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AUTHOR	Porter, Dennis
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ABSTRACT

This document addresses the recommendation contained in the 1989 California Strategic Plan for Adult Education for an integrated adult education data system. The recommendation proposes collecting and organizing community adult education information into groups of data on: program services, program delivery, learner characteristics, and learning outcomes. Chapter 1 offers a history and summary of the recommendation and lists its objectives. Chapter 2 is a review of relevant literature. Chapter 3 covers issues surrounding the recommendation and options for its implementation. Within a section on pros and cons of alternative approaches the following are covered: (1) location of the database; (2) data elements; (3) database hardware; (4) database software; (5) reporting requirements; (6) privacy and security; and (7) EduCard issuance and ownership. (EduCard, the Adult Education Access Card, is an educational recordkeeping and information system.) In chapter 4, five policy proposals are proposed to set the parameters for the management information design. Chapter 5 states that the next steps in the process are steering committee and agency review, followed by revision. (CML)

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Integrated Adult Education Data System

Policy Option Paper on Strategic Recommendation 8

First Edition
August 17, 1990

Submitted to:

Adult Education Unit
Youth, Adult and Alternative
Educational Services Division
California Department of Education
Sacramento, California 95814
(916) 322-2175

Chancellor's Office
California Community Colleges
Sacramento, California
(916) 322-6880

Prepared by:

Dennis Porter
Consulting Specialist
President, Micro Methods

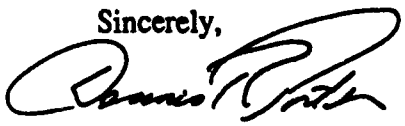
Adult Education Institute
for Research and Planning
429 J Street, Suite 400
Sacramento, California 95814
(916) 448-9063

Letter of Transmittal

The ***Integrated Adult Education Data System*** is one of fourteen recommendations in the *Adult Education for the 21st Century: Strategic Plan to Meet California's Long-Term Needs*. This policy option paper examines the initial policy issues associated with the design of an integrated information system capable of addressing cross-agency data. In doing so, it discusses (1) the strategic plan recommendation, (2) related background research and models which help elaborate the policy issues, (3) initial policy issues and options, and (4) our proposals.

Based on this discussion, the Interim Steering Committee, its subcommittees, leaders in the adult education programs and other interested persons can help us elaborate on and refine the proposals.

Sincerely,



Dennis Porter
Consulting Specialist
President, Micro Methods

STEERING COMMITTEE AND PROJECT STAFF

Interim Steering Committee

PAUL BELOMY
Principal
Santa Clara Adult School
Santa Clara

GARI BROWNING
CATESOL Representative
Costa Mesa

CHARLES CARLSON
Dean of Instruction
Bakersfield College
Bakersfield

LANI DeVINCENTIS
Dean of Noncredit Education
Glendale Community College
Glendale

JAMES FIGUEROA
Assistant Superintendent
Adult/Occupational Education
Los Angeles USD
Los Angeles

JEROME FINNIGAN
Education and Training
Xerox Corporation
El Segundo

RONALD GRISTOCK
Vice President
Community Affairs
Wells Fargo Bank
San Francisco

SANDRA HAMILTON
Executive Director
Southeast Los Angeles County
Private Industry Council, Inc.
Cerritos

NOREEN HANNA
Chair, ACSA
Adult Education Committee
Napa

GREGORY HEARN
Superintendent
San Benito High School District
Hollister

AUGUST HUESCA
Provost, Adult Continuing Ed
North Orange County Community
College District, Fullerton

THOMAS JOHNSON
Assistant Superintendent
Adult & Alternative Education
Hacienda La Puente USD
La Puente

PERCY JULIEN
Director, Adult Education
Oakland Unified School
District, Oakland

DARLENE LAVAL
Board of Education
Fresno Unified School District
Fresno

JERRY LEW
Regional Training Coordinator
Kaiser Permanente
Regional HRD
Oakland

HAZEL MAHONE
Superintendent
Grant Joint Union High School
District, Sacramento

ANITA MARTINEZ
Representative, Academic
Senate for Calif Community
Colleges, San Francisco
Community College

SUZANNE McCORMICK
Vice President, California
Manufacturers Association
Service Corporation, Sacramento

DANIEL McQUILLEN
Director
Kern County Regional Occupational
Program, Office of Kern County
Superintendent of School, Mojave

CONSUELO NIETO
Professor
Graduate School of Education
CSU, Long Beach

BONNIE OLIVER
Director, Special Projects
KCET-TV Educational
Enterprise Division
Los Angeles

HENRY PAGE
Principal
Palo Alto Adult School
Palo Alto

J. CORINNE PRICE
Director
Salinas Adult School
Salinas

WALTER POPKIN
President, California Council
for Adult Education
Montebello

DICK RANES
Unit Manager
IBM
Costa Mesa

JOE RICHEY
Executive Vice President
Industry Education Council
of California, Woodland

LEONARD RIVERA
Principal
Whittier Adult School
Whittier

FRANCES RUIZ
ESL Teacher
Corona-Norco Adult School
Corona

PRANY SANANIKONE
Assistant Director, United
Cambodian Community, Inc.
Long Beach

ADRIANA SANCHEZ-ALDANA
ESL/Amnesty Resource Teacher
Sweetwater Union
High School District, Del Rey
Adult Center, Chula Vista

ROD SMITH
Provost, Educational Cultural
Complex, San Diego Community
College District, San Diego

JUANITA STANLEY
Executive Director
California Literacy, Inc.
San Gabriel

GARY E. STRONG
State Librarian
California State Library
Sacramento

WILLIAM WENRICH
Chancellor
San Diego Community College
District, San Diego

State Education Staff

DOUG BURRIS
Deputy Chancellor
Chancellor's Office
California Community Colleges

RITA CEPEDA
Dean, Education Standards &
Evaluation, Chancellor's Office
California Community Colleges

GERALD KILBERT
State Director
Adult Education
California Dept of Education

RAY EBERHARD
Program Manager
Adult Education Unit
California Dept of Education

NORMA MORRIS
Analyst, Noncredit & Community
Services Chancellor's Office
California Community Colleges

KATHY WARRINER
Analyst, Basic Skills & Literacy
Chancellor's Office
California Community Colleges

LYNDA SMITH
Project Monitor
Adult Education Unit
California Dept of Education

Institute Staff

FRED BEST, Executive Director
BERNADETTE DAWSON, Associate
ERIC MARGOLIS, Associate
JIM McDONALD, Publications & Public Information
CUBA MILLER, Senior Associate

AEI

ANAN NUGGIHALLI, Computer Systems
DENNIS PORTER, Consulting Specialist
ABIGAIL SLAYTON, Consultant
VAN WOOLLEY, Senior Consultant

Adult Education Institute for Research and Planning
Sacramento, California

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The contents of this paper do not necessarily reflect the views or the following persons or institutions they represents:

Dr. Fred Best, Director, Adult Education Institute, Sacramento, California
Harold Cherns, Senior Consultant, Micro Methods, Berkeley, California
Dr. Ray Eberhard, Program Administrator, Adult Education Unit, California Department of Education, Sacramento, California
George Elford, Educational Testing Service, Washington D.C.
Allen Gandy, Coordinator, Special Projects and Services, Kalamazoo Valley Community College, Kalamazoo, Michigan
William Hamre, Associate Vice Chancellor, Management Information Services, California Community Colleges, Sacramento, California
Ed Kissam, Senior Associate, Micro Methods, Berkeley, California
Norma Morris, Chancellor's Office, California Community Colleges, Sacramento, California
Linda Smith, Adult Education Unit, California Department of Education, Sacramento, California
Dorothy Meaden Ward, Management Information Services, California Community Colleges, Sacramento, California
Kathy Warriner, Chancellor's Office, California Community Colleges, Sacramento, California
Van M. Woolley, Career/Vocational Assessment Consultant, Sacramento, California

Contents

Letter of Transmittal i
Steering Committee and Project Staff ii
Acknowledgements iii
Executive Summary vi

I. Introduction and Overview 1

Introduction and Overview of Recommendation 2
History of Recommendation 5
Objectives of Recommendation 6

II. Review of Literature and Information 8

General Literature and Background 9
Need for an Integrated MIS 10
Models and Proposals 11
System Design and Data Elements 16
Communications Link 17
Databases 18
Design Concerns 19
Cross-Agency Data 22
New Developments and Considerations 24
Key Findings 26
Options for Analysis 27

III. Options for Implementation 29

Criteria for Evaluating Options 29
Comparison of Pros and Cons of Alternative Approaches 30

(1) Location of the Database 31
(2) Data Elements 34
(3) Database Hardware 36
(4) Database Software 38
(5) Reporting Requirements 39
(6) Privacy and Security 41
(7) *EduCard*$_{TM}$ Issuance and Ownership 42

IV. Proposals 44

V. Future Actions 51

This paper has been prepared under Contract 7147 from the Adult Education Unit of the Youth, Adult and Alternative Educational Services Division of the California California Department of Education.

Pacific Management and Research Associates

429 J Street, Suite 400
Sacramento, California 95814
(916) 448-9038

This paper has been prepared to summarize background information and outline possible policy decisions. The contents of this paper do not necessarily reflect the policies of the California Department of Education, Community Colleges, Interim Adult Education Steering Committee, or other institutions.

Executive Summary

The Integrated Adult Education Data System recommendation proposes collecting and organizing community adult education information into groups if data dealing with (1) program services, (2) program delivery, (3) learner characteristics and (4) learning outcomes.

Information about students and programs is largely useless unless it can be easily stored and accessed for review and analysis. The need to improve learner access to programs, document program performance, and facilitate use of learner records requires an *integrated data system* capable of addressing cross-agency data.

This paper examines the need for an integrated adult education data system, the background information and relevant literature on the topic and major policy options to implement the system. The recommended options are examined in more detail and the groundwork is laid for the next analysis steps.

The recommended integrated adult education data system is expected to facilitate cross-agency planning, counseling, and accountability to:

- Help program staff with access to program information that is comparable across agencies.
- Modernize routine student intake and processing to ease the tasks of record keeping.
- Generate comprehensive data on program participation, learner characteristics, and educational achievement.
- Meet compliance needs by consolidating samples of student data stripped of identifying information.

High priority should be placed on ensuring that this data system meets both local and state needs.

Objectives

The objectives of the integrated data system recommendation are to design and test a system that will reliably and accurately maintain information on the service needs, the program environment, available services, learner needs and characteristics, and program outcomes. It is expected that the data system can measure program performance and will,

eventually, be able to determine the expected costs and learning expectations for different types of learners. Likewise, as learning moves away from seat time measures of payment and achievement, the system will be able to flexibly track and measure performance.

The Need

Adult and non-credit education programs are not required to report much information on learners, courses, or program outcomes to the State Department of Education.

Currently there is not an integrated data system in California for adult education; nor is there a data system that combines data from adult and vocational education with training and employment programs. Likewise, there is no learner centered data system for adult education that maintains detailed information on persons enrolling and completing adult education. Current management information system (MIS) developmental work by the California Community Colleges is beginning to address their noncredit information needs.

Adult and noncredit education programs are not required to report much information on learners, courses, or program outcomes to the State Department of Education. The data are often not comparable among providers. Consequently, local and state level administrators and policy makers lack accurate and timely information on:

- learner needs
- learner demographics
- learner diagnostics
- learner achievements
- services delivered
- service definitions
- cost effectiveness
- provider characteristics

Moreover, the need for and benefits of adult education are rarely evaluated or assessed. As a result, only limited data exist on the costs and benefits of alternative instructional strategies, working with high risk learners, and setting instructional priorities.

Cross-Agency Data

As the MIS is designed and tested, it is expected that various education and training programs will utilize this broad based integrated service delivery and data system. To do so, data definitions and assessment features must be comparable or reliable crosswalks must be developed for multiple data systems. Data dictionaries must define the program's definitions of terms, and comparisons between contrasting definitions must be determined. Local agencies would be required to follow the data definitions closely. Assessment and testing tools must be capable of comparison.

In an integrated data system, learner and provider data would be made available on a current or occasional basis. Only basic summary information, in all likelihood, would go to the community information

system. This information to be useful must be comparable. This requires methods to compare occupational education and training codes among the various providers.

