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DRAFT 10/28/96

CONFERENCE ON GRADUATION STANDARDS
NOVEMBER 12, 1996

GOOD MORNING! WELCOME TO THIS CONFERENCE ON USING TECHNOLOGY TO IMPLEMENT GRADUATION STANDARDS. IT IS A PLEASURE TO MAKE OPENING REMARKS WHICH WILL FOCUS ON TECHNOLOGY IN EDUCATION. THIS SUBJECT IS OF MAJOR INTEREST TO ME, HAVING HAD EXTENSIVE INVOLVEMENT IN ADVANCING THE USE OF TECHNOLOGY IN EDUCATION FOR MORE THAN 30 YEARS.

IMPORTANTLY, THIS CONFERENCE IS ANOTHER EVENT IN THE LONG TRADITION IN MINNESOTA OF PUBLIC/PRIVATE COLLABORATION TO IMPROVE EDUCATION.

HOPEFULLY MY THOUGHTS TODAY ABOUT TECHNOLOGY IN EDUCATION, INCLUDING SOME HISTORY ON ITS DEVELOPMENT, ESPECIALLY HERE IN MINNESOTA WILL PROVIDE USEFUL BACKGROUND FOR ^{TO DAY'S} ~~THE MAIN~~ AGENDA.

FIRST, WITH RESPECT TO HISTORY, IT SHOULD BE NOTED THAT A SIGNIFICANT PART OF THE INITIAL DEVELOPMENT OF MANY ELEMENTS OF CURRENT TECHNOLOGY WAS

ACCOMPLISHED BY CONTROL DATA'S PLATO PROGRAM ^{-PA}
^{PLATO}
~~WHICH~~ WAS THE WORLD'S MAJOR PIONEERING EFFORT TO
 APPLY COMPUTER TECHNOLOGY IN EDUCATION. PLATO IS
 THE ACRONYM FOR PROGRAMMED LEARNING AUTOMATED
 TEACHING OPERATION. THE ~~PLATO~~ PROGRAM BEGAN IN
 1963 WITH A TWO YEAR RESEARCH AND DEVELOPMENT
 PROJECT INVOLVING CONTROL DATA, THE UNIVERSITY OF
 ILLINOIS AND THE NATIONAL SCIENCE FOUNDATION. AT ITS
 CONCLUSION, CONTROL DATA AND THE UNIVERSITY
 CONTINUED THE COLLABORATIVE DEVELOPMENT EFFORT
 FOR 10 MORE YEARS.

THE PLATO SYSTEM WHICH WAS INTRODUCED INTO THE
 MARKETPLACE IN 1975 INCLUDED COMPUTERS,
 COURSEWARE, I.E. INSTRUCTIONAL MATERIALS, AND
 SOFTWARE FOR AUTHORIZING AND MANAGING INSTRUCTION.

COMPUTER-BASED EDUCATION FACED MANY BARRIERS AT
 THAT TIME. ONE WAS THE PREVALENT BELIEF THAT
 TEACHERS WOULD BE REPLACED BY TECHNOLOGY.
 ANOTHER WAS THE DEMEANING ^{AND INCORRECT} IMPLICATION THAT A

MACHINE COULD DO A BETTER JOB THAN A PERSON. AN EVEN GREATER BARRIER WAS COST. WITH EDUCATIONAL BUDGETS BEING TIGHT, FUNDING FOR TECHNOLOGY WAS SCARCE.

IN SPITE OF THE BARRIERS, PLATO FOUND IMPORTANT EARLY APPLICATIONS IN SCHOOLS, UNIVERSITIES, THE MILITARY SERVICES AND BUSINESSES. ITS GREATEST INITIAL SUCCESSES INCLUDED REMEDIATION IN K-12 AND HIGHER EDUCATION AND THE MILITARY SERVICES, PLUS BASIC SKILLS TRAINING FOR OUT OF SCHOOL ADULTS, ESPECIALLY THOSE ECONOMICALLY DISADVANTAGED. FURTHER, WITH RESPECT TO THE DISADVANTAGED, I PARTICULARLY RECALL THE EARLY PLATO SUCCESS IN AN INNER CITY SCHOOL, WHERE A NUMBER OF THE STUDENTS BROKE INTO THE SCHOOL AT NIGHT TO GET EXTRA INSTRUCTIONAL TIME.

