

Executive Summary

The PLATO® math curriculum was used in a pilot study as a continuing education offering for employees of the Amoco Fabric and Fibers plant in North Carolina. Thirty-eight Amoco employees used the PLATO® learning system over a six-month period, during which time their progress, in terms of grade level mastery, and time, in terms of hours logged in to PLATO® courseware, were tracked. The learners experienced an average gain of 1.6 grade levels during the pilot period (range of 0 to 4.8 grade levels) with an average of 26 hours 36 minutes spent logged in (range from 0 hours 17 minutes to 123 hours 45 minutes).

The Amoco learners also completed questionnaires about their experience and participated in a focus group at the end of the pilot period. Their responses indicated a positive attitude toward the PLATO learning system, a continued interest in using PLATO courseware and a commitment to continued learning for personal and job-related reasons. This form of computer-based training, with its individual learning paths, flexible time schedule, and learner-determined pacing, has proven to be an appropriate and effective way of meeting this population's continuing education needs.

The demand for continued PLATO offerings at Amoco Fabric and Fibers is present. Improvements to the PLATO implementation at Amoco could take place in the form of on-the-job time for using PLATO, faster computer set-up, motivational employee incentives and rewards and an instructor or other live assistance to facilitate using PLATO.

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Program Description

The Amoco Fabrics and Fibers plant in North Carolina offers the PLATO® system to its employees as an ongoing educational opportunity. This evaluation examines the experiences of 38 Amoco employees who participated in a 6 month pilot study using PLATO at their work site.

Amoco Fabrics and Fibers began offering PLATO to its employees in 1996 on a trial basis, to see how the educational opportunity was received and used. The initial focus was on developing math skills. Amoco's PLATO system is used as a stand-alone learning environment; no outside learning materials are used, nor do learners use PLATO to prepare for any outside test. While in some instances the mathematics topics covered in PLATO curricula and courses are directly relevant to some Amoco employee's job duties, PLATO courses used at this site are not necessarily directly contextualized to jobs. Learners were required to participate in the math curriculum as that was Amoco's main interest, but they were also free to explore the PLATO system and work in the course areas that were of personal interest. Amoco opted to participate in a pilot study evaluation of its PLATO system to find out how its employees were getting involved and what educational gains it was providing them.

The PLATO system was implemented on a volunteer basis at the Amoco site. Forty employees, primarily production plant workers, were originally slated to participate in this educational program. These employees were selected based through mutual agreement between themselves and their human resources director that they would benefit from participation in the pilot study. It was not required that they participate, nor did their participation have any direct bearing or consequences on their employment. Thirty-eight of the forty selected employees actually began using the PLATO system in this pilot offering.

Learners in this pilot study were asked to try PLATO on their own time. They were not paid for their participation; all efforts were strictly on a volunteer basis. Incentives for participation came in the form of a little reward, specifically a calculator for each participant who completed the pilot study. Learners were asked to use PLATO for at least two hours per week, and to participate in a focus group and fill out a survey about their experiences using PLATO.

At the beginning of the study, learners used the FASTRACK math curriculum placement system to determine their current grade level and proper learning path through the system. The data generated by their participation, such as modules attempted, mastery scores, and time logged in to modules, were collected from the PLATO system and analyzed to further determine how they used PLATO and what results they found. All learner data were gathered and analyzed anonymously.

As this pilot did not occur in a structured, classroom-based environment, and learners worked on the system independently and without instructor guidance, there was no instructor data to be collected at this site. Human resources personnel facilitate the local implementation of the program with assistance from PLATO Learning and learners take responsibility for their own involvement.

The Amoco facilities in which PLATO courseware is used consists of a six-computer lab. The computers in this lab were not used for other purposes during the pilot study. The lab did become congested at popular times such as lunch hour and shift endings, but a reservation book let participants sign up for computers in advance to ensure that a computer would be available when they wanted to work in PLATO.

