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ABSTRACT

The community colleges in the state of Washington are committed to a Six Year Plan to provide computing and information systems support to all students. The system is intended to make available a broad range of career placement information to assist decision-making, thereby humanizing education by insuring fewer misguided students, counselors and teachers. The pilot phase of a program, known as the Integrated Career Education and Placement Program (ICEPP), seeks to implement these goals. It rests on four linear segments of career development: exploration, preparation, specialization, and continuing education/employment. The system uses the IBM 360 Model 30 DOS System with ten files containing data on students, institutions, employment forecasts, training programs, financial aids, jobs available, job descriptions, job titles, community resources and follow-up material. The second phase of the ICEPP will expand the pilot version statewide; regional networks of four to six institutions will be formed and the batch processing mode of the first phase will be replaced by an interactive information processing system environment allowing the standard terminal applications of message switching, broadcasting, inquiry, data collection, conversational data entry, and order entry.

# THE DEVELOPMENT AND IMPLEMENTATION OF AN INTEGRATED CAREER EDUCATION AND PLACEMENT PROGRAM FOR THE WASHINGTON STATE SYSTEM OF COMMUNITY COLLEGES

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## INTRODUCTION

On July 1, 1971, the community colleges of the State of Washington embarked upon a planning project entitled "The Six-Year Plan." Implicit in this planning approach is the commitment to provide for every community college student appropriate computing and information systems support so that he may access and realize meaningful, useful, and relevant educational experiences. The assumption is that the computer can be a catalyst to student success.

Two colleges in the state system, Clark College, Vancouver, Washington, and Lower Columbia College, Longview, Washington, have been involved since January, 1972 in developing and testing a "pilot" exemplary project, that utilizes the computer to integrate data on student interests, aptitudes, and achievements, career and job information, and placement and follow-up after educational program completion. The project is primarily concerned with career placement where the word "placement" is used in a very broad sense: placement in a curriculum, placement in a financial aid program, placement in a job, etc. This, in contrast to the traditional interpretation where placement has been viewed and most often operated as an activity for terminating students.

Moreover, it is of vital importance that the student be no longer an object to be recorded, scheduled and tracked by computer solely for administrative record-keeping. The student's record and the integrated informational data base must be utilized to humanize educational processing by assisting the student as an individual with aspirations, needs, abilities and purpose.

The project spans a spectrum that includes not only the processes of education but equally the inputs and the outputs. The community college must move to the central position in serving students as they progress from the assessment of their interests and aptitudes, through the achievement of requisite skills and into successful careers. Thus, the project has been designed to provide the vehicle by which the community colleges can effectively and more efficiently provide not only coursework and service, but a "total approach" to career education and development for every student.

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The primary intent of the Integrated Career Education and Placement Program (ICEPP) is to improve (through use of a computer, a data base, and an information retrieval system) job and career placement for students through integration and improvement of all existing placement-related activities and services. It is an effort to provide up-to-date career information to the student from his mid-public-school years, through post-secondary/college years and into his employment years. It is also an effort to provide student and career information and services to employers, counselors, and instructors prior to the student's admission to college, while enrolled in college, upon termination or completion of a program of study, and during supplemental training and/or succeeding career field employment.

All data pertinent to job placement, student profile and achievement, career fields, financial aids and training programs are integrated into a multi-file data base accessible on demand by and/or all affected persons. Because the program interfaces a computerized information processing system with instruction, guidance, placement, and community involvement, it also brings together many of the career education approaches in development across the nation and, thus, affords a unique approach to a common problem throughout education. The program will make possible a more realistic appraisal of a student's career potential and options, thus reducing the number of failures and re-tries. By increasing the chance of success for students, the program can reduce the great "opportunity costs" of student failure and misdirection.

## PRIMARY OBJECTIVES

The ICEPP project has the following objectives which are implicit in the state system six-year master plan:

To increase the number of career placements for terminating and/or graduating community college students.

To provide accurate and timely follow-up information on career placement to students, employers, instructors, high schools, junior high schools, community colleges, and cooperating state and local agencies.

To provide to junior and senior high school and community college students and personnel detailed information, on demand, about manpower forecasts, job opportunities, training programs, placement services, career fields, and counseling and guidance programs.

To increase contact and two-way information flow between the community college and the potential student, the employer, and the community.

To identify and provide improved guidance and placement services for minority and disadvantaged students.

To develop a model program (Phase 1), including computer systems and procedures, that is available to colleges or groups of colleges in the Washington State System by June, 1973.

