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ABSTRACT

Lakeland Senior High School (LSHS), a suburban school in Lakeland, Florida, has used PLATO (registered) courseware from 1995 to meet a variety of student needs. They use their three dedicated PLATO labs to help students prepare for college placement tests such as the Stanford Achievement Test (SAT), prepare to retake the Florida High School Competency Test (FHSCT), and to help students develop specific skills in other courses. They have been creative in adapting PLATO courseware to suit the needs of students of virtually all ability levels. There has been a strong commitment from the administration and faculty to customize instruction to suit the special needs of individual students. An evaluation was conducted to describe the manner in which the PLATO Pathways program has been used at LSHA to examine the effectiveness of the FHSCT remediation effort, and to suggest possible areas of improvement for future PLATO implementation and use. Student FHSCT scores increased dramatically in both FHSCT retests. A significant positive relationship was identified between some student PLATO performance data and the FHSCT test scores. The faculty and the principal were positive about the PLATO courseware and believed that it contributed to student improvement on the FHSCT scores and on a number of affective measures. The 15 students sampled were positive about PLATO courseware, especially the fact that it allows them to learn at their own pace. Suggestions are outlined for maximizing the effectiveness of future PLATO use at LSHS. (Contains 6 tables and 20 figures.) (Author/SLD)

PLATO®
Evaluation Series

Lakeland Senior High School, Lakeland, FL

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Executive Summary

Lakeland Senior High School (LSHS), suburban school located in Polk County, has used PLATO® courseware from 1995 to meet a variety of student needs. They use their three dedicated PLATO® labs to help students prepare for college placement tests such as the Stanford Achievement Test (SAT), remediate to re-take the Florida High School Competency Test (FHSCT), and to provide students to develop specific skills in other courses. They have been creative in adapting PLATO courseware to suit the needs of students of virtually all ability levels. There has been a strong commitment from the administration and faculty to customize instruction to suit the special needs of individual students.

The purpose of this evaluation report is to describe the manner in which the PLATO® Pathways program has been used at LSHS, to examine the effectiveness of the FHSCT remediation effort, and to suggest possible areas of improvement for future PLATO® implementation and use.

Some of the more important results of this evaluation include:

- Student FHSCT scores increased dramatically in both FHSCT re-tests
- A significant positive relationship was identified between some student PLATO® performance data and the FHSCT test scores
- Faculty and the principal were positive about PLATO courseware and believed that it contributed to student improvement on the FHSCT scores and on a host of affective measures.
- A sample of students were positive about PLATO courseware, particularly that it allows them to learn at their own pace.

Six tables are included in the evaluation which detail FHSCT test results and instructor and learner attitude survey results. Suggestions are outlined for maximizing the effectiveness of future PLATO use at LSHS.

Table of Contents

Introduction

This report describes the PLATO-integrated strategies used by Lakeland Senior High School (LSHS), Lakeland FL, to support a number of student outcomes. LSHS has adapted and changed the way it has used PLATO each year since 1995 to respond to the changing needs of its students, to changes in the Florida standardized test, the Florida High School Competency Test (FHSCT), and to changes in the district graduation requirements. LSHS has used PLATO as a "catch all" for students - from college-bound students who need practice and review for the SATs, to severely challenged and special need students who need remediation and a great deal of individual attention. The FHSCT is being phased out and will be replaced by the Florida Competency Achievement Test (FCAT) in 2000. The FHSCT has been a graduation requirement in Florida since 1997 and has forced all high schools in the state to devise an effective plan to deal with failing students.

The faculty has used PLATO courseware for about four years in a variety of ways and is quite pleased with it. They use PLATO® Pathways to meet the following needs:

- Align the curriculum to the state standards
- Provide review for students studying for the SAT or ACT college placement examinations
- Provide individual remediation for students struggling to pass the FHSCT
- Customize the instruction of regular education and special needs learners alike, since each comes into the program with unique needs and a wide range of skill levels
- Establish learning programs that present a variety of computer-based modules corresponding to core subject areas
- Provide a motivational way to learn core subject material
- Provide individual assessment and tracking
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This report evaluates the general effectiveness of the school's PLATO strategies – which included both PLATO® interventions and traditional instruction. The purpose of this report is to describe the manner in which the PLATO® Pathways program is used within the courses at LSHS, to examine the effectiveness of the FHSCT remediation effort, and to suggest possible areas of improvement for future PLATO implementation and use.

Program Description

Learners. LSHS serves a diverse population of about 2,000 students. Minorities represent about 35 % of the student population with African American (24 %) and Hispanics (6 %) comprising the largest minority groups. Almost half (46 %) of the students at LSHS receive a free or reduced lunch. LSHS has a fairly low dropout rate, 2.7 % in 1997-98, compared the state average of 3.0 percent. The learner profile of these low-achieving students is consistent with the literature dealing with at-risk learners: they typically have a short attention span in school; they are poor readers and/or do not like to read; they question the relevance of the things they learn in school; they often feel disenfranchised from the school environment; and they expect to fail. They need as much one-on-one attention as possible.

Program Goals. There are three PLATO labs at LSHS. Regular education students have used one lab since 1995-97, special needs students have used the second lab since 1997-98, and the third lab was added this past year to be house the *Second Chance* program, which is for students in detention/in-school suspension. Each lab has distinctly different goals. The regular education lab uses PLATO for a variety of purposes: 1) to help transfer students and students who are returning from an extended illness "catch up" and acclimate to LSHS; 2) to assist students in an after-school tutor program; 3) to allow students with emotional or other problems to temporarily work in a safe, productive environment; 4) to help college-bound students prepare for college placement tests; and 5) to target the specific skills set forth by the Florida's Sunshine State Standards (previously known as Florida Frameworks). One of the other important ways the regular education lab uses PLATO is to help increase the passing rate for students who have already failed, or who are in danger of failing, the FHSCT.

The special education lab use PLATO extensively to individualize the curriculum for each student in the class. In a typical special needs class of 16 students, the range of ability and emotional maturity is enormous, so PLATO is used to individualized curriculum which allows the teacher to attend to individual needs of each student.

The *Second Chance* program is an in-school suspension/detention program for students who have discipline problems. These students may be in *Second Chance* for 3 days or several weeks. The instructor uses the *Fastrack* assessment test to determine the grade level of the student. This report may be used by the administration and counselors to help determine if a student is misplaced in a class – thereby causing the discipline problem. Teachers are asked to send work for these students to complete while in the program; however, when they do not send additional work, the students can continue studies in particular subject areas using PLATO. There were 195 students sent sometime during the 1998-99 school year.

The overall mission statement of LSHS describes it as "a learning community dedicated to working together to create a caring environment where everyone is respected as a capable learner expected to succeed and excel." The PLATO program goals have evolved over the four years it has been in use. FHSCT and FCAT requirements and changes in graduation requirements have caused the school to adapt and adjust the way the PLATO courses are

managed. In the Program Implementation Description section, the evolution of the program goals over the last four years is described.

