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Assessing Online Discussion Forum Participation

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ABSTRACT

As a socially constructive learning tool, discussion forums remain central to online education. They have continued to evolve in functionality, acquiring ever-increasing usability features. However, development has lagged in providing instructors the means to assess student work in forums. The author submits an overview of his software program that provides instructors with the means to evaluate forum work quickly, easily, and repeatedly. The software accomplishes this by accessing the forums' underlying database, searching for manifest and latent data, and calculating data associated with an array of metrics. This is a Web-based tool built on Open Source and standards-based languages, providing opportunities to port the program to numerous Learning Management Systems. It is the intention of this author to provide this tool, when completed, for such use as a free, Open Source tool. Interested parties may e-mail the author for progress updates. Currently, however, further work on the project must await the completion of another project, the author's dissertation.

Keywords: assessment; asynchronous communications; asynchronous discussion; discussion forums; distance education; distance learning; online learning community; Web based interactions

INTRODUCTION

Learning Management Systems (LMS) continue receiving expanded toolsets and quickly assimilating new Web-technologies to provide users an increasingly interactive, richer experience. Chat, streaming media, "blogs," "video-casting," and "podcasting" found their way into online educational settings soon after being generally accepted on the Internet. Yet, discussion forums, an old (in Internet time) technology, seemingly remain the core from which many instructors build online classes. These technological descendants from long-

ago bulletin boards and listservs, one of the earliest tools integrated into online education, remain central to the design and success of many distance education courses.

More so than the newer technologies, discussion forums approximate a replacement for the give-and-take of the brick-and-mortar experience, mimicking many-to-many discussions found in traditional classrooms. In addition, the recognizable conversational structure reflected visually in the tree-like output, simplicity and flexibility of the tool likely contribute to its continued success and acceptance, granting

users an immediate sense of familiarity. The importance of such comforting effects cannot be discounted, especially in a field still relatively new.

Discussion Questions

However, despite the history and wide, though not full, acceptance of the importance and use of forums, lack of awareness on how best to use them persists. Note that this unawareness does not pertain to the implementation of forums, or designing them to encourage adoption. In fact, Markel (2001) notes that forums have developed beyond simple, plain text message boxes, incorporating emoticons, HTML formatting, images, and hyperlinks to provide a more enticing tool to draw students into their use. Yet, while these features encourage participation, there is no clear way for instructors trying to devise effective forum evaluation schemes.

This article, therefore, examines forum technology assessment. Given the importance of assessment in learning, it is apparent that such a widely used distance learning tool must provide instructors with sound options for evaluating student work. Moreover, effective assessment options, with associated feedback, provide the added benefit of encouraging an increase in student postings, thus adding to the forums' potency. Yeh (2005) notes that student participation increases as instructors place an importance on posting by assigning grades to forum use. This is unsurprising, as one would expect graded assignments to garner more attention from students than non-graded activities. Swan (2001) finds this true as students calculate reward versus effort when determining whether to participate in forums. Forums with a larger percentage of influence on grades receive more use. However, while most LMS do provide instructors some means of forum assessment, current tools remain either overly limited or too time consuming to use.

Forum Types

Note, different forum types exist, and not all contain posts needing assessment. The first might be termed "social" forums. These fo-

ums furnish students with an informal area to discuss class- or non-class-related matters. Often, instructors state they will not view these forums' contents, thus creating a space in which students are free to speak openly, criticizing or praising the instructor, course, curriculum, or school without concern the comments will influence grading. Instructors often refer to these forums as "water coolers" or "student lounges." While these forums may provide students social benefit, instructors almost never assess them (Nelson et al., 2005).

A second type of forum might be labeled "general discussion." Like the social forums, these tend toward a free flowing, less structured style. However, unlike the social forums, these pertain to the course material and are less informal. Instructors may select broad topics or simply ask students to post any course related questions or material. Whereas social forums resemble hallway discussions among students, general discussion forums mimic an open question discussion in the classroom. Like their classroom counterparts, online general discussion students might receive grades based upon participation, insight, argument, initiative, and other factors.