Thus, ICEPP provides one of the significant vehicles by which state system goals and objectives can be achieved.

The ICEPP conceptual framework rests on four linear segments of a career awareness and development continuum:

(1) Exploration - The process of perceiving career alternatives through information related to the world of work.

(2) Preparation - The exploration of clusters of careers and/or specific careers as they are related to the individual's goals and abilities. The process of realistic appraisal through integration of information, interest, skills, preliminary specific training, and related work experiences.

(3) Specialization - The continuing process of personal assessment as related to concentrated specific career training, work-study and cooperative work experience.

(4) Continuing Education/Employment - The enhancement of skills within a career field through advanced training and skill maintenance, or retraining for a new career field, or recreational enrichment programs.

The Exploration segment provides junior high school students and personnel with employment forecasts, job descriptions, training programs and requirements, and community career information resources based upon initial student interest areas and related career clusters. The Preparation segment, based upon refined student interests and concentrated cluster studies, provides senior high school students and personnel with employment forecasts, job descriptions, training programs and requirements, and the community career information resources, and adds the financial aid program information and part-time and full-time job availability. During the Specialization segment, which commences with the enrollment of the student in the community college, student profile, interest, and achievement data is collected and used to match student interests, needs and progress toward a career goal with financial aid programs, part-time jobs, training programs and requirements, and community career information resources. Upon the student's program completion or termination the Continuing Education/ Employment segment begins. During this segment the ICEPP will provide lifetime placement information for former students, achievement data for employers, follow-up requests and reports, plus supplemental, new career, re-training, re-employment services as well as information on "enrichment programs" or personal development/interest programs.

The cross-referenced career information files are organized into related clusters; users can access one or all files or any combination of desired items. The interest survey for pre-college students can be used to forecast career enrollment projections. The student interest survey and the enrolled student record both provide a means for accessing of information by the student and accessing of the student from the non-student files. Common codes are utilized for job titles, major identification and program enrollment. Students can access the job-bank and also can be accessed by job title, major codes, work interest and prior work experience. The job-bank has a reference control which allows the employer to list a particular job through an individual faculty member or campus office, the placement officer or to all students with a particular job-related major or interest. By aligning a number of requirements for the job with characteristics contained in the student record, employers can utilize competency matching techniques. The follow-up survey for both former students and their employers can be merged with the student record. Both surveys provide for access to other data files. The total student record is created by merging the pre-enrolled student interest survey, the enrolled student record and the follow-up surveys. The total record thus makes it possible to "track" the changes or pattern in the student's interest, achievement and career record and draw together the four linear segments.

The career information component is designed to support the guidance function of making the student more aware of career opportunities and requirements and in the activity of self-assessment of his abilities in light of the requirements for a specified career. Through the cluster identification and a distinction between 2-year and 4-year training programs, a specific career interest is broadened to similar or related careers which are clustered by job similarity and laddered by entry-level skills/achievements/aptitudes. The expectation is that the student will make a better career choice in terms of his self-assessment. Career information and job-bank listings are either supplied or verified by local employers. In exchange for this data and their part in the follow-up, employers have an active opportunity to affect the content of the training programs, to "tell their own story" to present students (potential employees), and to interview job candidates who have completed the required prerequisite training and are accessed by a job listing. Part-time positions afford students co-operative training opportunities and insight into actual work conditions; the employer benefits from a student more committed to the particular job field; part-time employment becomes a more meaningful source of full-time employees.

Instructional program forecasting and planning can be based upon an expanded framework which accounts for relationships between employment forecast - jobs available; training programs - slots available; student interest - potential enrollment; student enrollment - number completing; placement - number remaining in position (career) and adequacy of training.

## PHASE 1 PILOT SYSTEM

The pilot phase of the ICEPP project is currently being implemented and tested at Clark College, Vancouver, and Lower Columbia College, Longview, Washington. The pilot phase information processing system utilizes the IBM 360 Model 30 DOS System located on the Clark College campus. The data base upon which the system relies consists of ten integrated data files. These are:

Student Information File - A detailed file of personal information such as name, address, age, testing records, work experience, and academic records; as well as a continuous inventory of career cluster and specialization interests, program enrollment and educational intent (identifying anticipated level and school.) During this pilot phase, junior and senior high school will not be "tracked" as to career field interest area as will be the case during the next phase. By collecting interest data from the student during "exploration" and "preparation" segments of the continuum of career awareness, the student information file will have history data relating to the sequence of interest areas available for use when the student enters college.

