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Technical Report No. 492

ALTERNATE REALIZATIONS OF PURPOSE IN COMPUTER-SUPPORTED WRITING

Andee Rubin
Bertram Bruce

BBN Systems and Technologies, Inc.
Cambridge, Massachusetts

February 1990

Center for the Study of Reading

TECHNICAL REPORTS

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
174 Children's Research Center
51 Gerty Drive
Champaign, Illinois 61820

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The work upon which this publication was based was supported in part by the Office of Educational Research and Improvement (OERI) under Grant No. 1-135562167-A1 to Bank Street College of Education, and in part by OERI under Cooperative Agreement No. G-0087-C1001-90 with the Reading Research and Education Center. The publication does not necessarily reflect the views of the agencies supporting the research.

Abstract

This report examines a variety of ways that the QUILL program for teaching writing was realized in elementary school classrooms. In particular, it looks at the different ways purposeful writing was achieved using MAILBAG, the electronic mail component of QUILL. The analysis shows that innovations in education should be viewed as objects created by classroom teachers as they integrate the packaged innovation with the realities of their institutions, their students, and their own goals and teaching styles.

ALTERNATE REALIZATIONS OF PURPOSE IN COMPUTER-SUPPORTED WRITING

New technologies in education are more than simply new tools. They typically require both teachers and students to conceptualize teaching and learning in new ways that must be integrated with well-established classroom routines. If this integration is too difficult, it may lead to rejection of the new technology; if teachers are convinced of the value of the innovation, the process may lead them to abandon former practices. But in general, teachers and students create *new practices* that reflect complex and situation-specific combinations of old and new approaches. Because these new practices are often not even imagined in the original conception of the technology's use, their very existence raises serious questions for traditional views about educational change, evaluation of innovations, the role of teachers in implementing innovations, and even the basic notion of an innovation.

It is curious that technology is often viewed as sufficient by itself to effect change. The assumption seems to be that if only teachers and students had access to the power of new technology, wonderful visions of learning would be realized. This assumption is part of what Papert (1987) calls *technocentric* thinking. It allows little room for the possibility that traditional practices may be integral elements within a functioning social system, and that they are unlikely to change simply because new practices are technologically possible. In fact, those teachers who do adopt innovations must engage in a complex problem-solving process in which they integrate old practices and new goals.

In this report, we look at a particular computer-based innovation, the use of QUILL for teaching writing, and examine different ways that the innovation was realized in real classroom settings. We focus on the various amounts and ways that QUILL's goal of purposeful writing was realized through the use of MAILBAG, one component of the QUILL software. Our goal is to understand how realizations of an innovation are created, and to use real classroom examples for insight into the process of integrating new technologies into teaching.

QUILL: The Idealization

QUILL (Bruce, Michaels, & Watson-Gegeo, 1985; Bruce & Rubin, 1984; Liebling, 1984; Rubin & Bruce, 1985, 1986) was an approach to the teaching and learning of writing built around a software system that included both tools and environments for writing. From 1983 to 1987, it was used throughout the United States and Canada, primarily in upper elementary and middle school grades. Although QUILL is no longer commercially available, we have extensive classroom data on its use. The issues its implementation raises are relevant not only to computer-based approaches to writing instruction, but to the adoption of any innovation in education.

QUILL's design was based on research on composition and encompassed prewriting, composing, revising, and publishing aspects of the writing process (Bruce, Collins, Rubin, & Gentner, 1982; Flower, 1981; Flower & Hayes, 1981; Graves, 1978, 1982; Newkirk & Atwell, 1982). It included a text storage and retrieval program (LIBRARY), a note-taking and planning program (PLANNER), and an electronic mail program (MAILBAG), all supported by a text editor (WRITER'S ASSISTANT) (Levin, Boruta, & Vasconcellos, 1983).

