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Software Engineering Institute
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State of Software Measurement Practice Survey

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Presentation Outline

- Introduction
  - Survey objectives & approach
  - The population being studied
  - Sampling plan
- Results
  - Response rates and outcome
  - Population demographics
  - Attitudes and beliefs about measurement use
  - Measures that are reported
- Summary Observations

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Survey Objectives

The objectives of this survey are to characterize

- the degree to which software practitioners use measurement when conducting their work
- the perceived value of measurement
- approaches that are used to guide how measures are defined and used
- the most common types of measures used by software practitioners

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Characteristics of the Survey

We used a structured, self-administered questionnaire that was available both via the World Wide Web and in paper form.

The questionnaire was designed to be short (17 questions) and easy-to-complete with questions phrased in close-ended format. Several questions allowed for short open-ended responses.

Stratified random sampling was used to select candidate respondents from a population comprised of members from three different subpopulations.

Candidate respondents were offered incentives to participate including

- platinum membership to the Software Engineering Information Repository (SEIR) that provides access to documents otherwise unavailable through regular membership
- early access to the survey results

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The Population Being Studied

The population that we would have *liked* to have studied is the entire existing body of software practitioners in the world. However, such a representative database was unavailable to us.

The population that we did use for this study included individuals who:

1. were entered into the SEI customer relations database during 2004-2005
2. registered to gain access to the SEI's Software Engineering Information Repository (SEIR) during 2004-2005
3. became an SEI Member during 2004-2005

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Sampling Plan

Subpopulation	Population Size	Sample Size	Adjusted Sample Size	Actual Sample Size
Customer Relations	6,398	603	2010	1670
SEI Members	1,242	434	1,242	951
SEIR registrants	7,540	612	2040	1539
Total	15,180	1,649	5,292	4,160

Calculated for:
precision of ± 2.5%
confidence of 95%

Adjusted based on estimated 30% response outcome.

- Invalid email addresses
- Non-responses
- Ineligible respondents

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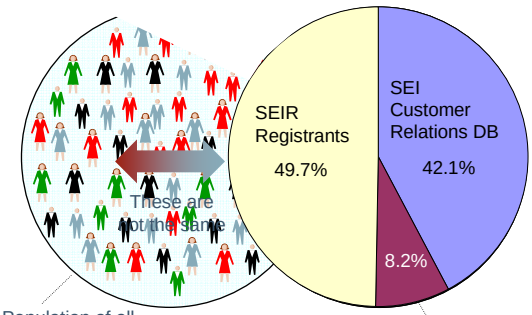
Important to Remember When Interpreting Survey Results



Survey results can *not* be generalized beyond the population used in this study.

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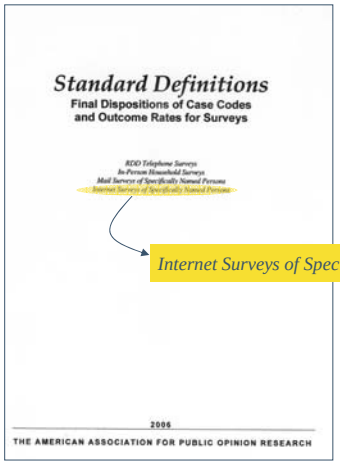
Response Outcome Rates



Internet Surveys of Specifically Named Persons

RR = Response rate
I = Complete interview
P = Partial interview
R = Refusal & break-off
NC = Non-contact
O = Other
UH = Unknown if household/occupied HU
UO = Unknown, other

