

Does Feedback Influence Student Postings to Online Discussions?

Katrina A. Meyer, *University of Memphis*

Abstract

Feedback theory proposes that feedback influences the behavior of a system and its parts and that is governed by rules. This exploratory study attempts to test this theory in a graduate-level class on leadership theory. Twelve students were asked to participate in five online discussions, each lasting one week. The questions for each discussion were selected to be provocative and rich, without having any correct answer. At the end of the discussion, students were asked to indicate which posting and poster they felt was “best” or most valuable and why they felt the posting was “best.” There is mixed evidence that the voting influenced subsequent postings; some individuals did improve while others were consistently good or poor posters. Students selected postings that were (in declining frequency of occurrence): *thoughtful* or *thought-provoking*, *well written or justified*, *uplifting*, *presented new information*, *same as their own opinions*, *changed me*, or *complex*. These reasons are similar to those of the instructor, although the students’ difficulty in choosing and rationalizing a choice and the frequency at which students chose posts that captured their own thoughts and opinions are of some concern. This study provides some evidence that these graduate students could evaluate their own discussions without the instructor intruding or dictating an evaluation scheme, although this may not be true for other groups of online students.

Introduction

In the traditional face-to-face class, the instructor provides feedback to students on the quality of their work, and usually, that feedback is delivered at the end of the class. In the online class, instructors struggle with ways of evaluating their students' postings to online discussions, providing the only recognized evaluation to the student. What if there were a way to have students judge the value of each other's contributions to online discussions and those evaluations encouraged their peers to prepare better postings? This question seems to rest on two issues: the role of feedback and the judgment of students.

Johnson (2001) describes how feedback was used to shape bulletin boards. In early dial-up computer bulletin boards, lively and contentious discussions could occur, if the community remained a certain size. However, with the growth of the Internet and the web, online communities grew to large sizes and produced numerous postings that were difficult to keep up with and were of variable quality, some from experts and some from "cranks" (cranks are pejorative for online denizens who hold kooky or crackpot beliefs). In face-to-face conversations, nonverbal cues can be shared to indicate to the speaker that his/her time is up or that the group has lost interest, but no such cues are available to the online community. The problem became how could such a large online community separate the wheat from the chaff – the postings worth reading from others of modest (or no) importance – in ways that might also alter the crank's postings in the future. In other words, is there an online equivalent to those nonverbal cues in the face-to-face setting that will indicate which posting is valuable, which poster holds valuable views, and which poster should be avoided?

The system developed by Slashdot.org – an online bulletin board – is described by Johnson (2001) in detail. In an effort to "promote quality, discourage crap" (p. 154), a Slashdot user would be asked on occasion to moderate a discussion. During a short time period, the moderator rates contributions, using only a discrete number of points. This system results in a type of "karma: if your contributions as a user are higher rated by the moderators, you earn karma in the system. . . Your subsequent posts begin life at a higher rating than usual, and you are more likely to be chosen as a moderator" (Johnson, 2001, p. 155). This works much like movie or book reviews, where some reviewers may earn greater credence among the public than other

reviewers. Over time, quality submissions would be encouraged and leaders arise.

What is important in this discussion is the understanding that online interactions – be they bulletin boards or class discussions – require the researcher to “analyze the message, the medium, *and the rules*” (Johnson, 2001, p. 158). It is not sufficient to analyze the content of what is written or posted. One also needs to understand the characteristics of the medium; whether the medium allows for synchronicity, interaction, linking, and various other functions. But finally, one needs to understand the rules of what “gets selected and what doesn’t” (Johnson, 2001, p. 158).