Institutional Code File - A file of codes and indices with associated descriptors used by the college to codify items in the ICEPP files.

Employment Forecast File - A file of cluster and specific job outlooks as compiled from national, regional, state, and local surveys, projections, and local specific employer needs. Each job category contains general and local long-range and short-range needs.

Training Programs and Requirements - A detailed file of training programs available as related to specific jobs identified in files (2) and (3), above. Included are entrance and program requirements, costs of the program, length of the program, how, when, and where to apply.

Financial Aid Program File - A file containing data on financial aid programs available to students categorized by cluster area, specific job code, and student need. Includes grants, loans, work-study programs, scholarships, how, when, and where to apply.

Jobs Available File - A detailed file on part-time and full-time jobs available to students exiting from high school enrolled in or completing college programs. Jobs are specified by cluster and job title with requirements, work schedule, wages, and by category (work-study, co-op training, temporary, etc.) with data on how, where, when to apply.

Job Description and Requirement File - A detailed file containing general job descriptions and entry level requirements, supplemented with specific local job descriptions. Included in the file are duty descriptions, work environments, skills and educational levels required.

Community Resources File - A file of community career exploration resources available to students, including films, speakers, visitations, persons to contact and information services by cluster and specific career code.

Job Title File - A file of job titles by cluster and specific job title. The file provides a cross-reference to WICHE (Western Interstate Commission of Higher Education ) Cluster, WICHE Specific, and DOT (Dictionary of Occupational Titles) codes. WICHE codes are based upon the WICHE Taxonomy of Instructional Programs that relates a unique numeric index to a unique job title. Each code is aggregated at the "intent" and "effort" level such that the first two digits of the code identify the cluster area and the intent, four-year or less-than-four-year programs, while the last three digits determine the specific career field. DOT codes additionally provide access to information on worker traits and skills required for a given job and relate to Washington State Employment Security job listing identifiers.

Follow-up File - A detailed file on response data solicited from terminated and/or completed students and their employers. File entries include data relative to job placement, performance, and student interest in additional training.

The first or pilot phase of the ICEPP project can be visualized as a batch-process information retrieval system that serves the student and the college initially when the student prepares to enroll in the college, subsequently while the student is pursuing a course of study, and finally when the student completes or terminates a program at the college.

When the student enrolls he is offered manpower forecasts, job descriptions, job requirements about information relevant to his interest areas, as well as related areas. ICEPP files are accessed using the WICHE cluster and specific code available from the student's application for enrollment. From the application form and data records supplied from high school, other colleges, and test scores,

