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ABSTRACT

One educational innovation that is receiving national attention is computer assisted instruction (CAI). The PLATO system developed at the University of Illinois (Urbana) is perhaps the most sophisticated CAI system. As with other CAI systems, it permits each student to learn at his own pace; it can provide precise feedback and remedial or advanced work depending on the student's performance; and it can serve as test, text, and tutor. Over the next few years, the Educational Testing Service will be evaluating CAI projects, including the PLATO Project at Kennedy-King College. The implementation strategy used at Kennedy-King will influence the reception of CAI by its faculty and students, and the project's success or failure may help decide the fate of CAI. The preliminary results of the project indicate that students who have used PLATO find the experience enjoyable and feel that CAI has helped them learn. If technical difficulties are overcome as expected, the PLATO Project will continue to be successful. (Appendixes provide the PLATO Schedule, Students' PLATO Evaluation, and Faculty Questionnaire.) (Author/DB)

THE DEVELOPMENT OF A STRATEGY TO IMPLEMENT THE USE OF COMPUTER-ASSISTED INSTRUCTION AT AN URBAN COMMUNITY COLLEGE

by

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Kennedy-King College

A PRACTICUM PRESENTED TO NOVA UNIVERSITY
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
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Introduction: Desire for Innovation

In recent years educators have been under fire from individuals within their own ranks, from the public, and from students. The vocal critics have claimed that educators have not been living up to minimal expectations. The critics have pointed to a lack of achievement, an irrelevant curriculum, and a high dropout rate during a time when there has been a general explosion of knowledge.[1]

This is not to say that educators have not listened to and acted upon such charges. Innovative programs have increased sharply over recent years primarily in response to the growing frustration of and demands placed by the community. But these innovative programs have not enjoyed much success, and there seems to be very little follow-up once these programs begin. Probably one of the most salient reasons for such failure is the inadequate planning and preparation for introducing such innovations.

One educational innovation which is receiving national attention and which is being implemented at some community colleges, as well as at some universities and public schools, is computer-assisted instruction (CAI). Over the next few years the Educational Testing Service will be evaluating two

CAI projects, including the PLATO Project at Kennedy-King College, a public junior college in Chicago. Assuming that computer-assisted instruction in itself is an effective teaching medium, the implementation strategy used to make this project successful takes on an even more significant role because it may decide the fate of CAI. The implications posed by CAI are tremendous, for a relatively inexpensive CAI system (such as the PLATO system) that can be shown to help students learn could be implemented by nearly every educational institution.[2]

This paper will focus on how the political process operates in education, how innovations may best be implemented, and how a strategy has evolved for implementing computer-assisted instruction at Kennedy-King College.

Political Process in Education

The political process operates in education as well as in any other system. David Easton defines "politics" as the "'authoritative allocation of values which have become widely desired and the explicit goals of public policy.'"[3] Authoritative allocations represent the governmental actions, decisions or policies which serve as outputs of the system, while the values and goals are the inputs. These inputs come in the form of demands and supports. The demands are the life-blood of the system because they compel the system to make decisions in favor of change. The supports or resources in the system seek to maintain homeostasis. On the basis of these inputs, actions, policies or decisions are made which are either accepted, rejected or modified by the public and which return

again as inputs in sort of a feedback loop.

Depending on the frame of reference, organizations either seek change because of internal and external conflict or they seek equilibrium by taking a course of least conflict. Perhaps organizations seek to maintain a balance between change and order. Although the pervasive resistance to change serves as a system support by helping to maintain stability, the desire or compulsion to change serves as a system demand helping to generate new life.

System Support: Resistance to Change

An organization is such because people within the organization have shared ideas and goals; to maintain their organization so it can function effectively, norms and rules are developed which the members agree to follow. It is not surprising then that there is usually resistance to change once an organization becomes established. All customary and expected ways of behaving are almost sacrosanct among those who follow such prescripts; and because these feelings are shared by most members in the organization, they cannot be changed easily. Even leaders must conform to organizational norms in order to retain a large following and to maintain their position.

Personality theory also suggests that individuals tend to resist change. The effects of primacy and retension of original attitudes are very strong so that in many cases individuals who have a long-standing attitude do not hear what they disagree with. Also, the way in which individuals first successfully cope with a situation sets a persistent pattern. Repetition, or fixed-in responses, tends to persist over time so that the familiar is the preferred.

