

Truth-Telling and Survey Methods in Advocacy Research:
A Call for the Formation of the Flat Venus Society in Library Assessment

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ABSTRACT

Computerized images from the 1992 Magellan space probe depicted high mountains and deep canyons on the surface of the Venus. Aware that Venus is mostly flat, rolling plains, one planetary scientist founded *The Flat Venus Society* to advance the aim of accurate representation of planetary scientific data. Since a culture of assessment requires accurate, thorough, and impartial collection, interpretation, and reporting of data, this paper proposes the formation of *The Flat Venus Society in Library Assessment*.

The paper reviews major library advocacy research studies and campaigns in the USA. Quite often these studies and campaigns report inaccurate information and draw unjustified conclusions. Many research studies fail to fully address limitations of their designs. Others misapply statistical techniques due to an insufficient grasp of their proper uses. Some campaigns use questionnaires for educational rather than data-collection purposes, exacerbating the already inadequate understanding of survey research methods among the profession at large. Interpretations and uses of cost-benefit and return-on-investment studies are often incorrect. Library value calculators are deceptive tools whose use should be abandoned. A call is made for the curtailment of the influence that marketing specialists have on the production of library advocacy information. The practices of these specialists threaten the reputation and credibility of the profession as a whole. A strategy by which the library assessment community might promote best research and quantitative analysis practices in librarianship is proposed.

"Evidence is like a jigsaw puzzle. You can't see the whole picture until it is completed."

- Jessica Fletcher, *Murder, She Wrote*¹

In his book *Visual Explanations* data visualization guru Edward Tufte recounts a story about astrobiologist David Morrison. When computer-enhanced images of the planet Venus were released by the National Space and Aeronautic Administration (NASA), their coloring, magnification, and scaling were grossly misleading. This led Morrison to publish this announcement in a planetary science publication:

This is a call for the formation of the Flat Venus Society. In the face of a media blitz that conveys the impression that Venus is characterized by soaring mountains and deep canyons, a dedicated group is needed to promote the fact that our sister planet is mostly flat, rolling plains.²

Because NASA's images exaggerated the slope of the planet's surface by a factor of 22.5 to 1, Morrison lamented:

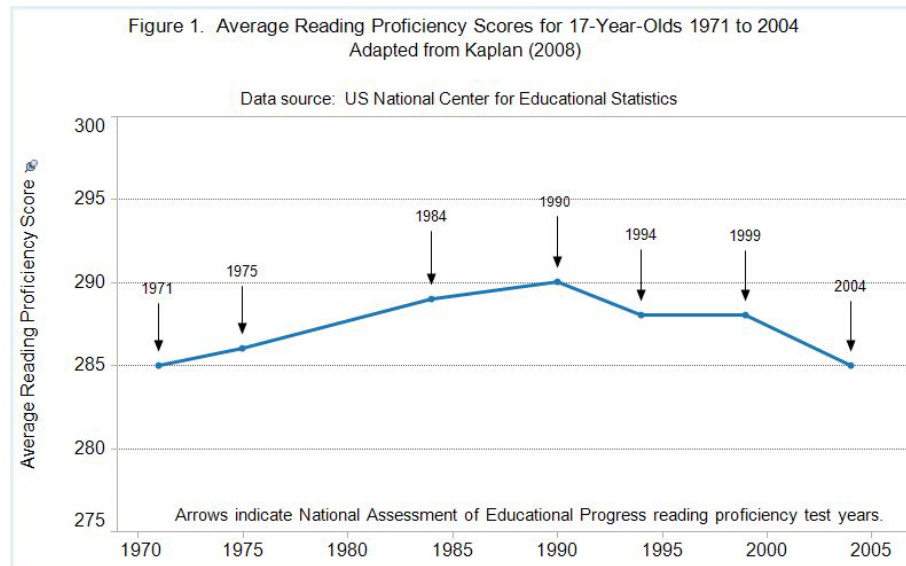
It does not take a rocket scientist to calculate that the mean slopes are no more than 3°. Yet the public thinks [Venus's volcanoes] are precipitous peaks with near-vertical walls rising into a black sky. (A black sky? On Venus?)³

Planetary scientists favoring fair, accurate, and responsible interpretation of scientific data were thus sought for membership in Morrison's Society.