In its software, accompanying curriculum, *QUILL Teacher's Guide* (Bruce, Rubin, & Loucks-Horsley, 1984), and teacher workshops, QUILL embodied a philosophy for teaching writing. QUILL emphasized the *process* of writing, including the importance of both planning and revision. The contrast between QUILL classrooms and traditional classrooms is highlighted in Table 1. In the column on the left is a gloss of what we call the *idealization* of QUILL, that is, the view of what QUILL was supposed to become in classroom use. (A full description of this idealization and the theoretical framework for the type of analysis we present here is given in Bruce & Rubin, in press). In the column on the right are parallel descriptions of a more traditional writing class; many QUILL teachers tried to integrate QUILL with some of these discrepant practices.

[Insert Table 1 about here.]

A central element within the idealization of QUILL was an emphasis on real audiences and purposes, which was expressed in the software, teacher's guide, and training. In the software, MAILBAG, in particular, reified this emphasis on audience and purpose. Combining features of the post office, the telephone, and a bulletin board, it facilitated direct communication among students, groups of students, and teachers. With activities suggested in the *QUILL Teacher's Guide*, it encouraged a variety of purposes for writing that students seldom experienced in school: "chatting," persuading, informing, instructing, and entertaining. It also motivated students to write more by introducing a personal element into the experience.

Many teachers introduced "writing as communication" to their students through MAILBAG. Because they had used MAILBAG extensively during training, teachers appreciated the differences between sending MAILBAG messages and standard classroom writing assignments. They saw MAILBAG as a way to help students understand writing as a communicative act through participation in writing activities that demanded a real audience and purpose.

Realizations: QUILL-IN-USE

The *realization* of QUILL in any real classroom was a recreation that drew upon the idealization, but was usually more dependent upon characteristics of the situation of use, institutional forces, the teacher's goals and teaching style, the students, and idiosyncratic technical details, such as the number of computers or room layout. Thus, the many forms of QUILL-IN-USE differed markedly from the original conception (see Figure 1).

[Insert Figure 1 about here.]

Of course, each teacher understood the idealization of purposeful writing in QUILL in his or her own way, and the variety of realizations was due in part to different teachers' interpretations of our message. What mattered was not just QUILL's conception of purpose, but that of the people who used it: What did teachers and students think writing was useful for? How did they use writing to accomplish personal goals? What did teachers think students should learn about writing in school? What natural goals for writing existed in classrooms or community contexts?

In most classrooms, MAILBAG use *did* lead to more purposeful writing. Students saw MAILBAG as an unconstrained writing environment and were thus able to use it for their own purposes. But the specifics of this use took many different forms, often surprising both us and the teachers involved. A few teachers regarded the openness of the MAILBAG environment as a pedagogical problem, and in these cases little purposeful writing with MAILBAG occurred.

Realizations of Purposeful Writing Using MAILBAG

We describe below a few of these alternate implementations of MAILBAG and how the integration of students' and teachers' purposes and habits with the innovation produced different realizations. Our data consist of writing by the teachers about their own classrooms (from which we quote in this report), student writing, electronic mail (both from MAILBAG and from a network for teachers), and field notes from classroom observations.

Symbiosis with Teachers' Pedagogical Goals

For several teachers, MAILBAG and its built-in assumptions were completely consistent with their current classroom practices and their attitudes toward teaching writing. These teachers firmly believed in "student-centered education" and in students' feeling ownership of the process and product of their work in school. They saw MAILBAG as a welcome extension of the way they already taught writing. They were comfortable with students' deciding when, where, why, and on what topics to write. Bonnie's multigrade, village-school classroom reflects this symbiotic use of MAILBAG. Students used the

program frequently and enthusiastically from the beginning of the year. Bonnie offered the following comments about her class's early use of MAILBAG, which, she says, "began with a roar and a blast."

> Probably the best thing about MAILBAG is communicating. The person at the keyboard is in complete control. I never made any MAILBAG assignments. Students could use it or not, decide what they would say, to whom, when, how often, and why.

