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Impact and Challenges of E-Learning

As the number of e-learning courses grows at institutions, the academic experience changes for an increasing number of instructors and students. Both groups must adapt as the institutional support processes evolve. Course preparation might entail, for example, learning a new software application to convey a concept more effectively; students may express their learning efforts via text, audio, or video. This creates new challenges that students and instructors must confront and overcome. This chapter depicts e-learning's impact on instructors and students, as gleaned from the research's interviews and online survey.

Adaptation Rule in E-Learning Course Development

When instructors first decide to incorporate an e-learning element into their instruction, most adapt a current course. When we analyzed interviewees' comments, a course adaptation path emerged. Many instructors start slowly, incorporating a simple course management system (CMS) tool. As they gain confidence, instructors begin to consider e-learning's pedagogical impact on their courses and how to further enhance them. The sequential pattern that emerged from the research suggested the following:

- ◆ *Instructors tend to start with less complex activities.* "Obviously one of the major ways that the faculty members use the technology is simply by posting relevant documents in our course management system," noted David Baird, director, innovative technology solutions for learning, Colgate University.
- ◆ *Instructors then begin to focus on pedagogical aspects, even if it is just to consider how to best use CMS functions.* "Adaptation requires commonsense judgments as to how to take standard classroom practices and plug them into the established structure of the software," said Steve Lucas, reading instructor and curriculum developer, Maricopa Community Colleges. "For example, the faculty member must decide whether an activity is best for a discussion board or e-mail."
- ◆ *Instructors rethink their course concepts accordingly.* "The adaptation process for the electronic course was about starting over completely," said Anita Leffel, a lecturer in the management department at The University of Texas at San Antonio. "Faculty had to build the template and plan extensively. They were developing the technical and instructional aspects of the course in parallel so that the instructional technology would fit within

the technical constraints. One cannot be thought of in a vacuum from the other. It is a very iterative process, based on trial and error, with lots of sampling and sketches.”

- ◆ *Instructors then begin to reference other teaching models.* Roger Caldwell, professor of soil, water, and environmental science at the University of Arizona, stated, “It depends on what an instructor is trying to do. If someone is interested in building a simulation or trying to communicate a certain concept, he reaches out to places in his own field for a resource link or to a resource like MERLOT.”

As instructors gain experience, they tend to move from strict course conversion to true innovation, using technology in new ways and within new courses. “The majority of courses that we have running were adapted from a classroom mode of presentation,” explained Paul Faber, dean of arts and sciences, Fort Hays State University. “We’ve seen that a faculty member typically designs his first e-learning course with a strong resemblance to his classroom-based course,” Faber said. “But as time goes on and he gains more experience, he begins to use the medium a little differently, with more freedom to structure it in a more unorthodox, freestyle way.”

When instructors teach an e-learning class, they must add technology to the many issues they already juggle. “The teaching and learning process is very fine tuned, a fact that is not evident until you try to tinker with it,” said Geoff Spedding, associate professor of aerospace and mechanical engineering at USC. “The flow of thought is disrupted in the class (when there are technical problems). The consequences of one small change can be far-reaching. The result of this ever-present threat of downtime means that the instructor needs to be ready to think on his feet and react in a flexible manner. Students

are amenable and flexible, and willing to cut the instructor some slack. After a while, however, the students expect the problems to be fixed. It is not acceptable to impose these problems continually.”

E-Learning’s Time Requirements Challenge Instructors

Perhaps the most frequently cited challenge of e-learning was the amount of time required to develop and maintain an e-learning course. Respondents often used such words as “shock,” “surprise,” or “drastically underestimated” when describing how much time they and their colleagues spent on e-learning relative to their traditional courses. Discussions with e-learning faculty suggest several key underlying drivers of this time burden.

- ◆ *Instructors need to rethink and fundamentally restructure e-learning classes.*

In many if not most cases, faculty spend substantial time and effort reengineering the course to adapt it for online delivery. This represents a significant amount of added effort for instructors, because many have fine-tuned their pedagogical approach for traditional lecture-oriented presentation.

- ◆ *Instructors need technical and pedagogical training.*

By and large, instructors tend not to initially comprehend that e-learning instruction differs fundamentally from traditional approaches and requires a major commitment of time and training.