It seems only natural that librarianship would support the sort of stance Morrison took. The importance of establishing the authenticity, accuracy, completeness, and relevance of information is central to our professional practice. Yet, we delegate our professional advocacy duties primarily to library marketers who apply the same tactics as NASA's cadre of public relations specialists. Campaigns devised thereby on behalf of libraries and librarians end up violating the core principles of the profession. Therefore, this paper is a call for the formation of *The Flat Venus Society in Library Assessment*. Information professionals favoring fair, accurate, and responsible portrayals of the efforts and accomplishments of libraries are hereby sought to join this cause!

Interested recruits can prepare for the task ahead by drawing inspiration from the work of Nancy Kaplan,⁴ who wrote: "To test official claims against available data requires us to know both how to understand quantitative measures and, more important these days, how to follow or seek out the trails that lead from claims to evidence."⁵ Kaplan examined the findings of a 2007 National Endowment for the Arts (NEA) report on the status of reading in the U.S.⁶ To support their claim that reading skills have been on the decline, NEA used a subset from a larger set of survey data on student reading proficiency collected by the National Center for Educational Statistics (NCES). Specifically, the full set of data spanned from 1971 to 2004, while NEA's analysis began with 1984.

One of Kaplan's key observations is illustrated in Figure 1: There was a moderate upswing in the average reading proficiency score for 17-year-olds until 1990, followed by an equivalent downswing into 2004.⁷ In other words, average reading proficiency levels in 1971 and 2004 were the same. So, NEA's use of half of the overall data misrepresents the larger picture. There was no substantial reading decline over the longer period.



Granted, other data in the NEA report that buttressed the theory of the decline of reading were interpreted reasonably fairly. Yet, not all of the data supported NEA's argument. Though unmentioned by Kaplan, NCES data also showed that average proficiency scores for 13-year-olds increased consistently from 1971 to 2004.⁸

When investigating research questions researchers are obliged to examine the complete range of evidence impartially even when some evidence might contradict our hypotheses. A key challenge for advocacy research is producing defensible findings while embracing the values that inspire the research. We apply evaluation and behavioral science research methods to library advocacy in order to produce evidence that passes higher standards of validity and objectivity. Impressionistic, anecdotal, biased, or otherwise tainted information all interfere with the accomplishment of this objective.