Instructor Characteristics and Role in Program. Ms. Sue Albritton teaches all the regular education students and Ms. Dotty Ivey, Chair of the Special Education department, teaches all of the special needs students. Each teacher's role and style are different but their philosophies are similar. They both believe that the student individual needs come first and they try very hard to use PLATO to customize instruction for every student. They are both very concerned about the negative effect that the state-mandated FHSCT may be having on education in general, and on their students in particular. They design and align the curriculum with LSHS's overall goals and, in Ms. Albritton's case, with the FHSCT. Each teacher has taught for over 20 years and is provided great autonomy and freedom by the principal, Mr. Mark Thomas. Ms. Albritton, certified in English, facilitates PLATO curriculum in math, English, and social studies. Ms. Albrittton aligned the PLATO curriculum to target the state standards covered on the FHSCT. Ms. Ivey's students are currently not required to take the FHSCT. A full time para-professional is assigned as a lab assistant to help Ms. Albritton manage and monitor student progress in the regular education PLATO lab.

Program Implementation Description

This evaluation will describe the various ways that LSHS used PLATO. However, data were available only for students enrolled in the regular education lab, thus only students in those courses were included in the formal quantitative analysis. Following are descriptions of how the regular education lab has used PLATO over the last four years.

1995-96. PLATO was first used during the 1995-96 academic year. This coincided with the move to block scheduling, i.e., four 1 ½ hour classes daily. The initial focus for the lab was to help transfer students coming into a 4-period day school. During this year, students did not receive grades for their work in the PLATO lab. Students were placed in the lab as an adjunct to the other courses in which they were enrolled, and reports were sent back to the teachers informing them of student progress. The teacher could use the reports to validate the grades for a student who may have transferred into the school after missing weeks of instruction. Seventy-five students worked on PLATO in this capacity during this year. But since LSHS did not have as many transfer students as anticipated, the school began using the lab for FHSCT skills.

During this year, English and math teachers would send a class to the lab once a week to improve skills for taking the FHSCT. During this year, when only one lab was used for PLATO, about 350 students used PLATO for this purpose. According to the principal, Mr. Thomas, the skill building was considered successful.

1996-97. The 1996-97 academic year began with emphasis on transfer students and FHSCT skills. During this year, the focus began to shift more toward sending students on a full-time basis for one, two, or three class periods. The lab slowly began emerging as another way for students to learn. As students were able to function in the regular classroom after finishing a course in the lab, more students were assigned to the lab. Most of the students were not in the lab for credit. Since some students needed to complete a course, Ms. Allbritton still continued to validate that course and send reports to the teachers in the regular classes. Some teachers were still able to send part of their classes for extra help on FHSCT skills. This option became much less available by the second semester.

1997-98. The 1997-98 year began with more students assigned full-time. Some needed credit and others needed skill building in FHSCT or SAT/ACT. By second semester, the class was full each period with full-time students. There was no longer any room for teachers to send even part of their classes for extra help. The lab was open for one hour for three afternoons a week for tutorial help.

1998-99. The 1998-99 year saw another shift for the PLATO lab. Many of the students were assigned to the lab for credit. The lab still serviced the new transfer students in the school. Ms. Albritton was also assigned the ESOL (English as a second language) class for the year. Every period had full classes. Besides the FHSCT test, LSHS students now have to take the FCAT test in the 10th grade as well as the Florida Writes test. [FCAT scores for 1998-99 were available but were not examined in the current evaluation as Ms. Albritton did not focus her effort on FCAT testing for her 10th grade students—as there was simply "not enough of her to go around."] One major reason for the changes this year was the changes in the requirements for

graduation (see Appendix A). The County decided that all students must take and pass Algebra I. Students were denied promotion without the course or its equivalent. PLATO became a way for these students to master skills needed to pass Algebra I. Frequently, students enrolled in Algebra I needed to begin with very basic skills, such as fractions, and work through pre-algebra skills before mastering Algebra I.

The original PLATO curriculum purchased by LSHS was already aligned to the skills identified in Florida's Florida Frameworks. When Florida Frameworks was replaced by the Sunshine Standards, Ms. Albritton handled the re-alignment of the PLATO curriculum to the new standards on her own.

Evaluation Design

The present evaluation examines elements of the implementation that are somewhat consistent with both a modified Mastery-Based Program Effectiveness design and an Affective Outcomes design[1]. PLATO module-mastery and time-in-program data were available for this report, as were other useful data. Recent student FHSCT scores were examined. Affective outcomes were measured with questionnaires completed by LSHS faculty and staff. Telephone interviews were also conducted with several key staff and faculty. It is important to note that LSHS used PLATO to serve students in a variety of ways across many courses, thereby making it impossible to examine one group or groups of students who had the same instructional experiences. As a consequence, interpreting the results of this program evaluation is somewhat complex. But as reported later, this flexibility in using PLATO in individualized for students is precisely what the school's principal views as PLATO's greatest strength.

The current evaluation seeks to describe each of the ways PLATO was used at LSHS. It examines FHSCT scores for those regular education students who failed at least one part of the test at least once and were enrolled in at least one PLATO course. Examining this group of students offers some insight into how successful the FHSCT remediation effort has been, and to what extent PLATO has contributed in that success. The evaluation seeks to examine relationships among several variables as well as describe a rich picture of participant attitudes and beliefs.

Data Analysis. Results of the instructor survey are reported. For open-ended survey items, similar responses are summarized and reported. In reporting the interview results, common threads and main ideas were collapsed and summarized. In the quantitative analysis, correlations were performed and reported at the .05 alpha level of significance[2]. Differences in FHSCT scores were analyzed using a paired-sample t-test, again at the .05 level. In other words, student gain scores were examined to determine if the gains were likely due to the LSHS intervention or are a result of random fluctuation. This analysis focused on *just* those students whose FHSCT scores over the last two years were available *and* who were enrolled in a regular education course in the PLATO lab.

Procedures for data collection. The evaluator interviewed by telephone the two teachers who are the primary PLATO users, Ms. Sue Albritton and Ms. Dotty Ivey, and the LSHS principal, Mr. Mark Thomas. The evaluator used the PLATO site overview questions to structure the interviews, and then allowed the inquiry to be guided by the concerns and perspectives of the participants. Ms. Ivey and Ms. Albritton completed instructor surveys. Finally, Ms. Albritton collected both the PLATO data and the FHSCT scores, and administered learner surveys to 15 students in Fall 1999. She then forwarded all data to the evaluator.

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[1] Foshay, R., *Guidelines for Evaluating Programs Using PLATO.* Technical Paper #2: Edina, MN: PLATO Learning, Inc., 1994.

[2] The .05 alpha level of significance is a widely accepted threshold for statistical tests; findings that exceed this threshold, i.e., < .05, are believed NOT to be a result of chance.

Results

The results are organized into two sections, FHSCT scores and Attitudes/Beliefs. The FHSCT scores section examines the trend of the FHSCT scores for students who failed at least one part of the test and who participated in PLATO regular education courses over the last two academic years. In addition, Pearson product moment correlations were calculated between PLATO module data from courses over the past two years and the FHSCT tests administered over the same period. The Attitudes/Beliefs section presents the attitude questionnaire data for the instructors, and results of the interviews with Mr. Thomas, Ms. Albritton, and Ms. Ivey.