When individuals are frustrated or insecure, there is an inordinate desire on their part to hold onto the past and to be fearful of experimenting with new approaches. Unfortunately, it is at such times that taking such risks would be a way to solve the problem; however, these risks are often too difficult t· try and may cause more anxiety.[4]

System Demand: Innovative Process

Although the principles derived from personality and social theory suggest that homeostasis is a very powerful force against change, complacency is not a tolerable situation, and the countervailing desire for the new experience may be just as basic.

The long-range goal of an organization should be to become sufficiently viable to adapt continuously to its changing environment and to its internal forces in order to help improve the extent to which it accomplishes its intended goals or carries out its functions. Such "self-renewal" fosters innovation.[5]

The innovative process according to Ronald G. Havelock's rational problem-solving model of change purports that problems can be solved through logical planning. Beginning with an initial disturbance which may mean pressure from within or from without an organization or a crisis situation, there should follow responsive, successive activities including: 1) deciding to meet the need for dealing with the disturbance; 2) defining the problem; 3) searching for possible solutions; and

4) applying a possible solution to the need.[6] If there is not satisfaction that the problem is solved, the cycle is repeated.

Strategy for Change

It is the role of the change agent to facilitate planned change or planned innovation. Planned change occurs via a "deliberate process which is intend ' to make both acceptance by and benefit to the people who ar. changed more likely."[7] If an organization is to achieve self-renewal, the change agent should use his expertise to help members of the organization help themselves. He should not do the work for the participants or else the success and longevity of the innovation will become too dependent on him. Thus his expertise, not his position, must be the primary basis of his influence.

Almost anyone may serve as a change agent in his organization, though some positions may be more relevant and auspicious than others. Some examples of people who might serve as change agents in education include curriculum coordinators, directors of federal programs, school consultants, continuing education instructors, and sometimes counselors, teachers, parents and students.[8]

Depending on the kind of problem or disturbance, the change agent may take on differing roles. He may serve as a catalyst trying to pressure the system to make changes. He may serve as a solution-giver; in this role, the change agent must know when and how to offer his solution and how to help his clients (those whom the change agent serves) adapt the solution to their needs. He may serve as a resource-linker;

in this capacity, the change agent brings needs and resources together. These resources may be funding, information on solutions, diagnostic skills, formulation and adoption of solutions, and expertise on the process of change itself. The change agent may serve as a process-helper; in this case, he uses his expertise of knowing how change comes about to show his clients how to recognize and define their needs, diagnose problems, set objectives, acquire relevant resources, select or create solutions, adapt and install solutions and evaluate solutions to decide if they satisfy their needs.[9]

The change agent as a process-helper may very well be in the best position to effect on-going change. This is not to say that the process-helper cannot also play any of the other change-agent roles; these roles are not mutually exclusive.

The change agent should be able to recognize and utilize six distinct stages towards the adoption of educational innovations. These include: 1) building a relationship; 2) diagnosing the problem; 3) acquiring relevant resources; 4) choosing a solution; 5) gaining acceptance of the innovation; and 6) stabilizing the innovation and generating self-renewal.[10]

Building a Relationship

It is next to impossible to effect change, to compel someone to do something, unless you have the authority to do so, or unless you know the person well enough to know his needs and his problems and to have a relationship of mutual respect. In short, the change agent should build a positive relationship with his clients. He must know the people with whom he will

work and those people and groups to whom his clients are related. He should build relationships particularly with people who are influentials, opinion leaders, and gatekeepers. He should be credible and respectable, friendly and familiar, and rewarding and responsive. Ideal relationships are reciprocal, open, realistic, and non-threatening.

Being either on the inside or the outside of an organization has advantages and disadvantages. The change agent working from within knows his organization, speaks its "language," understands its norms, identifies with its goals, and is a familiar figure; however, he may lack the proper perspective and special expertise, and he may have difficulty redefining his role if necessary. The change agent working from the outside can begin with no preconceptions, with an objective perspective, with special expertise, and he can be independent of the power structure; on the other hand, he may be regarded as an outsider lacking the knowledge and vested concern of those on the inside.

Diagnosis

During the diagnosis stage, the change agent should help his clients articulate their needs. A problem should be identified and defined in such a way that the change agent and his clients can work rationally towards its solution. An alternative approach would be for the change agent and his clients to identify opportunities, or potential areas for change; this may be a more positive approach. On a more general level, the change agent should attend to the question of how well the organization's "subsystems" are working together and whether or not there are enough adequate and

capable structures within the system for achieving the system's goals.