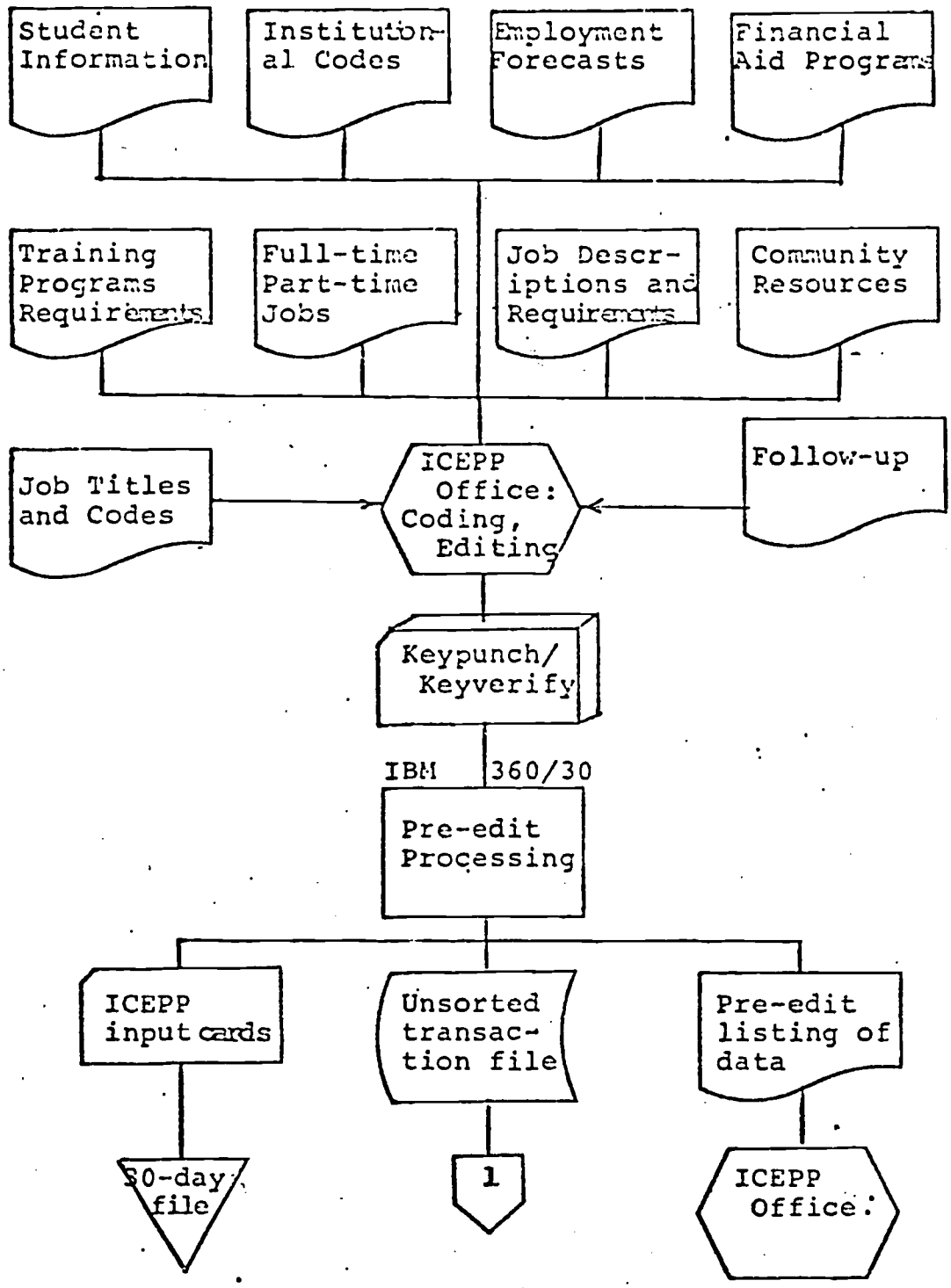
a student record is constructed and placed in the Student Information File. The SIF is updated quarterly as the student progresses through a program of study with student interest, work experience, financial needs, and training program progress.

During the time that he is enrolled in a curriculum, "matches" between student profile data and data from other files in the system are effected. By correlating such items as financial need with financial aid data, or part-time employment data, the student can avail himself of resources that may assist his progress through a training program and help gain experience related to his chosen career field. By matching jobs to interest, enrollment, progress and skills part-time employment is seen as providing work experience, financial assistance and an "exploration" opportunity wherein the student can better assess his career interests and aptitudes.

Also, during the period of enrollment, high schools receive follow-up data on the progress of their students who have enrolled in the college, employers receive information relevant to individual students in training programs, their skills and interests in part-time and permanent employment.