The last forum type considered here is the "topic driven" forum. These forums are the most structured in terms of content and correspond to classroom assignments in which the instructor picks topics and expects students to come prepared to debate and defend stances. Similar to general discussion forums, instructors may wish to assess topic driven forums as they would in the classroom—on participation, style, scholarship, argument, insight, and other subjective and objective factors.

Quantitative and Objective Forum Assessment

As stated previously, forums currently do possess methods to assess student work. The LMS and the instructor provide quantitative and objective means of evaluation. The concern, however, is whether these methods offer instructors the tools needed to accurately and meaningfully measure student work.

One of the most basic methods, in fact, exists in most LMS's, and is simply a count of each students' postings, allowing the instructor to assess based upon predetermined levels matched to grades. For instance, a minimum of five posts per week may warrant an "A," four a "B," and so on. The advantages of this method appear plentiful. For one, students easily understand the measurement and are clear on expectations, which Dennen (2005) notes may promote participation. In addition, assessing is easy for instructors, as the LMS likely provides reports listing a count total for each student. Instructors need do no more than run weekly reports and award grades accordingly.

Disadvantages, however, exist as well. Forum threads often contain a number of insignificant posts consisting of little more than "me too" or "well said." Since the LMS in this case only considers counts, these posts weigh equally with well-written, researched posts, a situation many students and instructors would find unfair.

Additionally, relying solely on counts encourages post submissions, but not necessarily forum participation, if the expectation is that students will also read their classmates' offerings. As a result, the forum may devolve into a writing exercise with each student posting detached, unrelated essays rather than interrelated posts, building an interconnected discourse (Dennen, 2005). Consequently, the forum in this case remains underused as an interactive, communicative learning tool (Dunlap, 2005) and becomes little more than a channel to submit electronic topical papers.

Instructors often address this shortcoming with a seemingly sensible solution: requiring students to comment or respond to a few of their peers' posts each week, in addition to submitting original posts. The requirements remain simple for the students to follow and easy for instructors tally. The new rule's intent, of course, is to forge threads from the posts, and subsequently, discussions from the threads, by mandating a level of interactivity. Although the idea seems reasonable and does produce at the least the instructor-assigned degree of interac-

tion, the threads may consist of little more than this minimum. Students post to expectations (Dennen, 2005) and without more guidance than simple quantitative requirements will post the minimum type of reply necessary. Moreover, the response or comment posts can lack a depth matching the original post, and a repetitive pattern quickly ensues in which responders follow up initial posts with inconsequential replies, adding little to the aggregate knowledge (Ivankova & Stick, 2005). Thus, the forums attain some interaction, but the requirement change may not bring about the desired higher-level discourse or debate.

The next step, then, is to raise the degree of discussion while maintaining an easy means to measure student work. Some instructors attempt this by requiring all posts, including the response postings, to have citations from peer-reviewed publications. This seeks to infuse a degree of scholarship, thus raising the discussion level. At minimum, the hope is that the new rule forces students to research and form their responses around that research.

This remains a simple quantitative and objective measure. Instructors may alter the number of citations needed, or the sources allowed, but the measure remains merely a type of count. There is the beginning of significant change, however. Note, though in essence simple, such a measure is beyond the abilities of typical LMS because they lack the capability to differentiate a citation from any other string of text. Thus, they cannot count or note citations, and the burden of tallying this assessment, then, moves for the first time from the LMS to the instructor.