Minimum Response Rate

$$RR1 = \frac{I}{(I+P)+(R+NC+O)+(UH+UO)}$$

RR1 = 42.4%

Counts partial interviews as respondents

$$RR2 = \frac{(I+P)}{(I+P)+(R+NC+O)+(UH+UO)}$$

RR2 = 50.7%

http://www.aapor.org/pdfs/standarddefs_4.pdf

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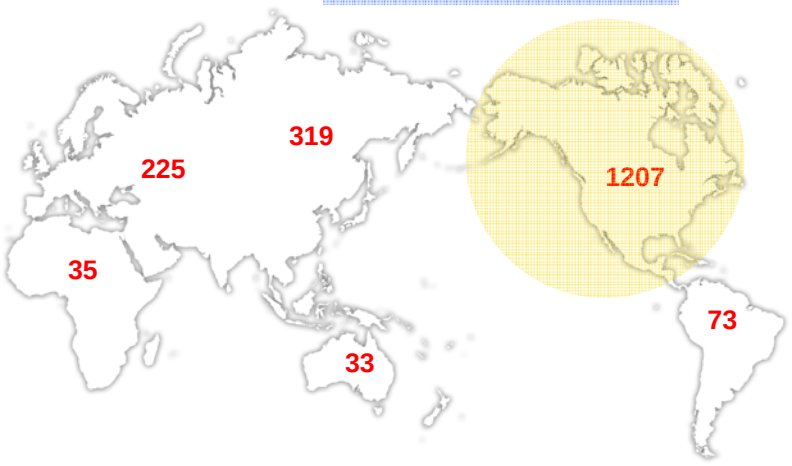
Respondents by Continent



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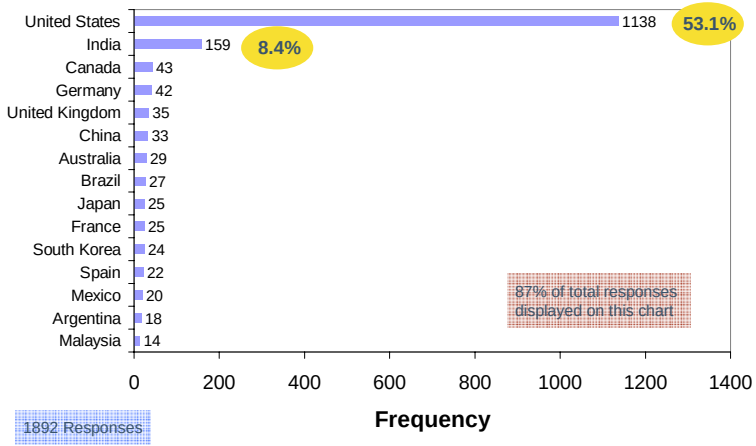
Primary Location – Top 15



1892 Responses

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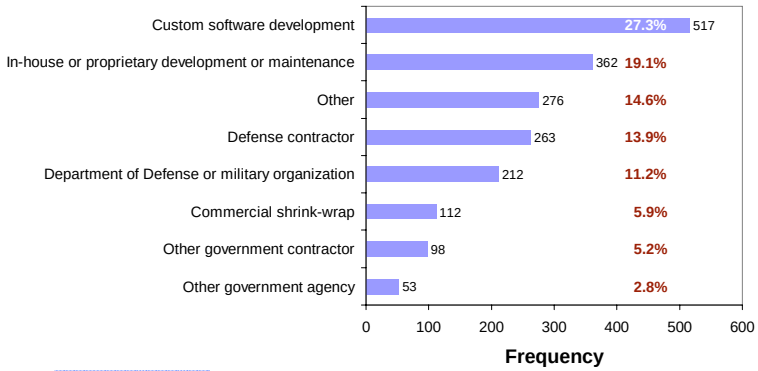
Describe Your Organization



1893 Responses

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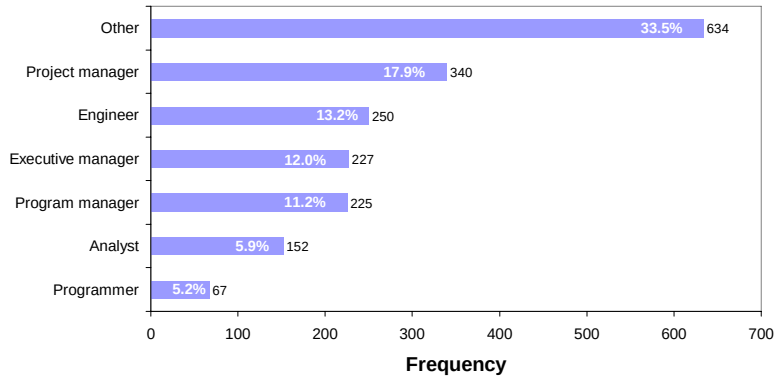
Survey Respondents