Below is one example of a MAILBAG message written in this class; note its oral language character. Students such as Wanda seemed to regard MAILBAG as an environment in which they could carry out the same communicative functions for which they used oral language.

> DEAR ALICE,
> WHAT ARE YOU GOING TO DO AFTER SCHOOL? IF YOU WANT TO PLAY VOLLEYBALL AFTER SCHOOL WE CAN BUT FIRST I HAVE TO CLEAN UP AT OUR HOUSE FIRT OK. WE WILL PLAY ALMOST ALL DAY. YOU OUE ME A CAN OF POP BECAUSE YOU PROMISED IF YOU WERE LATE.
>
> WITH LOVE
> WANDA

Although many messages contained nonstandard grammar or spelling, as did Wanda's, Bonnie never corrected any student message. She considered MAILBAG to be in the students' domain, where spelling and punctuation were secondary to just plain communicating. Ernie, a K-2 teacher who also saw MAILBAG as an extension of his classroom writing philosophy, shared Bonnie's attitude toward students' ownership of MAILBAG writing:

> I never stressed proper form with the MAILBAG program when the students were sending messages back and forth between themselves . . . I saw this program as a fluency activity. If the receiver of the message understood it, it served its purpose in my eyes.

In Bonnie's classroom, students expressed their control over MAILBAG by deciding both when to use MAILBAG and when to stop using it. Several other teachers also found that students' enthusiasm for MAILBAG diminished as the year went on, but Bonnie's comment about this shift reflects again how her educational views easily encompassed such a change:

> By springtime the MAILBAG was hardly used at all. At first I was disappointed, then pleased. The students had learned that there were appropriate forms of communication for specific needs.

Especially in small classes where students knew each other well and saw one another frequently outside of school, the kind of communication MAILBAG facilitated was mostly redundant. As Bonnie implies, students had become more sophisticated about audience and purpose and were not satisfied with a communicative situation that did not increase their access to real audiences.

In one class, however, interest in MAILBAG remained strong during the entire year. Hans taught high school in Bonnie's village and used MAILBAG with his class after learning about it from Bonnie. He designated one disk as the students' private MAILBAG disk and promised the class that he would never read it. The students continued to send messages on the disk all year, and MAILBAG remained the most popular QUILL activity. As the year went on, Hans actually had to ration MAILBAG's use because he wanted students to use the computer for other kinds of writing as well. Why did MAILBAG remain so popular in this class? Certainly at least one influence was the unique audience Hans defined for MAILBAG messages. It appears that the secrecy of the disk made the communication environment unusual enough that students did not consider it redundant with face-to-face communication.

Integration with Another Innovation

Before the introduction of QUILL, the classrooms we studied differed from one another along several dimensions: most notably, teachers' beliefs and practices related to the teaching of writing. A few teachers, in response to their own changing notions of pedagogy, had already instituted innovations that were consistent with QUILL's pedagogical goals. In most cases, the two innovations enhanced one another, but in at least one case, the earlier innovation had already fulfilled the goals QUILL set forth and thus reduced the students' and teacher's enthusiasm for MAILBAG. Alexander, a fifth-grade teacher, had for several years played mailperson for a short daily period during which he would deliver handwritten notes from student to student in the class. He described the purpose of this activity:

> NOTES is an activity that gives the students an opportunity to write notes to one another under the supervision of the teacher with the only rule being that they must address the note to someone in the class and have their name as the return address. They know that I do not read their notes and that anything goes (and it probably does). This activity is done in silence with myself as the mailperson and usually lasts anywhere from five to fifteen minutes.

While NOTES was a good introduction to MAILBAG, it also diminished Alexander's and his students' interest in the computer-based activity. Compared to NOTES, in which they could send and receive half-a-dozen messages in one session, MAILBAG was inefficient; message exchanges could take place only over the course of days, rather than minutes. The features of MAILBAG that allowed them to send messages to a group did not interest the students. In essence, students had no unfulfilled communicative purposes that MAILBAG could satisfy. In addition, Alexander felt that NOTES had already fulfilled the goal that most teachers attributed to MAILBAG--involving students in real-audience writing. Therefore, Alexander moved on to the PLANNER and LIBRARY rather quickly, where he pursued other writing goals.