Resources

Obtaining the right resources can help the change agent throughout each stage in the process, i.e. for diagnosis, awareness, initial evaluation of the problem-solving ideas, trial demonstration, post-evaluation, installation of the innovation, and maintenance. Written sources on the problem and potential solutions would help to give an overview as would information from an expert. Evaluation data on similar innovations and observations of "live" examples would also be useful.

Choosing a Solution

In choosing a solution, the change agent should pull together his resources into a summary statement which is relevant to the setting and which states implications for actions. Possible solutions should be questioned as to their feasibility, i.e. their benefit, practicability and diffusibility. Sometimes brainstorming with clients can achieve a synthesized new idea for solving a problem.

Gaining Acceptance of the Innovation

The steps involved with getting clients to accept an innovation include developing an awareness of the innovation, then an interest in it, evaluation of it's potential, trial demonstration, adoption and finally integration into the system. The change agent should be flexible and schematic. Individuals should be encouraged to make personal commitments but not pressured; they should be allowed to progress through all phases

in the sequence towards integration and encouraged to discuss their doubts. Giving encouragement means asking the appropriate questions.

Another approach is to use key people to diffuse the innovation throughout the organization. Here those opinion leaders who accept the innovation have the responsibility to pass it on to followers by word or by example. The change agent can help this process by introducing the change, by dealing with potential opponents, by bringing the innovation to the attention of the organization's leaders, and then by letting the leaders lead the way to acceptance.

Insofar as communication is concerned, using the right medium is important. Person-to-person contact would be best for legitimizing and reinforcing the decision by individuals to try the innovation. Conferences and workshops could prove an enjoyable experience for those taking part if the participants come away with new ideas, problems, findings, solutions, and skills which may lead to diffusion. The change agent must use the style and media with which he is most adept.

Stabilizing the Innovation and Generating Self-Renewal

At this point in the process, the change agent cannot just be content to rest on his laurels. He must ensure the continuance of the use of the innovation. This may mean offering continued rewards, routinization and continued adaptation capability. Generating the self-renewal capacity means that the change agent should teach his clients to be change agents for themselves. Perhaps it would be a good idea for the organization to establish its own change agency.[11]

Implementing Computer-assisted Instruction

Medium: PLATO

Computer-assisted instruction (CAI) is used to help individualize instruction so that a student may study a CAI lesson at his own pace and in his own style. A CAI learning station or terminal as viewed by the casual observer consists of a box-like structure with a TV-like screen which displays the learning material, questions, student responses and feedback and a keyset which allows the student to answer or ask questions. The terminal is hooked up to the computer.

A powerful CAI system, such as the PLATO system developed at the University of Illinois, is very much qualitatively different from other media in terms of its adaptability to various instructional roles. "It can combine content and process with evaluation, decision making, and record keeping. It is potentially test, text, teacher, remedial specialist, audio-visual specialist, guidance counselor, and administrator wrapped into one coherent system."[12] The student can interact with the system by receiving immediate feedback based on his particular response, and the computer can store and use an enormous amount of information about his past and present performance.

Keeping these characteristics of a CAI system in mind, it is not too difficult to envision an educational institution in which students take all their courses on the computer. A teacher who feels threatened by any attempt at encroachment

on his domain has reason to fear that his work might be eliminated by a machine. Even a teacher who has a liberal and open-minded approach to teaching may feel threatened by the fact that more and more of our daily life is being controlled by the computer. At the same time many teachers find it easier to shrug off CAI as just another technological tool in a long list of disappointing failures. They have been bombarded with all sorts of audio-visual devices and programmed materials which have not lived up to their fantastic promises.

On the other hand, an effective CAI system can be very beneficial to the teacher if it can be shown to be a valuable teaching tool when used by him to help his students learn. It is fair to assume that a teacher gauges his own effectiveness and competence in part on the bases of his students' attitudes towards the course and on their performance on tests. Also, the use of CAI can alleviate the teacher's need to spend a great deal of time giving drill, practice and remediation and thus allow the teacher more time to use his creative talents more effectively.

Setting: Kennedy-King College

Kennedy-King College, a magnificent stone structure located on the south side of Chicago, is one of eight campuses of the City Colleges of Chicago. Kennedy-King is a public, two-year community college which has had an open-door, tuition-free policy. Its clients comprise approximately 8,000 people who are almost all Black and poor and who live in the inner city.