Qualitative and Subjective Forum Assessment

Part of the allure of quantitative and objective assessment of forum work is the simplicity for the students and the instructors. For the instructors, this translates into speed and timesaving, as quickly accessed reports reveal each student's standing; grading is very straightforward. Yet, perhaps depending upon the student's age and grade level, relying solely upon quantitative

measures may not offer the clearest evaluation of performance. In the case of tallying postings, the measure is ultimately an electronic attendance sheet, tracking whether students checked in and “participated.” However, at the undergraduate level and higher, instructors likely prefer grading on criteria that are more substantial. Absent in most pure counting methods, subjective measures such as writing style, initiative, strength of argument, and originality offer a more robust grading rubric.

In fact, many such rubrics exist. For example, Edelstein and Edwards (2002) devised a forum assessment rubric called “Assessing Effectiveness of Student Participation in On-line Discussions.” This rubric consists of five categories: Promptness and Initiative; Delivery of Post; Relevance of Post; Expression within the Post; and Contribution to the Learning Community. The instructor is to consider each student’s work as a whole, evaluating each post on a scale of one to four, with one the lowest, in each of these categories. Edelstein and Edwards provide explanations for each rating of each category to aid the assessor. For instance, a one rating in the “Relevance of Post” category translates to “Posts topics that do not relate to the discussion content; makes short or irrelevant remarks.”

Such qualitative and subjective measures afford the instructor far more leeway in assessment than mere counts. Whereas a “me too” post is awarded standard points in a count assessment, such a post would draw the lowest score in the just mentioned Edelstein and Edwards category. These subjective ratings also provide the instructors the means to use their judgment, allowing them to weigh factors differently, perhaps for instance, heavily rewarding creativity in thinking or writing style, while affording less weight to the inclusion of citations.

Additionally, by moving to richer assessment rubrics, instructors lead students to submit richer messages, which elicit richer peer responses and lay the foundation of scholarly discussion. These subjective assessments attempt to measure higher-level learning, including analysis, synthesis, and evaluation

and direct students to post accordingly. Bhag-yavati, Kurkovsky, and Whitehead (2005) note that students adjust their posts to meet these expectations, and the forums’ quality wholly moves upward. As stated earlier, students adjust their work to meet expectations.

Unfortunately, the instructor time expended is a considerable drawback of detailed rubric scoring and subjective qualitative assessment. Consider the time needed to work through a five-category rubric in a class of 20 students in which postings could easily total between 500 and 1000. Unsurprisingly, instructor fatigue becomes a concern as forum management evolves into a significant time- and effort-intensive activity (Dunlap, 2005).

Another drawback, often overlooked, is the return to manual effort for the assessor such rubrics require. This is unfortunate considering most LMS’s run atop powerful computers very capable of intense calculations. Moreover, relational databases contain the actual forum data, availing a trove of information to SQL querying. Forgoing such computational resources is inefficient and counterintuitive considering online courses exist only through the use of such advanced technologies.

Proposed Solution

The need for a forum assessment aid seems clear. The requirements are also apparent—develop a tool to assist instructors in assessing forums using measurements beyond the simple quantitative counts. The tool should incorporate some degree of qualitative or subjective measure and should utilize the power of the host computer. Certainly, the tool should provide a simple, usable interface to encourage adoption.

Current Packages

Ideally, forum software would offer an integrated tool to assist in assessing forum messages; unfortunately, this is presently not well advanced. However, Wu and Chen (2005) have developed software that attempts automating assessment of student forum work. Their software is similar to Qualrus, mentioned by Gilbert (2005), in that it parses written submis-

sions and grades them based on the instructor's preprogrammed criteria. Whereas Qualrus and other similar essay-grading software purportedly evaluate style, grammar, structure, quality, and argument, Wu and Chen's software appears to measure fewer writing criteria. Instead, the software algorithmically determines knowledge density, or message quality, using instructor-specified keywords. The software then accesses the forum's database, and using the message field's length and participant-sorted message counts, assigns values for student effort and participation.