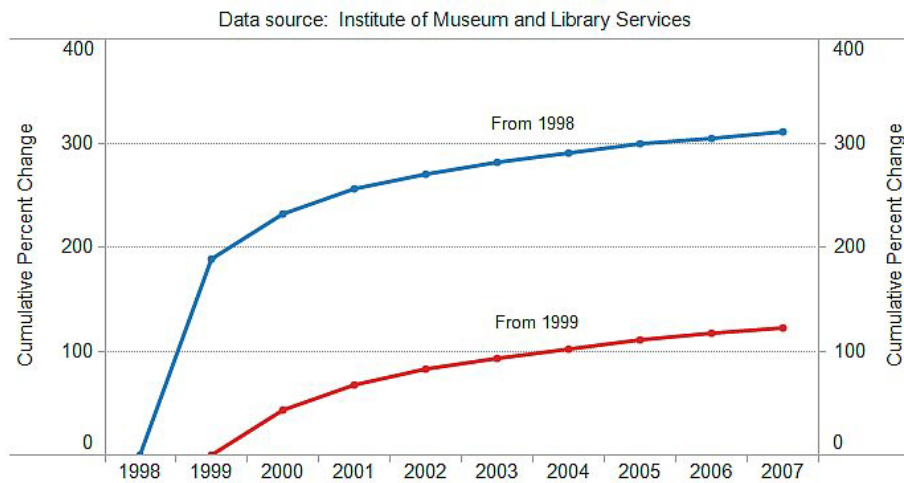
No Ration of Exaggeration

Nevertheless, the temptation to sensationalize data can be difficult to resist. This was true for Becker et al. in their national survey of use of public access computers. They report that the “average number of public access computer terminals in public libraries grew by more than 300 per cent.”⁹ Their observation is based on the annual survey of public libraries conducted by NCES. 1998 was the first year that counts of public access computers were collected. That year only 57% of libraries submitting their annual data reported this new item.¹⁰ So, the 1998 count—24,088 for the fifty U.S. states and District of Columbia—was quite understated.

In 1999 when 96% of reporting libraries did report this item, the count of public Internet terminals jumped to 69,427.¹¹ The increase from 1998 to 1999 was 188% as seen in the upper (blue) line in Figure 2. This single-year boost caused the cumulative rate of change to reach 300% by 2005. However, tracing the rate from 1999 results in a cumulative change of only 122% by 2007 as seen in the lower (red) line in Figure 2. Clearly, the lower line is a fairer representation of cumulative growth.

Moreover, rates of national public access computer installations over time are not useful measures of progress in making them available. Installation rates are necessarily high early on, diminishing steadily over time. The more useful measures of progress are the total number of computers installed and the extent to which these meet community needs.

Figure 2. Cumulative Percent Change in the Number of Public Access Computers in U.S. Public Libraries



Because of the extended economic downturn, public library advocates have recently latched onto the ideas of libraries as key sources of career assistance for U.S. citizens, and library computers as powerful job-seeking tools. These ideas have been disseminated widely by the American Library Association (ALA) and also appear in a national marketing project created by the Online Computer Library Center (OCLC) known by the 21st century moniker of “Geekthelibrary.org.” A brief educational questionnaire on the project's website lists this multiple-choice question: “In the current economic climate, what is the most common use for your local library's computer center over the past year?”¹² The correct answer is given as “preparing resumes and searching for jobs.” The website elaborates:

Libraries across the country report a significant increase in people coming in to use computers specifically to find and apply for jobs. Over 60 percent of U.S. libraries say that helping job seekers is now one of the most critical roles they play.¹³

While the Geekthelibrary.org website cites no sources for this information, the first statement appears to be based on anecdotal reports from national and state library organizations and the

news media. The second statement is probably from one of the series of longitudinal studies by Davis, Bertot, and McClure. This particular study found that 66% of librarians believed that computer-related services for job seekers are critical to their community.¹⁴ The following year the same researchers found this figure to be 74%.¹⁵ Neither of these surveys collected data about how often library computers were used for job-seeking compared with other uses. This technicality did not prevent Geekthelibrary.org staff from transforming librarians' impressions into measures of services actually delivered. Nevertheless, their claim is purely speculation.

As masters of persuasion, library marketeers seek to charm rather than inform. A typical example of marketeering prevarication is this factoid-style assertion from a promotional flier published by OCLC: "U.S. public libraries offering career assistance: 13,000" and "U.S. Department of Labor One-Stop Career Centers: 3,000."¹⁶ The suggestion is that, due to their prevalence, libraries provide 4.33 times more career assistance than government one-stop career centers do.

There are two problems with the comparison. First, due to their prevalence we might suppose that neighborhood convenience stores sell four times as many gallons of milk as supermarkets do. But we need actual sales figures from both store types to see whether this is true. Second, the comparison ignores the specific types of career assistance most public libraries provide compared with those most career centers do. Public library services are likely to be self-service access to vocational materials, word-processing, online job search websites, and so on whereas services from government centers will typically include vocational assessments and counseling, training in resume writing, job interview coaching, and so on.

The data in the OCLC flier are inadequate for demonstrating whether or not public libraries outperform government career centers. Accurate measures of the mix and amounts of services users receive at these two institutions are necessary to make a valid comparison. While government career centers routinely collect data like these, libraries do not. Indeed, these measures would be quite valuable for library advocacy, comparisons with other public agencies notwithstanding. Unfortunately, our surveys to date, including those by Becker et al. and Davis et al., have not addressed this information deficit.

