Indiana University
Purdue University
Indianapolis

Testing Center Annual Report
1997

Measurement and Evaluation Services for Students, Faculty, Administrators, and Researchers

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Section I: Introduction and Executive Summary

Organization, Mission, Vision, Values, and Goals

The Testing Center is a component of the Office of the Vice Chancellor for Planning and Institutional Improvement (PAII). The mission of PAII is to integrate the functions of institutional planning, implementation, and evaluation in ways that will continuously improve IUPUI. Figure 1 below shows the organizational structure and mission areas of the Testing Center.

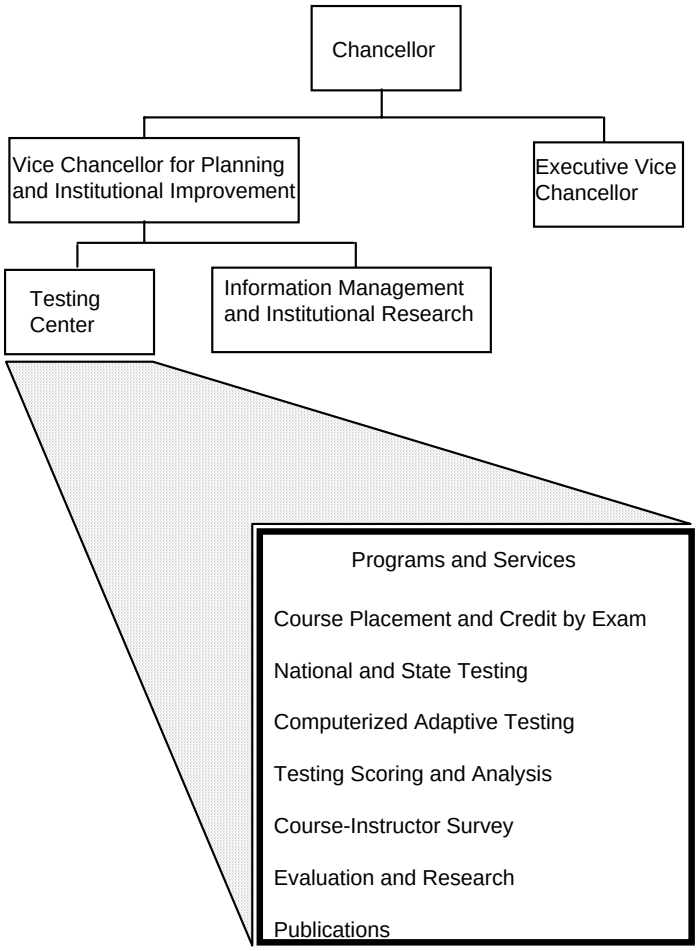

Figure 1. Organization and Mission Areas of the Testing Center

The Testing Center's mission is to provide assessment and evaluation support through the collection and processing of test data, creation of assessment instruments, and the lending of measurement expertise to constituencies throughout the campus community. Our vision is to provide integrated assessment and evaluation information in ways that will continuously improve IUPUI.

All Testing Center activities incorporate the following values:

- Work meets the needs of the sponsoring academic unit or individual.
- Results are thoroughly analyzed and explained.
- Work is timely, accurate, and reliable.
- Information is readily available to those who need it, secure from those who do not.

Our staff is committed to the following work ideals:
- Professionalism
- Responsiveness
- Thoroughness
- Accessibility
- Friendliness
- Sensitivity to data confidentiality issues

The IUPUI Testing Center's goals are manifested through its seven programs which are aligned with the Testing Center's operational objectives, the goals of the Division of Planning and Institutional Improvement, and the aspirations and goals of IUPUI (see bold letters and numerals for links with IUPUI aspirations and goals. The Center's goals include:

1. Working with academic units to facilitate initial student assessment for appropriate course placements and credits by examination (**L, 4**).

2. Providing a service and location where students can take independent studies exams as well as state and nationally-administered tests (**L, 1**).

3. Developing state-of-the-art assessment technology in support of tracking student achievement (**REX, 8; ABP, 3**).

4. Providing imaging and optical scanning to improve assessment practices on campus and facilitate the work of enrollment management units (**C/C, 3; L, 5**).

5. Providing course instructor surveys to assess student perceptions of faculty instruction (**L, 7**).

6. Providing general consultation on testing and assessment in support of improvement efforts and faculty generated research (**L, 5; REX, 1**).

7. Disseminating the results of applied research conducted at the Testing Center (**L, 4; REX, 8**)

We continually strive to make each program more complete, up-to-date, and responsive to the diverse needs of the University community.

Testing Center Advisory Committee

The Testing Center Advisory Committee consists of representatives from the departments of English (Dr. Susanmarie Harrington), Mathematics (Dr. Jeffrey Watt), the School of Education (Ms. Mary Wolting), the Admissions Office (Dr. Alan Crist), and the Undergraduate Education Center (Dr. Barbara Metzner). Its purpose is to help guide Testing Center policies and procedures, and to act as a vehicle for disseminating information throughout the IUPUI campus. The committee met twice during 1997 and gave two presentations to the Council on Undergraduate Learning.

Overview

Two major events shaped the character of this year. First, the Testing Center, with the financial backing of an Enrollment Management Consortium, purchased an Opscan 5000i and initiated an image scanning service. This new service will permit customers to optically translate written information into ASCII databases. Moreover, clients will now be able to store paper-based documents in electronic form and retrieve the information according to a number of classifying strategies. The vision is that this technology, in addition to addressing the needs of various service units on campus, can also be applied to the methodology of outcomes assessment.

This purchase was the culmination of a two year search for the appropriate technology and involved the cooperation of a number of diverse units on campus. More about this exciting new development is provided later on in this report. The Scanning Office is located in the Union Building, G015 and is open from 8:00 a.m. to 8:00 p.m. Monday through Friday and 8:00 a.m. through 5:00 p.m. on Saturday (except University holidays). Parking spaces for drop-off and pick-up are located in the south parking lot of the Union Building just adjacent to Ball Residence. A secure night drop box is available for after-hours drop-off. In cooperation with the Offices of Printing Services, a twice-daily courier service is now available to pick up and deliver scanned documents throughout the campus.

The second major development centered around the expansion of our off-campus high school testing program (i.e., the so-called "Pike Project"). The Testing Center obtained a competitive Strategic Directions Charter grant to expand this effort to an additional six off-campus sites. All placement tests can now be administered remotely and the software program driving the tests has garnered national attention.

We hope you enjoy taking a look at our annual report. A number of individuals have invested a significant amount of time to make this document interesting and readable. If you have suggestions or comments, please do not hesitate to contact us. E-mail regarding this document should be directed to: MShermis@IUPUI.Edu.

Section II: Reports From Program Areas

Placement Testing

Changes Made in Placement Testing Procedures

This section describes the changes made in placement testing procedures for the IUPUI-sponsored placement tests, including test development, administration, scoring, and reporting processes. Placement tests were developed for the purpose of matching students with instruction appropriate to their academic preparation in English, mathematics, and reading. Although the numbers of students taking the respective IUPUI placement tests has remained relatively unchanged[1] in comparison with the 1996 data, incremental improvements have continued to be made at the Testing Center. In addition to new staff hires, several significant changes were implemented to facilitate the efficiency, quality and economy of placement testing procedures. Specifically, the major changes in placement testing included a revision

[1] The total numbers of students who sat for the respective IUPUI placement tests in 1997 are as follows: English: 5987; Mathematics: 6824; Reading: 6031.

of test directions for the computerized reading placement test (RD100) and English placement test, a pilot implementation of computerized input for the English written exam, improvement in predictive validity of the computerized adaptive test (CAT) in mathematics, upgrade of the FoxPro placement test scheduling application, revision of the placement testing brochure, and the initial beta testing of the revamped IUTS application. A brief description of the major changes is presented in turn.

