# Closing the Gap: Proficiency vs. Perception

Annette C. Easton, (E-mail: annette.easton@sdsu.edu), San Diego State University
George Easton. (E-mail: george.easton@sdsu.edu), San Diego State University

**Abstract**

*The gaps that exist between a student's self-perceived computer skills, their actual computer skills, and the computer skills deemed important in business pose an interesting challenge for business schools, today, and for the foreseeable future. One strategy for managing these literacy gaps is developing curriculum that better tailors content to the evolving literacy of students. In an effort to operationalize this strategy, we have undertaken a study to measure the magnitude of the literacy gaps and the effectiveness of an introductory computer course required in our undergraduate business program. This paper presents the initial results of that study.*

## 1.0 Introduction

It isn't surprising that many students start college today with healthy perceptions of their computer skills. Computer games, the world wide web (the web) and instant messaging (IM) are just a few of the casual computer applications that have helped younger students develop a comfort level with computers that often renders itself as a form of computer literacy. Trends in K-12 education also suggest that students are being exposed to formal business computer applications such as word processing, spreadsheets and presentation software as early as elementary school.

Not surprisingly, many incoming university business students are dismayed to learn that they are still required to take an introductory computer course. Ironically, business faculty are equally dismayed to still find it necessary to provide some remedial computer education in many of their classes just so their students can complete certain course requirements.

The gaps that exist between a student's self-perceived computer skills, their actual computer skills, and the computer skills deemed important in business pose an interesting challenge for business schools today, and for the foreseeable future. A desirable outcome of closing these computer literacy gaps is a curriculum that provides the relevant, current computer skills for all of the constituents of the business school. This outcome may be better achieved if we actually understand the level of computer literacy that our students bring to business school. By knowing what levels of computer literacy exist within our classes, we may have a better opportunity to deliver a better educational experience for our students and to better prepare our students for their coursework and their careers.

## 2.0 Background

Over time, the definition of computer literacy has evolved from simply a basic understanding of terminology, to understanding how to write computer programs, to understanding how to use specific computer applications. Certainly defining a specific level of computer literacy is dependent on the specific context of the situation in which it is applied. Van Vliet, Kletke and Chakraborty (1994) conducted a study to determine if self-appraisal tests are a valid predictor of computer literacy. They defined computer literacy as "the ability to use microcomputers confidently for obtaining needed information, solving specific problems, and performing data-

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processing tasks. This includes a fundamental understanding of the operation of microcomputers in general, as well as the use of several types of applications software packages." What they reported was that self-appraisal tests were more lenient indicators of a person's computer proficiency than were objective tests. In addition, they concluded that self-leniency decreased as computer expertise increased.

Most professors have had classes where the range of pertinent skills of students has been broad. The scope of the students' skills make it difficult, if not impossible, to effectively reach all of the students. Experienced students are usually bored with the introductory-level material; novice students are often overwhelmed with the more advanced content. In the end, many are dissatisfied with the experience. By better understanding the levels of proficiency that exists within our classes, we increase the opportunity to deliver the most appropriate educational experience.

Further impetus for this study can be found in reviewing the guidelines set forth by the Association to Advance Collegiate Schools of Business (AACSB), the accrediting body for Schools of Business. AACSB (1991) has stated the importance of having students understand and apply concepts of management information systems including computer applications. Accreditation standards mandate that Colleges of Business assess not only how and where these skills are addressed across the curriculum, but also the effectiveness of the curriculum. Evaluating curriculum design and student learning can help business schools make progress on addressing AACSB accreditation. Born and Cummings (1994) suggest that assessment of student's computer experience, attitudes and skills should allow for feedback to faculty in designing curriculum. Further, they propose a model in which schools would assess students at several points in their school career to more fully determine the effectiveness of the entire curriculum. This is important in demonstrating that the technology skills are being learned at various points in the curriculum.

Given the specific purposes of this study, we have broadened Van Vliet, Kletke and Chakraborty's (1994) definition of computer literacy to include a basic understanding of information technology concepts. The revised definition of computer literacy reads: "The ability to use microcomputers confidently for obtaining needed information, solving specific problems, and performing data-processing tasks. This includes a fundamental understanding of *information technology concepts*, the operation of microcomputers in general, as well as the use of several types of applications software packages." We have operationalized this new definition of computer literacy in the self-assessment and objective assessment tests devised for this study.

## 3.0 Research Design

Figure 1 below depicts the assessment process implemented in our introductory computer course in spring 2002. The rows of the 2-by-2 matrix represent *when* the assessment activities occurred: at the start of the semester and again at the end of the semester. The columns of the matrix represent *how* the assessment data was obtained: self-assessed via web-based surveys and actually-assessed in a controlled environment using assessment software.

Approximately 200 students in the Principles of Information Systems course completed all parts of the assessment study. During the first week of the semester the students were required to complete a two-part online questionnaire. The first part of this activity yielded demographic information and a general self-assessment of the students' knowledge of primary business applications such as word processing, spreadsheets, presentation graphics, and database programs. The second part of the on-line questionnaire asked students to self-assess their ability to perform application-specific activities using a five-point Likert-like scale that ranged from (1) Not at All to (5) All of the Time. The questions used in this part of assessment process were modeled after the professionally-recognized MOUS (Microsoft Office User Specialist) standards for Excel, PowerPoint, Access, Operating Systems. The questions for the computer concepts assessment were drawn from nationally-recognized educational materials.