- ◆ *Additional time is needed to communicate with students.*

The increased communications requirements (principally e-mail) are without a doubt the “800-pound gorilla” of e-learning. Audrey Mosley, faculty coordinator for distance learning at St. Philip’s College, frequently hears faculty concerns about e-learning’s added demands. “One

of the biggest issues we've seen is the enormous volume of correspondence with students, and the time that it requires," Mosley said. "For the majority of faculty that teach both Internet-based classes and traditional classes, it's been a real challenge balancing the time commitments between the two [modes]." St. Philip's employed a straightforward solution: it imposed a limit of 20 students per Internet-based class.

- ◆ *New e-learning faculty tend, on average, to be marginally less technologically sophisticated.*

Early faculty adopters of e-learning tended to be more cutting-edge "pioneer" types, and as such they were highly motivated to make it work. It's not at all surprising that the next wave of adopters—while far from Luddites—are somewhat less motivated and/or equipped to address the issues inherent in offering e-learning courses. Comments by Julia Briggs, St. Philip's College, reinforce this notion: "At the beginning, the pioneering faculty were willing volunteers, and because of this were eager to learn all these things. The second wave of faculty is not entering the program with the same level of enthusiasm, and they are surprised at some of these differences. They're amazed at how labor-intensive and time-consuming it is—at the amount of time it takes to develop and teach the course, and the time required to respond to e-mail alone."

Technical Issues Assume a New Importance to Faculty

When adapting e-learning courses, interviewees identified several technical issues that hamper instructors' activities. The lack of course prototypes and software standards raises the need for a common course development platform. Others identified the technical limitations of course management software, though we couldn't determine

through the interviews whether lack of training or the software itself causes these problems.

David DiBiase, head of Penn State's E-Education Institute at the College of Earth and Mineral Sciences, pointed also to support staff's lack of technical expertise. "To make an e-learning course compelling—especially in our field (earth and mineral sciences)—requires the development of multimedia: Flash, Shockwave, and technical simulations," he explained. "That causes problems, because a person who has the technical skill and the understanding of our field to make compelling content is not always available."

When teaching, one respondent said, challenges can be as basic as how to write and easily distribute equations in an online environment. Others cited lack of technology proficiency—confusion when operating software, lack of awareness when the server crashes, and real or perceived CMS shortcomings. The University of Arizona's Caldwell cited lack of technical consistency in the classroom: "Are things going to work when I'm in the classroom? Will the Internet be up? Do I need to bring back-up materials on a disk? Will the last instructor have left things in good shape? These [issues] may be more basic than you'd expect, but dependability is still a major issue."

Unreliable technology can hinder instructors' ability to monitor student activities. "Students can claim to log in—either distance learning or resident—when the system is down," said Thomas Berner, professor of journalism and American studies, Penn State. "If it does not come back up, the students can then use that as their excuse when they are late with their assignments."

To resolve technical problems, one instructor brings back-ups to class for emergency use. Martha Marinara, assistant professor of composition at the University of Central Florida, reported that she receives

considerable technical support from her students during class. The fact that students have selected online courses tends to make them a bit more technically sophisticated, Marinara feels, and consequently better able to help the instructor.

E-Learning Technical Issues for Students

When designing e-learning courses, instructors must consider students' technical limitations—bandwidth and computer hardware, for example. The University of Arizona's Caldwell believes some faculty members create Web pages with too many graphics. This is not a problem for students in dorms, but many University of Arizona students live off campus and have varying degrees of online access and bandwidth. Instructors might also develop courses using large monitors, while students will display the pages on smaller monitors. To serve its global online student population, the University of Phoenix designs its online courses with the dial-up user in mind. Most courses use text-based materials and require extensive online text-based discussions. The institution shies away from any high-bandwidth material or activity.

Technical infrastructure deficiencies on the student side can impede course activities, especially in an online distance-learning environment. "One constant problem for online distance-learning courses is the technology and the knowledge at the other end," explained Fort Hays's Faber. "Students often do not have the proper equipment, particularly for some of the courses that require a higher bandwidth. We do not have a single set of user requirements for all courses; otherwise we would have to tame down some of the classes or set the requirements at the high end. We always find some students enrolling in a class in which they do not have quite the proper hookup."