Computerized Reading Placement Test

Although there was no widespread dissatisfaction among students with the test directions for the reading placement test, modification of the test directions was undertaken to improve both clarity and presentation of the instructions, thereby improving the test administration process. As discussed later in this report, the exit surveys show a significant improvement in student perception of the clarity of test directions for the reading exam.

As indicated in previous annual reports, the vision for the reading test was that it would perform as a placement test for all students, and would also serve as a diagnostic procedure for those who were recommended for developmental coursework. The current IUPUI computerized reading test consists of three parts namely, comprehension, reading rate, and three types of vocabulary tests (Word Attack, Words in Context, and Words in Isolation). This test has been evaluated on several psychometric dimensions, and has been demonstrated to have good reliability and validity (Shermis, Wolting, & Lombard, 1996)[2]. Development of the computerized adaptive version of the reading test is currently underway and should be completed later this year. Previous pilot studies on the reading test designed to work in a CAT environment have yielded promising results.

Computerized Adaptive Testing (CAT) in Mathematics

As reported in the past two years' annual reports for the Testing Center, the choice to convert the conventional computerized mathematics placement test to an adaptive procedure was made mainly to achieve increased efficiency in the use of both students' time and test items. The implementation of CAT procedures at the Microcomputer Testing Facility has offered a valuable demonstration of how incoming students can be better served through use of computer technology and advanced measurement techniques such as Item Response Theory (IRT). Furthermore, the computerized adaptive mathematics placement test has facilitated the needed improvements in the observed correlation coefficients between the placement test scores and the mathematics outcome measures. The placement validity coefficient for the adaptive mathematics test, calculated on the relationship between the placement test results and scores on a common final, averaged $\underline{r} = .30$, which makes it a very useful predictor and a significant improvement over last year. Most recently, the Testing Center, in conjunction with the Department of Mathematical Sciences, implemented some changes that should improve the predictive validity of the mathematics exam, especially for higher level courses. The changes included revision of the current mathematics problems based on an examination of the content validity or curricular relevance of the current placement exam, initial modification of item bank characteristics, and improved reporting of test results to facilitate the academic counseling process.

[2] Shermis, M. D., Wolting, M., & Lombard, D. (1996). Development of a computerized test for college reading placement. Journal of Developmental Education, 20(2), 18-24.

The next round of changes to be implemented by summer of 1998 will include revision of cutoff scores, modification of the three-parameter score conversion curve, implementation of minitests or testlets, use of "cheat sheets" for trigonometry and calculus-type items, reporting of subscores for the respective content areas in mathematics, and calibration of new math items to improve the curricular relevance and/or content representativeness of the adaptive mathematics item bank.

Since the switch-over to CAT, the Testing Center has been collecting information to evaluate the effectiveness of computerized adaptive testing in mathematics. As reported in the Annual Placement Testing Validity Report for 1996/1997, results from the computerized adaptive mathematics placement test are quite promising. So far, it seems the current adaptive mathematics test is working properly (for a majority of students) in that the new testing procedure is relatively efficient and yields higher correlation coefficients with the mathematics outcome measures.

English Placement Test

The English written assessment is a writing sample of approximately 500 words generated in response to a prompt. The response not only asks the examinee to address a topic, but also to defend the answer in a thoughtful way. The essay is typically scored by at least two raters from the English Department, and a placement recommendation is made. While the rating scale used by the department has sufficient variance for a good validity assessment, the fact that the outcome measure is based on grades tends to underestimate the true relationship between the placement test scores and final course grade. The placement validity coefficient for a sample drawn from Fall 1996 averaged in the mid-teens, but is still useful for placement purposes. The department is currently investigating alternative outcome measures. For instance, the department is evaluating the possibility of using portfolios as an alternative for one writing sample. In the interim, the English department has approved the use of typing (rather than writing) exam responses as a way to accommodate students' preferences and writing habits (Harrington, Shermis, & Rollins, 1997). Recently, the test directions for the English placement test were revised to improve the clarity, accuracy, and presentation of the instructions.

Software Upgrades in the Microcomputer Testing Facility

Most recently, the FoxPro scheduling application was upgraded to allow a multi-user capability which has removed the impediment in the current transfer of placement test scheduling responsibilities from the Testing Center to the new enrollment/orientation office. Furthermore, the Testing Center is currently "beta testing" a new version of the IU Test Reporting System (IUTS) that will accommodate a more flexible approach to the handling of student performance data. We eventually hope to offer academic departments the ability to incorporate information from multiple predictors rather than just one test score as they formulate their decision models for academic placement.

A few other software developments are worth mentioning. During Spring 1998, the Registrar's Office will be testing a new "barring" system that will permit departments to enforce course and placement testing pre-requisites. That is, students will not be permitted to enroll in courses for which they lack the minimum requirements without some sort of an override. The creation of this new technology is an outgrowth of compliance problems which began a few years ago when a counselor's signature was no longer required for course registration.

Validity Study of IUPUI Placement Test Scores

Annual reporting of placement test validity continues to improve, and suggestions for making further improvements in validity have been advanced. Specifically, by implementing the computerized adaptive math test, average validity coefficients (i.e., relationship between math placement test results and scores on a common final) have improved from .23 (1996) to .30 (1997). With the new computerized Indiana Purdue Reading Test, average validity coefficients have increased from .14 (1996) to .22 (1997). Similarly, there has been a modest improvement from near-zero correlations (in 1996) to mid-teens (1997) for the English placement test. One improvement in this year's Placement Testing Validity report has been the inclusion of probability graphs for academic counselors. Figure 2, for example, presents probability estimates based on specific cutoffs on the outcome measures when applied to particular mathematics compliant groups. Specifically, Figure 2 illustrates that a student with a mathematics placement test score of 14 is associated with an estimated probability of a B or higher grade of about .67. The corresponding C or higher cutoff score is 7 (probability of success is about .68). (Note, however, when a grade of A- or higher is employed, scores between 7 and 14 are associated with estimated probabilities of success of less than .25.) Overall, Figure 2 shows that the estimated probability of success increases as placement test scores increase. In other words, the higher the placement test score, the greater the probability of success in mathematics.

Note that the placement validity coefficients for the computerized adaptive mathematics test, calculated on the relationship between the placement test scores and scores on a common final mathematics exam, averaged .30, which reflects a very useful predictor and a significant improvement over last year.

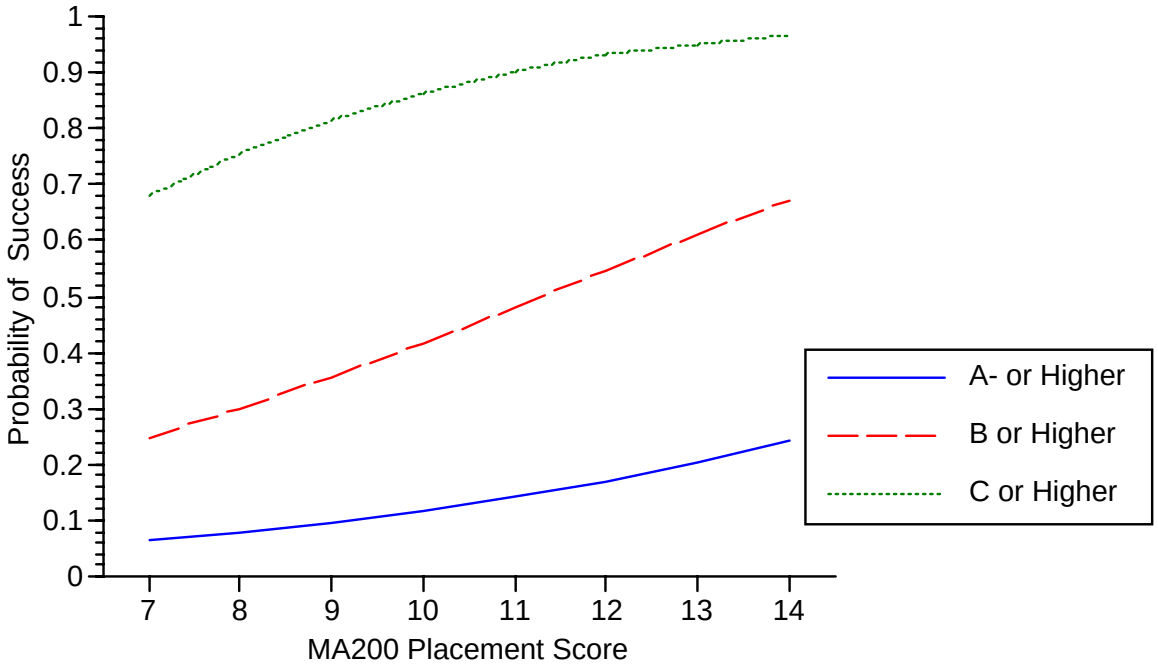

Figure 2. Estimated Probability of Success in Mathematics 001: A- or Higher, B or Higher, and C or Higher.

