

## Test Specifications for the Information Competency Proficiency Exam Bay Area Community Colleges Information Competency Assessment Project September 2003

### I. Purpose

The Information Competency Proficiency Exam (ICPE) is designed to assess community college students' proficiency with information competency skills. Its purpose is to assess if students can demonstrate information competency as defined by national and local standards. It was designed to serve as a challenge-out exam, or credit by examination, to provide students with a way to satisfy an information competency requirement for AA/AS degrees.\*

The exam is criterion-referenced to the document "Bay Area Regional Community College Information Competency Standards, Performance Indicators and Outcomes" (version 6/3/03), which is derived from the national *Information Competency Standards for Higher Education* (January 2000, ACRL and endorsed by AAHE) and the *Objectives for Information Literacy Instruction: A Model Statement for Academic Librarians* (January 2001, ACRL).

### II. Content

The ICPE is composed of two parts -- Part A and Part B -- which contain items that assess most of the performance indicators and outcomes in the "[Bay Area Regional Community College Information Competency Standards, Performance Indicators and Outcomes](#)." The following outcomes from that document are excluded because they seem to be better assessed by other means, such as by classroom faculty who assign papers, speeches and other types of presentations:

2.5.2 "Demonstrates an understanding of how to organize information gather (e.g., cards, file folders)."

3.2.2. "Analyzes the logic of arguments in the information gathered."

Standard 4 - "The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose." This standard has several performance indicators and performance outcomes, none of which are included in the proficiency exam, as one expects that classroom faculty in courses requiring research papers/projects would be requiring and evaluating these.

5.2.3. "Preserves the integrity of information resources, equipment, systems, and facilities."

The [four charts](#), "Information Competency Outcomes Mapped to Test Items," provide the mapping of test items to specific learning outcomes from the "Bay Area Regional Community College Information Competency Standards, Performance Indicators and Outcomes." There are four charts, reflecting four of the five standards from the national publication, *Information Literacy Competency Standards for Higher Education* (ACRL, 2000).

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\*The latest version of the exam, field-tested and revised twice, may be obtained at the project Web site (<http://topsy.org/ICAP/ICAPProject.html>) by completing a request form. Note that it has not been sufficiently field-tested to ensure statistical reliability and validity.

**Part A** contains 47 “scoreable” items (some matching items have multiple parts) and is organized into four sections:

- |   |          |
|---|----------|
| 1. Multiple choice “one best choice” format         | 24 items |
| 2. Multiple choice using boxed text or screen shots | 6 items  |
| 3. Matching format                                  | 6 items  |
| 4. Short answer format                              | 11 items |

**Part B** contains three “exercises” which include interconnected performance-based activities as follows:

Exercise I contains two numbered items, one of which contains two sub-parts

Exercise II contains three numbered items, each of which includes sub-parts

Exercise III contains two numbered items, one of which includes sub-parts

Part B has a total of 12 “scoreable” items, several of which have sub-parts.

### Summary of Point Scoring and Weight Assignment for Part B

Item	Weight	Percentage
B.1.a Narrowed topic	6	6
B.1.b Steps taken to develop narrowed topic	6	6
B.2 Posing the research question	6	6
B.3.a.1,b.1,c.1 Three key concepts	2 for each of the 3, total of 6	6
B.3.a.2-3, b.2-3, c.2-3 Synonyms or alternate terms	6	6
B.4* Style guide – specifying one	1	1
B.4.a.1,b.1,c.1 Resources on the topic: Selecting & citing	5 for each of the 3, total of 15	15
B.4.a.2,b.2,c.2 How found each resource	3 for each of the 3, total of 9	9
B.4.a.3,b.3,c.3 Why chose each resource	3 for each of the 3, total of 9	9
B.5 Additional research steps	7	7
B.6.a-b Evaluation of 2 Web resources	10 for each of the 2, total of 20	20
B.7 Synthesis of information in own words	9	9
TOTAL		100

### III. Developing Exam Items

This section serves to document in some detail how the exam items were developed so that anyone wishing to develop or modify items will be following good test design procedures and will benefit from our findings. Our process was informed by a testing consultant, an English as a Second Language instructor, and the results of two field tests, which identified problem items that were revised in the latest version.