To help online distance-learning students prepare, Fort Hays communicates technical requirements prior to the start of classes. "We post an expanded description or syllabus for each course—something that is well beyond what we publish in our catalog or class schedules," Faber said. "We try to make that publicly accessible on a Web site months before the semester begins. Once the student registers online for a class, it stimulates an automatic response that describes the technical requirements for that particular course. Also we mail a postcard to the student three weeks before the class with logon information." Before students enroll in their first online distance-learning course at the University of Phoenix, counselors review technical requirements with them and students sign a form stating their awareness of the requirements.

Students' E-Learning Activities and Challenges

E-learning changes the student's experience as well as the instructor's. Class time does not necessarily mean passively taking notes in a lecture. E-learning frequently requires hands-on activities, whether participating in an online discussion or creating a Web page about research activities. This introduces new issues and challenges for students, including computer experience and confidence, computer ownership, technical problems, and time management.

Students enrolling in an e-learning class must not only master the course's subject matter but also possess the technical skills to participate in the course and study effectively. This may represent a minimal technical challenge for many students, but this is not universal. "There is an assumption that all students grow up with technology and know it," stated Colgate's Baird. "In fact, our students display a great spectrum of

abilities and comfort levels with computers.” Other institutions, like Winston-Salem State University, identified lack of confidence and experience with computers as a challenge facing many of its e-learning students. Age may make a difference. Marquette’s Jon Pray, associate vice provost for educational technology, noted that most of their online distance-learning students were adults who might not be quite as prepared for the technology experience.

Even students who are comfortable using a computer might not possess all the necessary skills. “I like to say that students are computer savvy, but not computer literate,” stated Penn State’s Berner. “They know about it; they can play the games real well, but when I taught a computer literacy course, all the students identified themselves as experts. Upon the course’s completion, many admitted under questioning that they did not know 90 percent of the Word or Excel features I showed them. The students get only so far in using the computer on their own.”

ECAR’s study *Faculty Use of Course Management Systems* substantiates this observation: “[Faculty members] consistently report that their students seem to have inadequate technology proficiency and that this inhibits their CMS use. Complaints about students’ technological literacy focus on their lack of technical-problem-solving skills and basic technology-literacy skills such as file management.”¹

While Karen Harpp, associate professor of geology, Colgate University, noted students’ rising technical proficiency in her classes, she finds she doesn’t have to teach them “how to use the technology, but how to use it well.” Harpp cited student PowerPoint presentations that are “fabulously complex—students know how to scan, how to import, how to do everything . . . but the slides can be nasty. There is too much content on the slide, so I can’t read it.”

Also, not every student owns a computer. James Stenerson, director of the Center for Instructional Technologies at Pace University, is surprised at how many students need the institution’s learning resource centers for computer access, creating something of a digital divide among the student population. The access level differs for students who must use the computer lab versus those who tote their laptop with them or can work all hours in their room. Not every computer lab possesses the same technology. As students gain technical proficiency, noted the University of Arizona’s Barbara Hoffman, associate director, Center for Computing & Information Technology, “an emerging problem is access to higher-end tools (multimedia), and the number of students who use them is growing each semester.”

Even students using mainstream applications encounter technical problems. A common problem is slower dial-up speeds at home, especially in rural areas that rely on online distance-learning courses. These students cannot take courses effectively unless instructors scale back course activities accordingly. ECAR’s study *Faculty Use of Course Management Systems* noted the same problem: “Widespread problems with student access to technology certainly contribute to faculty perceptions that students have weak technology skills....Many faculty report that students do not have access with enough bandwidth to use the CMS effectively and that access itself isn’t always reliable.”²

As with their instructors, time management skills and self-motivation impact student performance in e-learning classes. “Some students complain that if they actually completed all the interactive activities, it would take a lot of time,” said Penn State’s John Harwood, senior director, teaching and learning with technology. “They don’t realize that it is just like a traditional course where they must complete all the assignments

and attend class. It is time-consuming." Penn State's DiBiase noted, "Disorganized individuals are not going to have a good experience. Students and faculty members both need good time-management skills." He noted that older students tend to have better luck with online distance-learning courses because they have developed better time management skills.