Learners used PLATO by starting from a floppy disk. This factor is likely to have slowed down the computers as learners tried to access data from the disk drive.

Data Analysis

PLATO Results

This pilot study began with a placement test and ended with a review of student progress. Using the FASTRACK system, students were initially required to take Grade Level Series Assessment Tests, which required them to master 75% of a module's objectives and 80% of a grade level's modules in order to pass a grade level¹. Based on their performance on these tests, students were placed at an initial grade level (the first non-mastered grade level) and given an individual learning path within the PLATO system. As students followed their learning paths, the system tracked their progress and assigned grade level gains as modules were mastered. Thirty-nine students took the FASTRACK placement test, and 38 began working on individual learning paths.

The participants in the Amoco pilot study began the study period with an average math grade level of 6; by the end of the study period, their average grade level had risen to 7.4, with an average gain of 1.6 grade levels. It is important to note that this average contains data from all 38 students who completed the initial FASTRACK grade level placement tests and began an individual learning path, regardless of the amount of time spent working on an individual learning path. Of these 38 students who began using PLATO, 21 (55%) experienced a grade level gain of 1.0 grade levels or higher. Six students (16%) experienced gains of greater than 4.0 grade levels during this study, and 7 students (18%) mastered the highest level module of the FASTRACK math curriculum. Figure 1 demonstrates the individual grade-level gains experienced by all 38 pilot participants. Figure 2 summarizes the grade-level gains experienced by all 38 participants.

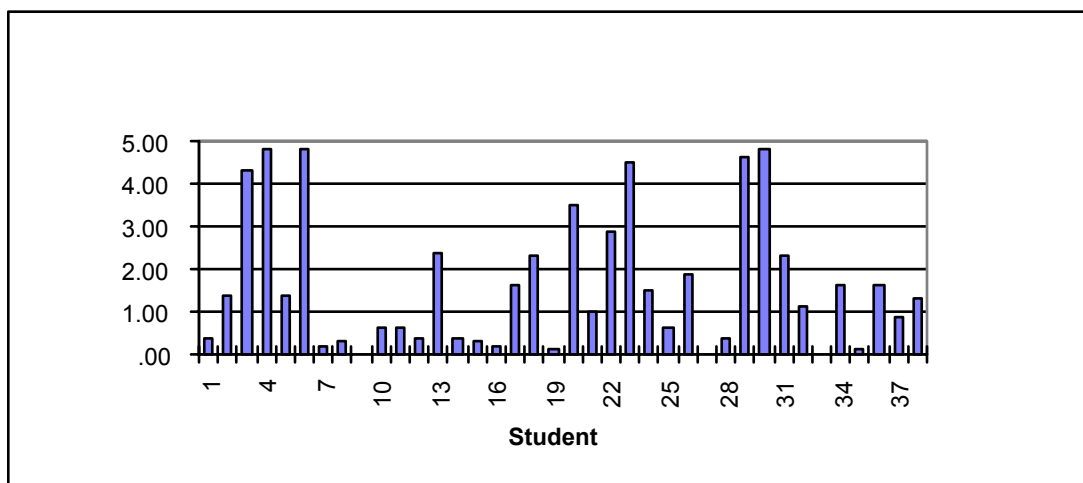


Figure 1: Individual Grade-Level Gains

¹ In the PLATO system, grade levels are criterion-referenced. Thus, there is only an indirect relationship of these figures to those that would come from a norm-referenced standardized test.

The Amoco students spent an average of 26 hours 36 minutes logged into the PLATO system during the pilot period, with a range from 0 hours 17 minutes to 123 hours 45 minutes. Figure 3 demonstrates the various time participation levels of students. Only 6 students (16%) met or exceeded the minimum requested participation time of 2 hours per week, which for a six-month period would be 52 hours. As well, the average time students were logged in to PLATO is higher than their actual usage time; there are several instances in which the data indicate students logged into a particular module for over 10 hours, suggesting that at some times students forgot to log off the system when leaving. As a result, data are not available for actual time spent on task.