The team members used the performance indicators and outcomes from the consensus document, “[Bay Area Regional Community College Information Competency Standards, Performance Indicators and Outcomes](#),” supplemented by the more specific *Objectives for Information Literacy Instruction: A Model Statement for Academic Librarians* (ACRL, 2001), to develop specific test items. Examples of test items were identified from a variety of local tests and assignments and were used in full or in part when appropriate.

The following practices were followed in **both** parts of the exam:

1. use as little library jargon as possible and be aware of language relating to cultural/ethnic differences and English language proficiency;

2. when appropriate, phrase items within a specific information need scenario to provide context; include academic type scenarios of information need as well as vocational and practical ones to reflect the diversity of community college students' educational goals and experiences and their personal needs for information;
3. ensure that the item adequately measures what the learning outcome states;
4. ensure that test designers agree on correct answer; and
5. include brief citations for all quoted and cited material used in the exam.

**Part A** developers strove to adhere to these additional points:

1. include a mixture of format types (e.g., multiple choice, matching and short answer) to best match the outcome assessed. After the first field-test, they eliminated the "circle all that apply" multiple choice items, as they found them difficult to score and the consultant advised that it may be confusing to students to have both "one best answer" and "circle all that apply" multiple choice items on the same exam;
2. try to use topics and information needs/scenarios from a variety of disciplines/fields that are relevant and not esoteric;
3. limit the number of answer choices for the multiple choice items to no more than five;
4. avoid true/false or yes/no item formats, as these seemed too easy for a challenge-out exam;
5. avoid "all of the above" in multiple choice items; instead repeat the numbers/letters of the answers, for example:
  - a. the online catalog
  - b. a periodicals database
  - c. the periodicals holdings list
  - d. answers a., b., and c. (**not** all of the above)
6. pose questions in the affirmative and use active voice, rather than in the negative or with passive voice whenever possible;
7. ensure that the item is grammatically simple (i.e., don't use complex sentence structures), clear and not too lengthy; and
8. recognize that the wording of certain test items, either in the stem of the question or in the choice of answers, might need to be modified for local practice, for example:

*Which of the following usually requires a password because it does not allow free access for all Web users?*

- a. library online catalog
- b. InfoTrac or EBSCOhost periodical databases (choice would depend on local holdings)
- c. Yahoo Web directories
- d. bookstores' Web sites

**The organization and formatting of Part A items** were revised to reflect good layout design practices and the consultant's advice to use such national standardized exams as the ACT and SAT tests as models. Therefore we organized and formatted the items as follows:

1. consistent use was made of shading or boxed text for appropriate items;
2. items of the same format type were grouped together (e.g., all the short-answer items, all the items that use screen shots or boxed text, etc.);
3. directions were provided for each format section so that students are clear about the type of items in that section and what to do. Example:

Directions: Read the following multiple choice items carefully. If you think that more than one answer might be correct, always select the BEST answer.

4. consistent use was made of **boldface type** for topics, keywords and for emphasis, when appropriate; Examples: What group of keywords **best** describes the information need for the following assignment? You want information about **career opportunities in nursing**. What would you type in the Web search engine box to find the **most** information?
5. consistent use was made of typeface style, font size and margin size with the goal of making the final exam as professional looking as possible.

## Part B Items

Performance items were written to provide clear instructions and to prompt test takers to amplify answers by including specific information. A minimum of design elements was included to keep the Web-based form as simple as possible, yet easy to navigate.

### Comments on Individual Items

**EXERCISE 1** *Your instructor has given you the broad subject civil rights in America and an assignment to write a 3-5 page research paper on some aspect of this subject.*

*Narrow this subject to a manageable topic for the assignment.*

**B.1** *Write in your narrowed topic ...*

**B.2** *Write in your research question ...*

#### COMMENTARY

**Subject selection** The student is asked to narrow the *subject* to a manageable *topic* for the assignment. The word *subject* is broader in meaning than the word *topic*.

When creating another subject/topic to substitute for this one, the subject, and its possible topics, should be intellectually accessible to any college student (including a student for whom English is a second language). It should not be too specialized – i.e., it should not assume prior discipline-dependent knowledge. This is not because applying discipline-dependent knowledge would be bad, but because those who *were able to* apply discipline-dependent knowledge might, without seeming to, bias the responses for the broader group. Sample research questions used on the Performance Exam fall more into social science fields than others, since more individuals have some knowledge of social science subjects than of more specialized subjects in the sciences, or even in the humanities.