Interaction with Classroom Management

Because many QUILL classrooms had only a single computer, using QUILL required some teachers to rethink their classroom management practices. How were they to integrate a free-form activity like MAILBAG into a more structured day? Wilma, a fifth-grade teacher, invented a procedure to deal with the changes in her classroom structure. Wilma's students' excitement over MAILBAG was particularly significant to her, because one of her goals for the year was to help her students learn to enjoy writing. While she was enthusiastic about MAILBAG's effect on her students, she was troubled by its classroom management consequences:

> When we started using MAILBAG, I had a problem with my students wanting to be back at the computer CONSTANTLY checking to see if they had any mail or not. We decided we needed to devise a system that would solve the problem. We talked about what we could do, and soon came up with a mailbox poster which worked quite well. We each wrote our computer code name on a library book card pocket, and glued the pockets to a piece of poster board. The poster board was then hung on the wall behind the computers. Another pocket was added to hold slips of red paper. When a student left a message on MAILBAG for White Knight, he or she would put a red slip into White Knight's pocket. After White Knight read his messages, he returned the red slips to the extra pocket.

The classroom management issues were so central to teaching with QUILL that Wilma's idea spread around the community via our technical assistance visits and the teachers' electronic mail network. The classroom management problem turned out to be a common one--and many teachers adopted Wilma's solution.

Different Goals for Individual Students

Jim, a sixth-grade teacher, had always treated his students as individuals. His class was made up of Black and Hispanic students from several housing projects, and he found he sometimes had to adopt unorthodox approaches to encourage certain students to put energy into their school work. Jim used MAILBAG to support this goal by adopting two separate personae in writing to his students. When he carried out straightforward, and sometimes quite personal, written conversations with his students, Jim adopted a teacher/computer expert persona, Dr. A. The following exchange is typical. The first message was posted to the Bulletin Board, where everyone in the class (including the teacher) could read it. The second is from the teacher to Marlowe, using her computer name, Pee Wee (which was particularly appropriate in this case).

> Bathroom
>
> Marlowe B.
>
> There is a lot of trouble in the bathroom. There's been writing on the new paint job, and there's been someone who's been peeling the paint off the radiator. If people keep messing up the bathroom, Ducky [the janitor] said that she was going to close the bathroom until we learn not to write in it. And there's been plenty of noise in there. If we don't have to go to the bathroom, don't go in.

> Dear Pee Wee,
>
> Thank you for being concerned about the girls' bathroom. I feel sorry for the girls who are messing it up. They must be a little "messed up" themselves. When I see Ducky, I'll try to remember to tell her what you said. --Dr. A.

Jim also had a second, more frivolous, persona called Dunedeen, a mischievous monster who sent anonymous messages to several students each week. Jim tended to use the Dunedeen persona with students who were reluctant writers, because his challenging tone got them to respond in writing to his teases. As Dunedeen, Jim engaged students in a fantasy world of teasing and light sarcasm, similar to the way they might interact with their friends on the playground. His messages provoked playful replies, filled with "hahahaha" and epithets such as "Squarehead," often from students who never spontaneously wrote in any other situation. In integrating QUILL with his strategies for dealing with individual students, Jim found MAILBAG's flexibility particularly useful for his purposes.

The "Traditional Writing Teacher" Uses MAILBAG

Not all integrations of purposeful writing with MAILBAG into the classroom grew out of symbiosis between QUILL and a teacher's purposes. In one case, a teacher completely rejected MAILBAG because it conflicted with her views of the appropriate way to teach writing. This teacher started out using MAILBAG in the usual way, and students began sending messages according to their own purposes, such as love letters to one another. When the teacher discovered this, she immediately made MAILBAG unavailable, because she felt that the messages students had been exchanging were not appropriate classroom writing. The gap between her pedagogical assumptions and those underlying QUILL was too great.