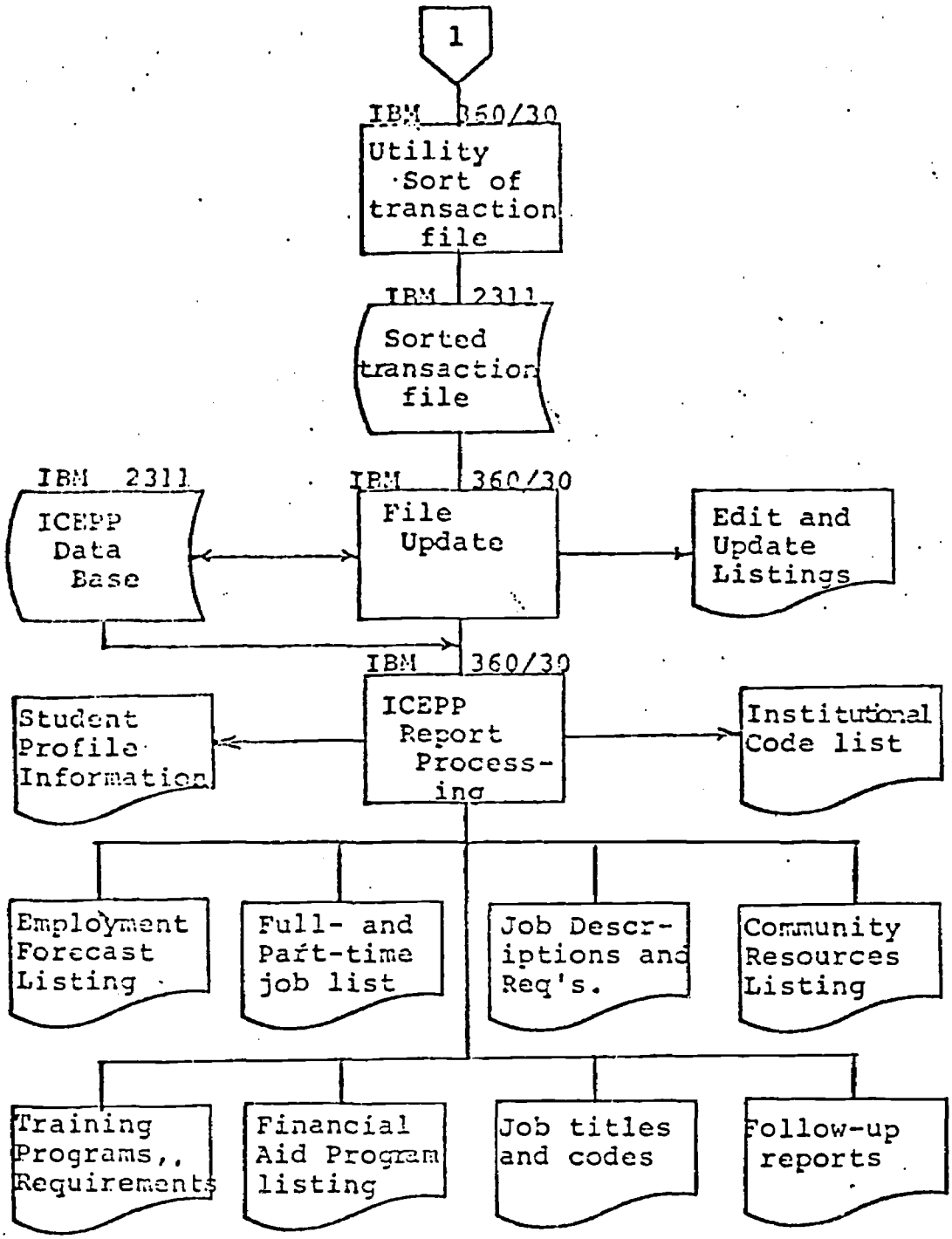
When the student terminates or completes a program of study, the placement services of the college, supported by the ICEPP information processing system, are available to help him find employment in his career field, and/or help him find further training in order to enhance already-acquired skills. Employers receive information on students who are graduating or terminating, students receive information on available jobs, and the college begins to solicit periodic evaluations and follow-up data from both student and employer.

Figures 1 and 2 illustrate the processing of the inputs and outputs of the phase 1 project. Output reports and listings are produced on reproducible masters that can be used to generate multiple copies for mass circulation to students, faculty, counselors, employers, high schools, and other parties. Input and output documents are kept in the ICEPP office repository.




The ICEPP Input Processing

Figure 1




(Reports and listings can be produced on a scheduled basis or on demand, selectively or grouped)

The ICEPP Update and Reporting

Figure 2

## PHASE 2 STATEWIDE MODEL

The conceptual goals and objectives of Phase 2 are essentially the same as those of Phase 1. The main differences lie in the configuration and capabilities of the information processing system and data base and the number of colleges served by that system.

In the conventional, batch-processing environment of the Phase 1 ICEPP system, the processing of reports is the end result of a series of sequential processes that edit input transaction batches, update master files, and produce the output. Reports are printed, filed in the ICEPP office, and disseminated on schedule and/or request. Several shortcomings of this methodology arise to diminish the effectiveness of the system as a tool in career planning. First, response time is relatively slow when a request for a particular report item is initiated. Off-campus users of the system such as high schools, employers, and other agencies are dependent upon mail-service or messenger. During peak advising and counseling periods, wide variety in requests tend to degrade the level of service to users. Of particular interest to the career-minded student is the opportunity to "browse" through sets of information on careers, training programs, and other resources. The Phase 1 batch system inhibits this practice by requiring either multiple sets of all outputs of the ICEPP distributed around campus and community, or, requiring that all students and interested persons go to the ICEPP office, guidance center or placement office.

In order to alleviate most of the shortcomings of the Phase 1 batch system, the Phase 2 Statewide Model calls for a "data base/data communications" information processing system environment that allows and supports the standard terminal applications of message switching, broadcasting, inquiry, data collection, conversational data entry, and order entry. The hardware/software configuration will provide batch, inquiry, and real-time modes of processing and will specifically support:

(1) a telecommunication/time-sharing network consisting of a variety of terminal devices,

(2) concurrent management of multiple tasks initiated remotely as well as batched tasks,

(3) continuous operation of system components and facilities,

(4) data base/data communication system,

(5) remote job processing to and from other host computer systems.