### Examples

- A. Subjects that would probably be too specialized:
- Neural network models in explaining cognitive development
  - Leadership structure of the U.S. Federal Reserve System
  - Zulu women's music
- B. Subjects that would probably be suitable:
- Gambling in the United States
  - Effects of television violence on children
  - Rising rates of juvenile delinquency

**Item B.1.a** (narrowed topic) – Field test experience shows that there is variation among librarians as to what constitutes an appropriately narrowed topic. Locally, librarians should discuss this to develop a “group mind,” and perhaps add criteria to their own local scoring rubric.

**Relationships between B.1.a, B.1.b, and B2** The tasks of creating a narrowed topic, writing about how that was done, and coming up with a research question are related. The field test showed that some students, for example, will pose a research question that does not stand up well on its own, but is understandable in the context of the narrowed topic. Locally, librarians will want to discuss how this should be handled, and insert further guidelines into the local scoring rubric.

### EXERCISE II

*You've been given the assignment to write a 3-5 page research paper on the following question: Should colleges be allowed to restrict student speech?*

**B.3. Write in the key concepts represented by the research question. Then write in synonyms or alternate terms for each concept that you would use in searching for information on this question.**

#### COMMENTARY

**Selection of research question** The topic should be one that is *already* narrowed and manageable for a 3-5 page research paper. The topic should encompass three distinct variables. The subject matter of the question should be intellectually accessible to a college student, and not dependent on discipline-specific knowledge.

### Examples

- A. Topics that would probably not be suitable
- How can air pollution be minimized? [only two variables]
  - Are genetically engineered crops safe? [only two variables]
  - What molecular mechanisms underlie physiological responses associated with fear? [assumes discipline-specific knowledge]
- B. Topics that would probably be suitable
- Do some migratory birds display effects of long-term global warming?
  - Are prison sentences for juveniles who have been convicted as adults too harsh?
  - Do low voter turnouts threaten democracy in the United States?

**Key concepts** Field test experience shows that a specific criterion may be thought to be *essential*. For example, for the research question “Should colleges be allowed to restrict student speech?” it could be argued that the concept *higher education* is essential and, therefore, *must* be included to earn a full score. To achieve scoring consistency, this is another area where further local discussion is needed.

***B.4 Identify three relevant sources for this research question***

## COMMENTARY

**Adding some activities:** Locally, librarians could decide to add some activities to this section of the Exam. Some suggestions follow:

- Outcome 2.3.3 of the Bay Area Regional Community College Information Competency Standards (ACRL Standard 2.3.b) states that the information competent student “uses various classification schemes and other systems (e.g., call number system or indexes) to locate information resources within the library.” For example, a local decision could be made to include physically retrieving a book from the shelves as a part of this test item.
- A prompt could be added in B.4.a.2, b.2, c.2 to ask the student to indicate what subject heading was used in the search.
- A prompt could be added to print out and submit the first page of the periodical article selected.

***B.5 In addition to the three sources you’ve selected, describe in two or three sentences at least two additional research steps you might take to adequately address the research question.***

## COMMENTARY

Refer to the scoring manual for examples of appropriate and inadequate responses.

This test item is designed to evaluate the test taker’s ability to project a continuing research process. Appropriate responses may change with different research questions and/or expectations of responses could be more specific as a result of instruction and learning activities. This item requires judgment as there are not exactly right or wrong answers. Local discussion will be required to consistently evaluate responses.

***EXERCISE III***

***B.6. Imagine that you are researching melatonin for a health science research paper. You have found the three Web pages listed below. Visit each one. Then pick two of them. In two or three sentences, explain why you would or would not use these sites for your paper, based on several standard evaluative criteria. Be as specific as possible.***

## COMMENTARY

- **Topic selection** Melatonin was selected as a topic because, although many individuals have heard the term, it is likely that most people do not know a great deal about it.
- **Web sites** The three Web sites include: a commercial firm; a U.S. government agency; a non-profit organization – i.e., the Web site provenances represent a variety of domain types
- **Context** In Exercise III as given above, context is provide, as in “for a health science research paper.” When the Web site changes, the context will change.