For further details on the annual placement validity study, see Mzumara, Shermis, Dossinger, & Olson (1997). A copy of this report can be obtained at the IUPUI Testing Center web site at http://assessment.iupui.edu/report/report.html/.

Training of Work-Study Employees

On-the-job training and formal training sessions continue to be provided to the work-study students in order to facilitate professionalism, thoroughness, and efficiency among the Microcomputer Testing Center (MTF) staff. A variety of topics (e.g., new placement testing procedures, test registration or scheduling of students for testing, customer service, generation of placement test reports, test security, confidentiality of information, Testing Center emergency procedures, teamwork, work ethics, etc.) are usually covered during formal training sessions conducted about twice per month. The topics are selected on the basis of the needs of the Testing Center proctors and receptionists and/or on the basis of a placement testing exit survey conducted at the conclusion of placement test administration. The MTF survey was designed to solicit information such as expertise and disposition of the test proctors, examinees' perceptions of the testing situation, examinees' computing background, and so on. In addition to providing some suggestions for training topics, information from the MTF exit survey is used internally to monitor proctor performance and to solicits suggestions that might improve the examinees' test experience.

Furthermore, bi-weekly group meetings of work-study employees have continued to offer the work-study staff an opportunity to present and discuss their concerns and/or suggestions for the improvement of placement testing operations at the Testing Center.

MTF Satisfaction Survey

The placement testing exit surveys continue to indicate very high satisfaction rates among students. Specifically, for the past two consecutive years, over 90% of students have reported being greatly satisfied with respect to both clarity and presentation of test directions for English, reading, and math placement tests, respectively. Approximately 97% of the 1996 and 1997 survey respondents reported that using computers to take placement exams was alright or very easy. Similarly, for the past two years, over 97% of the respondents have reported feeling quite at ease in taking computerized placement tests. Furthermore, about 90% or more students during the same time period felt that MTF staff were courteous or very courteous, and exhibited sufficient or quite extensive knowledge of computers. And a majority of students continue to perceive the respective placement tests as accurate measures of knowledge.

Despite the difference in response rates (3515 for the 1996 sample vs. 2923 "valid cases" for 1997), the overall students' computerized testing experiences seem to suggest that the IUPUI Placement Testing program is very pleasant, less confusing, and more "user friendly" than comparable experience with paper-and-pencil tests. Similarly, overall results of the student phone survey indicate a very favorable or positive disposition toward the placement test scheduling process. (Further details regarding a breakdown of the respective responses for the student satisfaction surveys are presented in the annual reports posted on the Testing Center web site: http://assessment.iupui.edu/report/report.html).

Figure 3 shows students' responses regarding the clarity of test directions. Overall, approximately 90% of the respondents reported that the directions for the English and reading exams, respectively, were

quite understandable or overly simple. Approximately 88.8% of the students reported similarly for mathematics exams. Perhaps the periodic addition of ongoing research directions to the existing mathematics instructions may have contributed to the slightly lower percentage rate observed for the mathematics exam. Otherwise, a significant majority of the students reported that the three placement exams had very clear test directions.

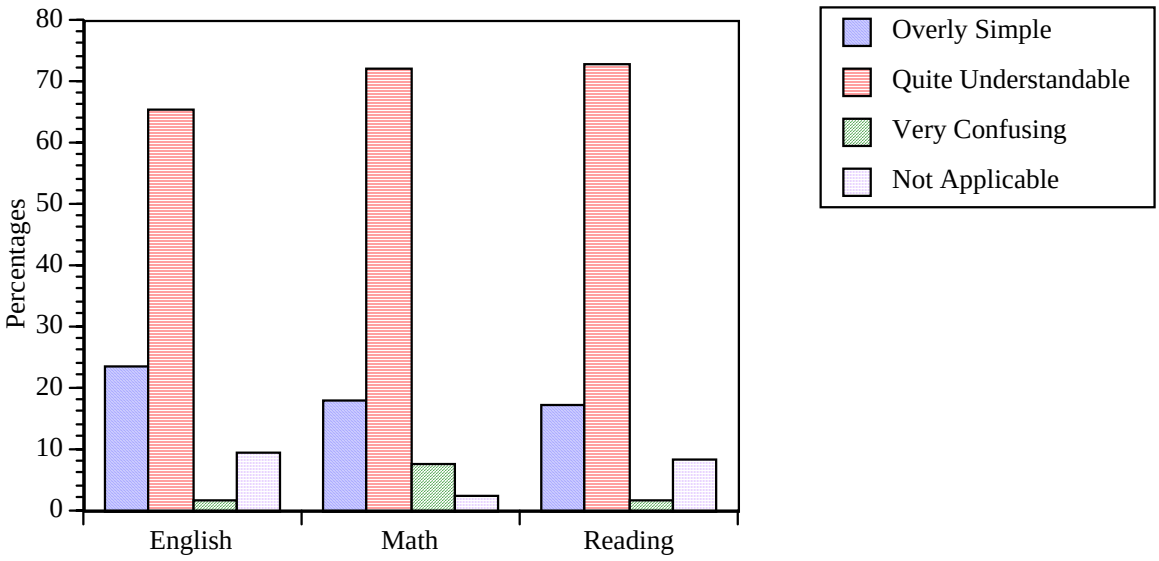

Figure 3. Student Perception of Placement Test Directions (Note: "Not Applicable" means that students did not take the respective placement test).

A somewhat remarkable finding was that approximately 56% of the students found the reading exam to be too demanding, whereas about 43% felt that the reading test was an accurate measure of knowledge. In contrast, only 28% of the respondents felt that the mathematics exam was too demanding; and 65% reported that the mathematics test was an accurate measure of knowledge. For the English placement exam, 11% of the students perceived the test to be too demanding; whereas 76% of the respondents said the exam was a valuable learning experience. Figure 4 shows a summary of the students' perceptions regarding the accuracy of the IUPUI placement tests in assessing knowledge in the respective content areas.

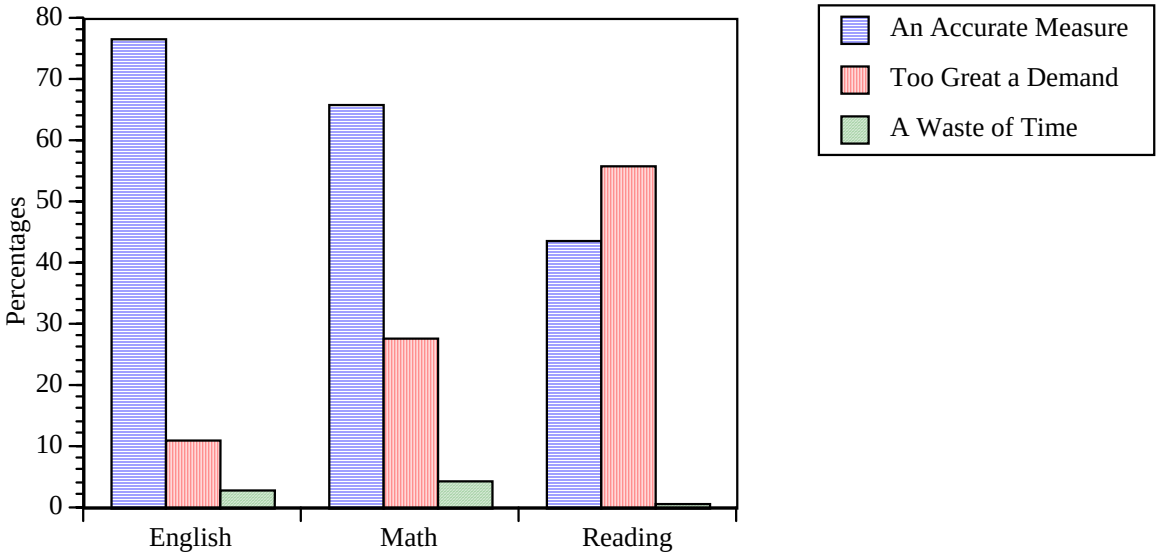

Figure 4. Student Perception of the Accuracy of Placement Tests.