Dave Szatmary, vice provost of educational outreach at the University of Washington, underscores how important self-motivation is for students to succeed at e-learning. "Students don't have to come into a classroom to have knowledge poured into their heads. They have to take the initiative." This can be such a problem that St. Philip's created a series of self-diagnostic tools to help students determine whether they possess the right characteristics to take an e-learning course successfully. The University of Phoenix's online distance-learning pedagogy forces students to take responsibility. Each course is very small, capping at around 10 students. Because the course work is team oriented, peer pressure forces students to keep up.

During class, instructors cannot assume that students understand fully the reasoning behind the incorporation of every e-learning tool. Penn State's Berner makes it "a point to tell students why I am using the technology, what the expectations are, and why it is to their benefit to use it—to get them more greatly involved in the class."

While instructors and students both face challenges in using technology for e-learning, most institutions identify faculty as the greater support requirement, for several reasons. Winston-Salem State University believes that peer learning is less common and less productive among faculty than among students. According to Colgate's Baird, students are more daring and tend to figure out problems on their

own. As the number of e-learning courses grows, "it penetrates past the early adopter crowd," explained Marquette's Pray. "We now help instructors who are interested but cautious." The University of Arizona's Hoffman believes that support needs continue to increase because "once faculty members gain familiarity, they want to do more and more."

Instructor and Student Technical Challenges

E-learning's success rests on the fundamental requirement that instructors and students possess adequate technical skills to use e-learning tools effectively. The survey explored the challenge this poses by asking respondents to assess instructors' and students' computer skills and identify significant technical challenges accordingly. (Note that information technology administrators—not instructors or students—completed the survey.) The findings discussed in this section represent the respondents' impressions and not their firsthand experiences with these issues.

Instructors might also want to learn computer skills to become better teachers. Gerry Philipson, an instructor at the University of Washington's Department of Communication, believes that "as a late adopter, the need to use these technologies pushes me more." While he sees students "cutting him slack" on technological sophistication and generally adapting to his limitations, their expectations nonetheless prod him to expand his capabilities. For others, this process is not as easy; lack of time, for example, may impede a person's ability to gain adequate computer skills.

To roughly gauge any potential problems in this area, ECAR asked online survey respondents to segment their student and instructor populations into five user categories to provide an indicative (not defini-

tive) assessment of their current computer expertise.

- ◆ *Leading edge:* Experiments frequently with emerging/cutting-edge computer applications/technology.
- ◆ *Early adopter:* Uses advanced features in generally adopted computer applications and might experiment with emerging or cutting-edge applications and technology.
- ◆ *Mainstream user:* Uses generally adopted computer applications proficiently on a regular basis but is not prone to experimentation.
- ◆ *Reluctant:* Tries to use generally adopted computer technology but has problems using basic features.
- ◆ *Avoider:* Uses computers as little as possible.

Figure 6-1 compares respondents' assessments of students' and instructors' computer skills. The differences are not significant when comparing all instructor and student skill levels or examining them by Carnegie class. Most instructors

interviewed, too, assessed their colleagues' skills as covering a spectrum of levels. They believe their colleagues possess the technical skills to create and teach an e-learning course, citing easy-to-use software, familiarity with course management software, and good training. Department area and subject matter can affect technical proficiency with instructional technology tools, as explained by Virginia Tech's Glenda Scales, assistant dean for distance learning and computing: "We are in the College of Engineering, and the expectation is that our students and faculty are familiar with technology. The key is effectively blending instructional technology into the teaching and learning process."

At least one institution noted that as their faculty's technical proficiency rose, instructors' interests shifted to pedagogy. "Many faculty members in our School of Nursing are advanced users," stated Lianne Connelly of Fort Hays's Department of Nursing. Over time, she added, her faculty has evolved substantially in technical competency and the pedagogical issues have moved to the