An actual (hands-on) assessment exercise followed part 2 of the self-assessment activity. In the actual assessment phase of the study, students were asked to complete specific application tasks that mapped directly to questions they had encountered in part 2 of the self-assessment activity. This part of the study was conducted in a controlled research facility on campus that supported SimNET XPert, a simulated MS Office XP training and assessment package from McGraw-Hill that allowed us to track whether students completed each task successfully. The scores from the skills assessment were classified with a five-point scale (Beginner, Some Skill, Intermediate, Advanced, and Expert) that mapped to the one to five scale used in the self-assessment exercise. Following the Start-of-Semester Self and Actual Assessment activities, the students participated in the normal semester class activities and assignments. At the end of the semester students repeated the self-assessment questionnaire followed by another objective (hands-on) assessment of their computer and application skills.

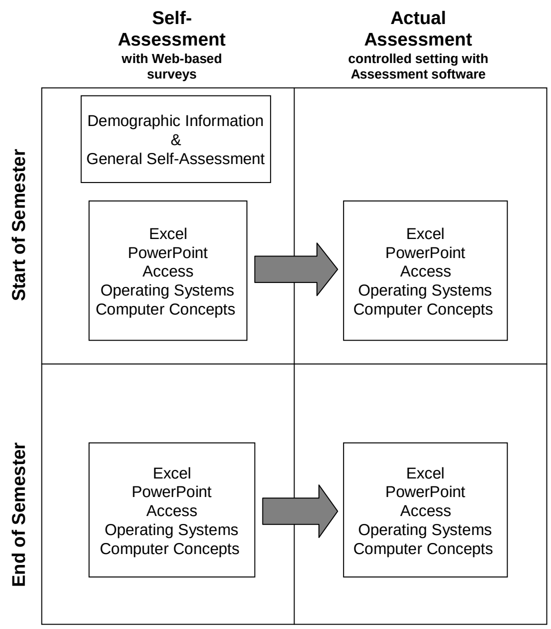


Figure 1
Assessment Process

## 4.0 Results

Results from analysis of the Start-of-Semester activities are shown below. Initially we are most interested in looking at the aggregate results for students who fall into the lowest two rating levels. Table 1 below summarizes the percentage of students who rated themselves at None or Very Little Skill (the lowest two ratings) for each skill area, along with the percentage of students who scored at the Beginner or Some Skill levels (the lowest two ratings) for each skill area:

**Table 1: Summary of Pretest Self-Perception and Actual Skill Levels**

| Skill Area | % Rated at None or Not Very Well Skill Levels – Student Self Perceptions | % Rated at None of Not Very Well Skill Levels – Student Actual Skills |
|---|---|---|
| Windows | 2.1% | 6.2% |
| Excel | 38.4% | 87.1% |
| PowerPoint | 50.8% | 77.5% |
| Access | 64.1% | 79.5% |
| Computer Concepts | 53.8% | 94.4% |

As you can see from these results, there is a significant gap at the beginning of the semester between the students' perceptions of their skills and their actual skills. Windows was the only skill area where students were close in predicting their skill levels. Further, the table shows that for all skill areas except Windows the vast majority of the students entering the course have low actual skill levels. On the average for all skill areas, 18% of the students scored in the beginner level for the skills areas.

Results from the analysis of the End-of-Semester activities are shown in Table 2. This table again reports the aggregate results of students self-assessment ratings at None or Very Little Skill (the lowest two ratings) for each skill area, along with the percentage of students who scored at the Beginner or Some Skill levels (the lowest two ratings) for each skill area:

**Table 2: Summary of Posttest Self-Perception and Actual Skill Levels**

| **Skill Area** | **% Rated at None or Not Very Well Skill Levels – Student Self Perceptions** | **% Rated at None of Not Very Well Skill Levels – Student Actual Skills** |
|---|---|---|
| Windows | 0.0% | 2.1% |
| Excel | 0.5% | 57% |
| PowerPoint | 0.5% | 65.2% |
| Access | 1% | 53.9% |
| Computer Concepts | 2% | 66.6% |

Table 2 shows that there was positive movement on the number of students moving out of the lowest two rating levels for actual skills. On the average for all skill areas, only 5% of the students still scored in the beginner level for the actual skills. This does show that students are learning the expected skills. Interestingly, the gap between the student's perceptions of their skills and their actual skills had widened by the end of the semester. We had expected students to be better able to predict their skills once they had more knowledge of what was actually involved in each of the skill areas. It appears that this did not happen. One possible explanation for this is that during the pretest students may not have known many of the terms referenced on the assessment and therefore had a greater likelihood to rate themselves lower. By the posttest, all of these terms had been covered in the class. It appears that there may be a disconnect between knowing the term and being able to successfully demonstrate the skill on an assessment.

## 5.0 Conclusion

To more completely understand the results, a detailed analysis of the self-reported data and hands-on assessment data is currently underway. We anticipate that these results will be a useful tool to help business schools and MIS departments make informed curriculum decisions and to provide a mechanism for tracking the evolving computer skills of beginning business students. Furthermore, the more detailed comparisons between self-perceptions and actual skills should be helpful in determining strategies for educating and motivating students whose self-perceptions are higher than their actual skills. Overall, our desire is to develop a curriculum model that address this literacy gap by providing flexibility in choosing and delivering course content to accommodate the evolving computer literacy of our students. 🕮

## References

1. Association to Advance Collegiate Schools of Business (AACSB). 1991. *Achieving quality and continuous improvement through self-evaluation and peer review: Standards for Accreditation, Business Administration and Accounting*. Adopted 1991, Revised May, 2000.
2. Born, R.G. & Cummings, C.W. (1994). An Assessment Model for Computer Experience, Skills, and Attitudes of Undergraduate Business Students. *The Journal of Computer Information Systems*, 35(1), pp. 41-53.
3. Van Vliet, P., Kletke, M. and Chakraborty, G. (1994). The measurement of computer literacy: A comparison of self-appraisal and objective tests. *International Journal of Human-Computer Studies*, 40(1), pp. 835-857.