Regarding students' experience in using computers, the present survey results suggest that about 2% of the respondents had no computer experience at all. In contrast, approximately 31% of the 1997 exit survey respondents reported having a great deal of computer-related experience. Despite the difference in response rates, these particular findings have remained unchanged from the survey results of the past two years. With respect to facility or ease in using computers, nearly 97% of the survey respondents reported that using computers was alright or very easy. In contrast, only approximately 3% of the respondents reported that use of computers was very confusing. Again, the present findings are almost identical to those reported in the 1996 annual report, which suggests no remarkable change in the computer-use characteristics of the student population from year to year. A majority of students (97.1%) reported feeling quite at ease in taking the computerized tests. Although a majority of students (84.4%) reported having adequate or a great deal of knowledge of computers, only a small proportion of students (3.4%) reported feeling very confused with computerized testing. The development and implementation of improved sets of computerized instructions (e.g., the revised test directions for English, reading, and adaptive mathematics as currently implemented at MTF) seems to make the students' testing experience pleasant, less confusing, and "user friendly". In addition, thorough training of our test proctors in test administration procedures as well as proctors' vigilance or alertness during test administration, helps to minimize or eliminate unnecessary examinee confusion.

The Testing Center is in a continuous process of improving the efficiency and effectiveness of the placement testing operations, partly through the implementation of computerized adaptive testing procedures. The placement testing exit survey, therefore, provides valuable information that facilitates this improvement process and thereby the accomplishment of the goals and mission of the Testing Center.

Student Phone Survey

In addition to the placement testing exit survey, the Testing Center administers a phone survey to students who call to register for placement tests. Placement testing reservations can be made Monday through Friday from 8:00 a.m. to 5:00 p.m. The phone survey was designed to obtain specific information pertaining to (a) how easy it is

for students to call the Testing Center for test registration purposes, (b) what (if any) problems are encountered by students in calling the Testing Center, (c) how long it takes the receptionist to register the student, (d), the reason for a lengthy phone conversation (if applicable), (e) number of students requesting rescheduling, and (f) students' reasons for rescheduling the placement test(s) (if applicable).

A total of 3093 respondents participated in the phone survey conducted between January and December 1997. The overall results of the phone survey indicate a favorable or positive disposition toward the placement test scheduling process. A breakdown of the respective responses for the phone survey are presented in Table A.1 in Appendix A. Note that the current move to transfer the placement test scheduling responsibilities from the Testing Center to the new enrollment/orientation office should address and/or resolve the continued concerns regarding student problems with contacting the Testing Center for test reservations. The good news is that the new enrollment/orientation office provides relatively more resources (e.g., increased numbers of receptionists, telephone lines, upgraded scheduling software, etc.) that should facilitate quality improvement in the placement test scheduling process. Meanwhile, the Testing Center has forged ahead and removed impediments in the transfer of placement test scheduling responsibilities by upgrading the existing FoxPro scheduling application and provided appropriate training and leadership to the admission/orientation staff.

Scanning

Image Scanning

Over the past two years a consortium of enrollment management offices has been investigating the incorporation of image scanning as a technology that can serve students, faculty, and staff at IUPUI. Units that have been actively pursuing this interest include the Registrar, Bursar, Financial Aid, Admissions, the UEC, and the Testing Center. Image scanning technology differs from the older mark-sense reading machinery in that captured data can be archived as "pictures", translated, verified, and manipulated. For example, data from a hand-printed application form developed by the Enrollment Center could be scanned, processed, and uploaded to IUIS in one transaction. This technology can speed up the processing of vital information that is pertinent to the matriculation process.

Two additional benefits can be derived from image scanning technology. First, the various service units involved consume a significant amount of floor space that could be recovered by storing an image of the document on high capacity optical storage devices. Secondly, academic units have long desired this technology to help them accomplish their goals. For example, a number of departments have asked for the capability to store student comments from course evaluation forms. Currently these comments are either lost or require manual entry by departmental secretaries.

In November of last year, National Computing Systems (NCS) performed a needs analysis for the service units mentioned above. They also interviewed Integrated Technologies and Auxiliary Services since these units have a vested interest in coordinating and making available technology services. NCS concluded that the IUPUI campus had the capacity to support more than one imaging operation. For the enrollment management service units alone, it was projected that over 600,000 documents would be scanned annually.

Since no direct central administration money was available to fund a new operation, a consortium of investors was created to underwrite the activities associated with image scanning. The Consortium was set up so that members annually invest in scanning shares defined as the number of scanned images. For example, a unit that agrees to invest in 30,000 scanning shares will have a guaranteed capacity of 30,000 scanned images (i.e., usually documents) for the next fiscal year. The total share count is a function of the number of investor units and the capacity purchased by each unit. For example, if the total investment were 300,000 shares, then a unit that purchased 30,000 shares would have approximately 10% controlling interest in the Consortium. Members of the Consortium include the Bursar, Registrar, Financial Aid, Admissions, and the Testing Center. Excess capacity will be made available to the rest of the University community on a first come-first served basis.

Because of its experience in scanning technology, the Testing Center (TC) was designated as the financial and service manager for the Consortium. In this capacity, the role of the TC is to acquire hardware, software, and personnel to run the image scanning operation and to attend to the image scanning needs of the Consortium members. The Testing Center is authorized to make whatever reasonable and prudent fiscal or policy decisions it requires for the smooth operation of the business. Major expenditures or policy changes require majority approval by the shareholders.

Initial funding ($170,000) for this project arose out of capitalization money controlled by the offices of the Bursar and Registrar. This money is to be repaid on a quarterly basis at a rate of approximately $10,000 per quarter beginning the second quarter of fiscal year 1997-1998.

Image Scanning Services

The TC now offers image scanning services for units wishing to use this technology for archival and retrieval of ASCII formatted databases. The archived images and their ASCII records may be viewed from PCs using the NCS image retrieval software. Users can access the databases directly through the Image Scanning Server also located in the Testing Center. Security software lets users access databases only for which they are authorized.

The forms are scanned with the 5000i Image Scanner, processed through the Accra software system, stored on magnetic optical disks, and accessed by the client at a workstation. The system consists of the scanner, a workstation to process the documents through the Accra software system, two servers and the optical jukebox, all running on a Microsoft Windows NT network. Figure 5 shows the 5000I scanner and operator’s workstation.

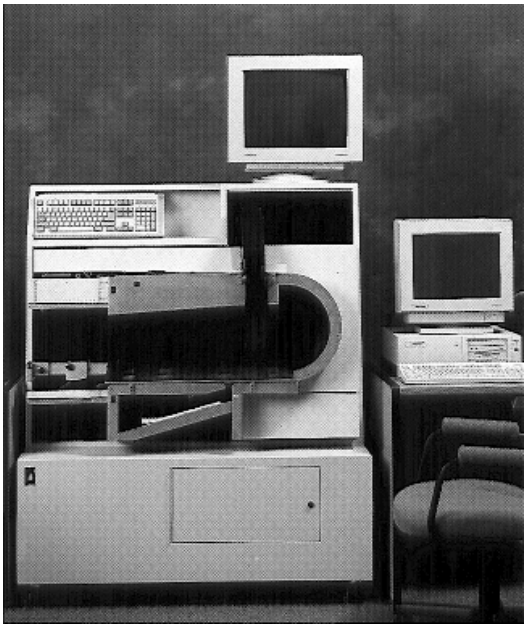

Figure 5. The NCS Opscan 5000i and Operator's Workstation

The software and machinery were delivered at the end of July, and became operational in early October. The delay in implementation centered around resolving problems of network configurations, software bugs, and hardware failure. National Computer System technicians were on-site to resolve the problems and to train the Image Scanning staff.