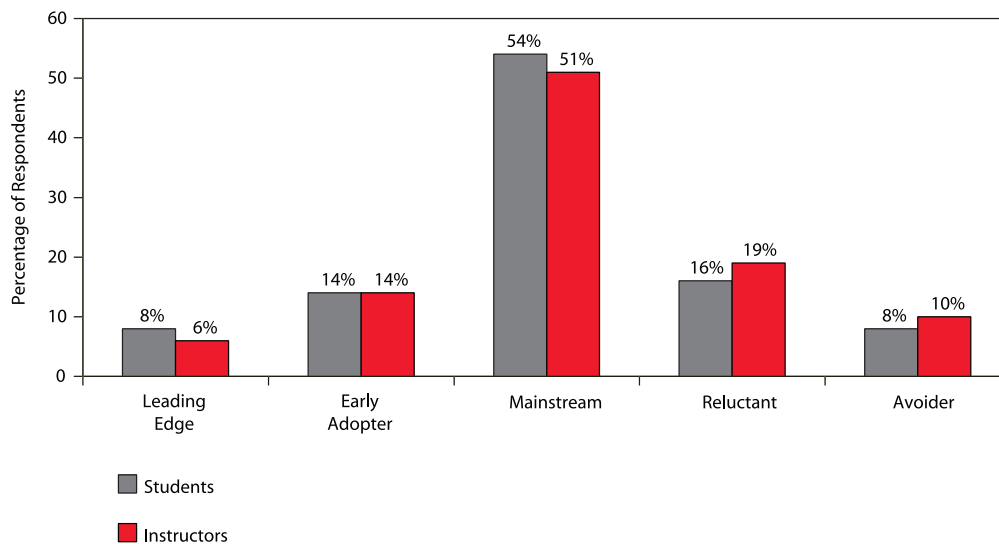


Figure 6-1. Respondents' Categorization of Students' and Instructors' Computer Skill Levels
Base: Total Respondents (N = 260)

forefront. Although survey respondents assessed computer skills similarly for students and instructors, they identified different technology challenges for supporting them. As Figure 6-2 illustrates, online survey respondents believe the most significant student support challenge is to enable students to use e-learning technology as much as needed by providing an adequate network infrastructure and keeping up with their technology demands.

Survey respondents cite different support challenges for instructors. Respondents identified “lack of knowledge to design courses with technology” and “lack of confidence to use technology in teaching”—core e-learning activities described earlier—as significant technology support challenges (Figure 6-3). Interestingly, as e-learning courses multiply, some challenges decrease in significance, suggesting that as e-learning becomes more commonplace, instructors become more comfortable using the technology.

Figure 6-2.
Significant Technology Support Challenges for Students
Base: All Respondents (N = 260)

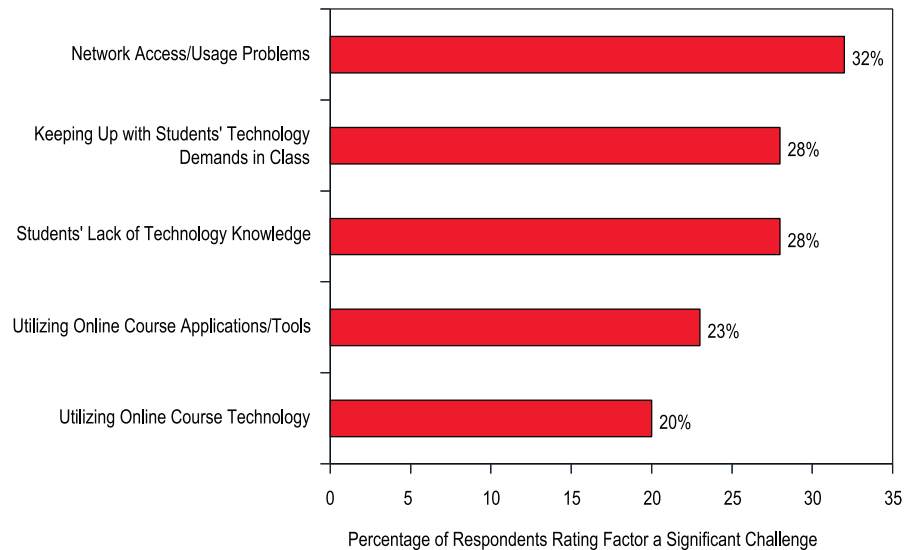
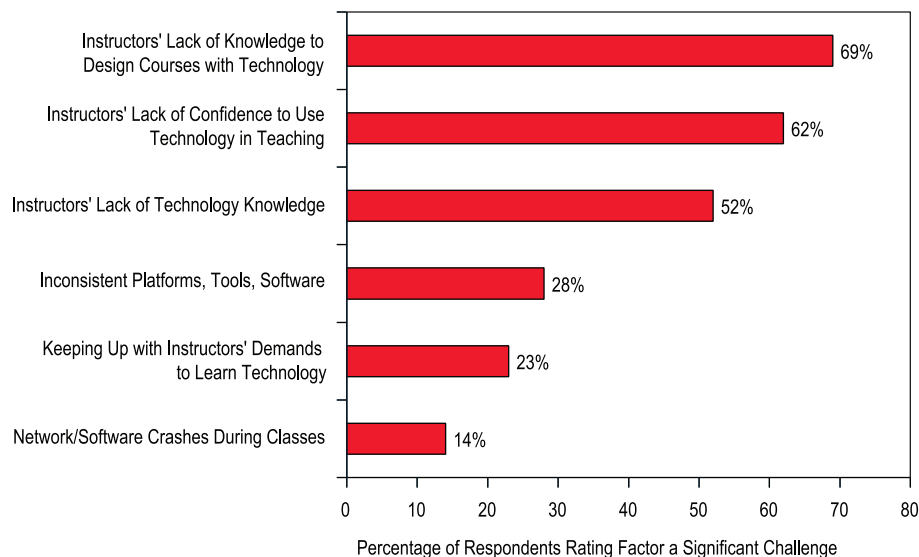