Characteristically, the students are disadvantaged academically, many having great difficulty with the basic skills of reading, writing and arithmetic. It is not unusual for students in a Freshman English class to be studying the use of proper grammar.

The students are very much like those who attend other community colleges in that they either cannot afford to go away to college, do not want to, have poor high school academic records, or desire less than four years of higher education.

Jencks and Riesman have maintained that community college faculty are not very innovative or inclined to use new kinds of instruction, that many were public school teachers who took enough evening courses to earn a Master's Degree and who are uninterested in research, and that many are much more interested in their own welfare than that of their students.[13] Although these observations may have had some credibility ten years ago, it would be grossly unfair and inaccurate to make such charges today. Community colleges have taken advantage of the abundant supply of teachers by selecting highly qualified people. Also, higher salaries commensurate with those paid by the four-year institutions have helped attract good teachers. At Kennedy-King College there are a sizeable number of teachers with doctorates and teachers with credentials from the prestige colleges and universities throughout the country.

Approach: Research, Development and Diffusion

The implementation strategy was initiated in the spring of 1971 by the vice chancellor for faculty and instruction of

the City Colleges of Chicago and the directors of the PLATO Project at the University of Illinois in Urbana after a series of discussions about the potential use of PLATO in the City College system and about the City Colleges serving as a test site to ascertain the feasibility and effectiveness of PLATO in the community colleges. It was agreed that the University of Illinois would eventually provide some 84 student terminals (learning stations) at no cost to several of the City College campuses with special preference given to Malcolm X and Kennedy-King Colleges followed by Wright College and the Dawson Skill Center. By September 1971 several City College instructors were awarded special fellowships to learn how to design lessons for PLATO. By the beginning of the fall semester 1972, a director of the PLATO Project for the City Colleges was appointed and three of the instructors who had been selected to develop PLATO lessons became coordinators at Kennedy-King, Malcolm X and Wright Colleges.

This approach is representative of the aforementioned rational problem-solving model in that there have been many external and internal pressures and a general feeling on the part of faculty and administration that something had to be accomplished to meet the growing need to successfully accomodate a student clientele that was entering the community colleges lacking basic academic skills. CAI was thought of as one possible solution to the problem.

Because of the urgency of the problem, the wide scope of the project, and the serious implications raised by CAI, the

Project's staff have been mostly concerned with building relationships and gaining acceptance of the innovation. Their particular strategy has been oriented towards research, development and diffusion.

This "R, D & D" implementation strategy sets forth several assumptions: 1) that there is a rational sequence in the evolution and application of an innovation which includes the research, development and packaging of the innovation before any mass dissemination; 2) that the planning would be on a large scale over a long period of time; 3) that there would be a division and coordination of labor to achieve the goal; 4) that the clients (in this case, particularly the faculty) would accept and adopt the innovation if it were offered in the right place at the right time in the right form; and 5) that the high initial cost (in this case, particularly for the state of Illinois, the federal government and the National Science Foundation) prior to dissemination would be necessary for long-term benefits in efficiency and quality of the innovation and for its suitability for mass dissemination.[14]

Some of the tactics employed by the City Colleges in implementing CAI have followed proven "R, D & D" tactics including: 1) an experimental demonstration of the system for faculty and administration to show the potential of the innovation; 2) an evaluation of a forerunner model's success at the University of Illinois in Urbana (PLATO III); 3) discussions with potential faculty users about the needs of their students and how CAI can help them meet these needs; 4) successive approximation whereby the innovation is gradually shaped into a useful product through a long series of informal evaluations and

redesigns both for hardware (PLATO equipment) and software (PLATO language and lessons); 6) the translation of the technical aspects of CAI into an understandable medium for its users; and 7) the packaging of CAI lessons into a form that can be best used by the faculty and their students.[15]

Gaining Acceptance of the Innovation

The PLATO Project at Kennedy-King College has progressed very well since its beginning on November 28, 1972 when several terminals were installed in the Resource-Skills Center. During the 1972-73 academic year, faculty members were given an opportunity to view PLATO demonstrations and to interact with specific PLATO lessons. Some instructors actively participated in learning how to design PLATO lessons, in developing new lessons, and in evaluating lessons in their field. Four instructors were awarded released time from their teaching responsibilities to develop PLATO lessons in their teaching discipline.