Really Mistaken Conclusions

The over-interpretation of library survey data takes various forms, as do the mistaken conclusions drawn. For instance, Geekthelibrary.org alleges that "Demand for computers in most libraries is so great that there is often a lengthy wait time..." and these "waiting lines are commonplace."¹⁷ In this case, Geekthelibrary.org again neglects to cite its information source(s). Presumably, the source is the same as the survey used by ALA to make this assertion:

Growing community demand...can overwhelm library resources...Despite ongoing improvement in the number of Internet computers available to the public, seven out of 10 public libraries report they do not have enough computers to meet demand all or some part of the day.¹⁸

The statement refers to the proportion of respondents choosing either of these two responses (of three available) to a questionnaire item in the study by Davis and her colleagues: (a) having “consistently fewer” computers than needed on any given day and (b) having fewer computers than needed “at different times” in any given day.¹⁹ It is unclear how uniformly respondents interpreted the wording of the multiple-choice responses. And, again, the data are the impressions of librarians, not auditable transactions reflecting actual computer availability and use. As for Geekthelibrary.org's interpretation of survey findings, Davis, Bertot, and McClure did not collect data about wait times. Thus, characterizing these as “often lengthy” is an embellishment of the facts.

Even overlooking these deficiencies, is it reasonable to conclude that library resources are “overwhelmed” because patrons wait for computers? Good public management requires balancing resources with need or demand. The particular problem of wait times is a quantitative one routinely addressed by the field of operations research. A typical operations research question in public services is the optimal distribution of emergency resources like fire fighting personnel and equipment or police patrol cars in a community. The goal is to minimize response (wait) times and deliver ample resources to respond effectively to emergencies—without overspending public funds. In the provision of emergency services it is understood that equipment may often be idle. However, for other public services including public library computers underutilization of equipment is a misuse of public funds.

Corporations understand this idea very well. An especially apt example is Disney World where waiting lines are an accepted part of the “guest experience.” Disney employs staff with Ph. D's in queuing theory to fine tune operations in order to maximize throughput on their attractions. Success is having a sufficient capacity that is busy all of the time while making wait times acceptable. As statistician Kaiser Fung explains, with Disney's attractions and also urban highway traffic flows, it is impossible to avoid occasional long delays no matter how many resources are made available.²⁰ Waiting lines may well be indications of efficient use of resources. Assessing the sufficiency of library computers requires more informative data than are available from the studies by Davis et al.

Buying Bias

The inadequacy of data does not prevent their promotion by the Geekthelibrary.org project. Indeed, several of the factoids posted on the project's website are untrue, including these statements: “Over 70% [of] elected and appointed officials feel that the library has sufficient funding” and “the majority (73%) [of elected officials] think the library has enough money for day-to-day operations.” In this instance the project cites its information source, which happens to be the OCLC study by De Rosa and Johnson that was the progenitor of the project itself.²¹ In this study the researchers polled U.S. elected officials by emailing the subscribers of *Governing*, a professional trade journal. Eighty-four self-selected respondents completed the study questionnaire.²²

Almost always self-selected samples are biased and inadequate reflections of the larger population our research studies seek to describe. Indeed, the OCLC researchers acknowledged this deficiency, noting that these respondents “represent a convenience sample that is quantitative

but not statistically representative of all local elected officials in the United States.”²³ The researchers should have therefore stated that the inferences could not and should not be drawn from this sample to U.S. elected officials nationwide. Instead, they devote twelve additional report pages to an analysis of these data as if they were reliable.²⁴

In these situations two basic explanations are possible, both of which are troubling: A research team recognizes significant faults in their findings and dismisses these intentionally, portraying the findings as if they were sound. Or researchers might not recognize the flaws or fully appreciate their severity. So, they operate under the misconception that their findings are more substantial than they actually are.