FHSCT Scores

Table 1 displays the combined 1998 and 1999 mean scores for students who failed either the Math or Communication (Language Arts) components of the FHSCT. In other words, English scores for students who failed at least one component of either the Fall 1998 or Fall 1999 test – the first FHSCT test for the academic year -- were combined, and then compared to their scores on the Spring re-test. Only students who failed either of the FHSCT components *and* who participated in the PLATO courses were included in the comparison. Paired-sample t-tests revealed that student FHSCT scores on the Spring re-test increased significantly on both the Math and English exams. In Math, student scored higher in the Spring re-test ($M = 698.65$) than they did on the Fall test ($M = 683.90$), $t(df\ 30) = 3.26$; $p = .003$ (effect size[3] = 1.28), for a gain score of 14.75 points. On the English component, students improved to a mean score of 698.03 on the re-test from a mean score of 679.83 in the first test in the Fall, $t(df\ 28) = 8.53$, $p < .001$(effect size = 1.35), for an 18.20 point gain score. In other words, those students who failed part of the first FHSCT and who were enrolled in the PLATO courses, scored significantly higher on the Spring re-test. [That is, the statistical tests confirmed that the increases in gain scores were too large to be simply accidental, or the result of random fluctuations.]

Table 1. Combined FHSCT Scores for 1997-98 and 1998-99 for Fall Test and Spring Re-test

FHSCT Test		Fall Test	Spring Re-test	Number of Students Passing Re-test
Math	M	683.90	698.65	
	SD	11.52	26.28	
	N	31	31	19
Communication (English/Language Arts)	M	679.83	698.04	
	SD	(13.47)	(16.89)	
	N	29	29	14

Note. Passing cut score for each test is 700.

[3] Effect size is a measure of the gain scores relative to the amount of the variance. An effect size of .80 is generally considered to be fairly large.

Table 2 displays the combined 1998 and 1999 mean scores for students who failed either the Math or Communication (Language Arts) components of the Spring FHSCT re-test. In other words, English scores for students who failed at least one component of either the Spring 1998 or 1999 re-test were combined, and then compared to their scores on the second Spring re-test. Only students who failed either of the FHSCT components on the re-tests *and* who participated in the PLATO courses were included in the comparison. Owing to student absences, transfers, etc. not all of the students who failed the first re-test took the second re-test. Paired-sample t-tests indicated that student FHSCT scores on the second Spring re-test increased significantly on both the Math and English exams. In Math, student scores increased by 40.09 points on the second re-test ($\underline{M} = 716.55$) over the first re-test ($\underline{M} = 676.45$), $\underline{t}(df\ 10) = 4.93$, $\underline{p} = .001$ (effect size = 1.40). On the English component, students improved to a mean score of 704.23 in the second re-test from a mean score of 685.85 in the first re-test, $\underline{t}(df\ 12) = 5.93$, $\underline{p} < .001$ (effect size = 1.58), for a gain score of 18.38 points. In other words, those students who failed part of the first and second FHSCTs and who were enrolled in the PLATO courses, scored significantly higher on the second re-test. [That is, the statistical tests confirmed that the increases in gain scores were too large to be simply accidental, or the result of random fluctuations.]

Table 2. Combined FHSCT Scores for 1997-98 and 1998-99 for Spring Re-Test and Second Spring Re-Test

FHSCT Test		Spring Re-test	Second Spring Re-test	Number of Students Passing Second Re-test
Math	M	676.45	716.55	
	SD	(28.56)	(15.91)	
	N	11	11	11
English/Language Arts	M	685.85	704.23	
	SD	(11.67)	(15.82)	
	N	13	13	11

Note. Passing cut score for each test is 700.

Several significant correlations between the FHSCTs and the PLATO usage data were identified.

English/Reading/Language Arts. Percent of modules mastered in Reading I is correlated with student scores on the English component on the HSCT re-test. As students mastered more PLATO modules in Reading I, they tended to score higher on the English part of the HSCT re-test. The percent of modules mastered in the Reading I course was positively correlated ($r = .99$, $p = .042$, $N = 3$) to student scores on the second HSCT re-test. In other words, the higher the student mastery rate on modules in the English I course, the higher those students tended to score on the English part of the HSCT. The percent of total modules mastered in all language arts courses (Reading I, English I, II, III, and IV, *Fastrack* Reading and Language Arts) was also related to student English scores on the second HSCT re-test ($r = .64$, $p = .010$, $N = 13$). Finally, total hours spent in PLATO is related to student English scores on the second HSCT re-test, $r = .489$, $p = .045$, $N = 13$, In other words, the more time students spent in PLATO, the higher their English scores were on the second HSCT re-test.

Math. Total hours spent in PLATO is related to student Math scores on the re-test, $r = .30$, $p = .038$, $N = 35$. In other words, the more time students spent in PLATO, the higher their math scores tended to be on the HSCT re-test.

Only significant correlations are reported here. PLATO module data are difficult to interpret for two reasons. First, the number of students enrolled in the same course *and* who had HSCT test scores for the same test was often too low to use statistical tests reliably. But second, and more confounding to the interpretation of the module data, is the fact that students of all abilities were co-mingled in many LSHS courses. The brighter students probably worked on

fewer modules since they had fewer skill weaknesses, and those modules would likely be the more advanced, and more difficult, modules. Thus the brighter students may actually have a *lower* mastery rate and/or have spent less time in PLATO but scored higher in the FHSCT because they had greater ability to begin with. The reader should use some caution in interpreting the correlational data.

Attitudinal/beliefs

Instructors. Ms Ivey and Ms. Albritton completed instructor surveys that are summarized in Table 3. Table 3 displays the frequency distribution by item of the responses to the instructor survey administered in August 1999. It includes: Part 1 - instructors' agreement or disagreement with different PLATO features; and Part 2 – instructors' descriptions of how often they perform certain priming and instructional activities in support of PLATO. Both teachers reported they have used computers for 10 years. Instructor open-ended responses are summarized in Table 4.

Learners. Mean score responses to the Likert items in the learner survey are displayed in Table 5. These survey items are based on the respondents' agreement or disagreement with different PLATO features (Strongly Agree = 5, Agree = 4, 3 = Neutral, 2 = Disagree, 1 = Strongly Disagree). Part 2 of the learner survey asked learners to describe what they liked and disliked about PLATO and is summarized in Table 6. Figures 1 – 20 include bar charts displaying frequency distribution by response for each item on the learner survey.

Interviews

Mr. Mark Thomas, Principal. I spoke with Mr. Mark Thomas, LSHS principal, in early August when the school was in the midst of a $14 million renovation. The work was going to cause serious disruptions in the scheduling of classes in the upcoming year. The PLATO labs, for example, had already been moved to different rooms. Nonetheless, he was upbeat and spoke with me in some detail about how PLATO is used at LSHS. Mr. Thomas does not view PLATO as a single-purpose tool thus was interested in this evaluation not simply to determine if their FHSCT remediation program employed over the past two years was helping their low-achieving students (despite the considerable pressure on schools like LSHS to raise standardized test scores). He sees PLATO as a valuable resource for students with a wide range of abilities.

Mr. Thomas explained his philosophy about the test pressure. "Sure a lot of people (school administrators) use it (PLATO) for remediation, and that's great. It does that really well. But we're about kids – all kids - and trying to get them to do better and be ready for life. Sure I use it to put out fires sometimes – but that's not the main use. It helps *all* kids. For kids who bomb out on the SAT, they need support. PLATO gives them hope. Most of these kids do better (on the SAT) after working with Sue (Albritton) in PLATO. It creates a great learning atmosphere."