Team Approach

City Colleges of Chicago has worked closely with the University of Illinois in Urbana. During the 1972-73 academic year, the University of Illinois offered two courses to help develop interest in PLATO among City College faculty; most sessions were held at City College campuses, primarily at Kennedy-King. The first course concentrated on teaching lesson design and TUTOR, the computer language. Another course on using PLATO lessons offered instructors an opportunity

to critically review lessons that had been developed in their teaching discipline. Faculty members could earn graduate credit for taking either course. Although both courses were well-conceived, they were not well-designed. Also, the PLATO staff of City Colleges had very little input. The Illinois PLATO staff and the City Colleges PLATO staff now recognize the need for more cooperation and better communication.

Another aspect of the team approach has been in organizing lesson-design groups for the various subject-matter fields to be evaluated by the Educational Testing Service, particularly English and mathematics and to a lesser extent biology and chemistry. The English and mathematics groups have been made up of faculty from the University of Illinois in Urbana, City Colleges of Chicago, and Parkland College (a community college located in Champaign-Urbana).

During the 1972-73 academic year each lesson-design group met several times to decide what lessons would be most useful to the clients and which would be best suited for presentation on PLATO. During the fall semester 1973 both the English and mathematics groups spent more time obtaining opinions from potential users on what lessons would meet their students' needs and allowed them more of a collaborative role in curriculum development. There was a distinct shift in emphasis from the single designer-programmer development of a lesson to the team development of lessons. The feelings of "here is what we have produced for you," "we will teach you how to program your own lessons," and "tell us what we can do for you" have been joined by "let's decide curriculum together" and even

"let's develop lessons together." Logically, this may be a better approach since it can be assumed that those who are actively involved in a project will use its product.

The PLATO community at large has taken a greater role in suggesting hardware and software features and in receiving consultation on programming problems and techniques by using a PLATO lesson called "notes."

Preliminary Results

The fall semester of the 1973-74 academic year was the first time instructors had the opportunity to have their students use PLATO on more than an experimental basis. PLATO usage by students had been delayed before the fall of 1973 to allow more time for lesson development and revision, for the faculty to see PLATO demonstrations, for engineers and systems programmers at the University of Illinois to work out technical difficulties, and for the construction of more PLATO terminals. Students in some classes in biology, chemistry, physics, English and mathematics (GED) spent many hours interacting with PLATO lessons during the fall semester. A copy of a typical weekly PLATO schedule is in the appendix.

Student Evaluation

To help determine PLATO's acceptability by Kennedy-King College students, copies of a questionnaire on "Students' PLATO Evaluation" (see appendix) were distributed among students in eleven classes using PLATO extensively. By January 2, 1974, the PLATO office received completed forms

from 124 students. The results were highly enthusiastic.[16]

Some of the findings pertinent to this study are as follows:

a) 38 of 124 respondents (30.6%) used PLATO on their own time as well as during class.

b) 115 of 124 respondents (92.7%) either found their PLATO experience "quite enjoyable" or "one of the most enjoyable educational experiences [they] have ever had."

c) 115 of 117 respondents (98.3%) either felt PLATO presentations were as effective as or more effective than other presentations. (66.7% found the PLATO presentations "most effective.")

d) 88 of 119 respondents (73.9%) thought the PLATO lessons they used were either mostly or completely clear.

e) 87 of 121 respondents (71.9%) either preferred to work at a terminal with another person or did not mind working with another person.

f) 84 of 118 respondents (71.2%) felt they did either "somewhat" or "a lot" better in class because of their PLATO experience

These students listed some of their frustrations, all of which can be rectified: technical difficulties such as "down" time (when the entire system is inoperative) (15 respondents), unacceptable responses which the student thought correct (11), unclear lessons (3), and inadequate time to view lessons (3). Significantly, only two students mentioned having typing difficulties, specifically in typing formulas and symbols. Only seven students mentioned having difficulty operating PLATO. Lastly, nineteen students indicated they had no frustrations.

Concerning what students liked most about PLATO, twenty-two indicated that they especially appreciated the feedback, and ten mentioned that PLATO compelled their concentration on the material they were to learn. Some of the other positive responses

include comments about self-pacing (11 respondents), instructional technique (8), better understanding of classroom material (7), simplicity of explanation (7), animation (3), humor (2), and self-learning (2).

Here are a few comments by the students about what they liked most about PLATO:

"I enjoy PLATO because he [sic] can give no F's, only another chance."

"I don't feel like I'm just there. I'm really learning."

"It's a great experience."

"It makes you want to go on forever."

"Everything."