Wu and Chen's method attempts less to assess message content than essay grading software such as Qualrus, and examines the database for supplemental information; this may be preferable for forum evaluation. If the instructor uses forums for socially constructive learning, for instance, much of the "construction" exists not individually in each message, but in the forum structure, in the interfaces between and among messages, captured latently in the database. Any assessment must consider the forum as a whole, messages inter-related in a web (Schellens & Valcke, 2004). To appraise each message separately and solely limits the instructor to an assessment of independent "mini essays," each presumably unaffected by others' postings.

Developing a Solution

Although Wu and Chen (2005) propose gleaning modest amounts of data from among the tables, this author believes the tables and the relations between the tables hold enormous amounts of valuable information. As an example, Dringus and Ellis (2005) believe mining the database has significant potential to reveal information hidden, for instance, in timestamps and sequence numbers. These numbers, referred to here as "manifest" information, lie in fields readily available to SQL queries. However, properly manipulating this manifest information potentially reveals additional "latent" information that is also useful in assessing the forums' contents.

For instance, message timestamps reveal relative temporal information that may show evidence of student initiative by indicating first postings or responses. Additionally, a post with many responses, evidenced by subsequent sequence numbers and parent-child pointers found in the database, may show a post's effectiveness. Certainly, for instance, it is arguable in a socially constructive environment that a student post, eliciting numerous responses and thus acting as the impetus for peer involvement, warrants a positive assessment to some degree. Yet, a methodology focused wholly on the individual message, and not tuned to consider the message "tree," misses this information entirely.

The solution, therefore, appears to require first the formation of meaningful measures, followed by a search of the database fields and relationships for latent and manifest data supporting the measures, and finally the development of the algorithm and SQL to pull the data from the database. The author has proceeded through these steps, designed such a program, and has developed a simple Web-based interface, allowing instructors to quickly and repeatedly use the tool. The hope is that the simplicity will compel instructors to use the tool often to provide students frequent feedback on forum performance.

Following is an overview of the measures used by this author, some insight as to the reason each is included, and a brief explanation of how the program attains the data:

- **Initiative:** Being first to provide an opinion is not easy, so the system rewards students in two situations: one if the student starts a thread, and two, if the student is the first to respond to an instructor post. The system captures this in the posts timestamps.
- **Effectiveness-Depth:** In a socially constructive environment, one measure of effectiveness is the amount of involvement elicited. Thus, the system calculates the number of responses and sub-forums spawned. Students are rewarded for being able to draw others into a discussion.

- **Effectiveness-Breadth:** This is similar to the previous measure in that it rewards students for educating classmate responses. However, a “deep” thread (many responses) may involve only two or three students, perhaps still valuable but less of an indication of the enthusiasm for thread than the number of responses indicate. On the other hand, this measure calculates and rewards effectiveness by tallying unique responders, thus revealing the scope of the enthusiasm.
 - **Value:** In the current system, students can anonymously rate each other’s posts on a one-to-five scale representing “Not Valuable” to “Very Valuable.” The system then measures value by averaging the peer rating a student’s posts receive. This is a very important measure since each student defines value for each post differently. What may seem to many students a simple, low-value posting may clarify a point and offer high value to other students. This metric accounts for the possible variances.
 - **Timeliness:** This measure is best used when the instructor does not impose a posting deadline on threads. Rather, students continue threads for as long as there is interest. In this way, students may revisit older threads as they learn more, or as they come upon new information. However, differences exist between legitimate, interesting late posts and messages submitted well after a thread is exhausted. The system recognizes this by calculating timeliness as the standard deviation of a thread’s posting time, and assumes interesting late posts will draw responses and move the standard deviation toward itself. Merely late posts will not alter the standard deviation and will not receive credit.
 - **Participation:** Post count is not a good measure of participation. For instance, one student may log in and post several times a week over the extent of a course. Conversely, a peer may log in at the last minute and post an equal number of messages. Clearly, they participated at different levels. To reward consistent participation, this system determines whether each student’s Average Time Between Posts (ATBP) is within the standard deviation of the class’s ATBP. Students whose ATBP is outside do not receive credit.
 - **Scholarship:** Instructors may expect posts to contain certain keywords, phrases, or names. Additionally, they may require citations. The system searches each post for words from an instructor-determined list and scans for citations. Posts receive credit for containing either keywords or citations. The citation search is not flawless, as the system uses regular expression patterns to match what are likely citations.
 - **Style:** Perhaps misnamed, the system does not examine the prose for writing style in this metric, but instead performs a word count. Students receive points for posts above a specified count but below another count. The attempt is not to reward short, unsubstantial posts, or long, rambling posts. Therefore, more precisely, the metric attempts to encourage succinct, concise writing.
 - **Instructor Points:** While the previous metrics seek to cull needed data directly from the database, certainly some subjective measures cannot be calculated from the tables’ fields. Thus, the system provides the instructor an opportunity to add or subtract points from each student’s assessment. Therefore, for instance, the instructor may reward a student who has consistently put forth original arguments, or who has carried discussions to a higher level. Likewise, an instructor may subtract points from a student who has done well, but has consistently used poor grammar or spelling.
- These metrics are varied enough to provide a flexible array of point opportunities to students. Some students may be comfortable, or in a fortunate position to attain points from the Initiative measure. Others may better at writing concisely or with a style the instructor appreci-