In a slightly different attempt at integration, a fourth-grade teacher attempted to integrate a fairly traditional writing assignment with MAILBAG. The idea for her assignment came from the *QUILL Teacher's Guide*, where we had described a "Classroom Chat" activity, based on a popular newspaper

column called "Confidential Chat." In the newspaper prototype, writers send anonymous letters describing their personal problems; they usually adopt a pseudonym that refers to their situation (e.g., Hassled Mom or Concerned Commuter). QUILL's variation had students sending anonymous messages to the MAILBAG's Bulletin Board in order to discuss personal problems anonymously with other students in the class. Mixing the pseudonymous personal consultation idea of Classroom Chat with a more traditional teacher-directed writing assignment, the teacher sent the following message, complete with pseudonym.

> Dear Classy Computer Kids,
>
> There are five members in my family and only one shower. Because I'm the youngest member of our family, I'm the last one in line to take a shower. By then, there's usually no more hot water and not too much time for me to wash behind my ears! It's a horrible way to start a day. What can I do to solve this problem?
>
> Cold, late, and dirty,
> I. Needabath

The following tongue-in-cheek student response hovers between reality and fantasy much as the original letter did.

> Dear I. Needabath,
>
> I think you should tell the first person that takes a shower you have to go to the bathroom. Then they should let you go before they take a shower. Quickly lock the door and take your shower. You will have enough of time to wash behind your ears.
>
> Sneaky and Desparate,
> Kerry N. and Jenny B.

An interesting problem emerged in this activity because of the conflict between the teacher's goals and the presuppositions of MAILBAG. The form of the teacher's message mimicked that of the standard Confidential Chat letter, but the students in the class all knew who had sent the letter and, even more important, that it posed a fake problem. Thus, their assignment was to pretend they were answering a real letter from a needy person, while knowing it was an imaginary letter from their teacher. While students produced imaginative replies, we observed that students were confused about their audience (their teacher or I. Needabath) and their purpose (real or fantasy) while they were writing. This lack of clarity was most obvious when they were signing their names; many were not sure whether to use their own names or to make up clever pseudonyms. In this situation, the teacher's assignment worked only weakly as an attempt to integrate two inconsistent pedagogical goals.

Students' Goals: Affecting School, Classmates, and the Outside World

Teachers were not the only ones for whom MAILBAG offered new opportunities for integrating technology with personal goals. In several classrooms, students found in MAILBAG a new and unexpected way to pursue their own purposes in school. Students in Syd's fifth-grade class in Juneau discovered that MAILBAG could serve an unexpected purpose in their relationships with others in the classroom. One of Syd's students "saw himself without friends"; Syd worried about both his academic and social development:

> He chose late Friday for his time [on the computer] so he could miss it, not realizing that more often than not, late Friday was the easiest time for me to be his partner.

> The other children, in spite of their ugliness to one another, were able to sense his feelings and began writing him [MAILBAG] letters telling how much they liked him and that they wanted to be his friends. There is no way to describe the face of this handsome, brown-eyed boy as he read these notes, frequently slipped into his desk anonymously. He sat near me for obvious reasons and I would watch him remove one and literally clutch it to his chest.

Syd's students, having learned the power of writing, chose to use it to be kind to a troubled student with whom face-to-face communication was difficult.

Students' purposes also interacted in an unexpected way with the availability of MAILBAG in a fifth-grade class in Oregon. When the teacher included himself as a participant in MAILBAG, he discovered that his students offered him opinions on school that he had not previously heard. Notes such as "I like it a lot better when you put the schedule for the day on the board" and "I wish we had art class more often" were representative of the opinions students communicated using MAILBAG. Because students saw MAILBAG as a medium in which they had increased access to their teacher, they used it as a new way to pursue one of their own purposes: changing their school environment.