Figure 6-3.
Significant Technology Support Challenges for Instructors
Base: Total Respondents (N = 260)



E-Learning and Support Requirements: Exploring the Connection

Whether transforming a course for an online distance-learning program, Web surfing a topic in class, or creating a multimedia presentation, some instructors and students will need assistance with their e-learning activities. Indeed, survey respondents estimate that 22 percent (total survey average) of students taking an e-learning course and 54 percent of instructors involved in e-learning requested support.

As a result, providing support for e-learning gains priority. Figure 6-4 shows that many institutions make e-learning support a priority, especially for traditional courses using technology—the most prevalent e-learning course type.

Institutions place an overall higher priority on supporting technology use in traditional

classrooms for several reasons. St. Philip's Briggs summarizes most institutions' situation: "The bulk of emphasis is now placed on using technology to support traditional courses. That's simply where the numbers are." But in other institutions, supporting online distance-learning or hybrid courses is important because of institutional priorities. The bottom line is that whether it's an online distance-learning course, a hybrid course, or technology use in a traditional classroom, e-learning presents a host of new support requirements, and institutions must provide the appropriate resources to address them.

Endnotes

1. G. Morgan, *Faculty Use of Course Management Systems* (Boulder, Colo.: EDUCAUSE Center for Applied Research, 2003), Vol. 2, p. 76.
2. *Ibid.*, p. 76.

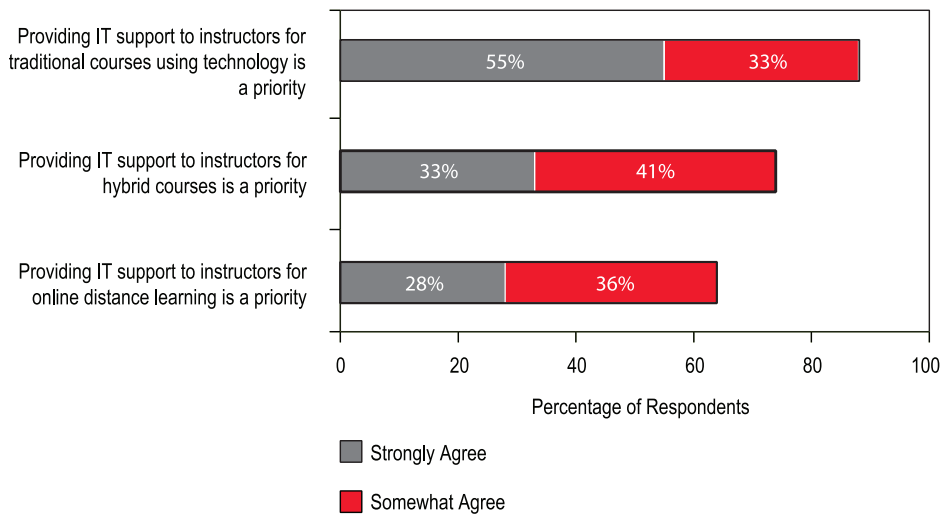


Figure 6-4. Priorities in Providing IT Support to Instructors for E-Learning Courses
 Base: Respondents Providing Type of Course
 (Online, N = 215; Hybrid, N = 227; Traditional, N = 260)