These instructional data can be compared to job classification systems, most notably the Dictionary of Occupational Titles (DOT), the Standard Occupational Classification (SOC) and the Census Occupational Classification. These cross walks among classification codes must be an aspect of the community information system.

Leadership for this effort comes from the National Occupational Information Coordinating Committee (NOICC) and its state affiliates. Considerable work will be required to make these cross-agency data definitions concise and accurate and therefore comparable.

Background on Research Findings

The literature review and background research address four areas of research:

(1) Need for an Integrated MIS
(2) Models
(3) System Design and Data Elements
(4) Design Issues

These four areas of research and decision-making are summarized below.

- **Need for an Integrated MIS.** The current adult education data system needs to be replaced to reflect persons served, actual learning outcomes and performance, and learner demographics. Presently there is no interagency data system, other than those that are program specific. An overall data system that links programs, without imposing undue burdens on providers is needed.

- **Models.** There are current MIS models that will guide any integrated data system development. None as designed is adequate. This is most especially the case in regards to data elements and data definitions. However, the system under discussion will evolve from the current data systems to reflect the need to share comparative information.

- **System Design, Components and Data Elements.** The integrated data system conceptually calls for three components: community information services, the provider component, and the learner (*EduCard*$_{TM}$) component. Within each component an optimal set of data elements will be determined. Since much of this data will be a one time burden (at initial entry), the utility of collecting more rather than less information is suggested.

- **Design Issues.** The underlying assumption is that an integrated data system must be sufficiently flexible to serve multiple programs and their own unique data requirements. Using a modular design can insure easy system upgrades,

and can accommodate changes over time. However, the data and data definitions among providers must be clear and comparable. This requires a cross-agency system where classifications can be compared.

Recommended Options

The five policy proposals are:

(1) **Locate Learner and Community Information Services Databases with the Adult Education Institute (AEI)**

During Phase I of the project, an AEI location will improve coordination and analysis.

(2) **Develop Multi-Agency Data to Support Multiple Agency Functions**

We should not underestimate the utility of data collection on a cross-agency basis. The major stakeholders should be participants.

(3) **Use Multiple Hardware Platforms**

Being too prescriptive regarding hardware will conflict with some provider's own MIS structures.

(4) **Use Multiple Software Platforms**

Selected software should support the multiple hardware platforms.

(5) **Integrate Data from Multiple Agencies**

Collaborating stakeholders have current reporting obligations, depending on the programs they sponsor. The integrated adult education data system reporting requirements should not place an undue burden on top of current and anticipated requirements, yet the data must be comparable across agencies.

Two other issues are discussed and other actions recommended:

(6) **Data Privacy and Security**

The privacy issue is addressed in the *EduCard*$_{TM}$ recommendation. System security will be examined in the feasibility analysis.

(7) ***EduCard***$_{TM}$ **Issuance and Ownership**

This issue is touched on in the *EduCard*$_{TM}$ policy options paper. It will not be examined in detail until the feasibility analysis.

These options are discussed in detail in the options paper and will be elaborated on in Steering Committee meetings.

Next Steps

The further development and analysis of the recommended integrated adult education data system issues and options will be performed by the Adult Education Institute for Research and Planning under the guidance of the Interim Steering Committee and its subcommittee proposals presented in this paper will be reviewed, revised and analyzed further during the feasibility analysis to gain clarity, acceptance to basic skills agencies, the business community, learners' groups and other stakeholders.

Any policy recommendations of the Interim Steering Committee will need to be reviewed by State Superintendent of Public Instruction, Bill Honig, and California Community College Chancellor, David Mastes, as well as heads of other participating agencies. The Institute staff and consultants will work under the guidance of the Interim Steering Committee to reconcile the requirements, concerns and differences of participating agencies.

Chapter 1
Introduction and Overview

An integrated adult education data system will improve program accountability and monitor progress in meeting learner, provider, area and state objectives.

This paper is a guide to initial planning activities to implement one of the core recommendations of the 1989 Edition of ***Adult Education for the 21st Century: Strategic Plan to Meet California's Long-Term Adult Education Needs***. This recommendation calls for the design and testing of an *integrated adult education data system*.

Information about students and programs is useless unless it can be easily stored and accessed for review and analysis. The need to improve learner access to programs, facilitate use of learner records, and document program performance requires an integrated data system capable of addressing cross-agency data.

The paper examines the need for an integrated adult education data system, the background information and relevant literature on the topic and major policy options to implement the system. The recommended options are examined in more detail and the groundwork is laid for the next analysis steps.

This paper is organized into five chapters:

(1) Introduction and Overview
(2) Review of Literature and Information
(3) Options for Implementation
(4) Proposals
(5) Future Actions

Substantial research and strategic planning has occurred in advance of this paper. We urge you to review two documents in particular:

Adult Education for the 21st Century: Strategic Plan to Meet California's Long-Term Adult Education Needs, 1989 Edition, Adult Education Unit, California Department of Education, Sacramento, California, May 15, 1989.

California State Plan for Adult Basic Education, Adult Education Unit, California Department of Education, Sacramento, California, June 9, 1989.

They provide the background for the *California 2000 Project* and this recommended approach.

Introduction and Overview of Recommendation

The integrated adult education data system should provide uniform measures and procedures for storing, accessing and using information on (1) program services, (2) program delivery, (3) learner characteristics, and (4) learning outcomes. It should reflect the interactions between learners and providers in a education and training system.

To be successful the data system must be responsive to local needs, provide appropriate information for all users, and provide timely information for program planning and staffing.

This system is expected to provide a means of entering, retrieving and analyzing data that is accessible to both state and local users. It should be developed to serve the needs of learners and local educational providers as well as the state. Data elements to be collected might include student records, student and program performance data, program participation and descriptive data. Safeguards would be developed to protect personal privacy.[1]

To be successful the data system must be responsive to local needs, provide appropriate information for all users, and provide timely information for program planning and staffing.[2]

The proposed data system will operate within tomorrow's adult education process. The process begins with a potential learner or group of learners (*e.g.* a business or public agency may also refer persons to pursue literacy, job skill or other types of learning).

[1] ***Adult Education for the 21st Century: Strategic Plan to Meet California's Long Term Adult Education Needs***, Adult Education 2000 Project, 1988-89 Adult Education Advisory Committee, page 19.

[2] "Summary of July 1989 Advisory Committee Meeting and Project Review," Adult Education Institute for Research and Planning, October 1989.

- Individual learners go to a ***Community Adult Education Information Service Center.***
- Upon arrival at the center, learners present their *EduCard*™. If they do not have a card, a new intake is initiated and a card is issued.
- This card is used to access individual educational records and program eligibility status from an ***Integrated Data System.***
- Existing educational records would provide information on the learner's skill attainment and educational needs in terms of standard ***Performance Measures*** used by all participating instructional providers as well as other assessment tools.

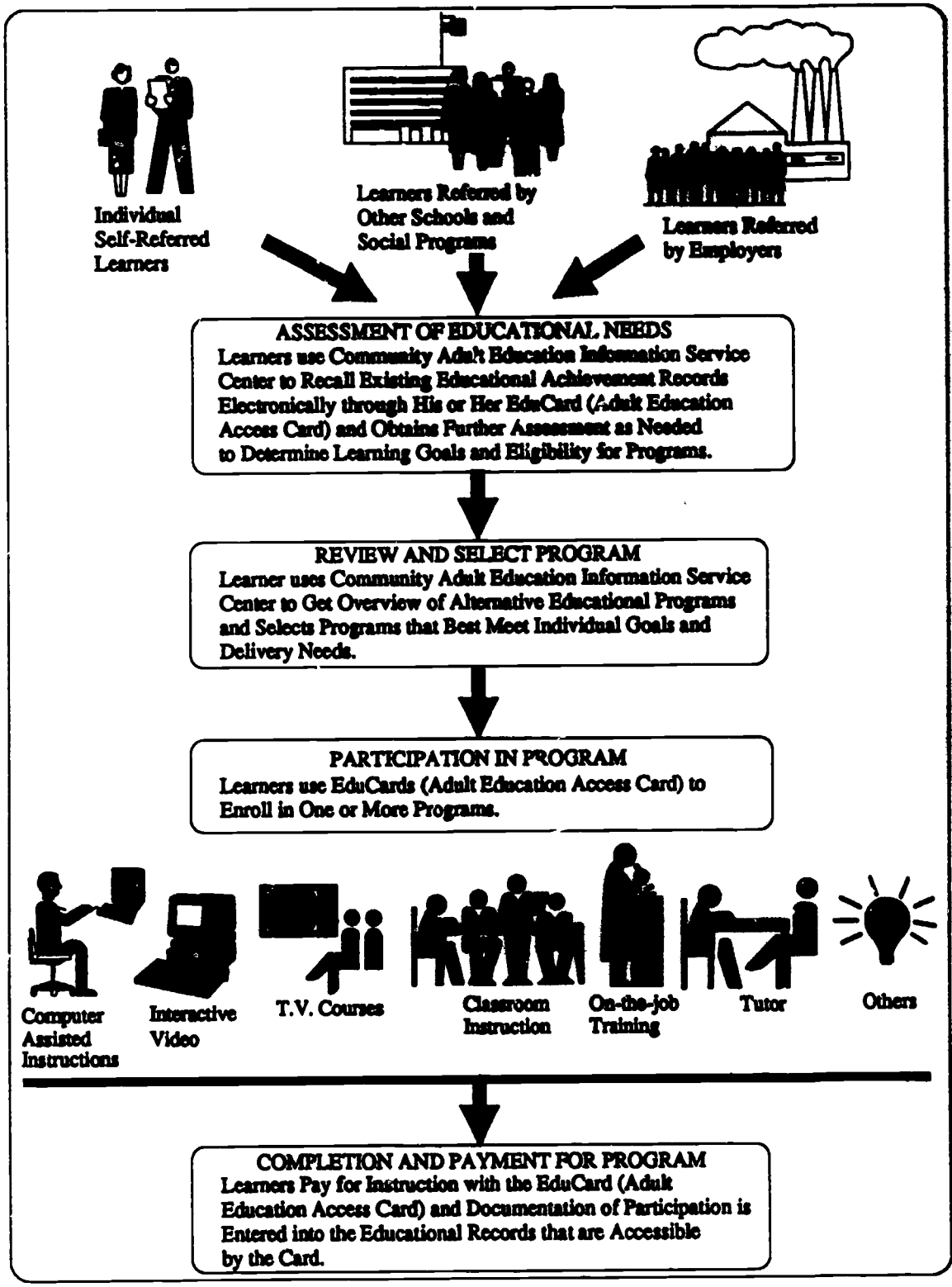
If initial or further services are needed, the learner can request assessment tests and counseling with resources available through the *EduCard*™. New assessment records and assessment costs are interactively entered into an ***Integrated Data System*** (See Exhibit 1).

Once assessments determine the needs of the learner, a combination of counseling and interactive information technology is used to provide an impartial overview of programs that meet the learner's needs. This will include information such as the educational objectives of the programs, cost to the individual participant (if any), duration and scheduling, location, special features, assessments of performance, satisfaction of prior participants, and certification status in accord with state and regional program ***Quality Standards.*** Once educational options are presented and discussed, the individual selects the program that best meet his or her learning goals. A quick check is made to insure that the program has an opening and the learner is referred to the program (See Exhibit 1).

The learner "checks in" with the program of choice (*e.g.* appears at locations, downloads through a modem linked to a home computer, rents a portable interactive instructional module, or meets a tutor). Upon checking in, the learner submits his or her *EduCard*™, which is used like a credit card to begin a billing process for services in accord with a system of funding policies and procedures designed to encourage program improvement, responsiveness, innovation and alternatives.

Exhibit 1

HOW ADULT LEARNERS RECEIVE SERVICES



Specific strategic plan recommendations for the integrated adult education data system are:

Recommendation 8
INTEGRATED ADULT EDUCATION DATA SYSTEM

Develop a data system to facilitate cross-agency planning, counseling and accountability:

- Help program staff with access to program information that is comparable across agencies.
- Modernize routine student intake and processing to ease the tasks of record keeping.
- Generate comprehensive data on program participation, student characteristics, and educational achievement.
- Meet compliance needs by consolidating samples of student data stripped of identifying information.

High priority should be placed on ensuring that this data system meet both local and state needs.