THERE WERE EARLY PLATO SUCCESSES IN OTHER COUNTRIES. ONE WAS ITS USE BY BLACK UNIVERSITIES IN SOUTH AFRICA TO DELIVER ENTIRE LOWER DIVISION ENGINEERING COURSES. NO ALTERNATIVE WAS AVAILABLE BECAUSE OF SCARCITY OF BLACK FACULTY.

ANOTHER EARLY SUCCESS WAS A PLATO INSTALLATION IN A SCHOOL LOCATED IN A SMALL TOWN IN GRENADA. THE GRENADA EDUCATIONAL SYSTEM, LIKE MANY IN DEVELOPING COUNTRIES, SUFFERS FROM POORLY TRAINED TEACHERS, LACK OF A WELL PLANNED CURRICULUM AND SCARCITY OF INSTRUCTIONAL MATERIALS AS ESSENTIAL AS PENCILS, PAPER AND TEXTBOOKS. IN ADDITION, THERE WERE FREQUENT ELECTRICAL POWER OUTAGES AND COMPUTER KEYBOARD PROBLEMS -- LOCAL ANTS FOUND THE GLUE HOLDING KEYS IN PLACE A DELICIOUS ADDITION TO THEIR DIET. IN SPITE OF THESE AND OTHER PROBLEMS AN INDEPENDENT EVALUATION SHOWED POSITIVE OUTCOMES --ESPECIALLY THAT LOWER ABILITY STUDENTS BENEFITED MORE THAN THE HIGH ACHIEVERS. THIS LATTER RESULT RAN COUNTER TO THE INITIAL PERCEPTIONS OF THE TEACHERS.

OTHER COMPANIES: IN THE LATE 1980'S, DURING THE PERIOD CONTROL DATA RESTRUCTURED TO ACCOMMODATE GLOBAL COMPETITION AND CHANGES IN

THE INDUSTRY, ITS EDUCATION BUSINESS WAS DIVESTED AND SOLD TO OTHER COMPANIES, MOST OF THEM LOCATED IN MINNESOTA. MAINLY, AS A CONSEQUENCE OF THESE DIVESTITURES AND NEW COMPANY FORMATIONS, MANY BY EX CONTROL DATA EMPLOYEES, MINNESOTA HAS A GREATER DIVERSITY OF COMPANIES OFFERING COMPUTER BASED EDUCATION PRODUCTS AND SERVICES THAN ELSEWHERE.

STATE GOVERNMENT: IN ADDITION TO CONTROL DATA AND OTHER COMPANIES' EFFORTS TO ADVANCE THE USE OF TECHNOLOGY IN EDUCATION, MINNESOTA STATE GOVERNMENT, COMMENCING IN THE EARLY 80'S, ~~TOOK~~ ^{DEVELOPED}

^{SEVERAL} INITIATIVES WITH THE SAME OBJECTIVE. THESE INCLUDED:

- ^{THE} ESTABLISHMENT OF STATE-OWNED MINNESOTA EDUCATIONAL COMPUTING CORPORATION (MECC) TO PROVIDE SCHOOLS WITH QUALITY COURSEWARE WHICH WAS NOT AVAILABLE ELSEWHERE BECAUSE OF THE HIGH COST AND DEVELOPMENT RISKS.

- ABOUT THE SAME TIME FUNDING WAS PROVIDED FOR IN-SERVICE TEACHER TRAINING IN THE USE OF TECHNOLOGY.
- ANOTHER PROGRAM FUNDED 15 TECHNOLOGY DEMONSTRATION SITES.
- LATER, AND VERY IMPORTANT TO MOST EFFECTIVELY USING TECHNOLOGY, A STRONG COMMITMENT WAS MADE TO GRADUATION STANDARDS WITH FUNDING FOR PILOT SITES WORKING WITH THE STANDARDS AND ASSESSMENTS.
- MOST RECENTLY, LEGISLATIVE APPROPRIATIONS HAVE BEEN MADE AVAILABLE TO SCHOOLS FOR VIDEO CONFERENCING EQUIPMENT, ACCESSING THE INTERNET AND INSTRUCTIONAL TRANSFORMATION THROUGH TECHNOLOGY.