Many students in field test sites in Alaska used QUILL to answer a pressing communicative need; they were unable to be in touch easily with people outside of their own villages, and they had no way of meeting new people. Partly in response to their needs, the QUILL project in Alaska instituted a long-distance network, implemented through a combination of human travel and U.S. mail (Barnhardt, 1984). On one of our trips through Alaska to visit classrooms, we carried a disk called "Supermail." Students in each classroom wrote messages to children in classrooms they knew we would later visit, often to students they had never met. Several eighth-grade girls saw this long-distance network as an ideal opportunity to work on their social problems.

Calling All Men

Sheila Forsythe Althea Jones

Hi,

This note is to all you good looking guys out there in the world. There are two of us writing so we'll tell you a little bit about ourselves. Our names are Sheila Forsythe and Althea Jones. We're both 14 and stuck in a small town in Alaska called McGrath. We have a pretty big problem and we hope that you guys will help us out. We have a very short supply of foxy dudes here. So if you are a total fine babe PLEASE I repeat PLEASE write us!!!

Keywords: /McGrath/Male Order Men/

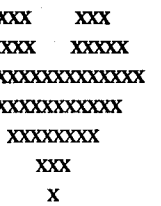
The authors worked hard on aspects of their message that would attract the attention of their desired audience. The second keyword (including the misspelling), for example, was their own invention, intended to attract male readers; their title, obviously, had the same purpose. These girls were correct in assessing what would please their audience: Groups of boys in distant classrooms, curious about the keyword and title, did read their message.

Not to be outdone, two girls in the next town, Holy Cross, wrote the following message on the Supermail disk:

Good Looking Juneau Boys

Two Holy Cross Girls Josie and Evelyn

Our names are Josie Adams and Evelyn Fields. We like skiing, basketball, hockey, writing letters to cute boys, and we would be more than pleased if any of you cute boys would write to us. We don't have any boyfriends. So you don't have to worry about that! We also would like you to send a picture when you write. (You are going to write aren't you?) We will send you a picture too. Josie is 14, and Evelyn is 13. Well, please write soon! We are waiting for your letters!!!



WE SEND YOU OUR HEARTS!
SINCERELY, JOSIE AND EVELYN

Keywords: /Juneau Boys/ H.c.r. Girls/

These two girls used a slightly different strategy for attracting readers; they knew the disk would be travelling to Juneau next, so they specifically aimed their "personal ad" toward Juneau boys, including them in both the title and keywords. They also spent considerable time and effort drawing the heart so that their message would compete effectively with the one from McGrath. Incidentally, boys in both Juneau and Oregon, where the disk later travelled, took all four girls' addresses with the intention of writing to them during the summer. In these cases, students' urgent purposes found expression in the new opportunities the QUILL innovation provided.

While most students were eager to send messages to distant classrooms, at least some students found the idea of writing to strangers uncomfortable. Communication with an unknown person was especially difficult for students who had spent their entire lives in a small Native community and had spoken only to people they knew well. Whatever purposes might have inspired them to use the Supermail disk, the discomfort associated with it was more powerful. Serendipitously, the Supermail disk seemed to ease this transition for some students in Nikolai, as their teacher, Don, explains:

> What made this activity fun for my class was the fact that Chip had just come from Telida and the most recent messages on the disk were from cousins and playmates upriver. This connection made the notion of sending hellos to strangers Outside seem less threatening.

Don reflects his students' view of the world by referring to the rest of the United States outside of Alaska as Outside, to them, a vast and little-known area. The Supermail disk provided an opportunity for the students to be in touch with the outside world; it made the transition gradual by allowing them to expand their understanding of communication from a familiar audience to a larger and unfamiliar audience Outside.