Data systems such as the one proposed in this plan have been developed for a number of purposes. The state of Michigan is now in the process of constructing such a system.[3] Data crosswalks developed by the National Occupational Information Coordinating Committee (NOICC) and its state affiliates allow processing and analysis of cross-agency data.[4] Finally, school districts and educational testing organizations have models for the processing and use of enrollment and student test data.

History of Recommendation

The proposed integrated adult education data system would be closely linked with the recommended adult education access card (*EduCard*™), and the community adult education information system to form the core of a "collaborative infrastructure" of information services for all users and providers of adult education and training. Its concept and design has been influenced substantially by the State of Michigan's Human Investment System.[5]

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[3] ***Countdown 2000: Michigan's Action Plan for a Competitive Work force***, Governor's Cabinet Council on Human Investment, Adult Literacy Task Force, State of Michigan, March 1988, page 32.

[4] Specifically, a kit of procedures and matching software have been developed to provide cross-agency data on education and training providers within California (***COICC Labor Supply Kit***, California Occupational Information Coordinating Committee, Sacramento, California, June 1988).

[5] ***Creating a Human Investment System: Report to the Governor***, Michigan Job Training Coordinating Council, March 1989.

The recommendation for Community Adult Education Information Services comes from a long-term planning process initiated in October 1988 by the Adult Education Unit of the Youth, Adult and Alternative Educational Services (YAAES) Division of the California Department of Education (CDE). It was developed under the guidance of a 26-member Adult Education Advisory Committee appointed by State Superintendent of Public Instruction Bill Honig. Their charge was to develop a long-term vision of adult education in the 21st century.

The idea for an integrated adult education data system was solidified when the Program Administrator of the Adult Education Unit, Dr. Ray Eberhard, Strategic Plan Advisory Committee members and Strategic Plan researchers visited the State of Michigan to discuss the Michigan Human Investment Fund and its Human Investment System.

Under leadership from the Governor, Michigan had created a Cabinet Council on Human Investment to implement a "demand driven" investment of human resource development funds in response to research indicating that the state was facing serious problems in providing an educated and trained work force.

An Adult Literacy Task Force had found a maze of programs and resources with differing intake polices, eligibility policies and outcome criteria. It recommended polices to ***coordinate services*** and enable the learner to make choices on how and when to obtain basic skills training and education.[6]

Central to the Michigan system are (1) the integration of human service delivery programs, (2) a statewide information services to assist learners to use educational programs, and (3) an integrated data system which features the use of a learner's individual smart credit card to maintain his or her service information. This model is discussed in more detail in an upcoming section.

Objectives of Recommendations

The objectives of the integrated data system are to design and test a system that will reliably and accurately maintain information on the characteristics of available instructional programs, the program environments, learner needs and characteristics, and program outcomes. It is expected that the data system can measure program performance and will,

[6] *The Michigan Human Investment Fund and the Michigan Opportunity Card*, State of Michigan, January 1989.

eventually, be able to determine the expected costs and learning expectations for different types of learners. Likewise, as learning moves away from seat time measures of payment and achievement, the system will be able to flexibly track and measure performance for a variety of different instructional modes (*e.g.* computer-assisted instruction, classrooms, TV courses).

Exhibit 2 sets forth the objectives for the integrated data system.

Exhibit 2
OBJECTIVES OF RECOMMENDATION

Maintain Data on Service Needs:

- Learner Needs
- Employer Needs
- Labor Market Needs

Maintain Data on Available Services:

- Education and Training Services
- Assessment and Testing Services
- Entitlement and Scheduling Services

Maintain Background Data on Services:

- History of Learner Services
- Status of Present Services
- Measures on Performance of Services

Maintain Data on Service Costs:

- Based on Service Types
- Based on Learner Characteristics
- Based on Provider Characteristics

Pending further review and discussion, these objectives provide a broad statement of intent for the proposed data system. Later in the development process, these objectives will be progressively specified in operational (measurable) terms.

Chapter 2

Review of Literature and Information

The literature and background review indicates several models and design steps to guide the design of an integrated data system.

There is a long history of efforts to utilize integrated data systems with human resource development programs.[7] While program-specific data systems are in widespread use, integrated data from several education and training programs has not yet become a reality. Development of such integrated data systems has so far been frustrated by cumbersome data collection methods, inappropriate hardware, local autonomy, changing specifications, and a lack of consensus concerning the nature of an integrated data system.[8] There is general agreement, however, that improved management information is an absolute necessity at the local and state levels to maximize resources, and improve adult education effectiveness, efficiency and equity.

Present and emerging technologies combined with growing agreement about the need for more accurate and timely program and participant information are pointing toward the development of a dynamic integrated data system.

Very promising models are being tested. However, it is important to design and test the California adult education model from the ground up, building on the experiences of other states and programs, and the knowledge of local stakeholders.[9]

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[7] For example, see Alfred Parnell, "Dynamic Evaluation: The Systems Approach to Action Research," Systems Development Corporation, August 1966; Dennis Porter, "The Pros and Cons of a National Manpower Management Information System, June 1972; Fred Best, "Framework for An Occupational Information System: Issues, Data and Policy Concerns," Pacific Management Research Associates for the California Occupational Information Coordinating Committee, April 1985; "Creating a Human Investment System," *Op. Cit.*; and *The Washington State JTPA* MIS demonstration disk, February 1989.

[8] *Background Papers for the Labor Supply Survey Kit Project: Issues and Options for Developing Local Data on Labor Supply from Education and Training Programs*, Pacific Management Research Associates for the California Occupational Information Coordinating Committee, November 1986, page 6.

[9] Fred Best, *Handbook for Local Planning Consortia*, Adult Education Institute for Research and Planning, Sacramento, California, March 1990.

General Literature and Background

The use of information systems and the nature of integrated systems design is an outgrowth of general systems theory.[10] In either human or machine based systems, there are five basic considerations to keep in mind when thinking about the meaning and function of the system:

(1) Total system objectives (most importantly, performance measures of the whole system)
(2) System environment (fixed constraints)
(3) System resources
(4) Components of the system (activities, goals and measures of performance)
(5) System management

These five considerations should be used in the evaluation and development of any integrated data system.[11]

The objective of the integrated data system is to provide current, accurate and appropriate information on the delivery of adult education services to citizens of California. These data, especially program performance data, are currently not available, making it difficult to determine the success of current interventions, and making it more difficult to prepare for the new knowledge and skills adults will need as we approach the 21st century. Of greater importance, there is now little in the way of comprehensive and comparable information about programs that will assist learners choose the educational opportunities that meet their individual needs.

To adequately address these five considerations, the literature and background research examines four issues:

(1) The need for an integrated MIS
(2) Models and proposals
(3) System design and data elements
(4) Design issues

Each issue is discussed in the upcoming sections.

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[10] For an good overview on the philosophy and practice of systems analysis see von Bertalanffy, Ludwig, *General Systems Theory*. George Braziller, New York, 1968; James Grier Miller, *Living Systems*, McGraw-Hill Book Company, 1978; and C. West Churchman, *the systems approach*, Dell Publishing Company, 1968.

[11] Churchman, *Ibid*, pages 29-30.

NEED FOR AN INTEGRATED MIS

Currently there is no integrated data system in California for adult education. Nor is there a data system that combines data from adult and vocational education with training and employment programs. Likewise, with the exception of developmental work now underway within the California Community Colleges, there is no learner-centered data system for adult education which maintains detailed information on persons enrolling and completing adult education. Finally, there is no comprehensive source of information about programs available to learners.

Adult and noncredit education programs are not required to report much information "about categories, courses, or students" to the California Department of Education.[12] The data are often not comparable among providers. Consequently, local and state level administrators and policy makers lack accurate and timely information on:

- Learner needs
- Learner demographics
- Learner diagnostics
- Learner achievements
- Services delivered
- Service definitions
- Cost effectiveness
- Provider characteristics

The need for and benefit from adult education is rarely evaluated or assessed. Therefore, limited data exist on the costs and benefits of alternative instructional strategies, working with high risk learners, and setting instructional priorities.

Moreover, the need for and benefit from adult education is rarely evaluated or assessed.[13] Therefore, limited data exist on the costs and benefits of alternative instructional strategies, working with high risk learners, and setting instructional priorities.

On the other hand, other training and employment preparation programs, especially those federally funded are often required to maintain and report more detailed user and provider information. Their reporting requirements and data definitions must be taken into consideration in the design of an integrated data system.

Finally, and of greatest importance, existing data systems do not provide services to learners. For the most part, there is no system that provides an up to date overview of available education and training programs. Nor do current systems facilitate the access and transfer of educational records for the learner.

12 "Meeting California's Adult Education Needs: Recommendations to the Legislature in Response to Supplemental Language in the 1987 Budget Act," California Postsecondary Education Commission, especially pages 23-26.

13 *Ibid*

MODELS AND PROPOSALS

It is expected that an integrated education and training system will address learners' developmental goals. These goals will include:

- GED completion/attainment
- Employability skills training
- Work force literacy
- Employment
- Small business/self employment
- Parenting skills
- Enhanced employability
- ABE/ESL completion
- Career advancement
- Economic self sufficiency
- Life management skills
- Occupational training

Building an integrated data system over time presumes that there will be a range of stakeholders and collaborating programs. Those programs and agencies likely to consider participation include:

(1) Providers:

- Adult schools
- Community colleges
- Regional occupational programs (ROPs)
- Continuation schools
- Libraries
- Private industry councils and service delivery areas (SDAs)
- Community based organizations
- Proprietary organizations
- Prison and corrections facilities
- California Conservation Corps
- Department of Rehabilitation
- Employers and business groups

(2) Programs:

- English as a second language (ESL)
- Elementary basic skills
- Older adults
- Citizenship
- High school diploma (GED)
- Substantially handicapped
- Home economics
- Parent education
- Health and safety
- Vocational education
- Employment Training Panel (ETP)

- Carl Perkins Vocational Education Act (VEA)
- Job Training Partnership Act (JTPA)
- Greater Avenues for Independence (GAIN)
- Immigration Reform and Control Act (IRCA)
- Vocational rehabilitation

Participants in the integrated data system will evolve over time. During the design and testing phase (1990-1993), various configurations of stakeholders will form.

To provide a sense of how the proposed data system might take form, three models will be described. First, the Michigan Human Resource Fund system is summarized. Second, current developmental work within the Chancellor's Office of the California Community Colleges will be reviewed. Third, state and federal initiatives to integrate educational supply and labor market demand data will be discussed.

Michigan Human Resources Fund

Current efforts in the State of Michigan offer the best guide to a major statewide effort to invigorate and create a human resource investment system. Research showed that the state was faced with serious labor force problems.[14] With pressure and initiative from the private sector and the leadership of the Governor, Michigan has embarked on an extensive campaign to create an "efficient, coherent and user friendly job training system".[15]

In 1988, the Governor's Council on Human Investment's Adult Literacy Task Force recommended an action plan to address the skills gap crisis. The new skills development system is based on five principles. The training and education system must:[16]

- be learner driven and learner sensitive
- emphasize shared responsibility of the stakeholders
- empower individuals to invest in themselves
- be learner friendly
- be accountable

From these principles came eight recommendations of which two are especially important to this paper.[17]

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[14] *Countdown 2000, Op. Cit.*, page v.

[15] *Creating a Human Investment System, Op. Cit.*, transmittal letter.

[16] *Countdown 2000, Op. Cit.*, defines Michigan's labor force needs by the year 2000 and recommendations to meet them.

[17] *Ibid*, pages v-vi.

(1) Simplify access to all adult training and educational services, focusing on a common system so that all citizens can participate in the development and management of their own skill enhancement plan.

(2) Develop a skills assessment tool for measuring Michigan's work readiness goal and definition to use with each participant in all training and educational program. The assessment will be used in determining incoming skill levels (and the mix of services required), progress toward completion, and in measuring effectiveness of programs.

Central to the Michigan system are the integration of human service delivery programs, a statewide information services system, and an MIS which features the use of a learner's individual smart credit card to maintain his or her service information.

Central to the Michigan system are (1) the integration of human service delivery programs, (2) a statewide information services system, and (3) a MIS which features the use of a learner's individual smart credit card to maintain his or her service information.

In the Michigan model participating provider organizations operate under the concept of a "franchise". They take on specified responsibilities as partners in the Michigan opportunity card and human investment system.[18] The stakeholder concept in the California adult education service delivery network will draw on features of the Michigan franchise model.