It is difficult to tell which is the case in this OCLC study due to the researchers' incongruous statement about the convenience sample. Perhaps they misunderstand aspects of sampling theory, as, for example, their use of the term “quantitative” suggests. Samples are neither quantitative or qualitative, although data collected by means of sampling is usually quantitative. Besides, whatever meaning might be ascribed to the term, the fact remains that the sample is unrepresentative.

A related entry on this same topic appears in the report's glossary:

Convenience sample—Data drawn from a population that has been selected because it is accessible and appropriate; not necessarily a statistically significant sample.²⁵

An entire sample cannot be characterized as statistically significant or insignificant. Rather, these designations are reserved for specific patterns exhibited in data that might (or might not) come from a sample. Statistical significance, discussed more below, is quite distinct from sample selection.

Unfindings

The possibility of conflicted intentions of researchers is illustrated in a recent study by Roman, Carran, and Fiore.²⁶ To the study's primary research question, "Do public library summer reading programs impact student achievement?" the researchers respond with an unequivocal, “Yes.”²⁷ Unfortunately, the evidence produced by study is quite insufficient to support this conclusion.

Proving that public programs produce change in clients requires certain minimum research design features. The designs must be able to isolate effects attributable to the program from those caused by extraneous factors. For this reason the most rigorous evaluation studies use random selection of participants, randomized assignment of participants to a program (treatment) group or control group, and/or some reliable method for establishing a baseline against which program results can be gauged.²⁸ Study designs that lack these methodological controls are insufficient for establishing an unambiguous link between the program and the results observed.

The design of the study by Roman et al. fails to establish such a link. The data reveal that summer reading students (“attendees”) out-performed students not attending summer reading

programs (“non-attendees”) both before and after the summer reading programs were held.²⁹ Thus, high reading achievement by attendees is attributable to factors beyond the summer programs. Because the attendee and non-attendee groups were not equivalent to begin with, comparisons between them are invalid.

The study data also show that average gains in post-summer reading proficiency by non-attendees was three times greater than gains by attendees. In the face of these significant contradictions, the study fails to explain any of the reading proficiency gains. The question about the role that summer reading plays in improving reading proficiency remains unanswered.

Roman et al. do acknowledge several weaknesses in the research design and say that the study therefore is “not definitive.”³⁰ (The more accurate term would be “inconclusive.”) They also explain that their research approach was intentionally “naturalistic” and “causal-comparative.”³¹ Whatever the advantages of these alternative designs, they do not produce reliable information about program impacts, again, due the lack of unambiguous linkages between program and results.

Unfortunately, this important fact is omitted from the executive summary, which reports this assertion without qualification: “Students who participated in the public library summer reading program scored higher on reading achievement tests at the beginning of the next school year than those students who did not participate...”³² Readers are left to assume that the summer programs accounted for the difference. We can only speculate about the motivations of researchers in studies like these. Are they purposely whitewashing results or do they believe their conclusions stand in spite of their significant shortcomings?

The Road to Wrong Information

For some researchers the road to wrong information is paved with the best of intentions. Rather than being purposely misleading, their studies present wrong information due to an inadequate grasp of research and statistical methods. A prime example is the use of inferential statistics and statistical significance testing. Because the theory of inferential statistics is so convoluted and non-intuitive, most statistics students never understand its concepts fully. As research psychologist Rex Kline reported, well-trained behavioral scientists often get the theoretical and practical details wrong.³³

It is not surprising, then, that library studies using inferential statistics would misinterpret their meaning. A recent OCLC report is an example of this.³⁴ The researchers conducted statistical significance testing on data from their survey of user perceptions of online catalogs. Then they made observations like “Significantly more public library respondents” preferred a given feature than academic or special library respondents, or that “significantly more academic and special library respondents ranked” some features higher than public libraries did.³⁵

These observations, however, misjudge what tests of statistical significance do. In actuality, they are like pass-fail tests. The tests serve as a rule-of-thumb for determining whether differences found in data are probably, one might say, “real” rather than “imaginary.” When the data pass the test (differences observed are “statistically significant”) the result is arguably a valid

reflection of the phenomena under study rather than explainable as a statistical artifact or fluke. When the data fail the test, the observed data (differences) are considered to be a statistical fluke.

