeine," Nancy wrote:

This morning on the *Today Show*, I saw a nutritionist talking about caffeine. I always wonder how unhealthful it is for me to drink coffee, tea, or cokes, so immediately I tuned in. While extreme consumption is not recommended, health officials agree that it does not have many unhealthful effects. However, this does not take into consideration people who get headaches from caffeine, have gastrointestinal problems due to caffeine consumption, or have other medial problems such as insomnia...

Most participants blogged about nutrition-related topics presented in the media as "fact" rather than something to be critiqued. An exception is Mountain's post titled, "Breakfast for dinner?" she reflected on a new meal plan she has seen on television:

ok so i was watching tv the other day and i watched this show about a woman who thought of a “breakfast for dinner” lifestyle...basically, she just reversed the meals she eats in a day and eats what she would eat for breakfast for dinner and vice versa. the more i thought about it, the more it made sense. eating a really small breakfast (when you need the most energy) and a large meal for dinner (when you’re going to be least active afterwards) doesn’t make nearly as much sense as reversing the two. since then, i’ve been trying to eat progressively smaller meals throughout the day. i’ve had a lot more energy since then and I’ve been losing weight! has anyone else tried anything like this??

She pondered what the television show claimed before trying it out and then asked others for their thoughts.

The news media also kept participants up to date on current events related to nutrition. During this study, several food safety issues were widely publicized in the media (e.g., tainted peanut butter and contaminated vegetables served at Taco Bell restaurants) and participants blogged about these incidents.

Knowing that the participants are heavily influenced by the media and that it may serve as the voice of expert knowledge in the absence of a content-related facilitator underscores the importance of teaching students to be critical consumers of the media.

Questioning and answering (or not). The fourth theme relates to the role of unanswered questions (or un-commented upon posts) in the conversations. As we noted earlier, we chose not to facilitate the blog discussions. From the interview data we learned that, as a result, the students felt more ownership of the conversation, yet at times wished for an expert to address unanswered questions. Bertha felt that if there was a facilitator or instructor present, “I don’t think there’d be as much talk about drinking and stuff like that; the topics might shift just a little but other than that I don’t think it would matter that much.” Nancy agreed, “That would probably definitely change it because if a professor or teacher saw the students’ questions or comments to other people, they could give them directions or suggestions.”

In an attempt to focus the discussion, Maxima tried to take on a leadership role in her post “we all got to blog better”:

We have to come up with better topics. So since it is spring break time and every1 is exercising last minute lets talk about metabolism. The question on this topic is; "Can you actually speed up your metabolism, or are you stuck with it for the rest of your life?" Lets see if this will help us b/c I knwo we are all having trouble.

No one responded to her post, and her frustration was evident in her interviews:

It’s so hard to find topics to talk about, like I would try to get [people] to talk about metabolism but no one would go with it, and I know one girl tried to talk about binge eating and I tried to help her with that but...nothing caught on...if a teacher assigned topics and students wrote about it and had other students evaluate what they wrote, or somehow set up groups in teams and discuss what each group wrote about—tell them if they’re right or wrong, maybe that would work better than everyone write about anything random.

As the participants noted, many questions were asked in posts, a good sign that the conversation was interactive (see Table 3). However, there were numerous times that posts went un-commented upon, or questions were raised but not responded to. For example, Denny in his post “Calories” asked:

How do food companies calculate these? I have a bottle of Powerade Option...The bottle says there are 10 calories in each serving and for 4 servings per bottle of this there are 40 calories using their math. In nutrition class we learned that each gram of carbohydrate has 4 calories. For 2g of carbs per serving 4 times that adds up to 32 instead of 40 using the math of 10 calories per serving. An 8 calorie difference isn't much, but there are supposedly only 40 to work with. For a food with a lot more calories, the estimate could be way off. Am I making sense here?

Denny attempted to apply his understanding of carbohydrates and calories to the nutrition label on his sports drink, but he was left confused. The numbers did not add up. Unfortunately, none of the participants responded.