The Phase 2 system design will include hardware and software facilities that provide a multi-tasking environment capable of:

(1) retrieving information from the data base that is identified by a small amount of keyed data input from a remote terminal,

(2) entering and editing data from terminals and in batch mode to update the data base,

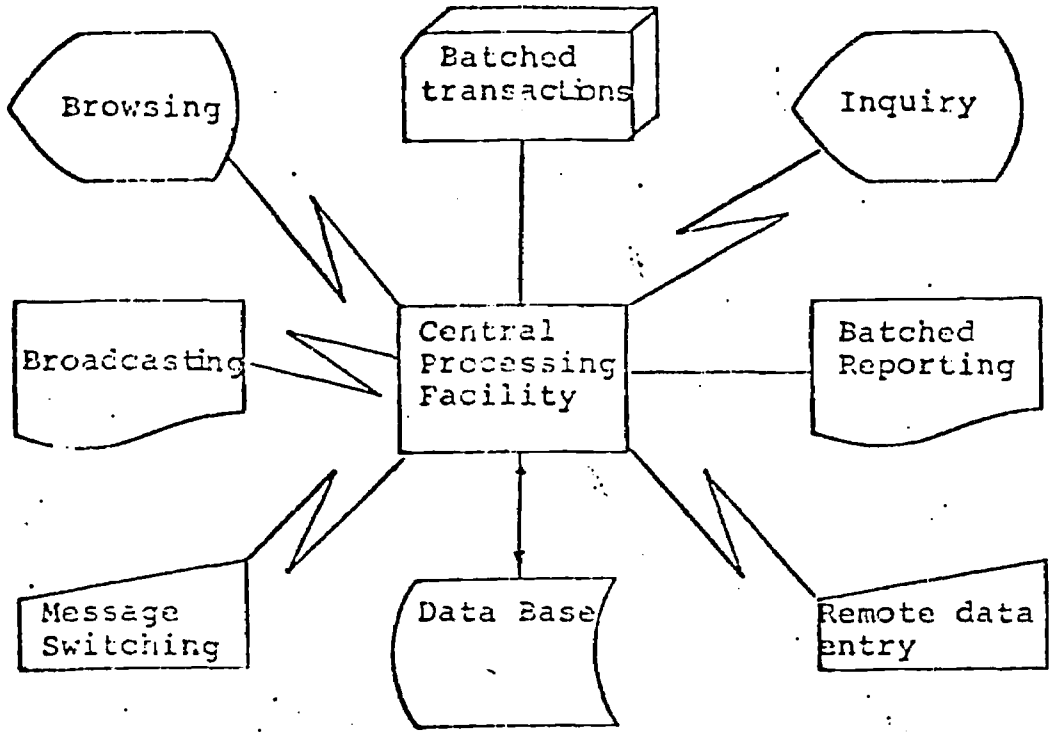
(3) routing and queuing for later routing information from any valid terminal to one or more other terminals,

(4) distribution of data base information to one or more terminals, triggered by commands or data entered at a terminal,

(5) updating and reporting from the data base in batch processing mode.

The phase 2 system interactive mode will enable the student to utilize a "quest" program that will allow him to exercise career selection skills through personal assessment of his interests and current and projected skills. Through a series of questions related to his interests and abilities that are framed within the parameters of his previous achievement and experience record, the student can identify possible career choices and then directly access the related information he desires.

The system features necessary to fulfill the requirements of the Phase 2 ICEPP Model is described schematically in Figure 3. In order to facilitate the exchange of information on a regional as well as local basis, the information processing system of the Phase 2 ICEPP will support community colleges and high schools of the state on a regional basis. Each regional grouping will consist of four to six colleges, depending upon geographic and demographic considerations. Benefits what accrue through the regional concept will enhance the efficient utilization of ICEPP resources, and will serve as the foundation for cooperative development of other community college systems with the state.




The ICEPP Data Base/Data Communication System

Figure 3

## SUMMARY

The information retrieval based career placement project described herein is a catalyst to understanding and facilitating the relationships between the inputs, processes, and outputs of community college educational programs.

The availability of an information processing system such as the one implicit in the ICEPP provides timely, accurate information upon which to base decisions, thereby insuring fewer misguided students, fewer misinformed counselors/advisors, and fewer costly failures and restarts. The anticipated outcome will be greater efficiency and effectiveness in career planning and programming for students in the community colleges of Washington State.