Online community bulletin boards are not perfectly analogous to classroom online discussions. Bulletin boards often allow posters to use a pseudonym, posters are not paying for the privilege of participating, and postings to some sites are rated (as in Slashdot.org). Student contributions to an online class discussion are not anonymous and therefore postings are clearly tied to a particular student and may even be graded, students pay tuition and fees to enroll in the course, and their postings are not rated in a public manner. (Postings made be part of the course grade, but grading is normally a secret function, between instructor and individual student.) One could say that students in online class discussions may be more accountable – to both classmates and instructors – for their postings since they are identified, but on the other hand, their postings go unrated by the students or instructor in a public way, which might decrease their accountability. On the other hand, when the online discussion is part of a face-to-face class (e.g., it occurs in a blended class), the student may still be affected by nonverbal cues that shape behavior in the face-to-face world. Therefore, it is not clear whether systems of evaluating postings, like the point system of Slashdot.org, will work in online class discussions.

For example, cranks may be rarer in online discussions in courses and may not present as much of a problem as in the online bulletin board. Students, perhaps because grades are at stake, are normally trying to impress rather than annoy (although some forms of trying to impress are surely annoying). But clearly, instructors want to find ways to improve the quality of online discussions, which is made more complicated by two factors;

- First, instructors do not always know what a student considers to be a quality posting, and therefore may need to find out how students think and what they value.
- Second, instructors and students may value different types of contributions, and therefore may come to different conclusions about what is quality.

In other words, if the discussion moderators (as in the system used by Slashdot.org) are students, their judgments would not be the same as the instructor. This is important if the instructor's judgment is the basis for grading and if student evaluations of the discussions were to be found to modify or shape subsequent postings. So the research questions are three-fold;

1. Do student evaluations of postings to an online discussion shape the quality of subsequent postings?
2. What do students consider a quality posting?
3. Are students' definitions of quality similar to the instructor's?

Review of Theory

This research is based on systems theory and the role of feedback in systems (Bertalanffy, 1968). Developed in the 1950s based on work in philosophy of science, biology, and engineering, systems theory was soon applied fruitfully to problems in sociology, political science, organizations, economics, and management. A simple example from electrical engineering is the thermostat that detects when ambient air has varied from the temperature set by a heating system and feeds back to the controlling mechanism that the heat must be turned on or off.

A system is based on interacting and interdependent parts that emerge to form a whole system. Fundamental to the system is the role of feedback, be it positive or negative, as it provides information to the interdependent parts. With cybernetics (Wiener, 1954), the role of feedback often acts as a governor of the system, or as an aid to the system becoming self-governing or autopoietic (Maturana, 1991).

Feedback is the means for guiding the system, helping it to become self-governing or self-organizing and bring about higher-order learning, (Johnson, 2001, p. 120). However, the

structure of the World-Wide-Web does not allow for feedback (Johnson, 1997), which prevents self-organization from occurring. The web is built with one-way links, shuttling readers from one site to another with no way for the reader to comment on the value of the link. Many web sites are presented as finished products, and visitors cannot provide feedback to the site holders about its value. This is especially true for corporate sites – or any site held by an organization – the content of the site is controlled by the organization. In contrast to these static and feedback-free sites are those that use “wikiware,” made popular by Wikipedia (<http://www.wikipedia.org>). Wikipedia is a site that has been created, modified, and evaluated by the users of Wikipedia, creating a living encyclopedia that changes as input from readers and users and experts is given. The quality of the information, which is not always vetted by experts, can be both better than that available elsewhere and less complete. In any case, the process is collaborative and built upon feedback loops from users to the site.

There are additional examples where the Web has used feedback theory to improve services to its readers, visitors, or customers. Amazon (Johnson, 2001, p. 215) has the most widely experienced feedback system, which learns what you might prefer by tracking purchases, recognizing possible preferences, and providing additional choices of likely, similar products. By choosing additional products, the system can adjust its analysis of the buyer’s preferences and improve future suggestions.

Firefly is an example of an intelligent agent that also discovers patterns, although in this case, it is in your musical tastes (Johnson, 1997). “Dealing only with patterns . . . of likes and dislikes among thousands of people . . . the agent can make subtle distinctions between appetites” (p. 197). Based on your feedback to some initial selections, Firefly identifies possible new musical performers you might like.