California Community Colleges Management Information System

The model that will have the most influence on the design of the integrated adult education data system is the MIS under development by the Chancellor's Office of the California Community Colleges MIS.[19] The system, when fully implemented, is expected to provide "unitary" information from some 70 community college districts and 118 community colleges.

This MIS is in its first year of pilot testing. Data from the system when fully implemented will be used for issue identification, policy analysis, and program planning and evaluation. It will permit the longitudinal tracking of students to determine goal achievement, instructional performance and needs.

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18 "Franchise Standards: Issues and Options," a workgroup report to the Michigan Human Investment Fund Board, October 1988, especially pages 9-16.

19 "California Community Colleges Management Information System Data Element Dictionary: First Year Implementation," Chancellor's Office, California Community Colleges, June 1989. This dictionary is the publication which defines and classifies unique data elements in the MIS.

The MIS will collect and process information from four major ingredients or sets of data:

- Students
- Faculty and Staff
- Facilities
- Financial Activity

They will be organized into six databases: (1) student, (2) section, (3) course, (4) program, (5) employee, and (6) facility. The linking data elements include the social security number for the personal identification number (PIN), and the classification of instructional programs (CIP), and district and college identifiers. When completed, the MIS will encompass credit and non-credit activities.

This community college MIS has been in the design stages for four years. Its initiation was prompted by the lack of outcomes and longitudinal data on student progress. The design steps have included:

- Development of a feasibility study report (FSR) for a system-wide MIS.
- Development and design of a data elements dictionary with substantial provider collaboration and consensus building.
- Pilot testing at Butte College, San Joaquin Delta College, Santa Rosa Junior College, and Mount San Antonio College.

The pilot testing of the matriculation portion of the MIS will occur over the next school year. The vocational education and basic skills portions of the MIS are currently under development.

Once the MIS is fully designed and tested, it is expected that it will take two years to implement. Costs for the implementation will be about $6.4 million. When the system is operational, the MIS costs are expected to be about three percent of the total operating budget of the districts and colleges.

Lessons to be learned from the community college experience are:

(1) Being certain to spend sufficient time on the MIS outputs--the data that will be derived from the system.

(2) Understanding how the data are developed, how it is collected, and the needs of the providers. The data must meet local needs and considerations. To address this need the community colleges will be given a microcomputer statistical software package and some reporting routines to use for their own planning and analysis purposes.

Both of these lessons stress the importance of provider involvement in the MIS planning and the determination of data elements and definitions.

The state level community college information will be reported via electronic data exchange. The community colleges will use the California State University network for information exchange.

The importance of this MIS design work rests in the substantial amount of developer and provider time spent on agonizing and negotiating over data elements and their definitions. These efforts will facilitate the "integrated adult education data system" design because of the needs for comparability among the data elements used in both management information systems.

Occupational Information Systems

Since the late 1970's, the federal government has initiated a series of programs to encourage and support the development of data systems to provide a cross-agency overview of labor supply coming from education and training programs and match this overview with labor market data on the demand for workers in occupational clusters.

One of the most important outcomes of this effort has been a series of crosswalks developed by the National Occupational Information Coordination Committee (NOICC). These crosswalks, which take the form of both "hard copy" reports and computer software programs, provide a basis for recoding enrollment and completer data from different education and training agencies (*e.g.* Adult Schools, Community Colleges, JTPA programs, etc.) and comparing it to labor market data on the demand for persons completing programs which provide skills pertinent to occupations.

Several efforts have been undertaken to develop and implement occupational information systems in California. During the late 1970's, a system was developed to provide statewide data through mainframe computers. This effort was terminated due to disagreements over the jurisdiction of participating agencies. During 1986-88, similar initiative was

undertaken to develop procedures and microcomputer software that would allow local consortia to develop comparable cross-agency data on the supply of qualified completers coming from education and training agencies.[20] This effort was technically successful in that it developed a system that provided a way of crosswalking data from all major education and training programs into a common and comparable classification system. Unfortunately, these resources have been applied in only limited ways because of disagreements among participating state agencies and a lack of resources to support local applications.

The most important aspect of these occupational information systems is the development and use of data crosswalks. These crosswalks allow data to be collected by various providers in the existing data coding system of the provider group (*e.g.* Taxonomy of Programs, Classification of Instructional Programs, Dictionary of Occupational Titles, CBED Educational Codes, etc.), then allow this data to be recoded into common classifications. These crosswalks produce reasonably accurate reclassifications. However, these classifications are not always perfect--a situation which produces both political and technical problems. In the best of worlds, it would be best to have a common coding system that is used consistently by all providers. However, if this is not possible, the above noted initiatives concerning occupational information systems provide an option for developing cross-agency data about programs without moving to a common coding system. This option might be applied as a permanent solution, or perhaps more appropriately, as an interim mechanism for developing comparable cross-agency program data while a common coding system is developed.

A good data system is based on the organization of information into databases in a way that it can be easily accessed, transmitted and analyzed by a trained person who does not require extensive computer hardware and software knowledge.

System Design and Data Elements

A good data system is based on the organization of information into databases in a way that it can be easily accessed, transmitted and analyzed by a trained person who does not require extensive computer hardware and software knowledge.

A good MIS makes pertinent and needed information readily available[21] at the state, region, provider and learner levels. The system design is expected to have four features:

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20 *COICC Labor Supply Survey Kit*, California Occupational Information Coordinating Committee, Sacramento California, June 1988.

21 A good database design will make it easy for the occasional user to query the MIS to obtain information. It is important that this *ad hoc* ability be available, and easy to understand and use. See Dennis Porter, "MIS Design and Use," Micro Methods for the Department of Labor, 1989 402 National Conference, April 1989.

(1) An easy to use local-state communications link for information transfer that protects program and learner privacy.

(2) Sufficient data detail to monitor, assess and define individual, provider and area services and outcomes.

(3) Design that encourages use of inexpensive, compatible and easy to use hard-ware and software requirements.[22]

(4) Comparable cross-agency and cross program information which can readily adapted.

These four key features are elaborated in the subsequent pages.

COMMUNICATIONS LINK

In order to be effective, provider data in both detailed and summary form must be available to other area and regional providers and to state sponsors. The levels of specificity are a function of the data needed for mandated, coordination and analysis purposes.

An important policy decision will be determining the exact nature of the data system. The primary options are between a centralized and a decentralized or distributed system. In a centralized system all provider and area data are reported to a central facility (presumably in Sacramento). However, because the data system will be designed to incorporate several programs with varying data definitions and reporting requirements, each level of player in the data system will be responsible for specific data. Michigan has addressed this issue by creating common data collection forms which reflect minimal data required by all participating agencies. After this minimum threshold, options are available to assist programs to collect more extensive information.

The initial participants in the data system that must be linked via a communication network are likely to include:

- Sponsoring state agencies or departments
- Community Information Centers
- Selected stakeholder organizations
- Learners
- Adult Education Institute

[22] Routine data entry should be designed for an intake clerk, paraprofessional or professional's responsibility depending on the nature of the provider organization. Software embedded edit checks, look up tables, and error trapping routines should be used to minimize the chance of error. These internal controls are a mark of a good information system.

- Area employers and business groups

The expected electronic and data reporting links will include:

- Learner to provider (*EduCard*™)
- Learner to Community Information Center (*EduCard*™)
- Provider to state sponsor
- Community Information Center to Adult Education Institute (to establish a statewide provider and support services listing)
- Provider to Community Information Center
- Learner to employer
- Employer to community information center

Each of these links may include specific reporting requirements and reporting schedules. A modem (telephone based data link) program will transmit the information in a highly automated manner.

What is not clear is the location for the statewide learner (*EduCard*™) and community information center master databases. There should be a statewide listing of *EduCard*™ holders with the current data on each holder. Likewise a master listing (electronic and print) of collaborating providers is needed. This topic is discussed in the issues and options section.

DATABASES

Exhibit 3, *Overview of Collaborative Infrastructure Functions*, outlines the organization of the California integrated data systems model. Three relational databases or files are clearly implied:[23]

(1) Community information services database
(2) User database (*EduCard*™)
(3) Provider database

There are two essential links between the three databases: (1) the provider's unique identification number and (2) the learner's unique identification number, permitting data from individual adult education interventions to data summaries of multiple interventions at the site, provider, region and state levels to be maintained.

[23] Relational databases build links between separate database files by linking common fields or elements. For example, the learner would be linked between the *EduCard*™ and community services and provider data files by a unique identifier usually known as the "personal identification number" (PIN).

The interrelationship of learner, provider, and community information services is set forth in Exhibit 3.

Based on our analysis of Exhibit 3 functions, an initial listing of data types and specifications are set forth (See Exhibit 4). They become the initial working set of data elements for the integrated data system model.[24]

The primary challenge in constructing this database is to obtain consensus on the data elements and their definitions sufficient to make them comparable across types of programs.

DESIGN CONCERNS

The MIS should be designed in a modular fashion to insure easy upgrades.[25] While the system can begin modestly, it can grow to include a broader range of data over time. The link to the *EduCard*™ insures that learner information can be broadened as the system becomes more widely accepted. For example, once the MIS is reliably tested and adopted, a learner's prior educational experience can routinely be part of his or her data record. This can be done by issuing the *EduCard*™ to all high school students and other persons eligible for adult education and training entitlements. In the era of lifelong learning, the *EduCard*™ will take on a wider utility.

The proposed integrated data system environment will encompass the provider agencies, the community adult education information centers, and the sponsoring agencies. Measures of effectiveness require that the MIS must be easy to use, meet local and state needs, be inexpensive but flexible to hardware and software changes, and have a core set of data elements that are reasonably timeless in nature.

The MIS must be able to accommodate other types of education and training programs and address multiple reporting requirements. This open ended feature suggests that the hardware requirements and software design be broad enough to accommodate a range of preferences.

Likewise, the MIS must be able to maintain data on learner performance and report summary learner and provider information to the state on a regular basis.

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[24] Fred Best, *Handbook for Local Planning Consortia*, Adult Education Institute for Research and Planning, Sacramento, California, March 1990, pages 28, 48-49.

[25] The idea of modular programming is the generally accepted approach to MIS prototyping and development. See for example Dennis Porter, "The Client Flow Approach to MIS Design," Micro Methods for the Department of Labor 1989 402 National Conference, April 1989; and Arthur Anderson & Co., "JTPA Statewide Management Information System Recommendations Report," June 1988.

