MAILING LISTS ARE PREFERRED TO NEWSGROUPS AS TEACHING TOOLS FOR UNDERGRADUATE BIOLOGY CLASSES

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Effective communication between instructors and students is a challenge regardless of the instructor-to-student ratio. Instructors of large classes, in particular, have resorted to various forms of Internet communication, such as mailing lists and newsgroups, to supplement class time and office hours. Mailing lists are closed discussions among subscribers who receive and send messages via an electronic mail program (e.g., Eudora). Newsgroups are public discussions to which anyone can gain access and respond via a newsreader program (e.g., Nuntius). Newsgroup messages are posted to a bulletin board that the subscriber must visit to read. Mailing lists and newsgroups share many advantages (convenience, greater anonymity, and speed of communication) and disadvantages (computer access required, impersonal nature, junk mail, and lack of graphics in older programs). However, surveys of both faculty and students in biology indicate that mailing lists are generally favored over newsgroups. Reasons given for mailing list popularity included greater familiarity with the E-mail format and ease of access.


Key words: Internet; E-mail

Instructors of classes, large and small, science or nonscience, are faced with the challenge of how to best communicate with and support students. Growing student populations and increasing institutional demands on instructor time are some of the pressures that prompt instructors to seek effective forms of communication other than the traditional means of class time and office hours. Therefore, many instructors have resorted to Internet use to disseminate and gather information, in some cases making Internet access an absolute requirement for students. This trend is addressed in a number of recent educational articles (1–5). Internet use for educational purposes has been on the rise since the late 1980s and has been correlated to improved grades, instructor-student communication, writing skills, and critical thinking (see reviews, Refs. 1 and 2). Reasons cited for the movement of the classroom into the electronic forum include pressures from increasing class size and the enhancement of learning by virtue of the interactive nature of computer use (1). Another practical but very important reason is the necessity for students to be Internet-literate and to develop their skills of communication and collaboration, vital in the professional world (5).

Two popular forms of Internet services for classes are mailing lists and newsgroups (see Table 1 for a comparison of characteristics). A mailing list (also known as a listserv or listproc) is an electronic forum in which list processor software distributes mail simultaneously to all list subscribers. Messages sent to the list appear in subscribers’ E-mail inboxes. Newsgroups are topically organized electronic discussion
groups in which newsreader software obtains articles from the newsmachine, a computer that runs the news server software. Messages are posted to an electronic bulletin board. Mailing lists and newsgroups share characteristics of any electronic forum: computer access and account required, relative anonymity, and speed and ease of communication. In both cases, it is possible to reply either to the whole group or just to an individual. From the viewpoint of an instructor (the owner), the major differences between mailing lists and newsgroups involve access control (none with newsgroups) and efficiency (newsgroups more efficient with >200 students). From a student's perspective, the most important difference is probably means of access: mailing list messages are delivered to the student's inbox, whereas the student must “visit” the newsgroup bulletin board. Variations of both mailing lists and newsgroups exist. For example, some classes use a moderated mailing list in which students E-mail the instructor with questions and the instructor posts the questions and answers to the list.

Mailing lists and newsgroups are similar services with comparable advantages and disadvantages; therefore, a simple comparison of characteristics may not suffice for an instructor to decide which will be most effective for his or her class. We have successfully used mailing lists for both large and small upper-level biology classes but have never employed a newsgroup as a teaching tool. We conducted these surveys to determine faculty and student patterns of use and comfort levels regarding mailing lists and newsgroups.

**METHODS**

Faculty members (n = 10) and undergraduate students (n = 356) in biological sciences at the University of Texas-Austin were surveyed regarding their experiences with mailing lists or newsgroups, or both. Written surveys were administered to two classes that were using a mailing list (n = 270) and two classes that were using a newsgroup (n = 86). In both cases, one class was a relatively large introductory biology class and the other class was a smaller, upper-level biology class. Table 2 shows the survey questions given to students and faculty. Most questions required a multiple-choice response, but comments were also solicited. Surveys were manually tabulated, and student survey results were graphed using Excel 5.0. Responses to questions 1, 3, 4, 5, and 7 were analyzed using nonparametric statistics (Mann-Whitney test) and a Student’s t-test. Questions 2 and 6 were analyzed using a chi-square test. Differences were considered significant if P < 0.01. Faculty results were not graphed or analyzed because of the low number of responses (50 surveys were distributed, but only 10 faculty members responded).

**RESULTS AND DISCUSSION**

The student survey results yielded several insights into student educational computer use. The mailing list and newsgroup student populations were similar in background, as indicated by responses to questions such as familiarity with computers (see questions 2–6 and Fig. 1). The responses to these questions were not significantly different between the two groups. In general, most students have a computer at home and are comfortable with computer use. Although most students say they usually prefer an indirect form of communication with instructors to speaking out in class, relatively few of them actually post messages to either the mailing list or the newsgroup. Apparently the bulk of discussion is between instructors and a small fraction of their classes. Approximately 30% of students surveyed agreed that using a mailing list or newsgroup increased their familiarity with and use of the Internet.
The similarities between mailing list and newsgroup formats and their advantages and disadvantages would lead one to conclude that the two are equally desirable teaching tools for most undergraduate classes. To our surprise, student survey results indicated that students use mailing lists more than newsgroups and perceive mailing lists to be more effective than newsgroups for instructional purposes. The responses to question 1 (frequency of use) and question 7 (perception of effectiveness) were significantly different between mailing list and newsgroup users (P < 0.001; see Fig. 2). Students checked E-mail much more frequently than they checked the newsgroup bulletin board, with “daily checkers” comprising ~50% of the mailing list group but only 3% of the newsgroup sector. Astonishingly, nearly 50% of students in newsgroup classes had never visited the bulletin board. As a result, more newsgroup users (or nonusers!) considered the newsgroup to be ineffective as a teaching tool (10% compared with <1% for mailing list users). More than 60% of mailing list users, but fewer than 30% of newsgroup users, considered the relevant technology to be very effective. Surprisingly, more than 60% of the newsgroup users classified newsgroups as “somewhat effective,” a seeming contradiction to the low percentage of actual users. However, many students added the qualifier that newsgroups were potentially effective, but either not as employed in that particular class or given the individual’s lack of familiarity and skill (see Table 3).