In the gaming world, feedback rules alter the pace of the game, its challenge level and speed, the goals, acceptable routes, and the player’s sense of accomplishment. Game theory (see Ross, 2006) has been applied to a variety of fields, but most recently it has been influential in the development of online games as well as online learning. Feedback in online learning environments might incorporate rules that take into consideration different student motivations,

learning curves, responses to reward or failure, and reinforcement rates and skill levels in an effort to keep the student “playing” or learning. Prensky (2001, 2005) has written passionately about the importance of gaming to learning, and makes the case that the game must be complex, rich with decision-making, collaboration with others, adaptive, and fun. Feedback from the player/learner to the game interacts with the rules to make the game harder or easier, whichever would work to keep the learner involved.

And finally, there is the feedback system described in Slashdot.org. All of these examples transform the web into a more interactive entity, where the participants can affect the product. Feedback comprises the rules (Johnson, 2001, p. 158) of online interactions. In online bulletin boards, it is the feedback rules that allow the quality messages to be identified, leaders to emerge, and the cranks to not tie up the members’ time.

What is intriguing about the theory behind the power of feedback is its role in shaping the online environment. Johnson (2001) put it thus: “Adjust the feedback loops, and a new type of community appears on the screen” (p. 162). The question is whether feedback applies to the class environment, especially to the online discussions. Do students participating in class online discussions respond to feedback in the same way as individuals participating in bulletin boards?

While there is a paucity of research on the role of feedback on student performance in online discussions, there is a solid theory to test. It may be a novel application of systems and feedback theory to online discussions, but perhaps not an odd one. Feedback may be a useful lens for evaluating whether students in online discussions can come to be self-regulating and self-governing, rewarding students who make valuable contributions and encouraging any crank to cease or modify their behavior.

Method

During a graduate-level course on leadership theory held in Spring 2006, five online discussions were held. Twelve students were enrolled in the course, composed of eight doctoral students, two master’s students, and two students preparing to apply to the doctoral program in higher and

adult education. Both the short duration (five weeks) of the online discussions and the small number of students (twelve) limit the generalizability of the study's conclusions until repetitions of the study can be completed. The course is a required course, normally taken at the beginning of doctoral study, and uses a blend of face-to-face class sessions, online materials, and the five online discussions of interest to this study.

The discussions were scheduled in weeks 8 through 12 of the course, so that students could become familiar with others in the class before engaging in the discussions. Each discussion began on the Tuesday after the Monday evening class, continued through the week, and concluded on Monday before the evening class. While there were assigned readings on various leadership theories and texts, the discussion was taken from issues that arose in the face-to-face class discussions. Each discussion was initiated by a question posed by the instructor as shown in Table 1 below.

Table 1: Questions for Online Discussions

Week	Question
1	Think about a great leader of the past . . . what theories or frames or research make this leader "great" in your view? What mistakes did they make? What life experiences made them the leader they became? What accomplishments made them great?
2	Leadership is an "unnatural act." I'd be interested in hearing your thoughts about whether leadership is a natural or unnatural act or quality in a person, and why. And what might encourage a person to act "unnaturally," or as a leader.
3	Let's assume you are (or will be) the leader of an organization or work unit. How do you lead when some parts or persons of the organization aren't working well (or perhaps at all)? What techniques do you use? What frames might be helpful?
4	The truth is, for many years in your career, you will be a follower, not a leader of an organization or a unit. So you need to be able to lead from your position (wherever it is) in the organization. What skills do you need? How do you handle co-workers, superiors, those you supervise? Give examples of leading from a "follower" position.
5	How do we define "right," "ethical," and "moral?" How is it different from legal, religious, and philosophical points of view? Do you think fairly normal people do unethical things? What things do we stand up for or fight for? How do we draw appropriate limits to accommodating to unethical people or situations? When you have a problem with government, what do you do?