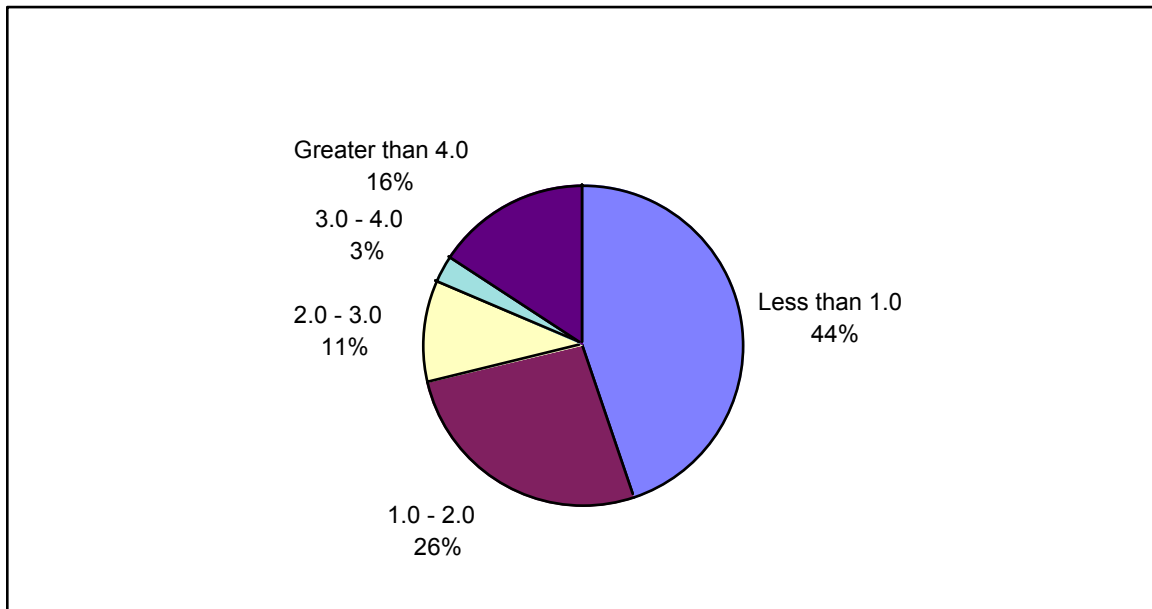


Figure 2: Summarized Grade-Level Gains

The correlation between amount of time spent logged into PLATO and grade level gain is 0.84, indicating the direct relationship between PLATO use and learning. Again, the time factor may be inaccurate in this study, erring on the side of being recorded too high, as it is representative of time logged in and not time on task; however, no student spent more than 4 hours 19 minutes logged into the system without showing some gain. All but one of the students who were logged in to PLATO more than 30 hours PLATO achieved gains of greater than 2 grade levels. Figure 4 demonstrates the relationship between time logged into PLATO and grade-level gain for each student.

Learner Questionnaire

An attitude questionnaire featuring 15 close-ended and 6 open-ended questions was administered to 26 of the learner's. The questions focus on PLATO's ease of use, the learners' comfort with computers and PLATO, and the learners' experiences with computers and PLATO. The questionnaire results indicated that the learners felt comfortable using PLATO. All survey items except for 11 and 13 were positively worded questions. The mean response to each of the thirteen positively worded questions was in the strongly agree-agree range. The mean response for all items, with correction for the negatively worded items, is 4.05, indicating again the learner's positive reaction to using the PLATO system. Figure 5 provides a graphical representation of the mean response for each item. A listing of each item along with its frequency distribution and mean response appears in Appendix A.