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Why the discrepancy in student response to such similar Internet services? One answer gleaned from this study is that students are more familiar and comfortable with the mailing list (E-mail) format than the newsgroup format (Table 3). In fact, a significant number of students, particularly in the introductory biology class, commented that they “never found the newsgroup.” Some of them apparently never even tried, perhaps intimidated by the technology. Another answer that emerged is that the mailing list messages are easier to access—that is, the message simply appears in one’s mail program inbox, whereas to read a newsgroup message, one must actively visit that site. It seems that the prevailing preference for passive learning extends into the Internet-based educational arena as well as the traditional classroom arena.

The few faculty members responding to the survey also expressed a preference for mailing lists, primarily because their students did not use the newsgroup format to the satisfaction of the faculty member. Types of items posted by faculty included class syllabus, concepts, and announcements. From the authors’ experiences, student postings generally are concerned with either clarification and amplification of concepts or with “housekeeping” items such as assignment due dates. Occasionally, more esoteric discussions evolve (see review, Ref. 1), such as a posted question of why chocolate is toxic to dogs that developed into a pharmacologically based exchange. Both faculty and students appreciated the noninvasive nature of the mailing list or newsgroup format. The reader can respond when convenient and is perhaps spared the embarrassment of not having an immediate answer. Many faculty have found that class Web pages supplemented by individual E-mails are even more effective, primarily because Web pages eliminate junk responses and offer graphics (current E-mail programs such as Eudora Pro and USENET newsreaders such as M3-Newswatcher support styled text and graphics as well). Partee (3) extols the triad of E-mail, Web page, and newsgroup technology because together they cover all the necessary bases of education. E-mail provides opportunities for personal counseling; Web sites can often disseminate information more effectively than a lecture; and newsgroups promote classmate interactions even among students uncomfortable with classroom participation (3).

**FIG. 2.** Comparison of student responses between mailing list \((n = 270)\) and newsgroup \((n = 86)\) users to questions 1 (Q1) and 7 (Q7). Question 1: How frequently do you check for updates to the list/newsgroup? Question 7: How effective do you think this technology is as a teaching tool? Analysis with a Mann-Whitney test and a Student’s \(t\)-test demonstrated that the combined responses of mailing list and newsgroup users to questions 1 and 7 were significantly different \((P < 0.001)\).

**TABLE 3** Summary of written responses of faculty and students

<table>
<thead>
<tr>
<th>Comments From Faculty and Students</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applies to both mailing lists and newsgroups</td>
<td>Convenient 24-hr access</td>
<td>Requires computer</td>
</tr>
<tr>
<td></td>
<td>Quick communication</td>
<td>Impersonal</td>
</tr>
<tr>
<td></td>
<td>Relatively anonymous</td>
<td>No graphics</td>
</tr>
<tr>
<td></td>
<td>Can be good study tool</td>
<td>Junk mail</td>
</tr>
<tr>
<td>Mailing lists</td>
<td>Students familiar with E-mail</td>
<td></td>
</tr>
<tr>
<td>Newsgroups</td>
<td>Ease of access</td>
<td>Students less familiar</td>
</tr>
<tr>
<td></td>
<td>Greater effort to access</td>
<td></td>
</tr>
</tbody>
</table>

EDUCATIONAL EXPERIMENTS

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The popularity of mailing lists is offset in the eyes of some by several problems. The plethora of postings, particularly before exams, can daunt the most dedicated instructor. However, the authors have found that although sifting through mailing list postings can be time consuming, many of the questions posted to the list are related if not repetitive and can be addressed in a single reply. Furthermore, students can be encouraged to answer each other’s questions, with instructors intervening only to correct erroneous postings. Manageability is further improved by the use of a moderated mailing list, mentioned earlier, in which all messages are filtered through the instructor for appropriateness and anonymity. Students are less inclined to send inappropriate or frivolous messages directly to an instructor.

Another problem, explored by Piirto (4), is the poor quality of writing used in E-mail documents. Contrary to the studies alluded to earlier, in which educational Internet use correlated with improved writing skills, Piirto found, as did we, that rules of writing are usually abandoned in E-mail communication. Generally, this characteristic of E-mail writing is not problematic unless assignments are actually submitted via E-mail. In that case, the instructor may need to clarify his or her expectations beforehand.

To our knowledge, no previous studies have been published comparing the perceived effectiveness and popularity of mailing lists versus newsgroups or any other Internet tool. Despite the similarities between the two formats, mailing lists are preferred to newsgroups as teaching tools for the undergraduate biology classes surveyed at the University of Texas, which are presumably representative of classes in general. The rationale given indicates that students are more comfortable with the E-mail format of mailing lists and that the messages are easier to access than the newsgroup format. Faculty prefer mailing lists simply because their students use them with greater frequency than newsgroups. The subtle differences between these two similar electronic forums could determine the difference between success and failure in extracurricular student-teacher communication.

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