To date, the TC Image Scanning Office has designed a scanable form for the Financial Aid Office that will help in determining incoming students' financial aid status. We are currently designing a replacement for the Registrar's Schedule Adjustment form, so that it will process faster and with more accuracy through the Accra System. This will decrease storage space needs for the offices, due to the fact that more of their reports, documents and forms will be available as electronic archived images.

The TC Image Scanning has begun the process of electronically archiving the Bursar, Admissions, Registrar, and Financial Aid Offices' stored documents, and various departments/organizations (Psychology Department, Sigma Theta Tau International,) contracted for analysis of their documents. Figure 6 shows the number of documents scanned since October.

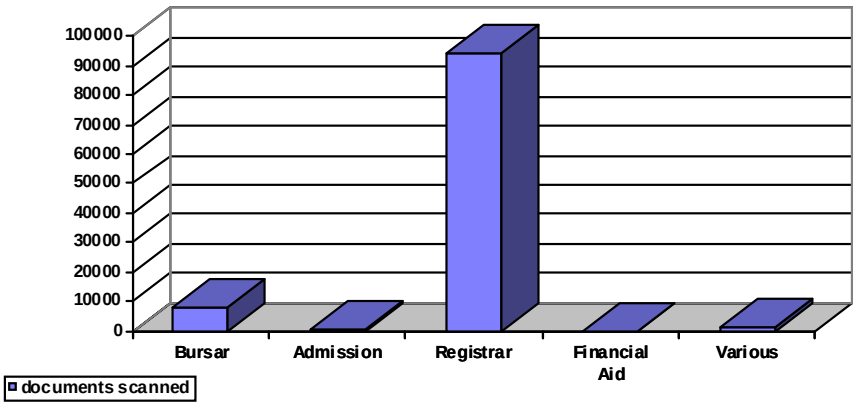

Figure 6. The Number of Forms Processed Through the Image Scanner

Optical Scanning

Scanning jobs that do not require the sophistication of imaging continue to be processed with optical scanners. The Testing Center supports two optical scanning machines, the NCS Opscan-5 and the NCS Opscan-3. Units are charged 15 cents per page for this service. For the processing of test information, optical scanning uses LXR•Test© software to process documents for our customers. The LXR*Test software and training is supported campus-wide by the Testing Center. Survey and non-test information can be processed using a variety of software packages. In 1997, 818 jobs were scanned for a total of 43,531 documents which compares favorably to the 27,055 sheets that were scanned in 1996 (Note: Scanning did not become an externally offered service until July 1996). These jobs generated approximately $6,529 in income. Figure 7 shows a breakdown of document volume by month for 1997 along with comparison data for the six months of operation in 1996. Information about image and optical scanning can be found at the IUPUI Testing Center web site at http://assessment.iupui.edu/testing/scanning.html/.

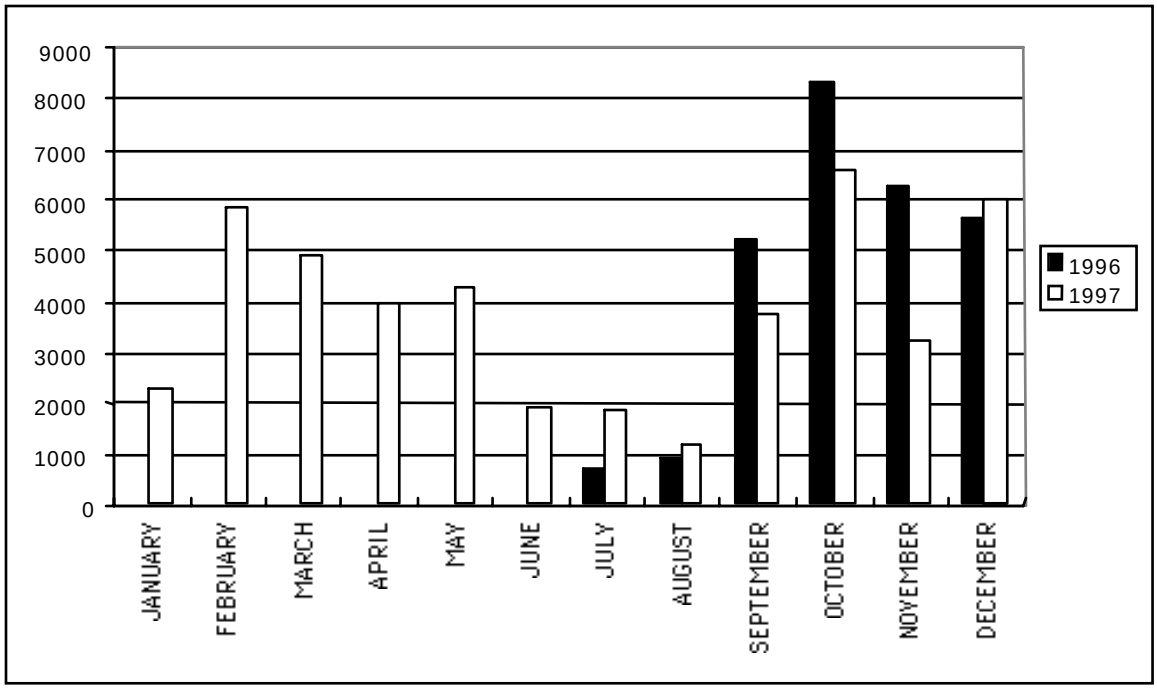

Figure 7. The Number of Forms Processed Through the Optical Scanner by Month for 1996-1997.

Course Evaluation

The Student Evaluation of Teaching (SET) program was originally developed in 1994, with the School of Public and Environmental Affairs (SPEA) as the inaugural client. Since that time, the course evaluation service has been offered campus-wide. In January 1997, a project was initiated with University Information Technology Services (UITS) to reprogram SET to be more efficient and to incorporate longitudinal tracking features.

The programming effort resulted in not only a faster system, but one that can now run off the network allowing multiple simultaneous users and greater security. The SET program will also read Microsoft Excel files into the database for creating new class sections. This will allow customers to easily create new course survey requests at a lower cost. While clients can select from a number of "standard" evaluation instruments, they can also opt to create customized forms more focused on their departmental needs. The Course Evaluation component of the External Testing operation produced approximately 64,240 scoresheets (42,426 in 1996--a 51% increase) this past year, with an annual income of $5,781. Of those, approximately 48,180 scoresheets (32,000 in 1996--a 50% increase) were scanned with an estimated income of $7,227. The Opscan-5 scanner was upgraded during the summer to increase the speed of processing.

Scan Forms Design

The Scanning Office of the Testing Center offers scoresheet design on a cost-recovery basis. This service permits faculty and staff to inexpensively design their own surveys and measurement instruments in a form that can be processed by optical scanners. This service was used by both academic and service units and generated approximately $6,500 in income.

External Testing

External Testing refers to the assessment activities conducted by the Testing Center that are not part of placement testing. Most of the activities (e.g., administering the institutional Scholastic Achievement Test or the Miller Analogies Test) are performed as a greater service to the University community, though some are conducted to facilitate the enrollment management process. More information about external testing including scheduled test dates can be found at the IUPUI Testing Center web site at http://assessment.iupui.edu/testing/external.html/.