Each student was requested to post two to three times during the week's discussion, and then to post one final time on Monday to select the posting that they felt was best or most valuable to

them and also explain why (there was no further attempt on the part of the instructor to define what “best” should be or what “value” ought to encompass). Two points were given to the student for posting to the discussion during the week and for posting with their choice of which student’s posting was most valuable. The points were for participation and not for the quality or frequency of postings. No points were given for receiving the most “votes.” Because the points were the same for all students and were for participation only, they are not part of the shaping exercise. The student selection of “best post” is analogous to the point system used by Slashdot.org and may be the mechanism by which the selections shape subsequent postings.

At the end of the course and two weeks after the conclusion of the last online discussion, a question on the Final Exam for the course asked the students;

“tell me your impressions of the online discussion. Did the postings change over the five-week period? Did you have a tough time deciding which were the best posts? Can you see any consistencies among the posts you thought were the best?”

Notes kept by the instructor/researcher on the process comprise the final source of information to include in the analysis.

The online discussions and the students’ selections of best posts were analyzed using content analysis as outlined by Maxwell (1996). The focus of this analysis was not the content of the discussions, which were in response to questions that had no correct answers but were aimed to generate discussion around interesting leadership issues (see Table 1). The content analysis focused on;

- Reasons given for the choice of “best post,”
- How ideas were expressed (both the writing and language used),
- Whether examples or data or authorities were used, and
- Comprehensiveness (depth and/or breadth) of the postings.

For example, one student might give a particular reason for choosing a post as best which was given a code that described the concept; other reasons were given new codes if the reasons

appeared to be different. Once codes were identified, they were grouped into logically consistent categories and frequencies noted; inconsistencies were also identified and various relationships or explanations attempted. This is a recursive process that yielded themes found across students and their choices for the “best post” and, on occasion, exceptions to those themes.

To answer the question about whether postings changed over the five-week period, the content analysis of the online discussions was reviewed specifically for depth and complexity, reasoning and written expression of each student. In addition, the instructor’s impressions were compared to students’ answers to the final exam question. To answer the question of what students considered to be a quality posting, explanations for why a particular posting was chosen as the best were analyzed as well as the answers to the final exam question. To answer the question of whether students’ definitions of quality were similar to the instructor’s, the content analysis of the discussions and final exam answers were compared to the definitions held by the instructor. Personal reflections by the instructor/researcher on the process and student comments provide another perspective to answer this question.

Results

Did Shaping Occur?

The first research question was “Do student evaluations of postings to an online discussion shape the quality of subsequent postings?” Of the students who expressed an opinion at the end of the course, three felt there was no change in the postings and two felt changes were evident. The students who felt there was a change identified three improvements: postings that became “more informative and detailed,” postings that displayed greater compassion over time, and an “increase in thoughtful and complex postings.”

Based on the content analyses of the postings over the five-week period, it is fair to conclude that perhaps both opinions are true. In other words, six students did increase the length, complexity, and documentation of their postings, which may reflect greater time spent on thinking about the question and preparing a thoughtful response. Here is one example of the change in a student’s postings over three discussions:

From week 2 discussion: “I agree with [name of student]. I also believe that leadership can be an unnatural and natural act.”

From week 3 discussion: “[Name of student], interesting post! I have never considered looking into the effects of organizational and job fit. I agree that if individuals don’t have the needed structural fit with the organization, the organization will suffer.”

From week 4 discussion: “This is a difficult question for me. When I think of leading from a “follower” position I think of my current position. I am often told when a situation arises that my responsibility is to come up with the best possible solution. However, when a decision is made, my supervisor makes another decision to compromise the situation to make the problem go away. The department said they would support me and that my decision was the best possible solution. But as soon as the situation became difficult, I became a follower again.”

This is a good example of a student contributing more in each post, but also dealing with more complex issues in subsequent weeks. This was also one of the youngest students in the class and a master’s student, so the growth is more remarkable, although the student never quite reaches the level of some of the doctoral students’ postings for writing, use of theory and research, or appreciation for complexity. It is also important to note that if improvement occurred, it was not linear: week five’s posting improving on week four’s posting improving on week three’s posting, etc. In other words, postings might improve in a subsequent week or two, but may not continue to improve across the five-week period.