ates, and positioned to acquire Style points. Still others may have the time to post frequently and receive points for Participation. All can pursue Value or Scholarship points.

The author's system seeks to add further flexibility for the instructor as well. Rather than considering each measure equally, the tool allows instructors to weight each metric to their preference. For example, one instructor may find the Effectiveness-Breadth measure most compelling in assessing forum work. Therefore, the instructor may weight this as 40% of the overall assessment calculation. On the other hand, another instructor may weight this at 10%, and weight Instructor Points much higher. By allowing varying weights, the system incorporates another degree of instructor subjectivity into the assessment.

An instructor configures the desired weights on a simple Web page that lists each measurement with an accompanying explanation for the measure. Each is followed by a dropdown box listing numbers from zero to 100, and the instructor weights each measure so the total of all selected weights, added together, equals 100. This screen also has a textbox input for keywords, used in text searches, in the event the scholarship measure is chosen. Naturally, instructors weight measures they feel important for assessment highly and those they consider less important lower or zero.

If the instructor selects Instructor Points as a measure, the next screen displays a class roster with a dropdown box with numbers from negative 100 to positive 100 associated with each student name. Here, the instructor assigns positive or negative points to each student. Note, these are the actual points; the weight of these Instructor Points was configured on the first screen.

The final screen, whether or not Instructor Points is used, displays each student's calculated rating. It is important to note the system scores students as a percentile rank of all points awarded and not from a finite allotment of points. Thus, first the system determines total points awarded for everyone, and then ranks

each student based upon the student's earned points. In this way, students are not aiming to amass a specific number of points for associated grades (i.e., 100 points for a C, 200 for a B, 300 for an A), but instead realize they must maintain pace with classmates through participation by accumulating as many points as possible. As classmates participate, the pool of awarded points grows, compelling students to continue to post, less their awarded allotment shrinks as a percentage.

CONCLUSION

Assessing student work in discussion forums remains difficult for busy instructors, especially if one wishes to use measures beyond simple tallies. However, the author's software solution offers some hope by providing an easy to use, flexible solution. The tool is Web-based, written in Open Source and standards-based languages that should provide the basis for easy portability. Interested parties can e-mail the author for progress updates. Unfortunately, for the moment other project requirements demand a—hopefully brief—respite from the project. When finished, though, it will be freely available as Open Source.

Because of use of the LMS's underlying hardware and software, the tool performs its calculations quickly. Additionally, because of the simple interface, the tool encourages instructors to run assessment reports often, thus enabling the instructor to provide continual feedback to students. Consequently, the forums rise to higher levels of discussion and debate and become true socially constructive learning environments as students learn to post, read, and respond accordingly.

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