Mr. Thomas is very happy with PLATO. He sees its greatest strength as enabling teachers to meet the varied needs of his students. "Whether it's ESOL kids, or students needing practice for the SAT's, HSCT remediation, or kids who are just struggling in a course, they can come into the lab for however long it takes to get help. That is the beauty of PLATO. It is not

targeted at any one group of kids – it's up to the school how they use it. Schools in the 90s need flexibility and PLATO gives it to them."

Mr. Thomas believes that using PLATO results in fewer discipline problems. "The majority of discipline problems occur because the student is either bored or too challenged – and PLATO takes both of those away. We have had no discipline problems – I mean zero in the PLATO lab." Mr. Thomas is quick to add that the role of the teachers is the most important ingredient in the success of PLATO. "I'd rate the success factors in order of importance as -- 1) the teacher and 2) PLATO. Sue has been great. The teachers in our other courses trust and respect Sue so when she sends their kids back to them, they know the skills have been covered. PLATO allows her to be a facilitator." He related one story about a boy in a tragic car accident that left him crippled and mentally very challenged. "When he came back from the accident, Sue was able to build a home for him in the lab. What a great place for him to get the kind of support he needed! He is quite happy there. I don't know what I could have done for him without Sue and the lab."

If he had enough money, Mr. Thomas would set up additional PLATO sections. "I'd separate it out if I had the money to set up more labs. I mean kids in Algebra 2 often need a bridge to get them through it. They really struggle when they get into some more complex math. PLATO could help these kids. I could probably fill a lab with *just* those kids. Overall, I am really satisfied. I hope we can increase our license and get more labs."

Ms. Sue Albritton, Teacher. I spoke with Ms. Albritton by phone during her summer vacation in July. She has used PLATO for 4 years and was also very positive about it. Like Mr. Thomas, Ms. Albritton believes that PLATO has contributed to students' remediation success and was equally interested in the evaluation. "The PLATO experience has been a positive one." She is an extremely organized teacher and maintains records of all grades earned by all the students in her classes – which she shared with me for inclusion in this evaluation. As the original PLATO user, she provided a comprehensive overview of how PLATO has been used and how that strategy has evolved over the four years. Much of that overview is summarized earlier in the Program Implementation section.

Ms. Albritton used PLATO to customize curriculum for students with a wide variety of needs and abilities. "We use it for math honors and advanced English, as well as HSCT and SAT remediation. We originally used to help transfer students catch up and get used to the block. Then we used the lab to help individual students who had emotional or other problems and who were not performing well in their normal classes. These students might be with us for a few days or a few months. If a kid needs out of a certain class, we get him. I teach individual skills to individual students." In most cases, the school counselor or the principal refers these students.

Ms. Albritton has numerous stories about students who persevered and succeeded using PLATO. One such story involves a recent graduate who had no algebra skills as a senior. "This girl had no algebra skills whatsoever at the end of junior year but she had her heart set on going to Florida State (University). So we worked out her curriculum and that kid worked very hard all year on her math skills and she finally got to where she could get through it. She just finished her first year at FSU and we are all proud of her." "I would say that after four years (of doing this),

our students are succeeding." She usually moves around the room and is very hands on. "I work the room and they see that I can make mistakes too and don't always know the answers. At the end of successful modules, they really feel good. If they fail, the computer never judges or says 'you are stupid.'"

Although she questions the validity and wisdom of the state's emphasis on the HSCT, she believes that PLATO helped her students perform on it. "I think there was only one kid in regular ed who did not pass the HSCT by his last try – and he only came to us this year." Ms. Albritton attributes the principal, Mr. Thomas and the assistant principal, Ms. Troy Wells, with creating a supportive environment for her to try different things with the kids, and to insulate the faculty from feeling overly pressured about the HSCT results. "They have been great. They let us do our job and do not give me more kids than I can handle in here (the PLATO lab). Without their support, I can't do what I do." She likens using PLATO with a "one-room schoolhouse."

She sees the social studies component as the weakest area in PLATO. And she thinks there should be more writing opportunities, but she compensates for this by supplementing her instruction with outside writing assignments. "The language arts is not really strong enough for college prep students," but again adds that that is not a serious problem if you "supplement it." In her view, PLATO's strengths are: the fact that PLATO is impersonal and doesn't talk down to students – "it is designed for adults and students appreciate that"; its alignment with the Sunshine Standards; and its ability to tailor curriculum for students of all ability levels allowing students to enjoy "small successes." Overall, Ms. Albritton is very pleased with PLATO. "I am convinced that PLATO has a big place in high school today and further down the line (in the future).

Following are selected stories about students enrolled in PLATO in the last two years related by Ms. Albritton in a written text. Pseudonyms are used.

1997-98:

John was an ESE (Exceptional Student Education) student who was trying to pass the HSCT so that he could get a regular diploma rather than a special diploma. Through the lab we were able to get him to a passing score in communication, but he missed math by one question the last time he took it in March.

Michael was also an ESE student who was trying to earn a regular diploma. He was a special needs student with multiple physical handicaps. PLATO allowed me to set up a stand-alone computer station to send home with this student since he could not be in school most of his senior year. He passed the HSCT after using the program at home.

Jessie came to us his senior year as a foreign exchange student from Malaysia. He spoke very little English. He spent 3 hours each day in the lab working on language skills. You will notice on the chart that he was not tested on HSCT. There was no reason since he did not have the English skills to pass.

Marsha began working in the lab for her math skills during the 9th grade. She has worked through *Fastrack*, Exploratory Math, Pre-Algebra, and Algebra I. In some cases, she has worked through the modules several times. When Marsha took the test the first time in March 1999, she passed (and we celebrated!). Many times Marsha would come to the lab on her own time during lunch and after school. She actually had to take Algebra I through PLATO so that she would be eligible to take the HSCT this March.

1998 – 99

Mojda and *Mahrie* were sisters who came to the United States in August just as the school year began. Neither spoke English. They had been living in Iran with their father for twelve years and were not allowed to write or talk with their mother during that time. These girls learned English during this year at the college prep level. They took Calculus as well as college prep English IV and Government.

Michelle completed her Algebra I and passed the HSCT. She will be a senior this next year and plans to work on Algebra II in PLATO.

Jerome was critically injured in an accident in October 1998. He returned to school in March still suffering the effects of being in a coma for several weeks. He had extensive brain damage and came back to school in a wheel chair. Jerome could begin work with second grade skills but adult content. He made much progress; however, he still has a long way to go.

Garth came to the PLATO Lab in the spring of 1998. He needed to pass Algebra I so that he could be promoted to grade 11. When the new graduation requirements became effective, no phase-in period was instituted. We had several students who were not even scheduled to take Algebra I until their junior or senior year. Garth had some learning disabilities in math and simply needed time and repetition in order to complete the material. Through much effort and repeated one-on-one instruction, Garth successfully completed Pre-Algebra and Algebra I. When he received his test results in April, he never stopped smiling. For Garth, that was a big plus, for you rarely saw him smile. He now talks of college.