On the other hand, six other students did not seem to change, and their responses in week five were similar in quality to week one responses. For these students, five posted complex and thoughtful responses every week while one student appeared to put in a minimal effort throughout all of the discussions. Because some of the good postings are quite long and complex, the example below presents a much reduced set of postings for one fairly consistent student:

From week 1 discussion: “When I think of a great leader, the person who comes to mind is Mary McLeod Bethune. She was the daughter of former slaves . . . she

taught at several mission schools . . . established a school for African American girls . . . convinced James Gamble of Proctor and Gamble to contribute financially to Cookman Institute . . . she founded the National Council for Negro Women. Not only did she seek to educate others, she inspired them. It is because of these accomplishments that she was a great leader.”

From week 2 discussion: “I believe that leadership has some natural qualities but it is mostly unnatural. Most people have the natural ability to lead. However, in order to develop those skills, you use the examples around you . . . If you surround yourself with corrupt leaders, you are more inclined to be that type of leader. But if you surround yourself with those with great ability and moral character, you are inclined to respond in that way. There are also a ton of books on leaders, as well as seminars and workshops which seem to imply that leadership is unnatural.”

From week 4 discussion: “I think that leading from a follower’s position requires good communication skills, an understanding of what your superiors require from you, tact, and lots of patience. When handling co-workers, you have to understand what they do or they won’t listen to you and you need to understand them as individuals, too. You have to find the way to communicate with them and create “buy in.”

The example below is taken from the one student who never quite improved the quality of postings from week to week or wrote responses that were minimally responsive to the question:

From week 2 discussion: “I think leadership is a natural act. Circumstances automatically move some of us to assume a leadership role. The question is whether they are going to be a good leader or a bad one.”

From week 3 discussion: “Strong leadership would probably evaluate the strengths and weaknesses of the malfunctioning parts of the organization as well as the human resources within.”

From week 4 discussion: “The best way to lead from a follower’s position is very subtle and gently . . . It’s a way of guiding from the rear.”

While these are not the entire postings, these excerpts capture the level of thinking. The last student was not a doctoral student.

If the voting process affected students' attention to and preparation of postings, it is difficult to determine with surety. Perhaps the voting influenced motivation to perform well; perhaps it was irrelevant to students who always try to perform well. It is unclear at this stage whether the students' voting of "best posting" influenced performance without a repetition of the experiment and asking if voting mattered to them (either getting a vote for "best post" or being overlooked). On the other hand, it is not clear whether students, if asked, would recognize or admit to such influence.

What Is Quality?

The second research question was, "What do students consider a quality posting?" These graduate students were relatively consistent in what they felt were good postings. Table 2 presents the frequency of occurrence of consistent ideas or themes across all of the postings and discussions.

Table 2: Frequency of Justifications for Choice of "Best Post"

Theme (additional definitions)	Number of Mentions
Thoughtfulness (thought-provoking, insightful)	18
Quality of writing (clear, based on theories studied, had examples, evidence)	14
Uplifting (honorable, inspiring, worthy)	8
Newness (new ideas, content, sources, or examples)	6
Sameness (same as my thought, I agree with)	4
Changed me (I will use this information)	4
Complex (comprehensive, deep)	3

The most frequently named quality was “thoughtful” or “thought-provoking” or “insightful.” In other words, there was something in the posting (its topic, points, or slant on the topic) that caused them to think. The second most frequent quality was that the writing in the posting was clear, connected to the theories studied, provided examples, used the text, or added evidence from an outside source. This judgment is interesting, since it shows that to some extent, students have internalized norms of graduate-level writing, with its stress on writing that is clear, documented, and uses material covered in class.