Table 3

Number of Posts, Questions Asked, and Posts without Comments

Name	Total posts	Total questions asked	Number of posts receiving no comments
Bertha	24	24	3
Blazie	26	18	2
Candy	26	5	6
Denny	22	11	3
Kat	19	14	5
Maxima	33	19	13
Mountain	19	21	2
Nancy	22	30	2
Penny	25	20	3

The blog posts and comments, particularly unanswered questions, revealed what students do not yet know. These points of uncertainty or confusion are potential venues for meaningful change as well as course improvement.

Discussion

The nine participants in this study posted and commented regularly over seven weeks on topics related to nutrition science. The themes identified in the analysis were four-fold. First, participants wrote about nutrition concepts within the context of their daily lives. Reading such blog conversations can help educators understand what connections are being made between the content and its application. This provides an opportunity to understand, from an actor-oriented perspective (Lobato, 2003), what may have been transferred from the undergraduate course. These insights can help instructors contextualize instruction in meaningful ways for the learners.

Second, it is not a simple task for undergraduates to make lifestyle changes based on what they learn about nutrition. Knowing and acknowledging the barriers and constraints students experience and write about in their blogs can serve as a starting point for finding ways to break through these barriers. Paulus and Scherff (2008) found that pre-service teachers, in unfacilitated online discussions, used the space to critique what was happening during their internships and to request and provide support to each other. These insights are helpful for teacher educators to better understand the internship experience from the pre-service teachers' perspective. Similarly, through the blog conversations, educators can become more aware of undergraduates' daily struggles and concerns related to nutrition issues.

Third, we found that the news media has a large impact on undergraduate students' understanding of nutrition science (and, likely, other disciplinary) knowledge. The participants turned to the media not only for topics to blog about but also as a source of expert knowledge. According to a survey by the American Dietetic Association (2000), Americans' primary sources for nutrition information are television (48%), magazines (47%), family, friends, and doctors (11%), and newspapers (18%). The Internet came in with 6%, and that number is likely to have increased since the survey was conducted in 2000. While there is value in understanding multiple perspectives on a topic, there is also a powerful drive, especially in learning situations, to find the "right answer," as Paulus and Roberts (2006) point out:

CMC and group tasks all hold promise for encouraging learning in context through reflection and analysis, they also present challenges. An epistemological shift may be necessary...one that acknowledges that multiple perspectives and representations are not only possible, but necessary, and that it is through dialogue that these perspectives can be explored. (p. 749)

Educators can learn through the blog conversations what their students consider to be expert sources of knowledge and respond accordingly.

Finally, unanswered questions in blog conversations are a valuable source of information for educators. It may not be realistic in large lecture courses for the professor, or even the teaching assistants, to answer all questions that are asked. However, these conversations provide a means for gathering information about what is known and not yet understood. This information can then inform future instruction.

Before educators can create more learner-centered environments, they need to know more about their learners. However, it is difficult to create such environments in traditional lecture courses. Computer-mediated communication environments, such as blogging, present places where a greater understanding of student meaning-making can be gained.

There are several limitations to this study. The study was done outside the context of a formal learning environment, and the next phase of the research is to integrate the activity as an integral part of the large undergraduate lecture course. To simulate a more formal environment,

we asked participants to make a certain number of posts and provided an incentive for doing so; however, we do not yet know how similar the findings will be to what happens in the formal environment. All but one participant were female, and all participants were in health-related majors. Thus, these participants may be more motivated and interested in the topic, more likely to ask questions and apply the course content to their daily lives. Also, female participants, those who often already maintain online journals, may benefit more from this experience (Herring, Kouper, Scheidt & Wright, 2004; Herring, Scheidt, Bonus & Wright, 2004; Herring, Scheidt, Wright & Bonus, 2005; Lenhart & Fox, 2006).