Ms. Dotty Ivey, Teacher. Ms. Ivey graciously agreed to chat with me on the telephone while vacationing with her family in Alabama. She taught all of the 180 of the students identified as special need. Half of them will earn a Special Education Diploma, the other 90 are in the regular education track. The students in the Special Education track do not have to take the FHSCT. Many of the students in the regular track need special help and are enrolled in a program called PASS, Parallel Alternative Strategies for Students. In PASS, students can work on customized PLATO material to help them get through courses such as Exploration I and II, and English I and II. She has an average of about 15-16 students in her classes and does not have a full-time assistant assigned to the lab to help her. She sees PLATO as essential to help her manage that many students at the same time. "I typically break the class into two groups in the lab. The first group works on their individual PLATO curriculum while I work with the other half on some other activity. I rarely lecture – I can't, really. I supplement what they are doing in

PLATO – and break it up to vary it a little bit with small-group instruction –usually some kind of hands-on activity. I could not manage that many kids without PLATO."

Ms. Ivey was also very positive about PLATO. "I really like it. Especially the reporting feature to track progress. Graphs are really helpful for my kids to show them how they are progressing. They like to see that - it boosts them." It helps her manage students with wide ability differences in the same class. "PLATO allows my faster kids to go in *Fastrack* and progress and not be held back and frustrated by some of the other slower students. I may have 15 students at 15 different levels. It has saved my life in a lot of ways. It helps kids move up faster than they could if I were on my own (without PLATO). It also does a lot for my students who thought they could not do anything – it builds them up." She is very concerned about a change in state policy that will require her special students to take the HSCT in the future, but she feels that "PLATO gives kids a good amount of practice and a psychological edge to take the HSCT."

Like Ms. Albritton, Ms. Ivey commended Mr. Thomas for his support. "Mark is very supportive. He lets us do what we need to do."

Discussion

FHSCT scores

Although it is not the highest priority for LSHS, it appears that the FHSCT program to remediate students was successful for both 1997-98 and 1998-1999. Student scores in both the Math and English components of the FHSCT test improved on each attempt. The strategy of customizing PLATO to complement targeted classroom instruction was quite effective. The fact that the school has made the commitment to allow Ms. Albritton to be a curriculum resource for all students is likely a key to the overall success.

It does seem that Mr. Thomas and other faculty members' belief that PLATO has helped their students is defensible. The fact that student success in some PLATO modules was related to higher test scores suggests as much. It is not statistically possible to make any definitive causal relationship, i.e., PLATO *caused* higher test scores, but clearly, that is not really the point. It is not practically important to identify which part of the intervention strategy (PLATO or the other classroom instruction) contributed more to the improvement. The encouraging fact is that the combination of PLATO and the efforts of skillful and dedicated teachers *together* made a difference. PLATO – along with the classroom instruction – were both integral parts of the program's success. Bear in mind that many of these students had already failed the FHSCT once when they only had the benefit of classroom instruction so it is logical to conclude that adding PLATO to the mix was critical.

This evaluation did not examine results from the other program for which PLATO was used, e.g., the SAT program.

Attitudes/Beliefs

Ms. Albritton, Ms. Ivey, and Mr. Thomas were quite positive about PLATO's contribution to the instructional strategies they have used in recent years. In fact, PLATO has in some cases, guided the strategy. The flexibility to individualize curriculum across ability levels has allowed greater freedom in assigning students to lab times. They were not constrained as much by the course description, e.g., Algebra II, that prohibits other schools from freely moving students around as needed. They all believe that PLATO has helped virtually all the students who have used it. They also believe that the instructor's presence, concern, and guidance is absolutely essential in the success of their strategy.

Students' responses to the survey items were generally quite favorable (see Tables 5 and 6). Students reported that they liked using PLATO and were comfortable using the computer. They particularly liked the fact that PLATO allows them to work at their own pace. A few limitations must be noted about interpreting the learner survey data. First, the survey was administered to learners in August 1999 about their experiences with PLATO during the previous academic year. Second, only 15 students completed surveys due to the timing of the survey administration. Thus their responses should not be seen as necessarily representative of all students who used PLATO during the 1998-99 academic year. However, it does provide some insight into the attitudes of some of the students who used PLATO during 1998-1999.

Conclusions and Discussion

The LSHS model seems to work extremely well. Whether this model can be replicated depends on several factors aside from the investment in the lab equipment. First, a flexible teacher who is willing to cover several content areas must be identified. Sue Albritton has taken on an unusual role that requires an uncommon blend of skills, both personal and professional. Second, the administration must relinquish some control. This program succeeds, in no small part, because Ms. Albritton and Ms. Ivey are granted considerable freedom. Third, the administration must be flexible enough to schedule students in and out of labs as needed, and must be flexible and creative about assigning credit for courses. The combination of PLATO's flexibility and the personal and professional dedication of the LSHS faculty have resulted in the successful implementation.

It seems that the faculty helped keep a positive atmosphere in the courses - repeatedly reinforcing to these students that they were not "failures." Also they did not try to use PLATO for something it was not intended. PLATO modules are discrete units of instruction. They do not exist within an overall meaningful context, and they are inherently not structured as purposeful learning experiences in themselves. At LSHS, they were used for skill acquisition and to complement the classroom experience. LSHS also made a large investment in time to ensure the program's success. The importance of this huge commitment in time and resources toward remediating these students cannot be overemphasized.

Table 3

Instructor Survey Response Frequencies by Item

Part 1 Directions: We would like to know how you felt about your experience teaching with PLATO systems. For each of the statements below, please check the box under:

SA	if you strongly agree
A	if you agree
N	if you neither agree nor disagree
D	if you disagree
SD	if you strongly disagree

Item		SA	A	N	D	SD
1	The PLATO course content includes what my students need to learn about the topics taught.	2				
2	The PLATO course objectives correspond to those for my course.	2				
3	The PLATO course content corresponds to the content of the standard end-of-course test we use.			2		
4	Content seemed generally free of errors and inaccuracies.		2			
5	Content was generally up-to-date.	1	1			
6	Quality and style of instruction was consistent throughout the curriculum.	1	1			
7	Students generally understood the explanations.		1	1		
8	There was adequate depth in exercises and tests.		2			
9	Tests, application/drill lessons, and tutorials corresponded to the objectives in the Instructor Guides.	1	1			
10	Tutorials involved the students through frequent questions, answers and feedback, rather than just reading.		2			

		SA	A	N	D	SD
11	Software was generally free of bugs and errors.		2			
12	All courseware used consistent keystrokes and display style.	1			1	
13	Color was used appropriately.	1	1			
14	Graphics were used appropriately.	1	1			
15	Screens were consistently readable.	1	1			
16	I was able to use student progress reports to identify students needing my attention.	1	1			
17	I was able to spend time in one-on-one tutoring and counseling while students used PLATO.	2				
18	I was able to make appropriate individual student assignments on the system.	2				
19	My students were scheduled to use PLATO for as much as they needed.	1		1		
20	I was able to relate what the students studied on PLATO to what they studied in other activities.		1	1		
21	In general, my students respond well to the PLATO system.	1	1			
22	My students rarely seemed confused or "trapped" by the system.	1	1			
23	My students respond well to the PLATO system.	1	1			
24	I find working with the computer is generally a productive, rather than frustrating, experience.	2				
25	I enjoy working with the PLATO computer system.	2				
26	The PLATO system plays a useful role in my teaching.	2				
27	I was adequately trained to operate the PLATO system.	1				
28	I would like more training on how to use PLATO to best advantage in my teaching.			2		