The third most frequently named quality was that the material or ideas in the posting were uplifting in some way, or honorable, admirable, inspiring, or worthy. For example, in response to two students’ postings, one student remarked on their “honorable” acts and another student picked a posting that discussed “what is worth fighting for in education and specifically higher education.” The fourth most frequently named quality was that the posting presented something new, either new ideas, new content, new sources, or new persons. As one student stated, “It [the posting] allowed me to gain a new perspective on this issue that I had not considered.”

The fifth most frequently named quality is that the posting expressed the same thoughts as their own, or that it said something they agreed with, although perhaps expressed better than they would have. Two examples of comments of this nature were: “This posting resonated with me and focused on ideas I am most familiar with” and “I think that her philosophy on the subject is the one that I prefer to use.” While students – like all other adults – have a preference for their own views, this definition of a good posting is perhaps the most worrisome. Tied for the fifth most-frequent quality are postings that changed the student in some fashion or that the idea would be adopted by the student. “I will keep this [post] in mind the next time a similar situation presents itself,” wrote one student. Or as another student stated, one student’s “submissions have more profoundly affected my views.” The final definitions for quality were that the ideas were complex or deep.

Are Definitions of Quality Similar?

The third research question was, “Are students’ definitions of quality similar to the instructor’s?” The definitions of quality from the students in Table 2 are in many ways similar to the

instructor's. Certainly, one hopes that engaging in graduate-level study ought to provoke thought, teach new writing and reasoning skills, present new ideas, change and uplift us. If there is anything of concern in the students' judgment of which postings had merit, it is in the occasional inability to explain what they valued and why.

In fact, when asked if they found it difficult to decide upon a "best post" to the discussion, seven said yes and three no. The question – which post was best or had the most value to them – was deliberately unspecific and undefined. Therefore, they had to derive their own method of defining "best" and "value" for them. In other words, determining what had value to them was an exercise they were either unfamiliar with or had not been asked to do. (One cannot avoid wondering if having to make the choice public – where all could see their choice – might have also made this a difficult act.) This is clearly an issue to be addressed in future classes, not as an exercise to replace the student's judgment with the instructor's, but as a way to clarify thinking and values as well as assessing their own and other's written, oral, and online contributions.

Does Age or Preference Matter?

Two other insights are perhaps in order. One might legitimately ask whether the level of the student (master's, pre-doctoral, doctoral) affects the quality of the postings or the insights into what was valued. It is difficult to unravel whether the issue is level or age, since master's students were also younger, but as Meyer (2006; under review) has found in earlier analyses, age may explain some differences. The younger master's students posted less frequently, their posts were less complex, and their reasoning about others' posts less well-developed or insightful.

Another caution concerns the role of preference for online discussions. A majority of students indicated that they liked the online discussions, felt they were "great and provided more time to reflect," that they were a good way to get to "know each other" or for the quieter students to express their thoughts, or that they were a good way of getting into ideas at depth. A minority expressed their displeasure with the medium, preferring the face-to-face class discussions. These preferences are certainly not irrelevant to the question at hand, since they capture the students' understanding and liking for the medium of online discussions, which can in turn affect their assessment of what is a quality post online.

Discussion

This study attempted to answer two basic questions. Did the voting for best posting shape the quality of subsequent student postings to online discussion? In other words, did this procedure act as a good feedback mechanism? There is modest evidence that some shaping of postings occurred, but as much evidence that the quality – whether high or low – stayed the same.

Perhaps there is some subtle shaping of behavior as students new to online discussions see what they are all about and the quality of postings experienced in a graduate-level class. Perhaps the lack of change over time confirms that adults have fairly stable characteristics, and if they change, they are not changed in a five-week period. And perhaps no self-respecting graduate student would change their behavior in the chase for votes from their peers. In any case, this is an exercise that requires repetition in this setting as well as others. It also may require a change in the rules, since gaining votes for best post resulted in no gain for the vote-getter. Perhaps points should be earned for receiving votes from their peers rather than solely for participation. Perhaps this change in rules will influence student performance.

Did it identify the best posts? In many of the cases, students used interesting and worthwhile reasons for selecting a particular post as “best.” Their reasoning was often sound and similar to the instructor. But perhaps what was most concerning was that they expressed great difficulty in making their choices and justifying them. This is something the instructor can address in future classes so that choices can be reasoned.