Faculty Questionnaire

Several instructors who had their students use PLATO extensively during the fall semester 1973-74 were asked to complete a questionnaire (see appendix) on their use of PLATO. Although it would be unfair to represent their responses as statistically significant, some of their responses are worth noting in this paper. Of the eight instructors who completed the questionnaire, all indicated that they used PLATO to supplement classroom instruction. Each of the other ways of using PLATO for instructional purposes as listed on item seven of the faculty questionnaire was checked by two or more instructors.

These instructors felt that PLATO lessons were "good" to "excellent." All thought that PLATO helped their students master material either "somewhat" (5) or "a lot" (3). Their frustrations were similar to those of their students, for they, too, listed technical difficulties most often.

Here are some of their favorable comments about PLATO:

"PLATO has given students a positive attitude toward learning."

"I think it has provided additional dimensions which I had not thought of (and, or) had provided a variety of examples of certain principles with a maximum of student independence."

"Less time is needed in class to cover material."

The estimated total number of student contact hours for PLATO usage by students of these eight instructors during the fall semester was over three thousand. All of these instructors indicated that they wanted to use PLATO during the spring semester as often as or more often than the fall semester.

Technical Report

Regardless of how effective the medium is or how pleased faculty and student users are, the PLATO Project cannot succeed unless the technical aspects of the system are working efficiently.

The PLATO system experienced much less "down" time during the fall semester 1973-74 compared to that experienced during the previous academic year when the system was inoperative enough to prevent more than minimal student use. This down time should continue to decrease until it becomes a very minor problem. It should be pointed out that some of the down time is used by systems programmers and engineers to improve the PLATO system.

Kennedy-King College, as well as the other participants in the PLATO system, have had only enough computer lesson storage or "ECS" (extended core storage) to guarantee the use of only one or two lessons at any one time at any one site.

Although during the fall semester 1973-74 this did not prevent any classes from using PLATO, it did prevent students from using different PLATO lessons at the same time. It is anticipated that Kennedy-King College will be given more ECS during the spring semester.

One of the more evident reasons for not recruiting more instructors to use PLATO has been that Kennedy-King has had to operate with only eight terminals with a weekly average of only six working. Adaptations have been made to forthcoming terminals to ensure their reliability and terminal maintenance has improved. Kennedy-King has been promised an additional eight terminals by the beginning of the spring semester in February 1974, and by the beginning of March it should have a total of twenty-four terminals.

Recommendations

The success of the implementation strategy used in the PLATO Project at Kennedy-King College has yielded some insights into introducing innovations in education. These insights are concerned with the following topics:

1) Personal relationships. It is essential that the change agent build positive relationships with potential users of the innovation. He should be open, honest and realistic. In addition to being credible, reliable and respectable, he should be friendly. Personal communication is often more effective than communication by letter or memorandum, though both should be used.

2) Opposition recognition. The change agent should recognize that there will be at least some resistance to the innovation regardless of how helpful the innovation is purported to be. He should understand that some resistance to change is beneficial, for it will compel him to look at the innovation from other vantage points. Defensiveness on the part of faculty or administration should be seen as part of the innovative process.

3) Client input. The innovation should be shaped to meet the needs of the clients. During the demonstration phase of introducing the innovation, the change agent should request and consider suggestions from those who use the innovation. Clients and potential clients should receive recognition for their assistance in helping shape the innovation and should be kept informed of new developments.

4) Innovation support. The innovation itself must offer support to those who will use it. If it increases the burdens of the faculty, it will probably not succeed.

5) Quality of usage. Quality of usage of the innovation is more important than quantity of usage. The change agent should not try to encourage everyone to use the innovation. He should concentrate his efforts on working with a few potential innovators, influentials, and gate-keepers in those fields where the innovation has greatest applicability. These early adopters will eventually become change agents themselves by diffusing the innovation among their colleagues.

6) Implementation modifications. Although the overall implementation strategy may require few changes, the change

agent should understand that the acceptance and adoption of the innovation will probably necessitate changes in the tactics he uses. He should expect to make some mistakes.

Other recommendations which have specific relevance to CAI projects include the following:

1) Usage priorities. Usage of the CAI system during the demonstration phase should be primarily for classes accompanied by their instructor. This will help assure faculty that the medium is not there to replace them. It will also encourage new faculty users to become actively involved. Emphasis should be on using CAI as part of classroom instruction, though "homework" assignments or makeup sessions without the instructor having to be present may also be encouraged.