1895 Responses

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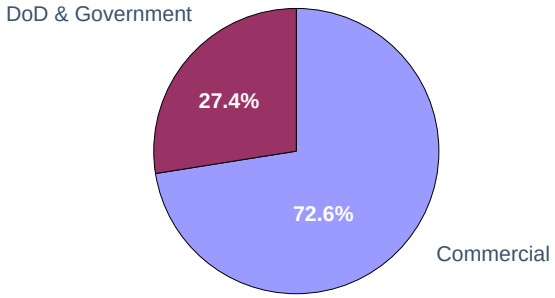
Approximate Population Proportions



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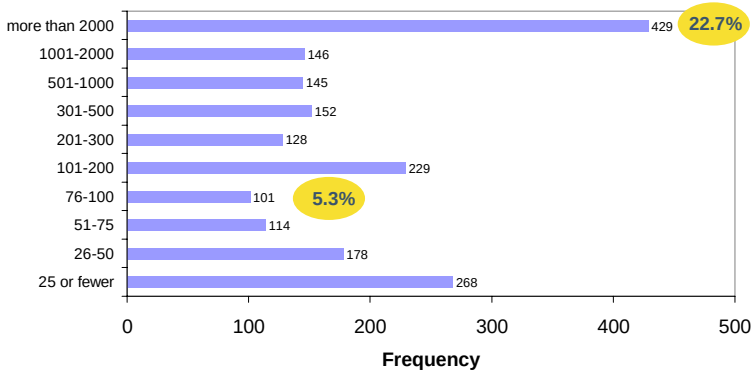
Number of Full Time Employees



1890 Responses

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How are you involved with measurement?
Are purposes for measurement understood?
Does measurement help?
Is measurement used to understand product/service quality?
Documented measurement processes?
Measurement definitions understood and consistent?
Do measurable criteria exist for products and services?
Is corrective action taken when thresholds are exceeded?

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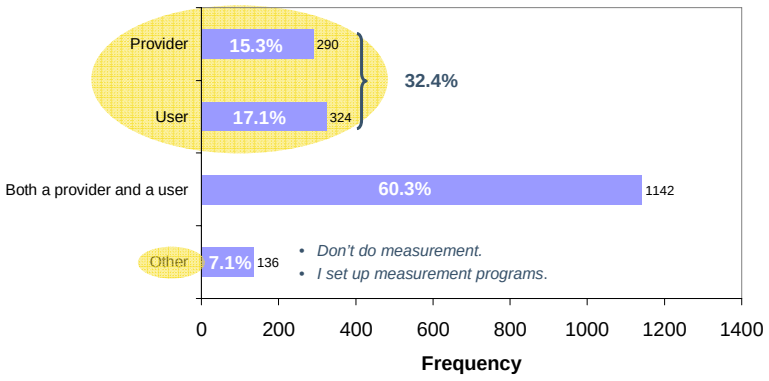
Involvement With Measurement



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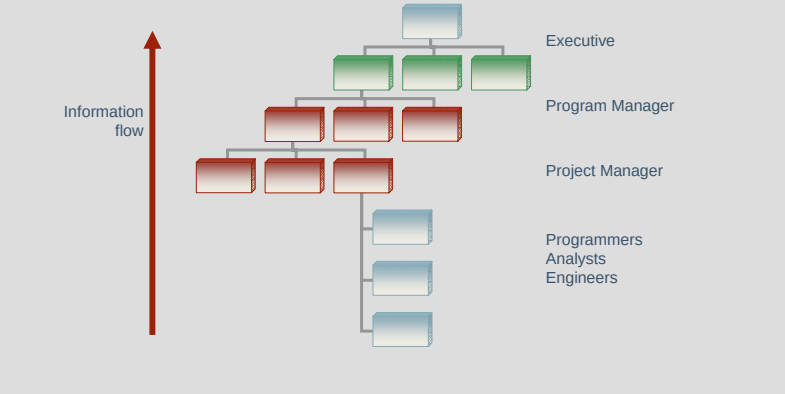
Provides (only) or Uses (only)