The importance of this second question is two-fold. First, if students are able to evaluate their own and others’ work with some consistency and validity, then this may argue for a different role for the instructor in online discussions. The instructor need not supervise the discussion closely or spend time evaluating the discussions, since student evaluations are reliable about who is performing well and who is not. Second, if the shaping process works, then the instructor can rely on the mechanism of voting or point-getting or some other rule so that students shape others’ behavior online.

Obviously, instructors working with students who are new to online discussions, who are young or immature, and/or who act like a “crank” may feel legitimately uncomfortable letting an online discussion go unsupervised. But perhaps even younger students can eventually have their postings shaped by the subtle rules put in place by the instructor to encourage quality postings that benefit the level of discourse in the class. Therefore, the choice of rule, and changing the rules, may become the instructor’s most useful tool for shaping student behavior and contributions to online discussions.

Conclusion

While it is legitimate to be cautious about generalizing these results to other types of students in other settings, perhaps it is fair to propose three advantages to feedback mechanisms in online discussions. First, feedback theory may have value in understanding what occurs when students engage in online discussions. It is certainly worth exploring and testing in other online environments as well as testing various rules to see which may elicit the best student learning outcomes.

Second, investigating the role of some students in the collaborative learning process recognizes their importance in influencing the performance of other students. This does not negate the role of instructors, but it provides a necessary balance as both instructors and highly regarded students influence how the class proceeds.

Third, using an on-going evaluation process – such as “best posts” or some other mechanism – brings a form of useful feedback into earlier stages of the course. This may well have value as it avoids evaluation occurring only at the end of the course and allows students to improve their performance before final grades are calculated.

Lastly, this area of research has a number of fruitful directions. First, it would be useful to explore the effect of using other rules, such as allocating points to the vote-getters (the individuals whose postings are recognized as the “best”). Second, perhaps point-giving ought to be rationed as in the Slashdot.org example, by allowing only a few students who have proven

themselves in some manner to give points at a time. Third, a more careful exploration of student thinking or motivation needs to be undertaken to determine if they think points matter or if they recognize the influence at all. Also, it may be important for instructors with younger students to test if direct instruction on what is “best” or “valuable” influences what students choose as “best postings.”

In any case, this research may be a productive use of feedback theory that will provide online instructors with new tools for evaluating online discussions and new techniques to influence student learning. Applying appropriate feedback rules may be an important way to encourage students to continuously improve their performance so that online learning can be recognized as an effective means of education.

References

- Bertalanffy, L., Von. (1968). *General System Theory: Foundations, Development, Applications*. New York, NY: George Braziller.
- Johnson, S. (2001). *Emergence*. New York, NY: Scribner.
- Johnson, S. (1997). *Interface culture*. New York, NY: Basic Books.
- Maturana, H. (1991). *Autopoiesis and Cognition: The Realization of the Living*. Dordrecht, Holland: D. Reidel Publishing Co.
- Meyer, K. (under review). The role of age and race in online discussions.
- Meyer, K. (2006). When topics are controversial: Is it better to discuss them face-to-face or online? *Innovative Higher Education*, 31(3), 175-186.
- Maxwell, J. A. (1996). *Qualitative Research Design*. Thousand Oaks, CA: Sage Publications.
- Prensky, M. (2005). Complexity matters. Retrieved July 19, 2006 from http://www.marcprensky.com/writing/Prensky-Complexity_Matters.pdf.
- Prensky, M. (2001). *Digital Game-Based Learning*. New York, NY: McGraw-Hill.
- Ross, D. (2006). Game theory. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy (Spring 2006 Edition)*. Retrieved July 19, 2006 from <http://plato.stanford.edu/archives/spr2006/entries/game-theory>.
- Wiener, N. (1954). *The Human Use of Human Beings: Cybernetics and Society*. Garden City, NY: Doubleday.