Part II Directions: Please rate how often you performed the following activities in class before your students used PLATO. Circle your responses using the following scale:

5	Before or after each computer session
4	Before or after most computer sessions
3	Occasionally, before or after a new unit or lesson
2	At the beginning of each semester or marking periods
1	Maybe one time during the year
0	Never

Item		Rating					
		5	4	3	2	1	0
29	Articulated to the student(s) in some way those prerequisite skills, knowledge, or attitudes needed to fully succeed with their newly assigned PLATO modules.		1	1			
30	Helped the students relate what they were about to learn in their PLATO assignments to their own personal previous experiences.			1	1		
31	Described to the students the specific objectives they were going to learn within their assigned PLATO courses or modules.		1	1			
32	Explained to the students how the skills and knowledge learned within their assigned PLATO modules fit into the overall course lesson goals.			2			
33	Clearly identified to the students the rewards and incentives for trying hard and doing well within the PLATO system.	1		1			
34	Explained to the students specific procedures for getting support if they didn't understand something they were trying to learn within the PLATO system	1	1				

Table 4

Summary of Instructor Open-Ended Survey Responses

Part III Directions: Please write your responses to each question in the space provided.

The following keys (letters) are used to summarize the below responses:
A: Ms. Albritton (Teacher, Regular Education PLATO lab)
B: Ms. Ivey (Teacher, Special Education PLATO lab; Special Education, Chair)

1. What do you like **best** about teaching with the PLATO computer?

   A. The best part of teaching with PLATO computer assisted instruction is the fact that every student can have his/her own prescription for learning.

   B. The students can proceed at their own pace, allowing me to meet many different needs in one class period.

2. What do you like **least** about teaching with the PLATO computer?

   A. I really can't think of a least!!!

   B. The tests use the same questions, even if a student takes it 6 times in order to pass it (i.e., 5-item tests are randomly generated from the same *bank* of 15 questions.)

3. Was there a regular time...in which your students experienced their PLATO modules?

   A. My students were assigned to PLATO for instruction, not as adjunct to another class. They worked on PLATO modules each day all period.

4. Describe any strategies you employed to determine whether or not the PLATO modules assigned to each student were the most appropriate for ensuring their success in your class?

   A. I usually had each student complete the Fastrack assessment test.

   B. I checked on their progress weekly. I used their achievement levels to make sure that they were working on appropriate modules.

5. How would you change the PLATO lessons?

   A. I would update the social studies and science format to follow the same pattern as the other lessons. It would be nice to eventually have the answers on the lessons point and click as a Windows answer might be.

   B. Add more audio.

6. What suggestions do you have to improve the way you use the PLATO system?

   A. No suggestions

7. What other comments or suggestions do you have on the PLATO system or this course?

   A. My only suggestions would be to continue improving the help lines through the Internet site. The more we can access that means of help, the better it will be.

Table 5

Learner Attitude Survey Responses

Question		SA	A	N	D	SD	n	M (SD)
1.	I am able to sign on to the computer without problems.	8	6	1			15	4.47 (0.64)
2.	Getting to my lesson is easy.	11	4				15	4.73 (0.46)
3.	The computer is easy to use.	10	4	1			15	4.60 (0.63)
4.	I can start and stop a lesson whenever I want.	9	3	1	2		15	4.27 (1.10)
5.	The computer lets me do something (like answer questions) often and not mainly just watch.	9	3	1	1	1	15	4.20 (1.26)
6.	I usually can understand what the computer teaches me, without help from my instructor.	5	7	2	1		15	4.07 (0.88)
7.	The computer gives me help when I need it.	4	8	2	1		15	4.00 (0.85)
8.	I can work at my own pace on the computer.	11	2	2			15	4.60 (0.74)
9.	I'm studying the same topics at the same time on and off the computer.	6	6	2	1		15	4.13 (0.92)
10.	My teacher helps me see the connection between what I'm studying on and off the computer.	9	5	1			15	4.53 (0.64)
11.	I feel I'm studying what I need to on the computer.	8	4	2	1		15	4.27 (0.96)
12.	The lessons on the computer are designed for people like me.	4	7	2	1	1	15	3.80 (1.15)
13.	When I give a wrong answer on the computer, I feel bad about myself.	2	1	5	5	2	15	2.73 (1.22)
14.	I would like more time to study on the computer.	2	8	4		1	15	3.67 (0.98)
15.	The computer makes me nervous.			5	3	7	15	1.87 (0.92)
16.	Working on the computer makes me feel good about myself	4	4	6	1		15	3.73 (0.96)
17.	I recommend learning from the computer.	5	7	2	1		15	4.07 (0.88)
18.	The computer lessons I work with are interesting.	3	10	1	1		15	4.00 (0.76)
19.	I try hard to learn from the computer lessons.	7	6	2			15	4.33 (0.72)
20.	The computer lessons make me feel more confident about doing well in school.	7	7	1			15	4.40 (0.63)

Table 6

Summary of Learner Open-Ended Survey Responses

1. What do you like **best** about learning from the computer?

Work at own pace [5]
I like working on the computer better (than normal class) [2]
It's one on one [2]
Helps me learn what I really need to learn [1]
Easier [1]
Break from regular teaching [1]
Don't feel like I'm being stared at [1]
Computer doesn't get mad at you [1]
Everything [1]
It's better [1]
Math – because it is very fun [1]
Learning Math and Writing [1]
Can re-take tests [1]

2. What do you like **least** about learning from the computer?

Bored after awhile working alone [3]
No response [2]
Sometimes it can be confusing [2]
Tutorials [1]
Time consuming/takes too long [1]
Nothing [1]
No group activities [1]
Sometimes freezes up [1]
Can't stop where you want [1]
Learning Reading and Science [1]
Too much reading [1]

How would you change the computer lessons or the way you use them?

Wouldn't change [5]
Make tutorials better [2]
Make them (the computers) faster [1]
Make it more fun/interactive [1]
Less boring [1]
Let them (users) stop where they want [1]
Make the assessments faster [1]
Make lessons easier and shorter [1]
Nothing [1]
No response [1]

3. What other suggestions do you have to improve any part of the course(s) which use PLATO?

"Nothing" [9]
No response [6]