Tests of statistical significance do not tell us whether some data are significantly higher or lower than other data. A given difference might be considered small, moderate, or large depending on the context. An evaluation of the magnitude of observed differences should be based on subject area knowledge and professional judgment, not on statistical significance. Statistical significance testing answers only the pass-fail, yes-no question of whether differences are likely real rather than statistical flukes. Granted, this is a subtle point about a confusing topic. Still, if our studies are unable to interpret a given statistical tool correctly, we should avoid using the tool. Otherwise, our misinterpretations can lead our reader audience astray.

An American Association of School Libraries (AASL) study did happen to lead its readers astray concerning its survey results.³⁶ In each year in which it was conducted, this longitudinal study has been based on respondent self-selection, that is, a convenience sample. In this case, the AASL report includes margin of error information—percentage ranges typically appearing with surveys and polls to indicate how precise the survey data are based on certain statistical assumptions. These assumptions, however, require that the survey utilize a probability sampling method such as random sampling. Convenience sampling falls under the more general rubric of nonprobability sampling. There are no reliable ways for estimating the precision of survey findings when respondents are selected using nonprobability sampling. So, the margin of error information AASL published is fiction.

The Beneficence of Cost/Benefit Analysis

To some in librarianship, financial and economic comparisons hold the greatest hope for proving and promoting the worth of libraries. These comparisons involve two related methods for estimating value—return-on-investment and cost-benefit analysis. Each approach involves calculations meant to identify the extent to which the economic benefits of a library (or library program) exceed its economic costs. The theoretical bases for these approaches are exceedingly complicated, involving several nearly incomprehensible concepts (“Pareto improvement,” the “Kaldor-Hicks criterion,” and others). Fortunately, as a project proceeds with survey instrument construction, the relevant concepts (“contingent valuation,” “willingness-to-pay,” “consumer surplus,” and so on), are not quite so esoteric.

Nevertheless, once studies are completed and results reported, a gap in our understanding becomes apparent. We are still apt to misunderstand the theory behind these approaches. For instance, Elliott et al. have been careful to communicate an important principle pertaining to cost/benefit analysis: Valuations from this analysis are unique to the communities and institutions from whence they come.³⁷ The figures are really not comparable across communities or institutions due to differences in assumptions and measures utilized. While cost/benefit ratios are expressed in units of currency (dollars), the ratios are not necessarily standard, that is, they may not be calibrated on equivalent scales. The library community at large remains unaware of this constraint as evidenced, for example, by the list of return-on-investment ratios for various U.S. states published by the Library Research Service.³⁸

Results from cost/benefit analysis are statements about “economic efficiency,” the degree to which the measure of relevant economic benefits surpasses all relevant economic costs. This idea should not be confused with the idea of “technical efficiency” (also called “operational efficiency” and “productivity.”) Technical efficiency refers to a determination of the financial cost of producing a standard amount (single unit) of a given product or service.³⁹

Nevertheless, a report by the now defunct Americans for Libraries Council mistook one form of efficiency for the other. It commended a library whose cost/benefit results led to the library sharing “management practices with local school systems and fire districts...to impart the secrets of its efficiency in managing money.”⁴⁰ Neither cost/benefit analysis nor return-on-investment are indicators of an organization's operational efficiency or its financial performance. Neither are they indicators of the managerial skills of its administrators.

More importantly, returns and benefit/cost ratios do not answer an important question: Are returns or surplus of benefits over costs adequate? Because these approaches take a purely economic perspective, they raise the distinct possibility that alternative public programs could produce greater returns given the same resources. Thus, if a local parks and recreations program demonstrates a return-on-investment that exceeds that of the library (presuming both are conducted in the same community using the same measures and assumptions), the community would be justified therefore to transfer its investments from libraries to its parks and recreation programs.