Implications for Practice and Directions for Further Research

There are several ways that educators can use online discussions such as blogs as both a learning and course development tool. In large classes, there is often not enough time for the instructor or teaching assistants to respond or participate actively in CMC discussions. The number of posts and comments can be overwhelming, so monitoring along with a low level of intervention may be ideal. Performing a simple content analysis on the blog conversations can provide information as to what topics the students are discussing and how frequently. Large undergraduate courses often have discussion sections, and teaching assistants can be responsible for responding to student posts and/or gathering information about misconceptions which can then be shared with the professor as she or he makes decisions about class lecture content.

Conclusion

The opportunity to talk online through blogging about concepts after a course is finished provides a way to document and analyze what has been learned from the actor's perspective (Lobato, 2003). Through these blog conversations, we were able to learn more about what topics were salient to the participants, how new knowledge impacted their daily lives, and what remains to be learned. These insights can help educators create more authentic, meaningful, and powerful learning environments—meeting students at their points of need.




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Figure 1. Main page of VOX blog with current post.

 **safer eating tip**
.....
Candy95 | Feb 17, 2007 |  Viewable by friends |  1 comment




so i found this safer eating tip on ediets.com. i thought it was interesting n kinda scary cuz i never do this..."**Lettuce:** Because it is grown so close to the ground, it can come into contact with manure or irrigation runoff, putting you at risk of contracting E. coli. When you buy lettuce, you should first discard the outer leaves. Then separate the inner leaves and thoroughly wash them. All raw fruits and vegetables can harbor disease-causing bacteria. Thoroughly wash any raw produce under cold running water before eating it. If appropriate, use a small scrub brush to remove any visible dirt. This is true even for organic fruits and vegetables."

[Leave a comment](#) or [mark as \[this is good\]](#)

 **cooking low fat...**
.....
mtb408 | Feb 16, 2007 |  Viewable by friends |  2 comments

tonight i'm making this chicken casserole. the recipe calls for sour cream, chicken (obviously), cream of celery and cream of chicken soup. i bought light sour cream and low fat or "healthy recipe" for the soup. i'm really hoping it doesn't turn out tasteless or watery..i may need to up the spices in it or something. has anyone tried to substitute low fat for regular stuff in a recipe?? any feedback/tips would be appreciated!

[Leave a comment](#) or [mark as \[this is good\]](#)

 **Hibernate**
.....
PennyLn88 | Feb 16, 2007 |  Viewable by friends |  1 comment


Sometimes I think hibernation is a great idea...like on these last couple days when it's miserably cold outside. I just want to stay in my bed all day. Is anyone else in anticipation for spring? I wish it was winter for maybe 2 weeks...and it could snow and have Christmas and such and then be sunny and warm after that.


Figure 2. Recent posts listed in reverse chronological order.


mtn408
United States
[View my profile](#)


mtn408 is a friend
[edit](#)
Send [message](#)


Neighborhood

 [dr. paulus](#)
Updated Apr 6, 2007

 [maxima10](#)
Updated Mar 7, 2007

 [berthath7688](#)
Updated Mar 5, 2007

 [Candy86](#)
Updated Mar 3, 2007

 [bLaZIE1223](#)
Updated Mar 2, 2007

Explore [friends](#)
[family](#) [friends & family](#) or [entire neighborhood](#)

[View my neighbors](#)

mtn408's blog Archives

- [March 2007](#) (1)
- [February 2007](#) (12)
- [January 2007](#) (6)


Powered by [Vox](#)

cooking low fat...


Feb 16, 2007 at 1:51 PM | [Viewable by friends](#) | [2 comments](#) | [Favorite](#)

tonight i'm making this chicken casserole. the recipe calls for sour cream, chicken (obviously), cream of celery and cream of chicken soup. i bought light sour cream and low fat or "healthy recipe" for the soup. i'm really hoping it doesn't turn out tasteless or watery..i may need to up the spices in it or something. has anyone tried to substitute low fat for regular stuff in a recipe?? any feedback/tips would be appreciated!

Comments

 **Candy86 wrote:**
Feb 17, 2007 at 8:58 AM | [Reply](#)

I've always thought low-fat things didn't taste as good, especially when it comes to cheese, milk, etc. i really don't think the light sour cream is going to be as good, but there are some things i've eaten where i couldn't tell the difference in the low-fat compared to regular.