Figures 1 – 20

Bar Charts for Learner Survey Attitude Items 1 through 20

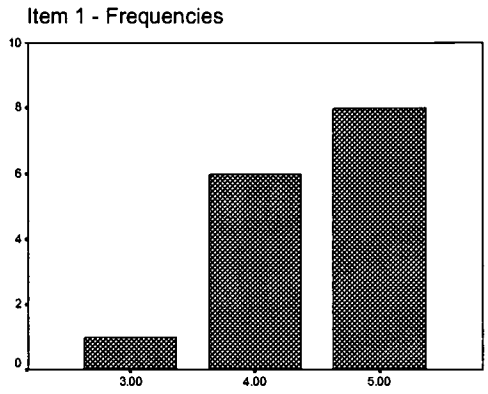


Figure 1

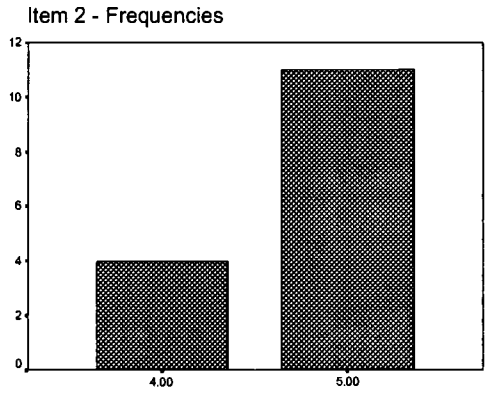
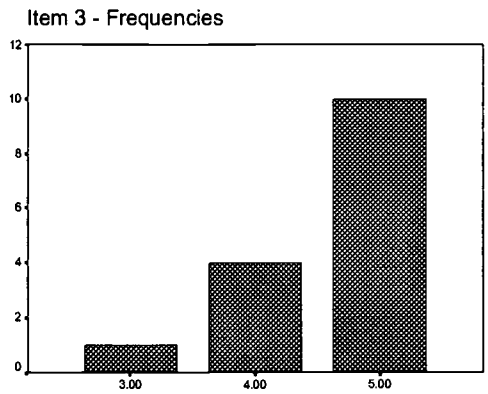


Figure 2



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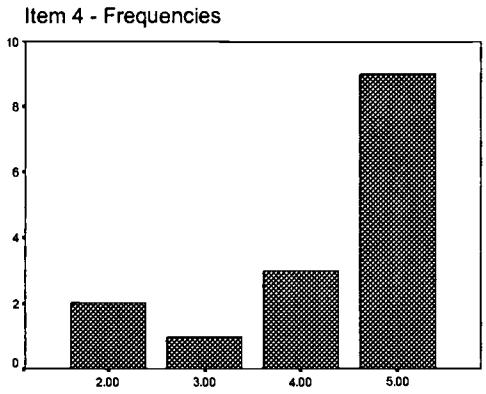

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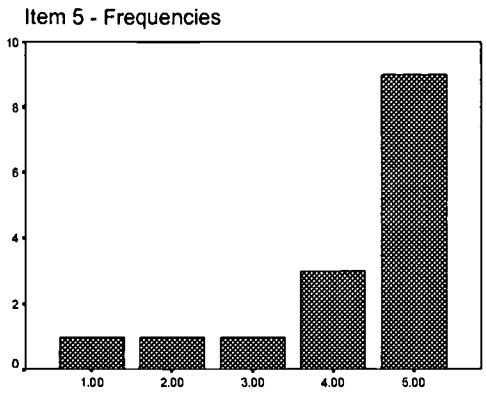

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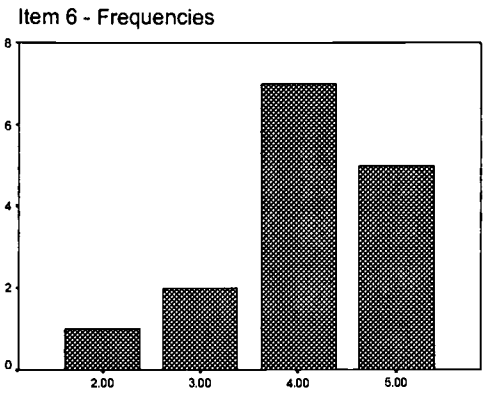

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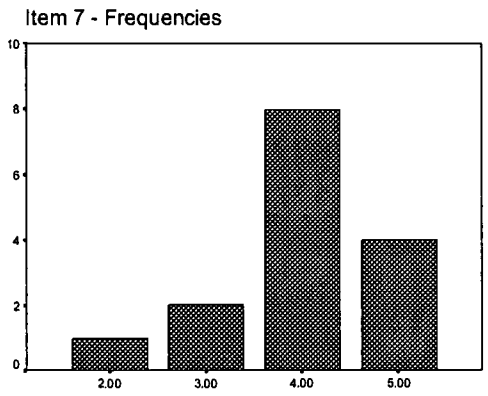

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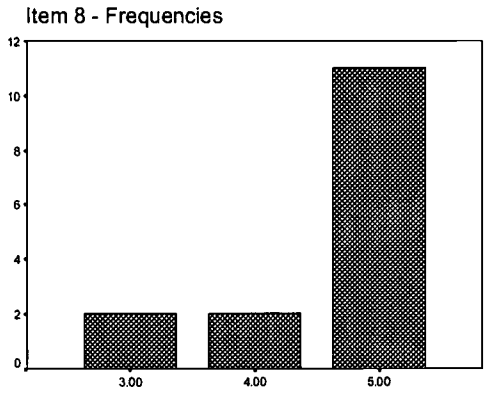

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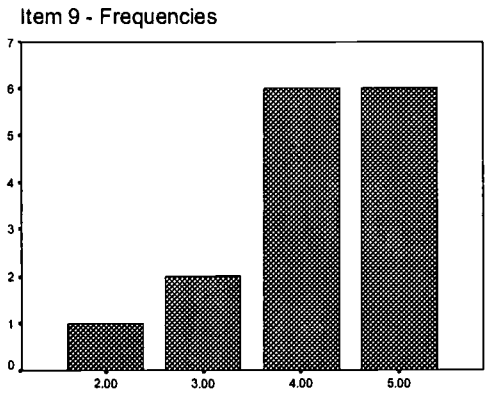

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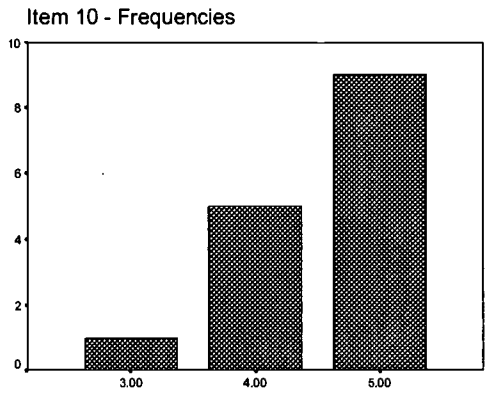

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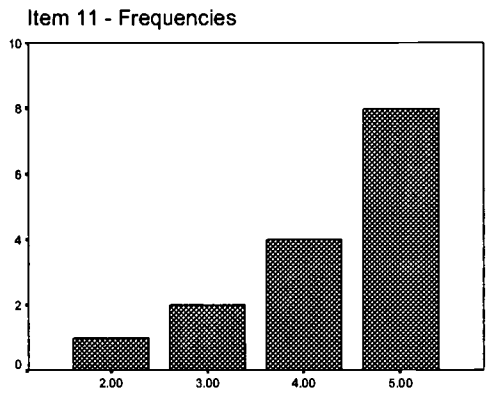

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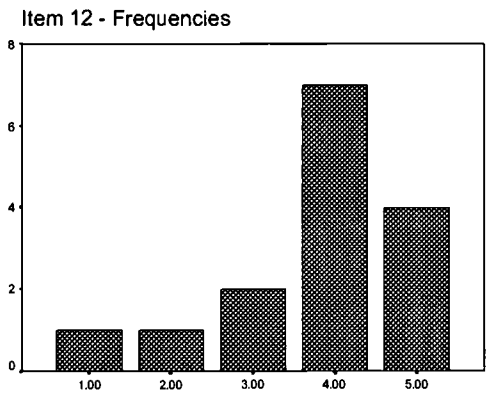