The most insidious use of these analytic approaches is the now popular “library value calculators.” They calculate savings that users ostensibly enjoy from borrowing books, attending library programs, and so forth compared to the taxes or tuition they pay in support of the library.⁴¹ However, these calculators are promotional gimmicks masquerading as assessment instruments.

Consistent with the mindset of marketeering, these virtual devices are meant to delight users more than inform them. What is not obvious, however, is how they hide information. They do so in the same manner that a skillful magician hides details of the physical realities of her tricks, namely, by means of distraction. The returns they announce for an individual user are, in reality, counter-balanced by one or more students, citizens, or households whose returns are negative. Losses by this group directly subsidize the surpluses reaped by the happy users of these devices. The losses part of the equation, as it were, is conspicuously missing from the calculator's programming. Withholding information like this makes these tools slanted and deceptive.

Further, the whole idea of individual returns or benefits is inimical to the conduct of library assessment. In assessment our objective is to determine how the library and its programs benefit the community of users as a whole, not how any given individual fares. For this reason, the calculators are not bona fide assessment tools. Regrettably, they have been endorsed by leaders in library evaluation and assessment including the Library Research Service and Herson and Altman.⁴² However, because these calculators withhold information, they are deceptive. Their use by libraries should be abandoned.

Plan for Our Planetary Society

The mission of the *Flat Venus Society in Library Assessment* is to keep the profession mindful of our commitment to responsible collection and use of library advocacy information. The Society encourages the formulation of complete and balanced portrayals of evidence without embellishments, hyperbole, or spin. In the end, exaggerated interpretations of research findings prevent us from improving the quality of our research and statistical information gathering. Stretching the truth about findings can lead us (and our constituents) to believe our data are more informative and substantial than they actually are. This mistaken belief then diminishes the incentive to seek the information actually needed to answer our research questions.

Part of the problem is the library profession's inordinate emphasis on marketeering, along with that specialty's low regard for information accuracy. Another is the profession's general ignorance of the principles of research, assessment, and evaluation. This ignorance makes the misappropriation of assessment tools for promotional purposes easier, as the case of library value calculators illustrates. Misappropriation of tools in this manner violates basic principles of sound measurement and evaluation. And it trivializes the assessment process, making users believe that measurement is a cinch when nothing could be further from the truth.

The same is true for the now popular use of questionnaires as teaching tools rather than survey research instruments. The multiple-choice Geekthelibrary.org questionnaire described earlier is one example. Another is an online questionnaire promoted by the Institute of Museum and Library Services to promote “21st century skills.”⁴³ While the educational goals pursued might be laudable, this application adds to the profession's already considerable naiveté regarding survey methods and measurement. The purpose of teaching-tool questionnaires is to influence (that is, change) respondents. That this purpose is wholly incompatible with sound measurement will not occur to most library professionals. In research and measurement it is crucial that data collection techniques do not bias or unduly influence respondents.

The only way to counter the inordinate influence of library marketeering is to establish high standards for advocacy information accuracy, reliability, completeness, relevance, and reasonableness. A fruitful area in which to begin would be lobbying for sound survey research practices throughout our professional organizations. In particular, we need to stress the importance of avoiding conducting surveys by means of convenience sampling. Further, the profession needs to assess potential bias in surveys conducted online by opinion research bureaus whose survey methods and respondent panels are proprietary and unverifiable. We need also to emphasize the importance of replicating survey studies, following Kline's reminder that, “Replication is a gold standard in science.”⁴⁴ Rather than making grand pronouncements from single surveys, advocacy research findings should contain caveats explaining the approximate nature of the results. In this same vein, consumers of advocacy research need to be reminded that no research findings are completely certain (uncertainty always lurks), regardless of the rigor with which it has been conducted.

In light of this pressing need, the formation of the first working committee of the *Flat Venus Society in Library Assessment* is hereby announced: The Standards Committee. Interested applicants for membership are cordially welcomed!

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