National and State Testing

This component of external testing is generally performed on behalf of non-profit or commercial testing firms for either the testing of scholastic aptitude or for certification or licensing purposes. Over 8,000 students took exams under this program. Tests administered under this program include the following:

SAT 11 times

GMAT 2 times

LSAT 3 times

ACT 4 times

ACT-PEP 24 times

Praxis (PPST, NTE, Core Battery) 4 times

TOEFL 5 times

AMP 30 times

CLEP 11 times

MAT monthly

DANTES as needed

All of the tests administered on behalf of Educational Testing Services will become computerized by 1999. Though ETS is currently under exclusive contract with Sylvan Learning Centers to administer their computerized and computerized-adaptive tests, it is quite likely they will expand their contracts to colleges and universities within the next year or two. Our hope is to be able to participate in the expanded testing program.

Strong Interest Inventory Testing on the World Wide Web

In 1997, the IUPUI Testing Center tested 780 students for the School of Business and the Division of Continuing Studies for the Strong Interest Inventory (SII) and the Myers-Briggs Type Indicator (MBTI), a popular personality assessment often used in conjunction with vocational counseling. In the fall of 1997, Consulting Psychologists Press developed the SII and MBTI to be administered via the World Wide Web. Report payments can be made via fax (credit card) or U.S. mail (credit card or check). Once payment has been received, student results are sent to their counselor/professor via campus mail.

Several benefits will be derived by administering the tests via the World Wide Web. First, students can take the test from any location hooked up to the Internet. Secondly, students will not have to schedule an appointment over the phone, nor will they have to take time away from

their busy schedule to take this test on campus. Finally, this new option will permit the Testing Center to offer these options to the high school web testing program.

Independent Studies Testing

In 1994, the administration of independent studies exams was computerized and initiated in the MTF lab. The External Testing Program has continued to give the Independent Studies exam from IU as well as from other campuses in the MTF lab. In 1997, approximately 1,088 of these exams were administered. This operation generated $14,144 in income last year.

Note that students participating in the Independent Studies Testing program are administered an exit survey. Two questions from the survey are highlighted in this year's annual report. The first question solicits the age of the student. Though the majority of examinees reported themselves as being older than age 24(57%), a surprising number of individuals taking the tests were traditional college-aged students (43%). The breakdown of ages is summarized in Figure 8.

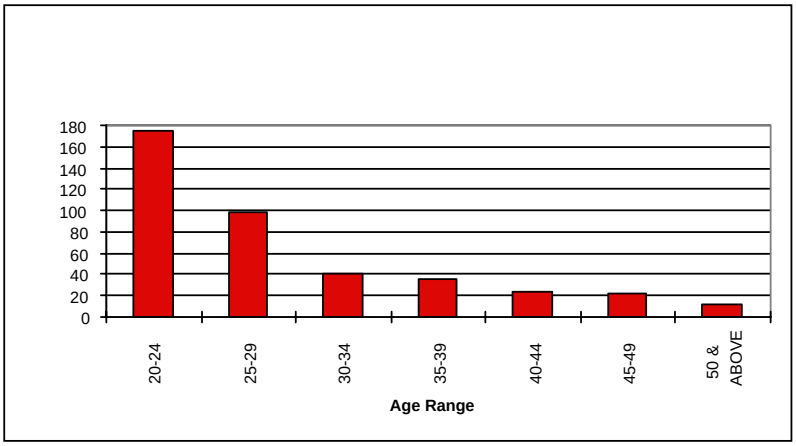

Figure 8. Age of Examinees Taking the Independent Studies Exam, (N= 1,088).

The second question highlighted in this year's report has to do with the level of friendliness with which the examinees were greeted at the Microcomputer Testing Facility. Eighty-nine percent of the examinees who responded to the statement, "I was greeted in a friendly manner", endorsed it with either "strongly agree" or "agree". Six percent were "neutral" about the statement and five percent reacted with "disagree" or "strongly disagree". While this is generally very positive, additional training will be directed to the lab proctors to ensure that even higher levels of satisfaction can be achieved on the "friendliness" dimension of the service. Figure 9 graphically summarizes the information on this dimension of service.

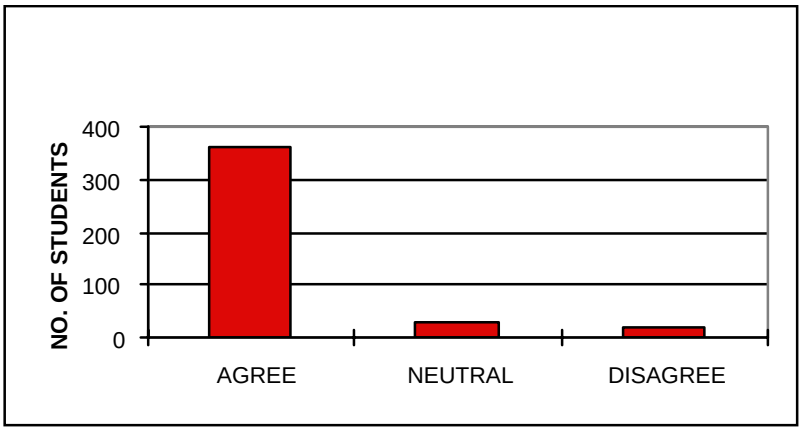

Figure 9. Percent Agreement with the Statement, "I was greeted in a friendly manner" (N= 1,088)

Development

Development refers to two components of Testing Center activity. One component focuses on test development and is staffed by two graduate student research assistants. The second component centers around the development of computer-based tests, supplemental multimedia, and data collection mechanisms. This section is supervised by one FTE programmer and work-study students. Both components are linked to the IUPUI goals of learning and collaboration.

Test Development

Efforts to improve upon test and data collection procedures were supported through a number of studies conducted in the Testing Center this year.

Computerized Adaptive Testing (CAT) in Mathematics

A study was conducted (Mzumara, Shermis, & Wimer, 1997) to determine if manipulating the starting ability level of an examinee to more closely match his/her high school math background produced better placements than having all students start at the same ability level. Known as the "screener study", the background questions were based on the work of Hsu & Shermis (1989)[3]. While no statistically significant differences were found, the math department asked that this technology be implemented since, at a minimum, counselors and advisors find that the background information is helpful in determining the pace at which the student is likely to learn.

Adaptive Reading Test

The Testing Center is currently creating a version of the Indiana-Purdue Reading Test that is both web active and adaptive in nature. As an adaptive test, the Testing Center will be able to offer the same or better assessment of a student's ability level than using a linear test, with the added benefits of not imposing a testing time limit on the student and a significantly smaller list of items for the student to

[3] Hsu, T. C., & Shermis, M. D. (1989). The development and evaluation of a microcomputerized adaptive placement testing system for college mathematics. Journal of Educational Computing Research, 5(4), 473-485.

take. Calibration of the item bank is currently underway and the test conversions are being performed by the Development office.

English Essay Exam

A study (Harrington, Shermis, & Rollins, 1997) was conducted to examine whether raters of essays are influenced by the type of input medium they receive. A total of 480 students participated and they were randomly assigned to one of three essay groups: (1) those who composed their responses in a traditional "bluebook", (2) those who wrote in a "bluebook", but had their essays transcribed into a computer, and (3) those who wrote their essays on the computer. A one-way ANOVA revealed no statistically significant differences in ratings among the three groups [$F_{(2,475)} = 1.21$, ns]. Because of the lack of differences among the groups, the English Department agreed to a change in procedure whereby students could type in their written essays.

Project Essay Grading

PEG, formerly known as Write America, is a computerized grading package developed by Dr. Ellis Page of Duke University to evaluate essay writing. Because of the computer transport developed by the Testing Center for the essay placement exam, Dr. Page contracted with the Testing Center for the same type of interface for PEG in a joint development effort. Research evaluating the efficacy of the interface and the software is currently underway.

General Support

The computer development team is tasked with responding immediately to problems that might arise from any one of the operational areas of the Testing Center. In addition to providing general software support, the team addresses hardware and communications problems as well. More information about IUPUI programming development can be found at http://assessment.iupui.edu/develop/.