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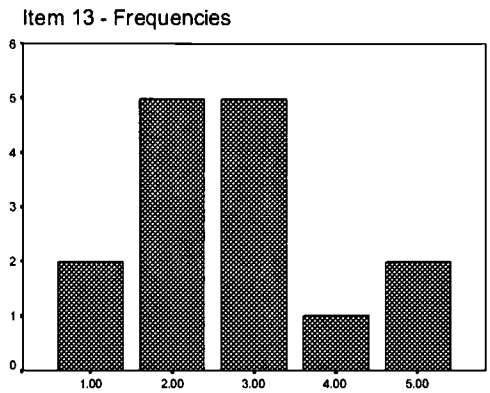

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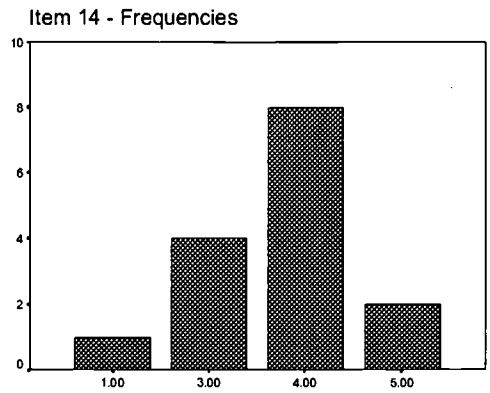

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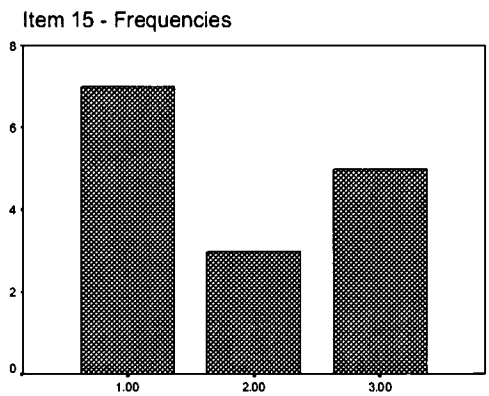

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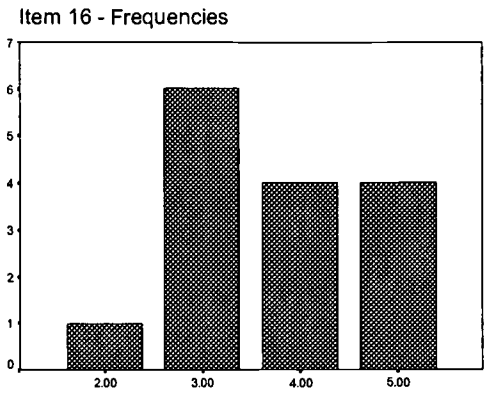

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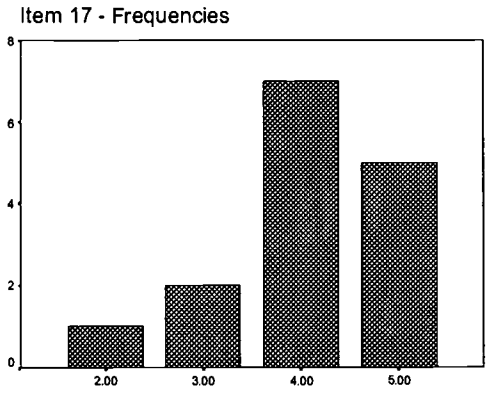

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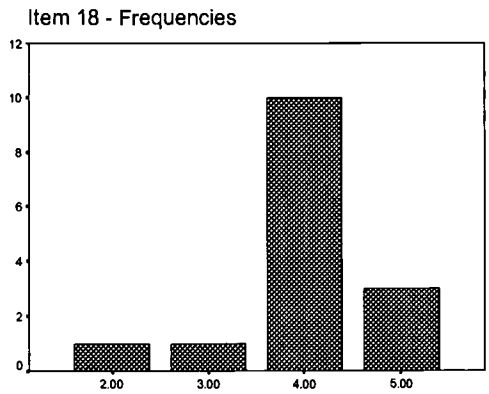

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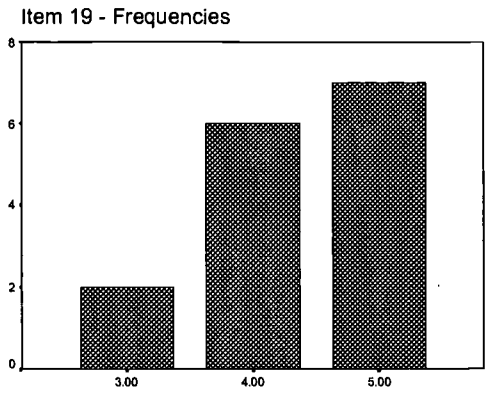

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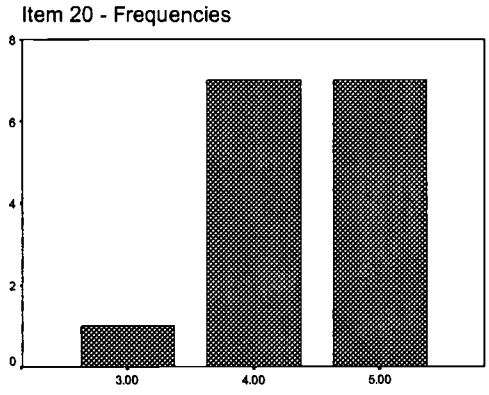

Figure 20

Appendix A

REQUIREMENTS FOR GRADUATION

Polk County School Board Policy, as of August, 1997

Grade Classification in Grades 9-12

For promotion from one grade to the next, the student must earn the following credits:

Grade Level	**Minimum Credits Needed**
Grade 9	Promotion from Grade 8
Grade 10	5 credits
Grade 11	11 credits*
Grade 12	17 credits
Graduation	24 credits

**For promotion from grade 10 to grade 11, the student must meet three additional requirements:*

1. Pass both English I and English II, **or**
   Earn a passing score on Communications Mirror HSCT, **or**
   Earn a score exceeding the cutoff on FCAT Reading;
   AND
2. Earn a passing grade in Algebra 1* or its equivalent, **or**
   Pass the Algebra 1 end-of-course test, **or**
   Earn a passing score on Math Mirror HSCT, **or**
   Earn a score exceeding the cutoff on FCAT Math;
   AND
3. Be in at least the third year of high school with at least eleven total credits.

*Definition of Algebra 1at Lakeland High School:

Algebra 1A/Algebra 1B

Class of 2000 - Integrated Math 1 only

Class of 2001 and beyond - Integrated Math 1 and 2

Algebra 1 Honors/Liberal Arts Math Advanced

About the evaluator:

Robert D. Hannafin is an assistant professor of Instructional Technology at the College of William and Mary, where he teaches preservice teachers at the graduate and undergraduate levels. He earned a Ph. D. in Instructional Technology from Arizona State University in 1994. His research interest is identifying features of computer-supported open-ended learning environments that contribute to learning gains. He has published in numerous journals including the *Journal of Educational Psychology*, *Educational Technology Research and Development*, and the *Journal of Educational Research*. Hannafin serves as a board member of *Educational Technology Research and Development* and recently served as guest editor for a special issue in that journal. He has served as evaluator or co-evaluator on several grants.

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