UNIVERSITY OF MINNESOTA: ANOTHER IMPORTANT CONTRIBUTOR TO THE ADVANCEMENT OF TECHNOLOGY IN

EDUCATION IS THE UNIVERSITY OF MINNESOTA BY THE DEVELOPMENT OF THE GOPHER SOFTWARE WHICH PROVIDES EFFICIENT ACCESS TO INFORMATION ON THE INTERNET.

COMMUNITY INITIATIVES IN MINNESOTA ARE SIGNIFICANT AND TAKE MANY FORMS INCLUDING THE ESTABLISHMENT OF COMMUNICATIONS NETWORKS TO FACILITATE COLLABORATIVE LEARNING. FOR EXAMPLE, THE LUMINENT PROJECT IN WINONA WILL PROVIDE INTERCONNECTIONS AMONG HOMES, EDUCATIONAL INSTITUTIONS, GOVERNMENTS, BUSINESSES, AND THE NATIONAL INFORMATION INFRASTRUCTURE.

CURRENT STATUS

BECAUSE OF THE PAST INITIATIVES I'VE JUST ENUMERATED, PLUS MANY OTHERS NOT MENTIONED IN MINNESOTA AS WELL AS IN OTHER STATES, COMPUTER TECHNOLOGY HAS BECOME AN INTEGRAL PART OF THE U.S. EDUCATION SYSTEM. AS BENEFITS HAVE BECOME MUCH BETTER DEFINED BY THE LARGE RESERVOIR OF

EVIDENCE WHICH HAS BEEN AMASSED SINCE THE
 CONTROL DATA PLATO DAYS ^{IT IS CLEAR} ~~DEMONSTRATING~~ THAT
 SIGNIFICANT IMPROVEMENTS IN STUDENT PERFORMANCE
 ARE ACHIEVED BY COMPUTER-ASSISTED INSTRUCTION.
 FOR EXAMPLE, A RECENT REVIEW OF ²⁵⁴ ~~250~~ CONTROLLED
 STUDIES ^{By MacKINSEY & Company} SHOWED THAT APPROPRIATE CLASSROOM USE
 OF COMPUTERS REDUCED THE MASTERY TIME OF
^{CERTAIN} ~~DIFFERENT~~ TYPES OF ASSIGNMENTS BY AS MUCH AS 30%.

THERE IS FURTHER EVIDENCE SUPPORTING THE EARLY
 PLATO EXPERIENCE ~~IN GRENADA~~ THAT COMPUTER
 ASSISTED INSTRUCTION HAS EVEN GREATER BENEFICIAL
 EFFECTS WITH LOW ACHIEVING STUDENTS. E.G., RESULTS
 IN NEW YORK CITY'S PILOT PROGRAM WHICH FOCUSED ON
 EDUCATIONALLY DISADVANTAGED STUDENTS SHOWED
 ACHIEVEMENT GAINS OF 80 PERCENT FOR READING AND 90
 PERCENT FOR MATH.

I WON'T TAKE TIME TO CITE OTHER SUCCESSES BECAUSE
 YOU WILL HAVE REPORTS TODAY BY A NUMBER OF

SCHOOLS WHO ARE AT THE LEADING EDGE OF APPLYING TECHNOLOGY.