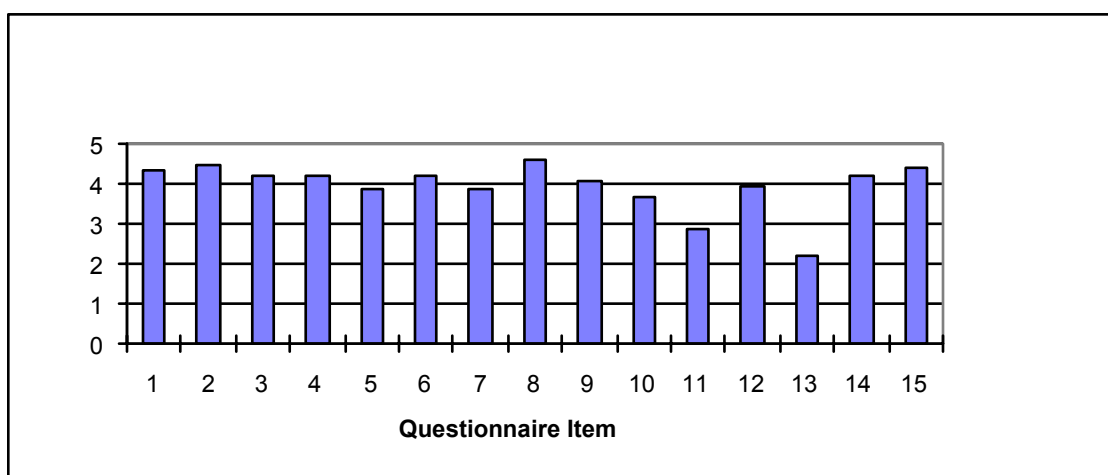


Figure 5: Mean Learner Questionnaire Responses

In their responses to the open-ended questions, learners indicated again a positive PLATO experience, with the feeling that they had been learning and benefiting from their use or the system. A complete listing of responses to open-ended questionnaire items appears in Appendix B.

The learners particularly liked the independent learning paths created by PLATO and the ability to control their own pace, an issue mentioned by 11 participants, stating "I can work at my own pace. If I have trouble with a particular lesson I can review it until I get it.", "If I have trouble with a particular lesson I can review it until I get it." and "It is a one on one learning program. I don't have anyone breathing down my back." These adult learners also felt that PLATO helped them recall, refresh and build upon their prior learning experiences, stating "It refreshes your memory on things that you probably forgot all about and enlightens you on things you might not know."

Time, the need for human assistance and computer speed were the three main concerns of the learners. First, they found it difficult to find the time to work on PLATO, which can clearly be seen in their participation levels. These participants worked full-time and were not paid for their participation; with all of their other responsibilities and commitments and despite their desire to learn, PLATO often did not get their attention. There was no instructor for these learners, which was an element that they missed. One learner said “Sometime you need a human touch,” a sentiment that was echoed by others. They indicated that at times they had questions or needed help, and they had no one to ask. Finally, learners indicated that they found the speed of the system to be a bit slow; they wished that they could work through problems. In their lab they worked from floppy disks rather than a hard drive or network, which did slow down their functioning.

When asked what they would change or how they would improve the course, most learners indicated that they would not make any changes and that they did not have any suggestions. On the implementation side, learners again mentioned their difficulty finding time to work in PLATO. On the software side, they indicated that they would like more user control (“The ability to escape from a part that you do not need to study.” “I would prefer to solve the problem from the start.”), and more instructions and examples (“Some lessons need to be explained more clearly.”).

Most of the learners expressed confidence that their experiences with the PLATO math curriculum would help them with their jobs. 16 respondents said that PLATO definitely would help, 5 felt that it might and only 2 said that it was not applicable to their jobs. Several learners further indicated that PLATO was helping them on a more general or personal level.

When asked if they would recommend using PLATO to other employees the learners gave an overall positive response, with 19 saying that they would recommend PLATO, 3 saying that they would recommend it selectively or conditionally, and only one person saying that they would not recommend it. Comments stated that they would tell others to experience PLATO because “it can only help, not hinder” and “no one knows everything so there is always room for improvement.”