Exhibit 3
OVERVIEW OF COLLABORATIVE INFRASTRUCTURE FUNCTIONS

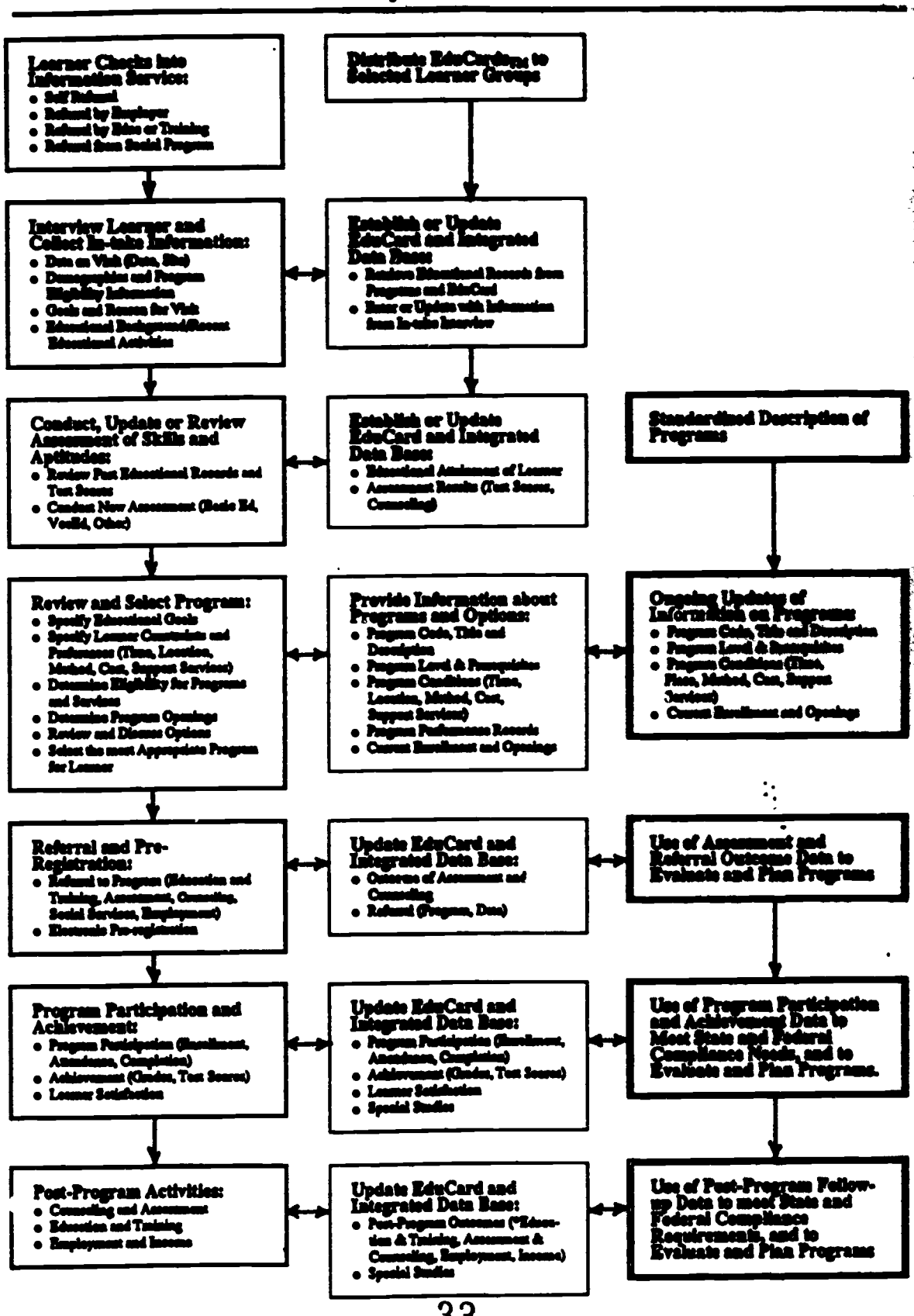

Exhibit 4
PROSPECTIVE DATA TYPES AND SPECIFICATIONS

General Types of Data:	Examples of Specific Data Elements:
Program Data:	
• Program Code, Title and Description	Program code and title (CIP classification system or system translatable to CIP), text description (content of instruction, schedule, testing, etc.)
• Program Level and Prerequisites	Years of general education, years/hours of instruction-related training required, minimum assessment test scores (CASAS, TABE, etc.), degrees and certificates
• Program Conditions (time, place, method, cost, support)	Time of instruction (duration, start/end date, days of week, times of day), location (address, facility), method of instruction (large or small class, tutorial, TV course, interactive educational technology, etc.), costs (fees, cost of books and supplies, other costs), support services (counseling, interviewing, travel, childcare, medical, parking, etc.)
• Program Performance Measures	Average performance data for class, programs and institutions (completion rates, pre/post assessment test scores, post-program activities)
• Current Enrollment and Openings	Size of enrollment per class or teacher, number of current openings, entry and exit dates
Intake and Update Data:	
• Demographic and Eligibility Data	Age ethnic-racial group, disability status, employment status, marital status, dependent children, veteran status, income (personal and household)
• Educational Records	Years of school, degrees (high school, A.A., B.A., graduate, vocational certificate), schools and training programs attended (with dates), grades
• Goals and Interests	Education and training goals (undecided, degree, skill mastery, literacy and numeracy), life goals (employment, education, home, other)
Skill Assessment and Aptitude:	
• Educational Records (see above)	
• Goals and Interests (see above)	Aptitude test scores
• Assessment and Aptitude Tests	Pre/post assessment test scores and dates (CASAS, TABE, GED, etc.), aptitude test scores
• Eligibilities	JTPA, GAIN, military services, job skills support services (childcare, medical, travel, income support)
• Interview Results	General priorities, specific priorities
Counseling and Referral Data:	
• Referral	Referral to program (program title, code, location and date of referral)
• Placement and Pre-registration	Pre-registration status (yes/no)

Continued next page

Exhibit 4, Continued

General Types of Data:	Examples of Specific Data Elements:
Participation and Outcome Data:	
• Enrollment and Attendance	Enrollment outcome (yes/no), attendance record
• Completion and Grade	Completion status (yes/no), grade or performance score, degree or certification (type and date)
• Assessment and Achievement Tests	Pre/in-process assessment test scores and dates (CASAS, TABE, GED, etc.)
• Learner Satisfaction	Satisfaction survey response (satisfied/ dissatisfied)
Follow-up Data:	
• Subsequent Activities	Follow-up status (education program, employed, homemaker, etc.)
• Learner Satisfaction	Responses from student exit and Follow-up surveys (satisfaction, reasons for DR/ satisfaction)

These basic design requirements suggest that the MIS be modular in design to easily adapt to changes over time. At the same time, the basic data elements and data definitions should be designed to be reasonably constant, permitting longitudinal and comparative analysis.

CROSS-AGENCY DATA

As the proposed MIS is designed and tested, it is expected that other education and training programs will utilize this broad based integrated service delivery and data system. To do so, data definitions and assessment features must be comparable. Data dictionaries must define program's definitions of terms and comparisons between contrasting definitions must be determined. Local agencies would be required to follow the data definitions closely. Assessment and testing tools must be capable of comparison.

In an integrated data system, learner and provider data would be made available on a real time and batch processing basis.[26] Only basic summary information, in all likelihood, would go to the community information system. This information, to be useful must be comparable. This requires

[26] Real time means concurrently based on a transaction. This refers to updating the *EduCard*$_{TM}$ as the result of receiving or completing a new service. Batch refers to periodic, usually regularly scheduled, updating of information. For example, a provider agency would submit summary batch reports to its sponsoring agency on a designated basis, as it would to the community information service. Likewise it would submit updated learner information to the central repository as scheduled. These updates can be completely machine automated or can require human guidance.

that methods be developed to compare data collected via different education and training program codes. The most prevalent of these codes are:

(1) U.S. Office of Education codes (USOE)

(2) Classification of Instructional Programs (CIP)

(3) Taxonomy of Programs (TOP):[27]

(4) Comprehensive Basic Education Data System codes (CBEDS)

These instructional data can be compared to training programs that classify their programs by occupational codes. Most notable among these occupational coding systems are the Dictionary of Occupational Titles (DOT), the Standard Occupational Classification (SOC) and the Census Occupational Classification. These crosswalks among classification codes must also be an aspect of the community information system.

The California State Plan calls for an integrated adult education data system to provide a "means of entering, retrieving and analyzing data that is accessible to both state and local users." This system will be defined, refined and tested over a four year period of time.

In addition to the Michigan model currently under development, there are seven management information systems used in California to maintain enrollment and completion data on institutional participants:[28]

(1) California Community College Information System

(2) Vocational Education Data System (VEDS)

(3) Post-Secondary Career Survey (PSCSS)

(4) California Basic Education Data System (CBEDS)

(5) State and National Apprenticeship Program System

(6) Rehabilitation Services Administrative Data

(7) JTPA Statewide Integrated Management Information System (SMIS)

The integrated data system must accommodate their data collection requirements, data definitions and form the basis for

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[27] *Background Papers for the Labor Supply Survey Kit Project, Op. Cit.*, pages 6-7 and Appendix 2.

[28] Fred Best, "Isolation and Assessment of Leading Sources of Labor Market Data," Working Paper 2 (draft), Pacific Management Research Associates for the California Occupational Information Coordinating Committee, January 1984, page 52.

creating the cross-agency data. Their components will be examined in more detail in the feasibility study phase.

As noted previously, these data systems can be made comparable by agreeing upon common codes, or using crosswalks to recode data into a common classification system.

The basis for the proposed "collaborative infrastructure" of information systems is described in Exhibit 3. Continued progress in the design and testing of such an "infrastructure" requires policy and technical decisions regarding:

(1) Databases: Location of statewide learners' database (*EduCard*$_{TM}$) and provider's database

(2) Data Elements:
- Specific data collection requirements
- Standards for cross-agency data

(3) Database Hardware

(4) Database Software

(5) Reporting Requirements

(6) Data Privacy and Security

(7) *EduCard*$_{TM}$ Issuance and Ownership

These items form the basis for the policy options to be reviewed in the next chapter. Each of these decision areas will be discussed in terms of their most obvious options. Hybrid solutions for the options are reasonable.[29] Several of these policy issues may require reconsideration as time progresses.

New Developments and Considerations

Our responsibility is to research and define the issues associated with the design of an optimal adult education integrated data system. There are several issues and considerations which will guide the *integrated adult education system's* design. As noted we must be sensitive to the ease of use of the system, to the capacity to measure program performance, and the ability to serve a wide range of providers including the employer community. There will be continued improvements in computer hardware and software. Therefore, system design should not be constrained in our deliberations by these considerations.

[29] Fred Best, *Handbook for Local Planning Consortia*, Adult Education Institute for Research and Planning, February 1990. This paper outlines the background, objectives and workplan for local planning consortia who will implement these strategic recommendations on a demonstration basis.

NEW TECHNOLOGIES

The new technologies which will impact and make easier the implementation of an integrated data system are aspects of computer and integrated circuit chip technology. Specifically they are:

(1) Computers:

- Improved speed and graphics capability
- Ability to access and use digital images
- Improved capacities to store information inexpensively
- Ability to use voice commands in machine communications

(2) Smart Credit-Type Cards:

- Low cost improvements in integrated circuit card memory
- Wider acceptance of magnetic and integrated circuit card technology[30]

(3) Software:[31]

- Increased use of object oriented programming (OOP) and computer assisted software engineering (CASE) techniques making software modification less expensive
- Increased use of graphic interfaces, reducing training time and simplifying data entry, editing and queries
- Expert system software which will facilitate program eligibility decisions and reduce disallowed costs

It is commonly expected that these and other technological advances will simultaneously reduce the costs and increase the performance of the proposed integrated data system.

CHANGING SOCIAL AND ECONOMIC NEEDS

The transition to a lifelong learning society, driven by economic need and technological advances, is chronicled in the previous research leading to the *Strategic Plan for Adult Education*. The particular needs emphasized here are:

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30 *smartcard 2000: the future of IC cards*, D. Chaum and I. Schaumuller-Bichl, Editors, North-Holland, 1989.

31 Courney, David, "New tech not just acronyms; offer competitive advantages," MIS Week, November 13, 1989, page 58.

(1) **Skills Gap:**

- California faces serious skills deficiencies in an increasingly global economy
- The changing work force with at least one estimate that 15 percent (3.1 million persons) of the California population has literacy performance deficiencies

(2) **Need to Reach Alienated Learners:**

Roughly one-fourth of California adults still have less than a high school diploma.

(3) **Growth of Women Workers:**

Skills upgrading and confidence in their ability to compete for employment

(4) **Need to Improve Program Performance:**

- Context sensitive performance assessment
- Paperwork reduction
- Integrated human service delivery system
- Cross-agency data to assess education and training services
- Context sensitive adjustment to labor market demands
- Measuring multiple modes of adult education services

These changing social and economic needs require better information to help learners access educational programs, and assist educational programs to plan and manage for improved performance.

Key Findings

The literature review and background research address five areas of research. These include the need for an integrated MIS, models, system design and data elements, and a variety of design issues. These are capsulated below:

- Need for an Integrated MIS. The current adult education data system needs to reflect persons served, actual learning outcomes and performance, and learner demographics. Presently there is no inter-agency data system, other than those that are program specific. An overall data system that links programs, without imposing undue burdens on providers is needed.

- **Models.** There are current MIS models that will guide any integrated data system development. None as designed is adequate. This is most especially the case in regards to data elements and data definitions. However, the system under discussion will evolve from the current data systems to reflect the need to share comparative information.

- **System Design and Data Elements.** The integrated data system conceptually calls for three components--the community information services component, the provider component and the learner (*EduCard*$_{TM}$) component. Within each component an optimal set of data elements will be determined. Since much of this data will be a one time burden (at initial entry), the utility of collecting more rather than less information is suggested.

- **Design Issues.** The underlying assumption is that an integrated data system must be sufficiently flexible to serve multiple programs and their own unique data requirements. Using a modular design can insure easy system upgrades, and can accommodate changes over time. However, the data and data definitions among providers must be clear and comparable. This requires a cross-agency system where classifications can be compared.

These findings will guide the isolation and discussion of planning options in the remainder of this report.