In selecting other topics and other Web pages

- **Topic selection** Use topics that are within a college student’s parlance, but not judged to be terribly familiar to the typical student. Examples could include: quantum computers [or molecular computers]; safety of cell phones; fertilizers and the environment; economic impact of maquiladoras; the future of hydrogen-powered automobiles.
- **Web sites** In selecting the Web sites, include a variety of types of Web domains.

***B.7 Using information found at <http://www.aafp.org/971001ap/cupp.html>, describe the uses of melatonin in your own words.***

## COMMENTARY

Refer to the Scoring Manual for guidance about distinguishing plagiarized from personally-worded summaries. To achieve consistency in scoring, local discussion about acceptable and unacceptable wording is recommended.

## IV. Documents That Accompany IC Proficiency Exam

### Part A

Two documents accompany Part A of the exam. They are:

1. Scoring Rubric for Short Answer Items

Use this document for guidance in scoring the short answer items in Part A.

2. Answer Key and Scoring Sheet

Use this document to score and record the Part A items. (This document can be obtained, along with the exam, by completing the request form at the Web site, [www.topsy.org](http://www.topsy.org)).

### Part B

Two documents accompany Part B of the exam. They are:

1. Scoring Sheet

Use this document to record scores for each test item

2. Scoring Manual

This document is the rubric to use with a scoring sheet when evaluating (scoring) exam responses. The Scoring Manual has 5 columns.

1) **Test Item** – The exact wording of the test item prompts on Part B, the Performance Exam.

2) **Criteria to apply** – The criteria to apply in evaluating a response. If there is more than one criterion (which is usually the case), there will be an indication as to whether criterion 1 AND others need to be met, or whether there is an OR relationship between criteria, or some other requirement.

3) **What constitutes competent** – Refers to the standard being set. For example, on some items, all of the criteria need to be met; on others, a certain number out of the total possible is needed. This column provides the information needed to decide if a test answer is correct, that is, earns points.

4) **Notes on scoring** – Additional aids to scoring with further explanation of the criteria and examples of appropriate or inadequate responses.

5) **Score and weighted score** – There are three steps to the scoring process outlined in this column.

Step 1) Consider each criterion and score as correct or incorrect.

Step 2) Take the number of correct criteria and award a score for the entire test item based on whether all the required criteria were met or not.

Step 3) Convert the score for the test item into weighted points.

After assigning points for each item, add up all points to determine a score for the complete exam. A total of 100 points are possible.

Below is a row from this chart with generic explanations and a second example of test item **B.1.a**

Test item	Criteria to apply	What constitutes competent	Notes on scoring	Score and weighted score
Exact wording of the test item	Specifies the criteria and how they must be met.	Specifies how each criterion will be applied, and which criteria must be met to get the points for a correct response.	Provides examples to elucidate what constitutes appropriate or inadequate responses	Assigns 1 point to each criterion specified. If all specified criteria are met (e.g., 3 out of 3), the test item score is <b>1</b> . If fewer than the required criteria are met (e.g., 0, 1, or 2 out of the 3) are met, the test item score is <b>0</b> . Weighted score – If the test item score is <b>1</b> , the weighted score is ___. If the test item score is <b>0</b> , the weighted score is <b>0</b> .
Test item	Criteria to apply	What constitutes competent	Notes on scoring	Score, and weighted score
<b>B.1.a. Narrowed topic</b>				
Your instructor has given you the broad subject <i>civil rights in America</i> and an assignment to write a 3-5 page research paper on some aspect of this subject. Narrow this subject to a manageable topic for the assignment.	Criterion 1 – Topic is narrowed by specifying time frame, or persons, or organization or group, or location, or event or incident, or some combination of these, or other similar, appropriate limiter(s) is (are) applied. <b>AND</b> Criterion 2 – Narrowed topic is within subject assigned. <b>AND</b> Criterion 3 – Narrowed topic is appropriate to a 3-5 page research paper	At least one of the narrowing techniques has been applied to the subject. <b>AND</b> The other 2 criteria are met.	Broad topic is <i>Civil Rights in America</i> Examples of appropriately narrowed topics ✓ <i>Status of Arab American Civil Rights After 9/11</i> [narrowed by time frame and group] ✓ <i>Effects of the UC system prohibiting race-based admission criteria</i> [narrowed by organization and event] Example of a topic not properly narrowed ✓ <i>The civil rights movement in America, equality then and now</i> [no time period, incident, or group used to focus]	Criterion 1=1 Criterion 2=1 Criterion 3=1  3 out of 3 = 1 0, 1, or 2 out of 3 = 0  Possible scores 1, 0  <b>Weighted score</b> <b>1 = 6</b> <b>0 = 0</b>