2) Faculty demonstrations. To introduce CAI to potential faculty users, a short but efficient personal demonstration is in order which should provide: a) information on CAI; b) a sample CAI lesson showing some of the features of the system and demonstrating that CAI is not necessarily dehumanizing; and c) instruction on operating the machine. Then the potential user should be encouraged to interact with a lesson in his teaching discipline.

3) Student demonstrations. To introduce CAI to new student users, a similar demonstration should be given to the class as a group at the beginning of the class's first CAI session. Then the students should use their assigned lesson. The demonstrator should only comment on how to operate the machine.

He should reassure the students by mentioning that no special typing skills are required and that they should not be overly concerned about running into difficulties while using the machine for the first time.

4) Team approach. Working with representatives of the CAI system can prove helpful for developing experts within one's own institution. Inside and outside experts can work well together so long as communication between them remains open.

5) Curriculum development. Interested and capable faculty should be given academic assignments for developing CAI curriculum, designing new lessons, and suggesting revisions for existing lessons. This will attract more potential CAI users and ensure that CAI lessons are appropriate to the needs of the students. Translation of lessons into the computer's language could be accomplished by hiring experienced programmers.

PLATO SCHEDULE — WEEK of December 17, 1973

	MON.	TUES.	WED.	THURS	FRI.
9-10	CHEMISTRY Benca	Authoring	PHYSICS Degeeter	Authoring	Authoring
10-11	ENGLISH Stoakeley	ENGLISH Stoakeley	↓	CHEMISTRY Benca	ENGLISH Stoakeley
11-12	↓	Authoring	↓	BIOLOGY Rich Crockett	Authoring
12-1	BIOLOGY Ambuel	CHEMISTRY Douthat	Authoring	Authoring	BIOLOGY Ron Crockett
1-2	Authoring	BIOLOGY Ambuel	CHEMISTRY Benca	Authoring	Authoring
2-3	Authoring	Authoring	Authoring	PHYSICS (makeup)	ENGLISH Schneeman
3-4	Authoring	ENGLISH Monippallil	Authoring	Authoring	Authoring
4-5	GED Lewis	BIOLOGY Bomer	Authoring	Authoring	Authoring
5-6	GED Lewis	GED Lewis	GED Lewis	GED Lewis	GED Lewis
6-7	GED Goudeaux	GED Goudeaux	GED Goudeaux	GED Goudeaux	GED Goudeaux
7-8	GED Hill	GED Hill	GED Hill	GED Hill	GED Hill

Date

STUDENTS' PLATO EVALUATION

How you feel about having used PLATO can provide valuable information for our improving PLATO lessons and the PLATO system. Please answer these questions:

(Number of respondents)

1. How have you used PLATO? (Check all that apply.)

124 a. I am in a class that uses PLATO; the class title is _____

38 b. I have used PLATO on my own time.

39 c. I have been helped by a tutor or a friend to use PLATO.

79 d. My instructor helps me while I use PLATO.

2. Have you enjoyed PLATO? (Check only one.)

64 a. It is one of the most enjoyable educational experiences I have had.

51 b. It is quite enjoyable.

7 c. I feel neutral towards it. ("So what?")

2 d. My experience has been negative.

0 e. It is one of the least enjoyable educational experiences I have had.

3. Has the material you have seen been the kind that could have been taught as rapidly or as completely by another medium such as a lecture or a textbook? (Check one.)

78 a. No, most of the PLATO presentations were most effective.

37 b. Yes, the presentations could have been equally as well presented by _____.

2 c. Yes, the presentations could have been more effective if they were presented by _____.

4. Have you had time to complete lessons? (Check one.)

18 a) All 39 b) Most 49 c) Some 17 d) None

5. Have the lessons on PLATO been clear? (Check one.)

44 a) All 44 b) Most 30 c) Some 1 d) None

6. Do you prefer to work alone or together at a terminal? (Check one.)

34 a) Alone 45 b) Together with 1 or 2 others 42 c) Either way

7. Has PLATO helped you do better in class? It has helped me do:

35 a) A lot better 49 b) Somewhat better 34 c) About the same

8. How many hours have you used PLATO? (Check one.)

(not asked)

__a) Less than 1 hr. __b) 1 to 3 hrs. __c) 4 to 8 __d) More than 8

9. What have been some of your frustrations?

10. What things have you liked most about PLATO?

Date_____

FACULTY QUESTIONNAIRE:

Use of PLATO during the _____
Semester 19___ at Kennedy-King College

In order to keep an on-going record of our use of the PLATO system and to justify Kennedy-King's use of PLATO, I would be grateful if you would fill out the following questionnaire:

(Number of respondents)

1. Your name_____

2. Number of classes using PLATO_____

3. Course title(s)_____

4. Number of sections using PLATO_____

5. How are your students assisted while they use PLATO? (Check all that apply.)

   8 a. I help them at the terminals.
   1 b. They are helped by a Resource-Skills Center tutor.
   1 c. One of my students serves as a tutor when anyone has trouble.
   4 d. The students use PLATO without any special help.
   __ e. Other_____

6. How do your students use PLATO? (Check all that apply.)

   6 a. Each student works alone at a terminal.
   5 b. Students work in small groups of 2 or 3 at each terminal.
   __ c. Other_____

7. How are you using PLATO with your students? (Check all that apply.)

   3 a. As the sole presentation of portions of classroom instruction.
   8 b. As a supplement to classroom instruction.
   3 c. As an introduction to new material.
   5 d. For remediation or practice.
   4 e. As a laboratory experience.
   __ f. Other_____

Use of PLATO, _____ _____ continued

8. How many of your students have you had using PLATO this semester?_____

9. How many hours has each of your students used PLATO this semester?_____

10. How many of your PLATO students have filled out a "Students' PLATO Evaluation" form? _____ out of _____

11. If you are a PLATO author, how many hours have you spent this semester designing PLATO lessons?_____
(List any newly completed ones:_____
_____)

12. How have you felt about the PLATO lessons you have used? On the whole they have been:
2 a) Excellent 4 b) Very good 2 c) Good __d) Fair __e) Poor
Comment:_____

13. Has PLATO helped facilitate your students' mastery of material?
3 a) It has helped a lot 5 b) Somewhat __c) Very little
Comment:_____

14. What has been the general attitude of your students towards PLATO? They have liked it:
7 a) Very much 1 b) Somewhat __c) A little __d) Not at all

15. How has PLATO helped you and your students?

16. How often do you expect to use PLATO next semester?
6 a) More often than for this one 2 b) Same as for this one
__c) Less often than for this one __d) Not at all
Comment:_____

17. What have been some of your frustrations?

18. What are your suggestions regarding PLATO's use for the next semester?

19. How can the PLATO office at Kennedy-King serve you better?

FOOTNOTES

[1]William J. Buchan, "Design for Introducing Educational Change," Education 91 (April-May 1971): 298.

[2]The Computer-Based Education Research Laboratory (CERL) at the University of Illinois in Urbana where the PLATO computer is located has estimated the cost of the PLATO system will be between $.50 and $1.00 per student contact hour once the PLATO system has 4,000 terminals using the computer. (The terminals are connected to the computer at CERL by telephone lines.)

[3]Michael W. Kirst and Edith K. Mosher, "Politics of Education," Review of Educational Research 39 (no. 5): 629.

[4]Goodwin Watson, "Resistance to Change," in Concepts for Social Change, ed: Goodwin Watson (Washington, D.C: Cooperative Project for Educational Development, NEA, 1967), 15-18.

[5]Paul C. Buchanan, "The Concept of Organization Development, or Self-Renewal, as a Form of Planned Change," in Concepts for Social Change, p. 2.

[6]Ronald G. Havelock, The Change Agent's Guide to Innovation in Education (Englewood Cliffs, N.J: Educational Technology Publications, 1973), pp. 5-6.

[7]Ibid., p. 5.

[8]Ibid., pp. 9-10.

[9]Ibid., pp. 8-9.

[10]Ibid., p. 11.

[11]Ibid., pp. 43-128.

[12]Ernest J. Anastasio and Judith S. Morgan, Factors Inhibiting the Use of Computers in Instruction (Washington, D.C: EDUCOM, 1972), p. 33.

[13]Christopher Jencks and David Riesman, The Academic Revolution (Garden City, N.J: Doubleday, 1968), pp. 484-485.

[14]Havelock, Change Agent's Guide, p. 161.

[15]Ibid., pp. 163-164.

[16]It should be pointed out that the instructors of the eleven classes were given the number of forms they estimated necessary to accommodate each of their students who had been using PLATO. The instructors then had their students complete the form during class time. Except for absentees, this ensured that each student would complete the form. Of the 135 forms given to the instructors, 124 were returned completed.

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