Options for Analysis

The initial policy decisions that should be examined reflect the development of a new data system. Our research shows that no existing data system meets the needs specifically the 1988-89 *Strategic Plan for Adult Education*. As a result, it is necessary to address the following design issues for a new data system:

(1) Location of the statewide learner's (*EduCard*$_{TM}$) and community information services databases

(2) Data elements:

- Specific data collection requirements
- Standards for cross-age [illegible] data

(3) Database hardware

(4) Database software

(5) Reporting requirements

(6) Data privacy and security

(7) *EduCard*™ issuance and ownership

These issues serve as the cornerstones for assessing the feasibility of designing the integrated data system. They also identify issues requiring policy guidance.

Chapter 3
Options for Implementation

System design must accommodate current reporting requirements while providing sufficient data to measure learner and program performance and impacts on identified needs.

This chapter establishes criteria for evaluating alternative approaches for implementing an integrated data system, then specifies and evaluates options for implementing the system.

Criteria for Evaluation of Options

The criteria for evaluating implementation options reflects the previously discussed considerations of system design. Restated, the criteria are:

- Improve Learner Access
- Acceptability of Stakeholders
- Ensure Ease of Use
- Maintain Learner Privacy
- Cost Effectiveness
- Improves Accountability

While there is some overlap among the criterion, they represent the critical features that will determine the ability of the proposed data system to meet the goals of the *Strategic Plan*. Exhibit 5 outlines the criterion and their basic features.

Exhibit 5
CRITERIA FOR EVALUATING THE PROPOSALS

Improve Learner Access:

- **Interactive**
- **Consolidate Information for "One-Stop" Access**

Acceptability of Stakeholder:

- **Minimize Administrative Burden**
- **Reduce Paperwork**
- **Improve Performance Measurement**

Ensure Ease of Use:

- **Minimal Staff Training and Retraining**
- **Automated Electronic Reporting**
- **Built In Security**

Maintain Learner Privacy:

- **Password Protection**
- **"Need To Know" Access**

Cost Effectiveness:

- **Minimizes New Investment Costs**
- **Standardizes Data Collection**
- **Reduces Analysis Costs**

Improve Accountability:

- **Consolidate Performance Data**
- **Provide Performance Data to Stakeholders**

Comparing the Pros and Cons of Alternative Approaches

Alternative approaches for implementing aspects of the data system will be identified as issues followed by a discussion of the options. We have taken broad based issues for this paper with the expectation that more technical and program related concerns will follow in the next two development steps. Key decision areas to be addressed include:

(1) Location of Database
(2) Data Elements
(3) Data System Hardware
(4) Database Software
(5) Reporting Requirements
(6) Data Privacy and Security
(7) Issuance and Ownership of *EduCard*$_{TM}$

These issues, and options for dealing with them, will be discussed in the following pages.

(1) LOCATION OF DATABASE

The database is described as having three components:

(1) Learner component
(2) Provider component
(3) Community information services component

Each has different elements (fields) and is linked to the other elements via learner and provider unique identification numbers. There is no apparent requirement for a presumed direct link between the community information services and learner components, but rather that summary information on learner characteristics is passed from the provider component to information services.

Correct choices for the location of the statewide consolidated database are as follows:

- Adult Education Unit
- Chancellor's Office, California Community Colleges
- Adult Education Institute for Research and Planning
- Other Parties (*e.g.* proposed Adult Education Council, California Postsecondary Education Commission)

Option 1A
ADULT EDUCATION UNIT

Of the some $730 million dollars in fiscal 1989 spent on adult education, 50.8 percent will be spent by adult schools.[32] The California Department of Education's Youth, Adult and Alternative Educational Services (YAAES) Division, primarily through its Adult Education Unit (AEU), is a predominant player at the state level in providing leadership, direction and monitoring of adult education.

It is presumed that all adult school (provider) information will be reported to the California Department of Education. This will require modifying and updating their current MIS design. However, because the learner information will be reported from a variety of providers, there are jurisdictional problems.

Evaluation: It does not make sense to centralize the learner and community information databases within the

[32] *Adult Education for the 21st Century, Op. Cit.*, page 10.

California Department of Education during the design and testing phase. It does make sense to begin to evaluate their overall MIS and prepare for the likelihood that under the integrated data system, the provider adult school information, at the least, will be the domain of the CDE.

Future Prospects: The three- or four-year Phase I development and testing period provides sufficient time to evaluate what and how the CDE MIS should be improved. Advances in computer hardware, software and telecommunications will facilitate the capacity to manage an expanded MIS function.

Option 1B
CALIFORNIA COMMUNITY COLLEGES

The Community Colleges have a major commitment to noncredit adult education. Community college noncredit, basic skills and vocational information will be reported to them as part of the new integrated MIS. The Chancellor's office maintains demographic and academic student data along with fiscal, course activity, and instructional information. In the integrated data system, the timeliness and accuracy of the information collected for noncredit education will be stressed. However, as in the case of the AEU, there are jurisdictional problems regarding locating the learner and community information services databases with the Chancellor's Office.

Evaluation: As with the CDE, It does not make sense to centralize the learner and community information services databases in the Chancellor's Office during the design and testing phase. It does make sense to begin to reevaluate the noncredit segment of their MIS and prepare for the likelihood that within the integrated data system the noncredit adult education information, at the least, will remain the domain of the Community Colleges.

Future Prospects: The three- or four-year Phase I development and testing period provides sufficient time to evaluate the comparability and adaptations the Community College MIS should be make to accommodate the integrated adult education data system. Advances in computer hardware, software and telecommunications will facilitate the capacity to manage an expanded MIS function.

Option 1C
ADULT EDUCATION INSTITUTE FOR PLANNING AND RESEARCH

The Adult Education Institute for Planning and Research (AEI) was created by the "California State Plan for Adult Education" to provide technical support to the four year and strategic plan implementation. It has a vested interest in the development and testing of the MIS and will provide leadership in the design tasks.

Evaluation: In the short run AEI seems the likely location for the aggregate learner and community information services databases, since it will be responsible for the management of the MIS design. It will give the responsible personnel more control and interaction with the system developers and field design sites.

Future Prospects: It seems unlikely that AEI will be ultimately responsible for the management of the learner database or the integrated MIS. This should be determined over the course of the development period.

Option 1D
OTHER PARTIES

The proposed Adult Education Council or the California Postsecondary Education Commission (CPEC) are possible future locations for the databases. CPEC is charged with studying and recommending policies, procedures and programs to the intersegmental aspects of postsecondary education more effective and efficient. In this regard their recent efforts (1987) to study the feasibility of developing a comprehensive student information system predates and influences our development efforts.[33]

Evaluation: The Adult Education Council concept is not fully developed and cannot be evaluated at this time.

CPEC is the kind of third party which could operate a "clearinghouse" for learner identifier numbers, especially if the concept of the *EduCard*™ and the uniform kindergarten--college unique student identifier concept--is implemented systemwide. However, this option will require more study and analysis over the development period.

The utility of assigning unique student numbers for record keeping, management and policy analysis is clear to persons involved in MIS and research. However, the privacy concerns associated with centralized student files and records are

[33] *Feasibility Plan for a Comprehensive Student Information System*, California Postsecondary Education Commission, [nd].

difficult to overcome. Replacing the current unique number concept with a uniquely personal identifier like a written or eye signature, or a fingerprint can reduce potential misuse and abuse.[34] It is not difficult, in fact routine, to protect the privacy of individual records in large databases. Only summary information (aggregated from multiple records) would be available to all but a very few persons. The privacy issue is discussed in more detail in the policy option paper on the *EduCard*™.

Future Prospects: An examination of the legislated mission of CPEC is a necessary part of determining whether they are a likely place to assign the learner database. They are favored by their broad mandate and less operational role. It is a matter for further research.

Option 1E
DECENTRALIZED TO LOCAL PROVIDERS

It is difficult to conceive of a learner database being maintained on a decentralized level. Clearly, the most accurate data on a learner will be on his or her *EduCard*™. However, because of the learner's mobility, it can be hard to keep track of the person's current involvement with the adult education system, except by centralizing the information.

A primary use of this centralized information is policy analysis, planning and evaluation. It makes more sense from the viewpoint of data accuracy to require that learner data be updated to a central database. Likewise, if a learner loses his or her *EduCard*™, it will be easier for a local provider to reissue a card by calling a central database to download the pertinent information.

(2) DATA ELEMENTS

There are effectiveness and efficiency tradeoffs between collecting minimal and a lot of (maximal) data in an integrated MIS. The norm has been for local providers to collect only the information required by their funding agencies[35].

Examples of prototype database elements are summarized in Exhibit 4. They should not be considered an exhaustive list and are used to stimulate thinking on the subject. The inclusion or exclusion of specific information is a matter for

[34] The idea of a completely unique identifier which can be scanned optically and matched to a database record is attractive. This suggests that the learner, once in a data file, can simply use the scanned identifier can be rematched to a file. This approach poses a number of systems design problems and is futuristic, but cannot be ruled out in the next stage discussions.

[35] Porter, Dennis, *Strategic Management and the Role of the Management Information System*, Micro Methods for the Department of Labor 1989 402 National Conference, April 1989.

on-going analysis. For the purpose of this paper we suggest two alternatives:

(1) Collect minimal information in the integrated data system.

(2) Collect maximal data in the MIS.

Option 2A
COLLECT MINIMAL INFORMATION

This approach aims at insuring that very uniform information is collected in the data system. By minimizing the amount of information, it may be possible to reduce data collection burdens on providers and to a lesser extent on learners. By reducing the burden, the data system can be assured of collecting more complete data.

Evaluation: Most "data collection overload" occurs when information is first entered into a database. This will be the case with the community information service information. Scanning intake information into a data file can reduce this burden.

Learner information will be more available due to the *EduCard*™, thus reducing some collection burdens. The crux of the collection issues is in the learning environment where on-going service and outcomes information must be collected. We do not view this as a major problem, though it will require new systems and possibly technology to help automate information collection. Again optical scanning technology may play a useful role.

Future Prospects: Labor saving devices like optical scanners and the *EduCard*™ reader will reduce collecting redundant or repetitive information. Presuming an increased use of learning technologies and more emphasis on measuring learning outcomes rather than seat time, the learner centered data collection will become more automated.

Option 2B
COLLECT MAXIMAL DATA

There is not a precise definition of "maximal data". It is determined by inter-agency negotiation. While the suggested data elements (Exhibit 4) require more analysis and comparison with current data systems, the argument to collect a substantial amount of information on learners, providers and service interventions is that programs, policies and strategies can become more context sensitive.

Evaluation: New technologies can reduce the data collection burden and collecting more information systematically will give local and state administrators and analysts tools to shape program options and strategies. For adult education programs, data collection will entail new procedures and costs. The move towards more performance based learning services requires detailed information on services, outcomes and learner characteristics.

Obtaining consensus on more information during the MIS design and testing phase seems preferred. It will not be wise to later seriously revise the data collection requirements. It reduces the value of information analyzed over time.

Future Prospects: New technologies will make program and learner centered information collection and reporting less burdensome. During the testing phase, efforts to determine the actual costs associated with MIS data collection can be made.

(3) DATABASE HARDWARE

When fully implemented, we can expect the integrated data system to be used in different configurations by providers with varying levels of service provision and management information systems. Hardware requirements for a new system will have cost and information integration implications for providers and the sponsoring agencies.

The basic policy question will be whether to impose hardware requirements or utilize software that will accommodate a range of hardware "platforms". For analysis purposes we suggest two alternatives:

(1) Multiple platform options

(2) Microcomputer platform with upward integration

Option 3A
MULTIPLE PLATFORMS

This option permits existing hardware, for the most part, to be used in the data system. It will rely on software that can be ported to various computer operating systems. For the larger computer systems, if they do not use the software and do not care to license it, they can opt to maintain those data on a smaller computer and work out ways to integrate the information in summary ways with their other information.[36]

[36] Adult, career and noncredit education program information may or may not be integrated into the provider's regular MIS. It is more likely that financial information, especially payroll and possibly attendance will be integrated.