The Part B developers also prepared a “Scoring Rubric with Mapping of Learning Outcomes” which links **learner outcomes** (what the student will be able to do), to **test items** (how the student will demonstrate his/her ability), to **Criteria to apply** (how we will know if the student has done this well), to **What constitutes competent** (the degree of meeting the criteria constituting a level of competence appropriate for a 2-year college graduate).

## V. Timing

The sections are not timed, but the entire exam was designed not to exceed three hours. Field-testing revealed that most students complete Part A within 45 minutes to one hour and Part B within one to two hours. A break can be taken between the two parts.

## VI. Scoring Issues and Level of Performance

It is strongly recommended to use three different scorers for assessing the responses for Part B items. The second field test revealed that scorer training is necessary to improve inter-rater reliability. Scorer training should include reading and discussion of the Part B “Scoring Manual” and the scoring sheet. Moreover, a session is suggested where the three scorers actually score a few exams and discuss their scores and interpretations.

This project had hoped to determine a recommended passing score. However, using the findings of the second field test to establish a valid and reliable passing score proved to be impossible, due to the low inter-rater reliability score for Part B and the Part A items that were identified as needing further revision. The project team decided that recommending a cut-off/passing score would be unwise since the nature of each institution’s instructional program might warrant a local decision about a passing score. In fact, one of the project team members has actually used the exam as it existed at the time of the second field test for three students who were challenging the new information competency graduation requirement and decided that students must score 70% or higher on Part A and Part B.

Test items in Part B were weighted to reflect, proportionally, the contribution of each item to the overall standard for information competency skills and understanding being set by the exam. For Part B as a whole, the weighted items add up to 100. Part A’s total points do not add up to 100. Rather than use weighted points, the points for Part A items are based on the type of item: multiple choice = 1 pt; short answer = 2 pts.; matching = 1 pt for each correct match. To see the total points for the combined test items from both parts of the exam mapped to performance outcomes, the reader is referred to the chart “[I.C. Proficiency Exam Specifications: Item Mix and Point Values with Totals for Each Standard.](#)”

The project team offers the following options about how an institution might decide to establish a passing score:

1. A passing score could be expressed in total points necessary to pass from both parts of the exam. One can easily calculate a percentage of correct answers for both parts of the exam by setting the total possible points equal to 100%. Example: total points = 164 = 100% and passing score is decided to be 70%. Thus, a student would need to score 116 total points or more in order to pass the exam. This option allows a student to compensate for poorer performance in one part by better performance in the other part.

Variation to option #1: The score for Part A is changed to a percentage. Part B is already 100 points, so it is converted to a percentage. The two percentages are added together and divided by two which becomes the “final score.” A threshold is established for a passing grade. Example: a student could score 32 on Part A or 50% of the items correct and 100% on Part B and the average would be 75%, a passing score if the threshold was 70%.

2. A passing score is established for each part of the exam. Each part maintains the same threshold (for example 70%). In this scenario, a student has to perform at a passing level in both parts in order to pass the whole exam.

3. A passing score or percentage is separately established for each part of the exam, but in this case one part could be different than the other; e.g., Part A = 70%; Part B = 80%. In this scenario, a student has to perform at a passing level in Part A as well as in Part B, but one part could be weighted more heavily.

## **VII. Suggestions for Administering the Exam**

Procedures for administering the exam will primarily be a local decision and will take into account the possible use of a proctored testing facility and security provisions. Regardless of the local decisions, the project team recommends that an online version of the complete exam be seriously considered. At the minimum, however, the performance-based part of the exam should be online. For practical purposes the entire exam should probably not exceed three hours, but each part doesn't need a separate time limit. It is recommended to allow students to have a break between the two parts of the exam.