Pike Project

The Testing Center has expanded what was known as the Pike Project into several area high schools, career centers and Ivy Tech. As a direct result of our Web Placement Testing, we can offer our placement testing anywhere that has an Internet connection and proper supervision. Within high schools, this project facilitates the college application process, allows for college placement without leaving the high school grounds, and can allow for individual assessment at the HS level, i.e. is this student on the right course track to get into the major of his/her desire? This can allow a student to take charge of his or her own college future by seeing if he or she is ready for a certain class upon graduation, and if not, to challenges one's self by taking the classes that will prepare for college. At the moment these tests are offered by the Testing Center to six area high schools with other sites planned in the future.

HTML Programming.

In addition to contracted support with NCME, the Testing Center also maintains a web page for the dissemination of test times and locations, Scanning Office hours and charges, requests for IUTS access, and requests for re-testing. The Testing Center maintains all instructions for testing via Web Interface and uses a combination of Quicktime Video and RealVideo for multimedia instruction. In addition, Testing Center reports, bulletins, and general information memoranda are

located on the web. The Testing Center Web Server can be reached at http://www.assessment.iupui.edu/testing/.

Web-based Testing

As well as maintaining our standard web pages, the Testing Center now offers the Math Computer Adaptive Test, the Reading Test, and the English Essay Exam on-line. These have been adapted from the Macintosh Hypercard-based testing we had previously used, and can now accommodate a variety of computers, with minimum requirements of an Internet connection and a Web Client. Full requirements may be viewed at http://testing.tc.iupui.edu/onlinetesting/rqs.html and the testing page can be viewed at http://testing.tc.iupui.edu/onlinetesting/.

Computer Adaptive Math Testing MA400

As noted earlier, the Testing Center is continuing with the evolution of the math test. The current incarnation of the test MA300, is a web-based application running on a PowerMac 9600 and includes all the features of the Hypercard version, with the major improvement of being able to use it from any Internet browser. To assess a more accurate picture of a student's abilities, MA400 will offer testlets and mini-tests. These will allow a student to be fully tested in one pool of knowledge before being moved to either a higher or lower ability estimate. Programming for this has been performed by both Silicon Prairie Ventures and University Information Technology Services and coordinated by the Development Office.

Future Directions

While the focus of this report has been on past accomplishments, we would be remiss to conclude without a word or two about future objectives. These plans, of course, are contingent on the availability of funding or the emerging needs of the University. The activities enumerated below fall under Goal 3 (*Link appropriate evaluative mechanisms to campus goals and implementation strategies*) and Goal 4 (*Provide information resources that enable the campus and individual units to improve processes and outcomes continuously*) of the 1998 Goals, Implementation Strategies, and Performance Indicators for PAII.

This past year the Testing Center was awarded one grant proposal under the umbrella of the Strategic Directions Charter to further the aims of learning and assessment. The proposal:

Shermis, M. D., & Mzumara, H. R. (1996, October). College Placement Testing Through the World Wide Web: Preparing Students for Post-Secondary Education. Grant submitted under the auspices of the Strategic Directions Charter of Indiana University ($63,333).

provided for the expansion of activities from the so-called "Pike Project". This effort permits high school students to take IUPUI placement tests as a means of preparing for post-secondary work. The program also sets up a mechanism for students to apply to IUPUI, explore financial aid options, and talk to (UC) counselors. The project calls for additional in-house and external programming, graduate student support for grading English exams, academic counseling support, along with some modest funds for assessment activity. Six local high schools are participating in this project (North Central High School, Decatur High School, Clay-Carmel High School, Lawrence North High School, Lawrence Central High School, McKenzie Vocational Center) along with Ivy Tech and two IUPUI off-site locations (Glendale and Circle Center Malls).

While project development is funded for next year, we will still require supplemental programming work for the maintenance of this project (and any expansions, e.g., IUPU Columbus) beyond the initial funding period. Moreover, the move to off-site testing and the possible split of the Testing Center's physical location mean that we require a full time programmer to support the various locations where we have testing presence. We would like to establish a permanent position to provide a minimal level of support.

A related activity revolves around the so called "Page Project" funded in part by designated money from the Vice Chancellor for Planning and Institutional Improvement. This project calls for the creation of a web-based transport mechanism that would allow us to use the Project Essay Grading software, developed at Duke University, to evaluate written essays administered at the off-site high school locations. Implementing this software would result in considerable savings of turn-around time for our high school clients and may lead to a study that would permit it's use on campus. We are currently gathering data to build a rating model (a minimum of 2000 rated essays is required) and are in the midst of developing the transport mechanism. We expect to report on the results of our investigations in next year's report.

As mentioned above, we will be implementing a placement testing presence on the local campus of Ivy Tech. While this will facilitate the placement testing of some transfer students, we do not yet have a mechanism for equating the placement test scores between Ivy Tech and IUPUI (nor between the other IU campuses and IUPUI). The essence of this idea was summarized in an unfunded SDC proposal:

Shermis, M. D., & Mzumara, H. R. (1996, February). Equating placement tests across the campuses of Indiana University. Grant submitted under the auspices of the Strategic Directions Charter of Indiana University ($27,460--unfunded).

A research design has been developed that would effectively allow us to equate placement tests between Ivy Tech and IUPUI and our hope is to conduct a study that would permit us to make the equating calculations.

This past year the Testing Center was successful in negotiating with the Enrollment Management units to bring a $170,000 image scanner to the IUPUI campus. This system is managed by the Testing Center and is primarily dedicated to scanning the 650,000 documents generated by the Enrollment Management service units. In addition to the building space saved by the new technology, image scanning will speed up the processing of the various forms that students are asked to fill out during the enrollment process. We anticipate that the benefits of the image scanner will spill over to other areas of campus. This new service is currently operational and now makes possible improvement in other areas as well.

For example, one component of our course evaluation development work that has particular promise for both program review and departmental faculty administration centers around the development of the Student Evaluation of Teaching (SET) program. This is a comprehensive database system that permits the generation, scanning, and reporting of course evaluations for customer units across campus. What sets this system apart from others is that it is very flexible (it is used for courses on this campus and five others) and can track faculty performance longitudinally. When finally completed, it will permit deans and department chairs to ask for course evaluation information across a number of dimensions (e.g., ratings for 100 level courses, developmental courses, etc.). At the next available opportunity, we will be submitting an SDC grant to allow us to transfer the system to a

client-server environment so that we can cope with the increased demand for this service. The transfer of technologies would be done in a manner analogous to the work covered by our SDPC grant that is moving the IUTS system to a client-server configuration.

Teaching, Research, and Service

In this final section, we list some of the external activities that speak to our contributions beyond the student service mission of the Testing Center.

Teaching

Mark Shermis designed and taught two courses for the Department of Psychology: Clinical Rehabilitation Psychology Assessment I (Psych I664) and Clinical Rehabilitation Psychology Assessment II (Psych I669). Howard Mzumara taught three graduate courses for the School of Education during Spring and Fall of 1997 -- Introduction to Computer Analysis of Educational Data (Y500), Intermediate Statistics Applied to Education (Y502), and Qualitative Inquiry in Education (Y611).

Research

(Articles)

Shermis, M. D., & Chang, S. H. (1997). The use of IRT to investigate the hierarchical nature of a college mathematics curriculum. Educational and Psyhological Measurement, 57(3), 450-458.

Shermis, M. D., & Lombard, D. (1997). Effects of Computer-Based Test Administrations on Test Anxiety and Performance. Computers in Human Behavior, 14, 111-123.

Shermis, M. D., & Lombard, D. (in press). A comparison of survey data collected by self-completed mail questionnaire and electronic mail. Journal of Business and Psychology.

Shermis, M. D., Webb, P. M., & Mzumara, H. R. (in press). An assessment of the concurrent validity and reliability of the Merkler Style Preference Inventory (MSPI). Journal of Career Assessment.

(Articles Under Review)

Harrington, S., Shermis, M. D., & Rollins, A. (1997). The influence of word processing on English placement test results. Manuscript submitted to the Journal of Writing Research.