Evaluation: The issue of hardware requirements and configurations will be examined in more detail in the feasibility and implementation phase. The Michigan Human Investment System has experienced problems associated with compatible hardware and software in the beginnings of its *beta* test phase. Providers in the test counties complained that the new system was imposing new data collection reporting burdens and that the data had to be capable of being used within current data collection systems.[37]

Future Prospects: We can expect to see microcomputer and small minicomputer hardware become much more powerful while remaining inexpensive. We are already encountering major breakthroughs in inexpensive high density data storage devices. The primary issues are the nature of the provider and sponsor's information systems and hardware at the point that the integrated data system is linked into or stands along side of current MIS.

Option 3B
MICROCOMPUTER PLATFORM WITH UPWARD LINKS

From a design and cost point of view, using microcomputer relational database software is attractive. The question is whether it can handle the job. The largest providers would serve some 35,000 learners in a year in a number of programs. That would require storage capacity on the order of certainly no more than 500 million characters of information. This fixed memory requirement can be addressed by two sides of an erasable optical disk, suggesting that larger computer systems are not absolutely needed. The upward links would be based on a standard query or data exchange program.

Evaluation: For the design and testing phases, the use of microcomputers seems plausible. However, further analysis is required. The answer in many ways rests with provider agencies and their current MIS arrangements. The integrated data project should seek to serve them.

Future Prospects: Microprocessors and computer memory are continuing to be less expensive and more powerful. Desktop computers can perform tasks of mainframes of fifteen years ago.

[37] Phone conversation with Allen Gandy, Coordinator, Special Projects and Services, Kalamazoo Valley Community College. Kalamazoo and Saint Joseph counties are the *beta* test site for the implementation of the Michigan integrated data system. During these tests it became apparent that there were some incomparabilities among the institution's hardware and the proposed new software. The new software also conflicted with current providers data collection and reporting.

(4) DATABASE SOFTWARE

While hardware is discussed first, the choice of database software determines the hardware requirements. There are rules of thumb to determine what software to use. However, the use is often based on prior purchasing decisions when software and hardware were less sophisticated. There are several brands of current (fourth generation) software that can run on micro, mini and mainframe computers, with all the code written on a microcomputer. This comparability among the various sizes and types of computers makes them very attractive. However, in a few cases it may mean new mini or mainframe software purchase/lease expenses and learning/training costs.

The options are the same as for the hardware:

(1) Use multi-platform software

(2) Use microcomputer software with upward links

Platforms means the type of computer and basic operating software (operating system) it requires.

Option 4A
MULTI-PLATFORM SOFTWARE

There is current relational database software written in a programming language which can be easily adapted to most computer systems from micro to mainframe. This makes it possible to serve many hardware masters without having to completely rewrite the database software. This flexibility is extremely attractive.

Evaluation: Portability among many computer platforms has many advantages. In the final analysis, the software selected may be the same regardless of the options considered.

Future Prospects: We can expect to see object oriented programming (OOP), code generators which help write software, and "graphics interfaces" which will make it easier for the novice or occasional computer user to enter and maintain MIS data. Some more clear standardization on the structured query language (SQL) will be helpful and is possible.

Option 4B
MICROCOMPUTER SOFTWARE

This option suggests selecting a microcomputer database program which can serve the primary small computers (DOS, OS/2 and Macintosh operating systems). However, using software that meets these requirements as well as serving other platforms seems as useful since the costs are about the same.

Evaluation: The orientation towards microcomputers is based on the assumption that micros can perform most of the MIS tasks associated with the integrated data system. This makes software that can be prototyped and developed on a micro cost effective.

Future Prospects: We can expect software to be easier to prototype, but we cannot expect that building in systems controls and error trapping will be something that the nonprogrammer readily understands. The cost and time to prototype and develop database software will substantially decrease.

(5) REPORTING REQUIREMENTS

Database design begins with decisions about what data are needed. This is based on the required reports as well as the types of *ad hoc* information routinely required. In designing the integrated data system, special care should be given to the types of data necessary (See Exhibit 4 for list of Prospective Data). This will drive our system design.

Our hypothesis is that MIS data collection will place minimal burdens on instructors and administrators. It will be researched further in the upcoming feasibility analysis.

Providers are the primary reporters. Their data requirements should be balanced with the state sponsors and those of the policy analysts.

Since computer memory and storage costs are decreasing, it is reasonable to assume that providers can simply report more of their data to state sponsors, rather than periodic summary status reports. More contemporary summary type reporting approaches are needed, and within this premise are framed two alternatives:

(1) Upgrade current reporting requirements

(2) Make more detailed information available

The discussion of both options follows:

Option 5A
UPGRADE CURRENT REQUIREMENTS

Under this model, the current data collection and reporting requirements would serve as the base for considering our design requirements. Additions, data definitions and crucial changes would be proposed. However, there would be minimal fundamental change in the data collected or the manner in which data are reported from providers to their state sponsors. An exception will be the adult education programs, who will be required to be far more detailed in the data collection and reporting.

At the same time there will be a new reporting structure with the addition of the community information services data. They are descriptive and summary reporting information.

Evaluation: This approach suggests a more distributed approach to reporting, where providers can essentially collect what information they wish as long as they collect the information required for integrated data reporting purposes. Issues of accuracy and reliability will present, but basic precautions will be taken to reduce data error. The concept of ***developing a common intake form*** which satisfies the variety of sponsor's data requirements is attractive. Providers can augment this basic data set as required.

Double counting will be controlled by the *EduCard*$_{TM}$ while program and fiscal specifications and tracking in an open entry-exit environment are subject to solution and error checking.

Holding the provider responsible for eligibility determination and data reliability rather than the community information system seems to be the best approach.

Future Prospects: The growth of the integrated data system over time will influence the reporting requirements as will pressures for more accountability. The basic measures should be built into the system now.

Option 5B
MORE DETAILED REPORTING

The detailed reporting option can take on several forms. The most simple would be to require that detailed learner based information be provided by the reporting agency to the state repository. However, the notion of massive data element reporting can cause information management problems. For the most part, it would not be a burden on providers who would simply transmit the information in machine readable form. More importantly, it implies a more centralized approach to data management.

A variation can be an oversight agency that defines data collection and reporting requirements. This approach would take into account required reports to funding agencies while urging a broader view of information collection and analysis.

Evaluation: This approach requires a collective will and state level leadership. There is a lot to be said for the wider perspective and the cross-agency capacity to compare and aggregate data. It would serve planning and service needs and help ease into a more performance based approach for resource utilization.

Future Prospects: The more comprehensive approach requires more commitment and leadership. It is difficult in an inter-agency context. The issues are human, not matters of design or machine.

(6) DATA PRIVACY AND SECURITY

Privacy is also addressed in the *EduCard*$_{TM}$ options paper. Here we are more interested in general issues of privacy and security. There are laws governing student privacy in California. This means that student data can only be used without identifying the individual. This is the norm for all programmatic and social science research. Likewise, clear access rules and procedures are required to insure privacy of information. One principal would be, of course, that the cardholder would always have access to his or her file.[38]

Data privacy may be more a concern of the citizen than it is to the database personnel who respect it. The normal privacy controls include permitting multiple levels of access to data on a password controlled "need to know" basis.

38 "Confidentiality: Issues and Options," a workgroup report to the Michigan Human Investment Fund Board, October 1988.

Data security has three attributes:

(1) Input and editing controls
(2) Access and user controls
(3) Backup and storage controls

Input controls are software-embedded checks over access to information, content and accuracy. Certain data elements will be required. A file cannot be closed before these elements are included. Range checks, "look up" tables (on screen tables with data listings to choose from) and error trapping routines manage aspects of data accuracy. These machine based features limit inaccuracies in data entry.

Access controls limit the uses of the database software. There are often several levels of access permitting casual users to obtain query information by summary categories such as "number of ESL enrollees in the first quarter of 1991." Data entry persons may be limited to input and limited editing, but may not purge records. Likewise only designated persons at site, provider and the state levels will have access to individual learner raw files.

One example is potential employer access to files. Ideally, area employers looking for employees with particular attributes can query the integrated data system locally for information. This information would probably be in the form of a listing of persons with certain attributes without identifying the individuals. If interested, there will have had to be prior agreements to release the learner's name or the relevant provider will serve as intermediary to contact the learner and make the referral.[39]

Backup and storage controls insure that data will not be destroyed. Backup and archive procedures are built into database programs. They limit problems of hardware failures. Since we are proposing moving towards an electronic information system that can be largely paperless in execution, careful controls for data backup must be instituted. These controls must also take into account legal and sponsor requirements on how information is stored for program audit purposes.

(7) *EDUCARD*$_{TM}$ ISSUANCE AND OWNERSHIP

The concept of the *EduCard*$_{TM}$ stresses improving learner access to education and training services. Ease of use, minimizing record keeping and registration, and improving

[39] There are presumptive roles that education and basic skills training agencies play vis a vis the employer community. It is clear that there would have to be stakeholder agreement on this approach, and it could not overlap too close to the mandated responsibilities of the Job Service.

service quality are the goals of the learner based approach. There will be knotty problems associated with implementing the concept.[40]

This subject is addressed in some detail in the *EduCard*$_{TM}$ options paper. It is mentioned here to frame a set of policy issues over the control and use of the card. These concerns include:

(1) Who owns the *EduCard*$_{TM}$?

(2) Agency reimbursement for card related expenditures.

(3) What are the procedures for reissuing the card?

(4) What liabilities are implied in using the card concept?

(5) Is the card a prerequisite?

(6) Procedure for assigning personal identification numbers.

(7) Mechanics of card type and linkage to the data system.

The role of the card in the integrated data system is to facilitate access to services and improve and minimize record keeping. It is the surrogate for the learner in the data system.

40 "Customer Services: Issues and Options," a workgroup report to the Michigan Human Investment Fund Board, October 1988.

Chapter 4
Proposals

Background research and analysis suggests five initial policy proposals. When ratified, these proposals will drive the further elaboration of the integrated adult education data system design.

Five policy proposals are proposed to set the parameters for the MIS design. In the process of their review, other policy issues should surface to be included in the feasibility analysis task. These proposals are:

(1) **Locate Learner and Community Information Services Databases with AEI**

(2) **Maximize Data Elements Required in the Proposed MIS**

(3) **Use Multiple Hardware Platforms**

(4) **Use Multiple Software Platforms**

(5) **Upgrade Current Reporting Requirements.**

Two other issues are discussed and other actions recommended:

(6) **Data Privacy and Security**

(7) **Issuance and Ownership of *EduCard*$_{TM}$**

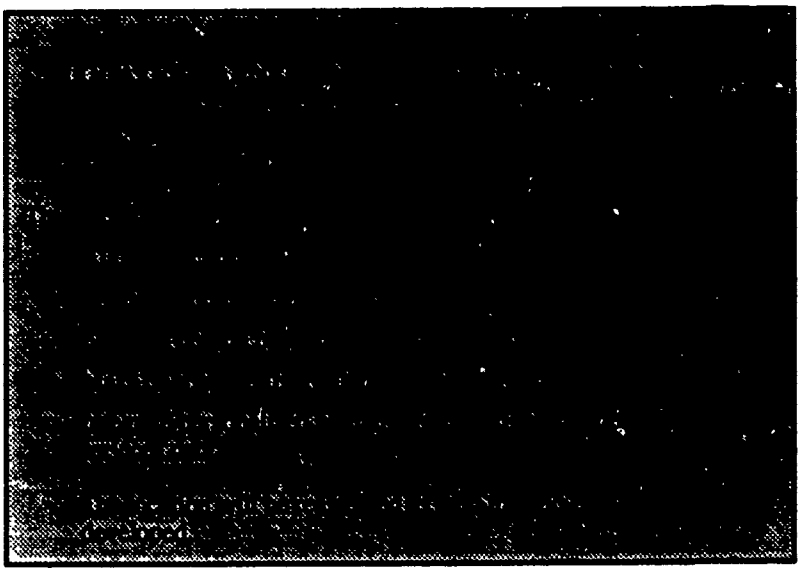
These options have been discussed in detail in the preceding chapters and will be elaborated on as research and discussion progresses. For the moment, the most important concern is whether we have addressed the central themes or issues which will permit us to begin to refine our integrated adult education data system model.

Proposals

This section discusses the pros and cons of the recommended approaches. They reflect changes recommended by the Data and Information Subcommittee of the Interim Steering Committee. Alternatives are not reviewed, but are evident. Readers are encouraged to identify and recommend other issues and concerns which should be addressed.

