

Why use an item banker?

White Paper

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Table of Contents

Introduction	1
Advantage 1: Single location	1
Advantage 2: Presentation of items.....	1
Advantage 3: Additional information	3
Advantage 4: Specific functionalities	3
How much does it matter?.....	5
Conclusion.....	6
Further reading	6

Introduction

An *item banker* is a software program specifically designed to serve as a database for test items and accompanying information, as well as provide functionality for the development of tests. While it is possible to utilize spreadsheets and word processing documents for these purposes, it is quite inefficient. The cost of an item banking system will easily be offset by the decreased costs caused by a reduction in time spent on manual processes as well as the greater quality of the published tests.

The greater efficiency of item bankers for item bank management and test development is due to several distinct advantages:

1. All information is in one place, rather than spread across a large number of documents and spreadsheets;
2. The items are better presented than in a spreadsheet, so that an item appears as it would appear in a test, not in columns as in a spreadsheet;
3. A wide array of additional information is stored, including statistics, keywords, comments, and revision history;
4. Substantial functionalities are provided that are specifically designed for test development.

Advantages 1-3 are more for convenience. Advantage 4, on the other hand, is a necessity for professional-level test development.

This concept, of course is nothing new and not limited to the test development world. Businesses use specialized accounting software and associations use specialized member database software. Just as it does not make sense for an association to try to manage hundreds or thousands of members with a spreadsheet, it does not make sense for a testing program to do the same with a bank of items.

Advantage 1: Single location

The most immediate and obvious advantage of item bankers is that all important information is in one place. If a testing program designs test forms in word processing documents and stores statistics in spreadsheets, if several test forms are used per year the number of files to manage becomes quite unwieldy. It can be extremely difficult to find something if you do not know exactly where it is.

However, item bankers are not omniscient; there will always be some information that they cannot hold, because there is just too much information surrounding an item. For example, item bankers will typically not have a spot for item response theory (IRT) fit statistics or item parameter standard errors. Nevertheless, item bankers are still far more centralized than separate files for everything.

Advantage 2: Presentation of items

Some testing programs will keep item texts in a spreadsheet or perhaps in a database program where the interface appears as a spreadsheet. Doing so prohibits the test developer from

being able to view an item as a user would see it on a test. The stem of an item typically involves at least a few words, and in some cases many words, and a spreadsheet column would have to be 10 inches wide just to see all the words – which would of course be wrapped when printed on paper for test administration, with multiple-choice options listed immediately below the stem.

Take the following item for example.

1. How many nouns are in the following sentence? “A dog chased the cat across the yard, while the man continued to rake leaves.”
- A. 3
 - B. 4
 - C. 5
 - D. 6

In a spreadsheet, this item would appear in a format that is unreadable, as below.

Figure 1: Item in a spreadsheet

Item	Stem	Option A	Option B	Option C	Option D	Difficulty	Rpbis
1	How many nouns	3	4	5	6		

On the other hand, the following screenshot demonstrates how that item appears in Assessment Systems Corporation’s (ASC) item banker, FastTEST 2.0.

Figure 2: Item in FastTEST 2.0

The screenshot shows the FastTEST 2.0 interface. On the left is a tree view of the item bank structure, including categories like Business, English, Measurement, Science, and Sports. The main window displays the details for item 'Eng_001', which is an 'English item' located at 'Sample\English\' with a 'Date Created' of '1/1/2010' and a 'Unique ID' of '85'. Below the header, the item text is shown: '1. How many nouns are in the following sentence? “A dog chased the cat across the yard, while the man continued to rake leaves.”' followed by multiple-choice options A. 3, B. 4, C. 5, and D. 6.

Advantage 3: Additional information

Item bankers hold far more information than a word processing document. Moreover, the fields in an item banker provide guidance as to what exactly is the important information to record, for those not familiar with test development and psychometrics. The following screenshot shows one of the four tabs in FastTEST 2.0 that is dedicated to storing information about the item in addition to its text.

Figure 3: Item information tab in FastTEST 2.0

The screenshot displays the 'Information' tab of the FastTEST 2.0 interface. At the top, there are five tabs: Identifier, Text, Information (selected), Statistics, and Notes. Below the tabs, there are three input fields: 'Author:' (empty), 'Source:' (empty), and 'Date Created:' (1/1/2010). Below these fields, there are two main sections. The left section is titled 'Item Response' and contains six radio button options: 'Multiple Choice' (selected), 'Multiple Response', 'True/False', 'Free Response', 'Instructional', and 'Survey'. The right section is titled 'Score this item' and contains a checked checkbox. Below this, there is an 'Answers:' section with a 'Number of Answers:' field containing the value '2'. Below that is a 'Keyed/Correct Answer:' field with a grid of 10 empty boxes. At the bottom of the 'Answers' section, there are two radio button options: 'Numeric' (selected) and 'Alphabetic'.