Mzumara, H. R., Shermis, M. D., Wimer, D. G. (1997). Use of examinee's previous math background in computerized adaptive math placement testing. Manuscript in preparation.

Printz, B., Shermis, M. D., & Webb, P. M. (1996). Stress buffering factors related to adolescent coping: A path analysis. Manuscript submitted to Adolescence.

Shermis, M. D. (1995). Using computerized adaptive testing for college mathematics. Manuscript submitted to the Journal of Mathematical Behavior.

Shermis, M. D., Mzumara, H. R., Bublitz, S. T. (1997). Controlling testing and computer anxiety: Test performance under CAT and

SAT conditions. Manuscript submitted to Applied Measurement in Education.

(Reports)

Mzumara, H. R., Shermis, M. D., & Dossinger, K., & Olson, J. J. (1997, November). Validity of the IUPUI placement test scores for course placement: 1996-1997. Indianapolis, IN: IUPUI Testing Center.

Shermis, M. D., Mzumara, H. R., Kiger, B., & Marsiglio, C. (1997, January). The Testing Center Annual Report 1996. Indianapolis, IN: IUPUI Testing Center.

(Presentations)

Shermis, M. D. (1997, February). Psychology Review. Presentation given for the Association for Advancement of the Behavioral Sciences, Atlanta, GA.

Shermis, M. D. (1997, April). Recent developments in college placement testing: Assessments via the World Wide Web. Presentation made at the annual meeting of the American Educational Research Association, Chicago, IL.

Shermis, M. D. (1997, May). Using LXR•Test for assessment. Presentation given to School of Nursing faculty, Indianapolis, IN.

Shermis, M. D. (1997, July) Presentation power: Extending the limits of the written word. Presentation given at the Information Technology Institute (AIR), Indianpolis, IN.

Shermis, M. D. (1997, October). Electronic portfolios. Presentation given to School of Education faculty, Indianapolis, IN.

Shermis, M. D. (1997, December). Assessments in the major. Presentation given to the IUPUI Department of Psychology, Indianapolis, IN.

Shermis, M. D. (1997, December). Electronic portfolios. Presentation given to School of Social Work faculty, Indianapolis, IN.

Shermis, M. D., Harrington, S., Watt, J. X., Wolting, M. (1997, April). Recent developments in placement testing at IUPUI. Presentation given to the Council on Undergraduate Learning, Indianapolis, IN.

Shermis, M. D., & Marsiglio, C. (1997, January). Computerized adaptive testing using the Internet. Presentation given to the faculty of Pike High School, Indianapolis, IN.

Shermis, M. D., & Marsiglio, C. (1997, July). Computerized adaptive testing using the Internet. Presentation given to the faculty of Carmel High School, Indianapolis, IN.

Shermis, M. D., & Mzumara, H. R. (1997, November). Assessment technology support. Workshop given at the sixth annual Assessment Conference, Indianapolis, IN.

Shermis, M. D., Mzumara, H. R., Bublitz, S. T. (1997, April). Controlling testing and computer anxiety: Test performance under CAT and SAT conditions. Paper presented at the annual meetings of the National Council on Measurement in Education, Chicago, IL.

Shermis, M. D., Mzumara, H. R., Lillig, C., & Brown, M. (1997, August). Computerized adaptive testing through the World Wide Web. Paper presented at the annual meetings of the American Psychological Association, Chicago, IL.

Howard Mzumara was a participant in the Instrument Fair conducted at the 1997 Assessment Conference in Indianapolis, IN.

(Grant Applications)

Shermis, M. D., & Mzumara, H. R. (1997). College Placement Testing Through the World Wide Web: Preparing Students for Post-Secondary Education. Grant submitted under the auspices of the Strategic Directions Charter of Indiana University ($63,333).

Service

Consultant Presentations

Mark Shermis consulted for the Leona Group, Lansing, MI, which creates educational software administered through the Internet.

Howard Mzumara provided professional support to the Testing Center's Optical and Image scanning operations (particularly in application development, data processing and report generation, project management, and supervision of personnel) and statistical consultancy to external clients of the Testing Center.

Journal Reviewer

Mark Shermis was a journal reviewer for the following scholarly publications:

Archives of Physical Medicine and Rehabilitation (1 manuscript)

Educational Measurement: Issues & Practice (1 manuscript)

Conference Reviewer

Shermis was also a reviewer for conference papers for the following organizations:

American Educational Research Association (AERA)
National Council on Measurement in Education (NCME)

Mark Shermis Committee Work

(National Committees)

Chair, American Psychological Association Continuing Education Committee

(University-wide Committees)

Academic Affairs Committee
Academic Policy and Planning Committee
Administrative Council
Professional Communications Committee
Program Review and Assessment Committee
Testing Center Advisory Committee

(Department of Psychology Committees)

Methodology Group

(TQM)

Co-chair, Research Team for the Enrollment Management Group
IMIR/Systems Management Steering Group

(Training)

Howard Mzumara attended a 4-day NCS Accra Application Development course (from June 2 to 5, 1997) in Minneapolis, MN.

Howard Mzumara Committee Work

TC Representative to the Enrollment Center Steering Group/Entry Process Action Team
TC Representative to the Orientation and UEC Staff Group

APPENDIX A

Table A.1

Results of the Phone Survey for the 1997 Sample (N = 3093).

1. NUMBCALL Number of Times Calling TC
(How many times did you call before reaching us?)

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Missing Responses	0	3	.1	.1	.1
One time	1	2056	66.5	66.5	66.6
Two times	2	445	14.4	14.4	81.0
Three times	3	238	7.7	7.7	88.7
Four or more times	4	351	11.3	11.3	100.0
	Total	3093	100.0	100.0	

Valid cases 3093 Missing cases 0

2. PROBFACE Student Problems Faced
(What problems did you face in reaching the Testing Center?)

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Missing Responses	0	12	.4	.4	.4
Busy Signal	1	1011	32.7	32.7	32.9
Voice Mail	2	3	.1	.1	33.0
Wrong Number	3	1	.0	.0	33.1
No Problems	4	2070	66.9	66.9	100.0
	Total	3093	100.0	100.0	

Valid cases 3093 Missing cases 0

3. REGTIME Duration of Registration Time
[How long did it take you to register the student completely (with FoxPro)?]

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Missing Responses	0	4	.1	.1	.1
2 - 3 minutes	1	1119	36.2	36.2	36.2
4 - 5 minutes	2	1946	62.9	62.9	99.2
6 - 7 minutes	3	12	.4	.4	99.6
More than 7 minutes	4	12	.4	.4	100.0
	Total	3093	100.0	100.0	

Valid cases 3093 Missing cases 0

4. RESCHEDL Is Student Rescheduling?
(Is the student rescheduling the tests?)

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Missing Responses	0	13	.4	.4	.4
Yes	1	417	13.5	13.5	13.9
No	2	2663	86.1	86.1	100.0
	Total	3093	100.0	100.0	

Valid cases 3093 Missing cases 0

5. WHYDELAY Reason for Prolonged Registration
(If the call lasted longer than 7 minutes, the reason was:)

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Missing Responses (N/A)	0	3045	98.4	98.4	98.4
Inactive student	1	4	.1	.1	98.6
Excess Info Provided	2	38	1.2	1.2	99.8
Technical Problem	3	3	.1	.1	99.9
Mgr. Assistance Needed	4	3	.1	.1	100.0
	Total	3093	100.0	100.0	

Valid cases 3093 Missing cases 0

6. WHYRESCH Reason for Rescheduling
(The reason for rescheduling was:)

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Missing Responses (N/A)	0	2681	86.7	86.7	86.7
Sickness	1	40	1.3	1.3	88.0
Forgot	2	34	1.1	1.1	89.1
Transportation	3	34	1.1	1.1	90.2
Personal	4	304	9.8	9.8	100.0
Total		3093	100.0	100.0	

Valid cases 3093 Missing cases 0