(1) LOCATE DATABASES WITH THE ADULT EDUCATION INSTITUTE

During initial development, the Adult Education Institute (AEI) should be responsible for the statewide consolidation and storage of local databases.



During the period of time for design and testing the integrated data system, it makes sense to locate its management and the location of the learner and community information services databases with AEI. At the time that the system is expanded to other stakeholders, the policy question should be reexamined.

It will make it much easier to monitor and evaluate the design and implementation of the MIS, if the learner and community information services databases are located with

AEI. Since AEI researchers will be the most interested in the data, there is little argument to address an alternative.

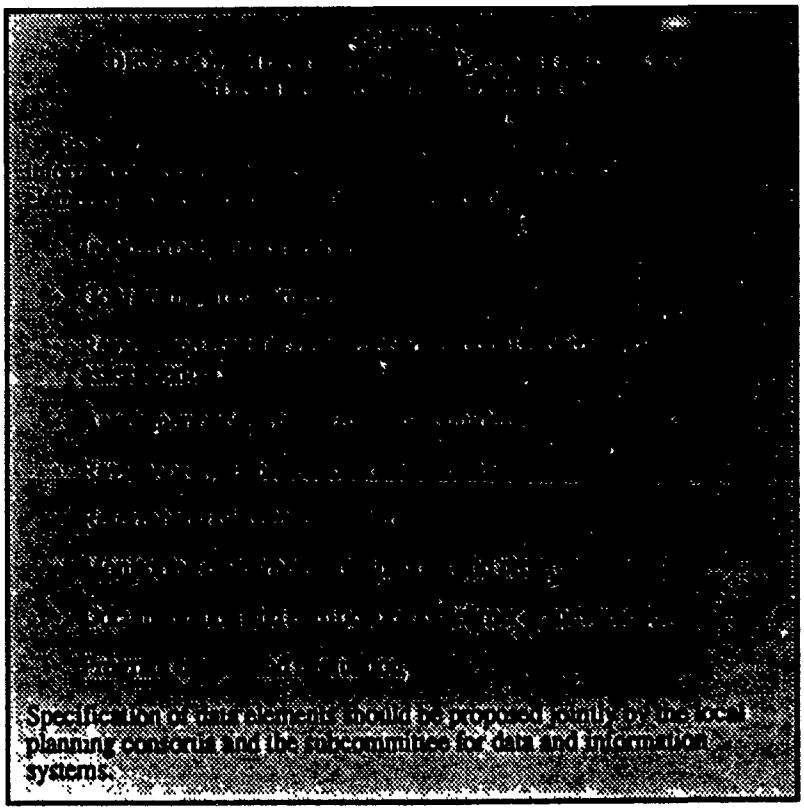
Access to these data in summary form by providers and interested parties should be made as simple as possible. The role of the adult education outreach and technical assistance network (OTAN) should facilitate on line access and special data reporting and two way communications.

The costs of an integrated data system in all likelihood will be negligible for providers who currently have detailed reporting requirements. It will have equipment, software, and personnel costs for the development and testing and for some providers.

Locating the learner database with AEI seems to have no major cost or other negative impacts, other than the costs associated with implementing a new data system.

(2) DEVELOP MULTI-AGENCY DATA TO SUPPORT ALL EDUCATIONAL FUNCTIONS

Priority should be placed on ensuring that the Integrated Data System contains all essential data elements.



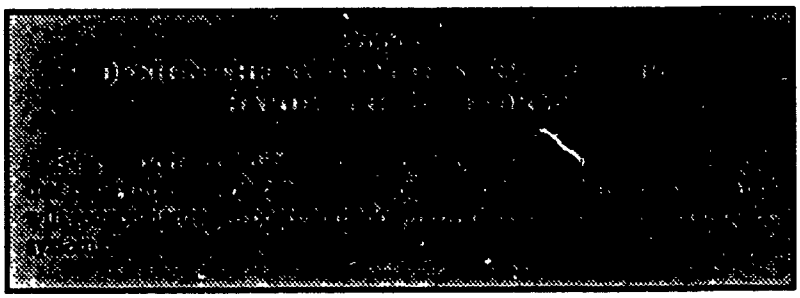
The content of component databases should place higher priority on procuring needed information than on economizing by limitation of needed data elements.

To be effective, an integrated data system must capture the right information needed to make intelligent policy and administrative decisions. If the data are not collected, or are only collected in a sampling fashion, they are less likely to be of value. The key lies in defining the optimal mix of data elements useful for the provider, area and state use. This requires a decidedly collaborative approach.[41]

The costs are increased data collection expenses and to a lesser extent in data processing and analysis time. There may be some resistance to more detailed data collection, though it is more likely to be an issue if the data's utility seems of questionable value.

(3) DESIGN THE SYSTEM TO SERVE MULTIPLE HARDWARE PLATFORMS

The diversity of computer hardware configurations used by education and training providers requires maximum flexibility to use and link multiple hardware environments.



This option seeks to optimize current and future flexibility in provider hardware choices. While there will be a few exceptions, this open choice will reduce the costs of adapting to and interfacing with the integrated data system.

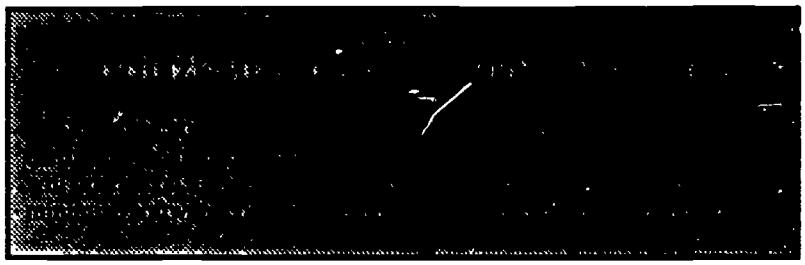
The positive impact is maintaining provider choice and comparability in its hardware decisions. It will reduce hardware costs and retain the providers own system connectivity.

41 Fred Best, *Handbook for Local Planning Consortia, Op. Cit.*, Adult Education Institute for Research and Planning, Adult Education, February 1990.

There are new costs associated with the integrated data system. They will be the *EduCard*$_{TM}$ reader, cost sharing on the card and possibly the need to add data system computing capabilities at the provider sites. However, the flexible hardware option seeks to minimize these costs.

(4) UTILIZE MULTIPLE PLATFORM SOFTWARE

Software for the Integrated Data System should be selected or developed so that it has the flexibility to work within many operating systems and hardware configurations.

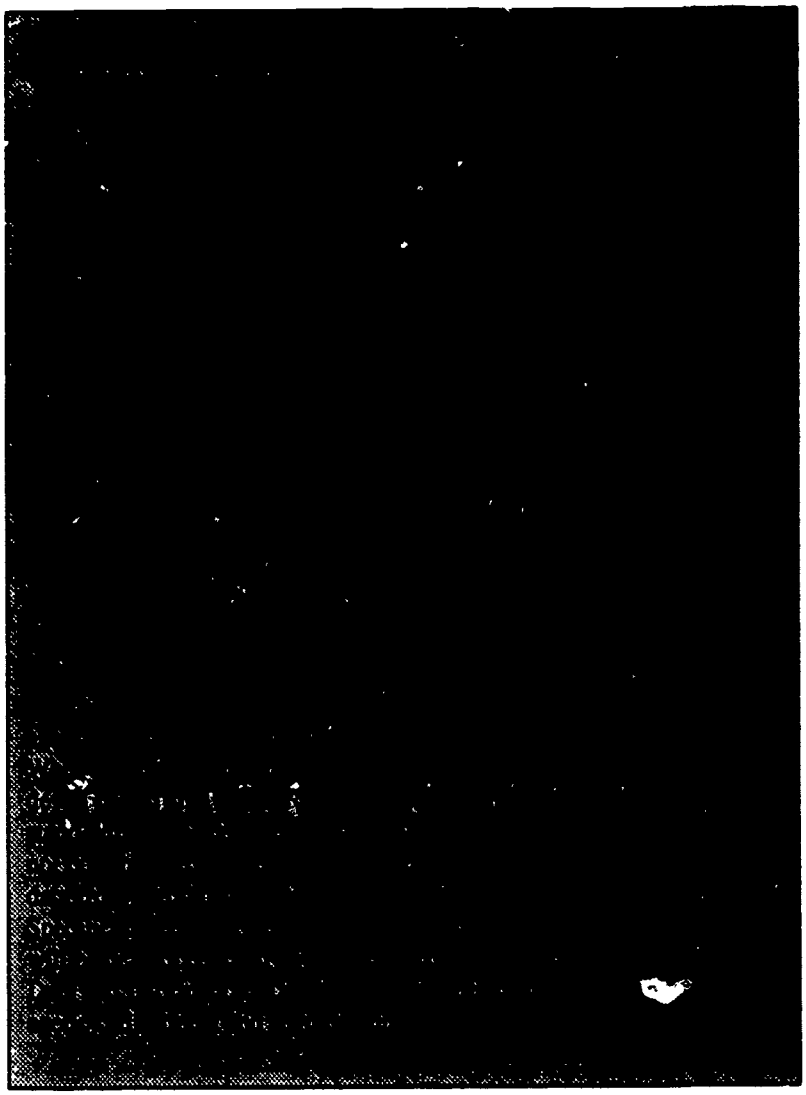


Minimizing hardware costs associated with the data system are the objective. Database software that can operate on many operating systems seems optimal.

Those providers who utilize mini and mainframe computers and wish to link the integrated data system to them may find that they will have new software purchase and licensing costs in order to utilize the software. This may make it more attractive to try other hardware solutions in program management. Likewise the data system is defined as being more program based than administrative and some costs may not be tied into the integrated data system. This is a matter for further analysis.

(5) INTEGRATE DATA FROM MULTIPLE AGENCIES

The basic data reporting requirements for participating and potentially participating agencies should be used to determine the base level data element requirements for the Integrated Data System.



Once core data element needs are specified, state and local collaborative planning processes can augment these data elements with items required to meet the needs of learners and other stakeholders.

Cross-Matrix Analysis

Exhibit 6 displays an evaluation of the recommended options with the proposed evaluation criteria. In the course of our review, we can add other proposals or we can compare all our options across the six evaluation criterion. For the purpose of this document, we address only the preferred options.

Exhibit 6

ILLUSTRATIVE CROSS-MATRIX COMPARISON OF RECOMMENDED OPTIONS VIA COMMON CRITERIA

Criteria:	Options:				
	Stake-holder accept-ance:	Ease of use:	Maintain learner privacy:	Cost effective:	Improves account-ability:
(1) Locate Learner Database with AEI	■	■	■	■	■
(2) Develop Multi-Agency Data to Support All Educational Functions	■	■		■	■
(3) Use Multiple Hardware Platforms	■	■		■	■
(4) Use Multiple Software Platforms	■	■		■	■
(5) Integrate Data from Multiple Agencies	■	■		■	■

Degree of Impact: ■ High ■ Medium □ Low

NOTE: Assessments within each criteria should also include negative impacts (*e.g.* moderate negative impact and strong negative impact).

Chapter 5
Future Actions

The five policy proposals and the upcoming feasibility analysis will refine the integrated adult education data system. The next steps are Steering Committee and Agency review, followed by the appropriate adjustments.

The process for developing, reviewing and enacting the strategies and short term policies will have several reoccurring steps. Policy options and proposals are developed, reviewed by agency heads for their acceptability, and then adjusted until they are acceptable to the heads of collaborating agencies.

The Institute staff and consultants will work under the guidance of the Interim Steering Committee to reconcile the requirements, concerns and differences of participating agencies.

Further development and analysis of the Integrated Adult Education Data System will take the form of a feasibility study. This next step will be performed by the Adult Education Institute for Research and Planning (AEI) under the guidance of the Interim Steering Committee and its subcommittees. During the feasibility analysis, the proposals presented in this paper will be reviewed, revised and analyzed further in order to gain clarity, acceptance to basic skills agencies, the business community, learners' groups and other stakeholders.

Any policy proposals of the Interim Steering Committee will need to be reviewed by State Superintendent of Public Instruction, Bill Honig, and California Community College Chancellor, David Mertes, as well as heads of other participating agencies. The Institute staff and consultants will work under the guidance of the Interim Steering Committee to reconcile the requirements, concerns and differences of participating agencies.

This review and discussion process is designed as a progressive cycle of public comment and dialogue among agency heads, Steering Committee Members and Institute personnel.