MAJOR CHALLENGES: IN SPITE OF THE MOUNTING EVIDENCE OF THE BENEFITS OF TECHNOLOGY, MANY SCHOOLS HAVE ALLOCATED ONLY A SMALL PERCENTAGE OF THEIR BUDGETS FOR ITS USE. ACCORDING TO A RECENT U.S. DEPARTMENT OF EDUCATION REPORT OF THE TOTAL PUBLIC EXPENDITURE ON EDUCATION NATIONWIDE, 1.3 PERCENT IS ALLOCATED TO TECHNOLOGY. SINCE THIS NUMBER IS AN AVERAGE, THERE ARE A LARGE NUMBER THAT HAVE INVESTED EVEN LESS AND FAR BELOW WHAT IS REQUIRED TO ACHIEVE THE FULL BENEFITS FROM TECHNOLOGY. AS A CONSEQUENCE ONLY 4 PERCENT HAVE ENOUGH COMPUTERS FOR STUDENTS TO USE REGULARLY, ~~OR ONE COMPUTER FOR EVERY 5 STUDENTS.~~ LESS THAN 10% OF THE SCHOOLS HAVE INSTALLED NETWORKS FOR INTERCONNECTING COMPUTERS IN CLASSROOMS WHICH IS ESSENTIAL FOR FULLY UTILIZING THE POTENTIAL OF TECHNOLOGY IN INSTRUCTION.

HERE IN MINNESOTA, THE RECENT APPROPRIATIONS BY THE STATE LEGISLATURE FOR INSTRUCTIONAL TRANSFORMATION THROUGH TECHNOLOGY ARE CRITICALLY IMPORTANT TO FACILITATING PROGRESS AND ^{MUST} ~~SHOULD~~ BE SUBSTANTIALLY INCREASED ~~IN THE FUTURE~~ TO ~~BOTH~~ HELP ASSURE CURRENT PARTICIPANTS THE MEANS TO MAINTAIN IMPLEMENTATION AT ^{AN} ~~THE~~ OPTIMUM RATE AND TO PROVIDE INITIAL FUNDING FOR ADDITIONAL SCHOOLS THAT HAVE STRONG TEACHER AND PRINCIPAL LEADERSHIP ^{COMMITTED TO} ~~FOR~~ TRANSFORMATION THROUGH TECHNOLOGY ~~AND OTHERWISE READY FOR BASIC~~ ~~CHANGE.~~

A FULL PERSPECTIVE ON THIS PROGRAM AS WELL AS OTHER LEADING EDGE EFFORTS WILL BE PRESENTED TODAY BY PARTICIPATING SCHOOLS.

IN CONCLUDING I AM GLAD TO SAY THAT I BELIEVE THAT MINNESOTA IS POSITIONED TO ACCELERATE PROGRESS IN TAKING ADVANTAGE OF THE POWER OF TECHNOLOGY. A MAJOR REASON FOR MY BELIEF IS THE GROWING NUMBER

ARC OF TEACHERS, PRINCIPALS AND SUPERINTENDENTS ^{THAT}
LEADING THE DESIGN AND IMPLEMENTATION OF
INSTRUCTIONAL TRANSFORMATION THROUGH
TECHNOLOGY. ~~THIS IS IN SHARP CONTRAST TO EARLIER~~
~~TIMES, WHEN CONTROL DATA AND OTHER VENDORS WERE~~
~~PROVIDING MOST OF THE INITIATIVE FOR THE ADOPTION OF~~
~~TECHNOLOGY. AT THE SAME TIME, A DIVERSE ARRAY OF~~
~~COMPANIES ARE AVAILABLE TO FURNISH EQUIPMENT,~~
~~SOFTWARE, COURSEWARE AND SERVICES IN SUPPORT OF~~
~~TRANSFORMATION. EQUALLY IMPORTANT ARE THE~~
~~ONGOING INITIATIVES OF STATE GOVERNMENT AND~~
~~COMMUNITIES. ALL OF THESE RESOURCES ALONG WITH~~
~~THE TRADITION IN MINNESOTA OF PUBLIC AND PRIVATE~~
~~ORGANIZATIONS WORKING TOGETHER TO IMPROVE~~
~~EDUCATION FURTHER SUPPORT MY BELIEF MINNESOTA~~
~~SCHOOLS WILL BE RAPIDLY BENEFITING FROM~~
INSTRUCTIONAL TRANSFORMATION THROUGH
TECHNOLOGY.