Conclusion

The purpose for MAILBAG was simply stated: to create a writing environment in school where audience and purpose were obvious and paramount. But even with such a simple goal statement there was a great variety of realizations, as the software capabilities interacted with students' and teachers' purposes and with institutional realities. As students and teachers attempted to integrate their purposes, beliefs, and habits with the innovation, many new innovations were constructed.

The use of MAILBAG for purposeful writing is only one area in which alternate realizations of QUILL arose. In every case in which QUILL raised significant pedagogical issues, teachers had to confront the relationship of their past practices to those implied by QUILL. This resulted in a variety of solutions to the need to integrate QUILL with sometimes disparate goals, values, and practices. Our analysis views these as creative solutions to the complex and ill-defined problems teachers must solve when presented with an opportunity to change.

These analyses call for a situationally defined conception of the process of educational change. An innovation is not an object that can be packed inside a box, but rather a set of practices that emerges from the social setting of its use. Thus, in a sense, a teacher cannot *accept* or *reject* an innovation; instead, he or she *creates* it. The consequences of this view for teacher education, evaluation of innovations, and theories of educational change are far-reaching.

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Table 1

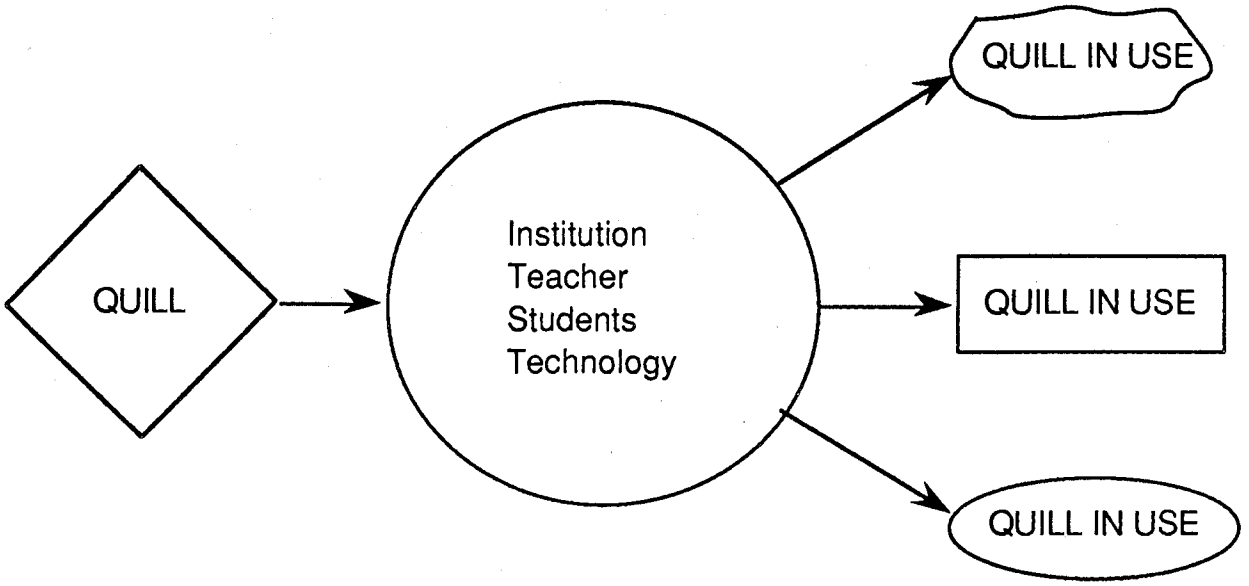
Contrasts between QUILL and traditional classrooms

QUILL	Traditional classrooms
Prewriting	Sit and write
Topic choice	Designated topic
Multiple genres	Mostly narrative
Multiple real audiences	Teacher as audience
Real purposes	Writing for a grade
Conferencing	Red marks as response
Revision	Editing
Collaboration	Hidden papers
Sharing writing	Isolated writers
Writing across the curriculum	Writing in English class

Figure Caption

Figure 1. Alternate realizations of QUILL arising from the situation of use.

Figure 1


QUILL
Institution
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