Moreover, while it is possible to store large amounts of information in a spreadsheet, a spreadsheet is not able to actually *use* any of the information. Item bankers are designed with the knowledge of why certain pieces of information are important, and how to use them for their intended purpose. This leads to Advantage 4.

Advantage 4: Specific functionalities

As previously discussed, the first three advantages are quite straightforward and designed simply to make test development work more convenient and efficient. But these three do not take test development to a higher level of sophistication and professionalism. Item bankers do this by providing functionalities that are specifically designed for the test development process, some of which would be impossible to do with a word processing document and spreadsheet.

The most important functionality is the application of the relational database paradigm for test form construction. Every time a new test form is assembled, it is done by recording the list of items rather than the items themselves. On the other hand, with word processing documents, every new form means a new document containing all the items.

Besides being much more efficient with regards to file size and disk space, this makes it easier to use items more than once. Moreover, the item banker will track which items a test is

on, so that when you view the item, you will be presented with a list of all the tests in which it appears.

Item bankers make it easier to track modifications that are made to items over time. Some item bankers directly record each modification that is made to an item, and by whom. Some explicitly have version control. FastTEST Web does both of these. FastTEST 2.0 does not do so explicitly, but there are several ways to record this information, most importantly the use of the “Notes” field, which is an open area to record any information about an item that does not have an designated field already available.

An item banker makes it easier manage, categorize, sort, and search for your items. This is because item bankers provide functionality for this. FastTEST 2.0 utilizes a folder system similar to computer operating systems; you can see this on the left side of Figure 2. The user can create any folder structure they wish to categorize their items. Furthermore, this structure can be dynamically searched in concert with the various pieces of information associated for each item, as seen in Figure 4. If you are building a test and know that you need a Science item on the topic of Chemistry, with an IRT difficulty greater than 1.0 and IRT discrimination greater than 0.7, you can search directly for all items that meet these requirements.

Figure 4: Item search screen in FastTEST 2.0

Find...

Folders to search:

- Entire Workspace
- Sample
 - Business
 - Marketing
 - Origins
 - Personnel
 - English
 - Measurement
 - Reliab/Validity
 - R/V Testlet 1
 - R/V Testlet 2
 - Reliability/SEM
 - Validity
 - Science
 - Astronomy
 - Chemistry
 - Geology
 - Sports
 - Basketball
 - Football
 - Hiking
 - Running
 - Statistics
 - Correlation
 - Descriptive
 - Stan/Dev_Scores
- Include subfolders

All Items Within Selected Folders.

Item With the Following Unique ID:

Items Matching the Following Criteria:

Item Identifier:

Keywords:

Description:

Author:

Source:

Date Created between: 1/ 1/2010 and 1/ 1/2010 inclusive

Item-Total Correlations between: 0.00 and 0.00 inclusive

P-Value between: 0.00 and 0.00 inclusive

IRT a parameter (discrimination) between: 0.00 and 0.00 inclusive

IRT b parameter (difficulty) between: 0.00 and 0.00 inclusive

IRT c parameter (guessing) between: 0.00 and 0.00 inclusive

Max item info falls between theta of: 0.00 and 0.00 inclusive

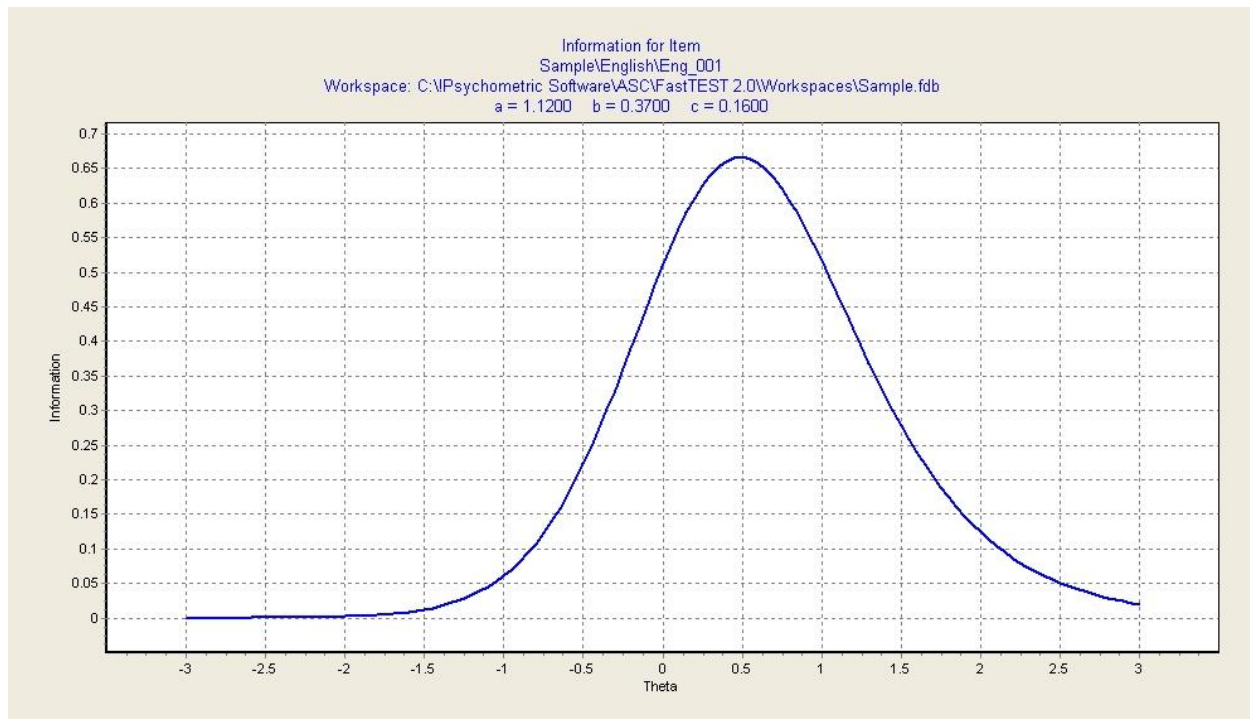
Maximum item information values between: 0.00 and 0.00 inclusive

User 1 between: 0.00 and 0.00 inclusive

User 2 between: 0.00 and 0.00 inclusive

Good item bankers provide sophisticated psychometric information for the user to evaluate the psychometric characteristics of an item or test form. For example, FastTEST 2.0 provides graphics of the item information function and item response function for each item, and frequency distributions of classical statistics as well as the test information function and test response function from IRT for each test. Such information is essential in developing tests with high psychometric quality, and is impossible with documents and spreadsheets except with substantial custom programming. An example of this is shown in Figure 5.

Figure 5: Item information function in FastTEST 2.0



Finally, item bankers make it easy to use your final product – a test form – once it has been finalized. The form can be printed immediately in a format for paper-and-pencil delivery, or exported for delivery via a third-party vendor. The FastTEST Professional Testing System, a massive extension of FastTEST 2.0, allows you to publish your own computerized tests for deliver in your own secure testing labs. FastTEST Web allows you to do the same for web-delivered exams.

How much does it matter?

Consider the amount of manual labor saved by the use of an item banker. With a single test form, this could easily reach 25 hours. If employees working on the project are paid an average of \$20 per hour, this amounts to \$500 in savings. Item bankers can range from less than \$100 to tens of thousands of dollars for behemoths that include additional pieces like examinee management, but ASC's FastTEST 2.0 is \$499 for Academic/Government users. This means that use of a specialized item banking program for a single test form could pay for itself.

Conclusion

Given the cost scenario just described, in most cases it does not make business sense to continue with test development utilizing documents and spreadsheets. Substantial savings can be had by using an item banker – and this does not even consider the sophisticated advantages such as IRT graphics and analysis. Perhaps the greatest disadvantage is the learning curve associated with new software, requiring the understanding and buy-in of relevant stakeholders.

If you are interested in FastTEST 2.0, a trial version is available via download at <http://assess.com/xcart/product.php?productid=227>. This version is fully functional, but limited to 30 days. A much more powerful system is FastTEST Web (www.fasttestweb.com), which not only does item banking online (so users can log in from anywhere), but also delivers web-based exams including computerized adaptive tests (CATs), manages results, and provides reports. If you desire a demonstration or training on either system, please contact solutions@assess.com.

Further reading

Vale, C.D. (2006). Computerized item banking. In Downing, S.M., & Haladyna, T.M. (Eds.) *Handbook of Test Development*. Mahwah, NJ: Erlbaum.

The most comprehensive book available on test development has an entire chapter devoted to item banking software, written by a co-founder and former President of ASC.