 **Kat05 wrote:**
Feb 23, 2007 at 12:26 PM | [Reply](#)

i always use low fat things. i can ususally not tell, maybe because i'm so used to it. the only thing i think that is not good low fat is sliced cheese. but with all of those ingredients it should be pretty good still.

Next Posts

- [Food Network](#)
- [peanut butter](#)
- [water the morning after](#)
- [retaining water...](#)
- [nursing school](#)

Previous Posts

- [taking time off](#)
- [adderall](#)
- [breakfast for dinner?](#)
- [veggie burgers!](#)
- [drink mixers](#)

Post a comment

You are currently signed in as [dr. paulus](#). [Sign Out](#)

Figure 3. Example of posted comments.

Appendix A Orientation Materials

Nutrition Blog Study

Orientation

4 pm Tuesday January 9, 2007

- Welcome, introductions, and snacks

Participation guidelines

- Post three times per week; comment on five other participant posts per week.
 - Try not to post all on one day.
 - Try to comment on different blogs each week.
 - We may comment from time to time and will email you to remind you to post (if needed).
- Reason for pseudonyms—a way to maintain your anonymity if you so choose.
- What happens in the blogosphere stays in the blogosphere.
- Begin blogging on January 15 and end on March 9 (before Spring Break)
- \$50 on February 9; \$50 on March 9
 - Quality and quantity of posts
- Interviews after Spring Break.
- Sign informed consent statements.

Set up your blog on Vox

- Join Vox and create your blog using your pseudonym.
- Click on email link to activate.
- Edit your profile.
- Design your blog template.
- Compose a post.
- Add friends, see your neighborhood.
- Adding photos—Don't use a photo of yourself if you want to remain anonymous
- Explore by keyword search to see related blogs of interest.

Ideas for what to talk about and how to talk about it

- It's really up to you!
- Tell a story about an experience that happened that day related to health, nutrition, wellness, etc.
- Reflect on conversations you had related to health, nutrition, wellness, etc.
- Consider how others' experiences are different from or similar to yours.
- When making a post, end with a question about what others think or if anyone has had a similar or different experience
- When you don't agree with or understand what someone is writing, ask the writer in a comment to "say more."
- When commenting, ask questions rather than making statements or simply agreeing.

Appendix B Interview Protocol

Overall Experience

1. Tell me what stands out about the last seven weeks in terms of the blogging study.

Participation

1. Tell me about your approach to blogging and your blogging style? How did you decide what to write about? How did you decide when to post?
2. Describe one of the most interesting posts you wrote, read, or commented on. How did you decide which posts to comment on? Were there particular blogs you commented on more often than others? Are there any conversations that stand out?
3. Will you continue blogging now that the study is finished? Would you start blogging for other purposes? Do you read/write other blogs?
4. Tell me about the participation requirements—too much? Too little?
5. How would having a facilitator or instructor have changed the process?
6. What ways would blogging be useful as part of a class?

Technology

1. Tell me about the Vox format/bloggging tool. What would you change about the blogging tool?
2. How important was using a pseudonym and having your posts available only to others in the study?
3. Did you make any private posts? Would you have minded making any of the posts public?
4. Why did you/didn't you use images in your posts?
5. How does your blog reflect your personal style?

Nutrition

1. What does healthy food mean to you?
2. What are concepts you learned in introductory nutrition?

Other

1. Besides the financial incentive, what other reasons did you have for participating in the study?
2. What was most rewarding/helpful part of the experience?
3. What was the most frustrating/least rewarding aspect of the experience?
4. What would make this experience better?
5. What else should we know about your experience?

Notes:

1. This research was funded in part by Project RITE at the University of Tennessee.
2. Preliminary findings were presented at the annual meetings of the International Association for Cognitive Education and Psychology 2007 and the American Educational Research Association 2008.

ⁱ All posts are included verbatim from the blogs, unedited to preserve the feel of the post.