321 User

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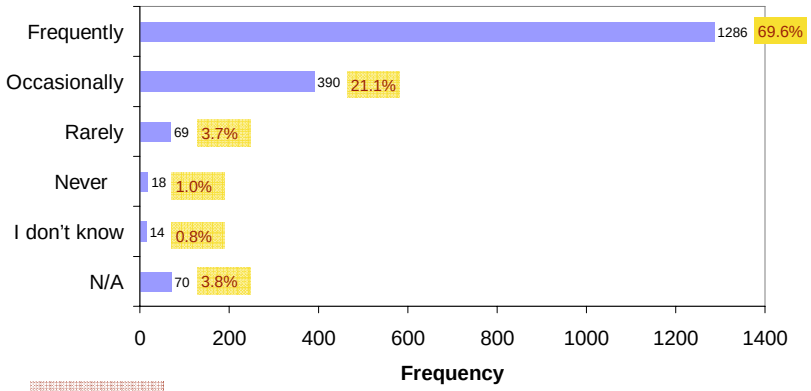
Purpose for Measuring Is Understood



1847 Responses

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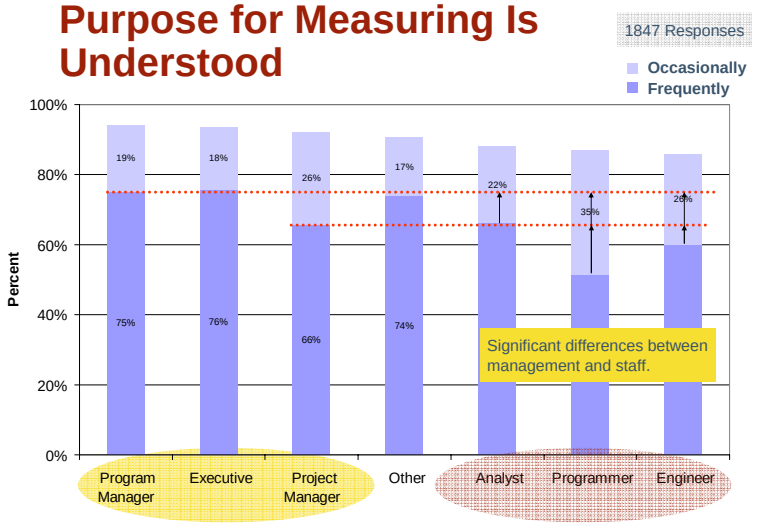
Purpose for Measuring Is Understood



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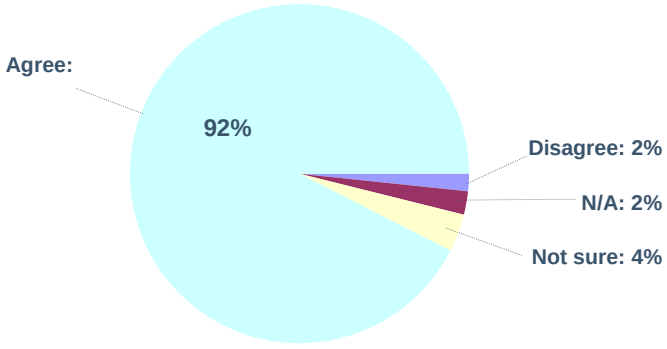
Believe That Measurement Helps (To Some Degree)



1868 Responses

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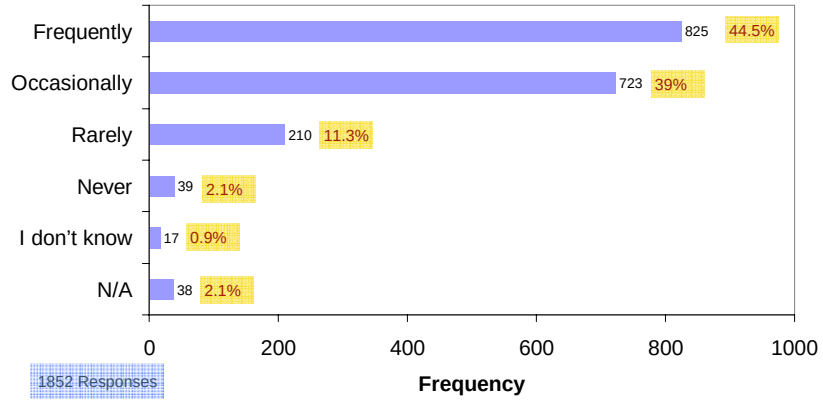
Measurement Used to Understand Quality of Products & Services



1852 Responses

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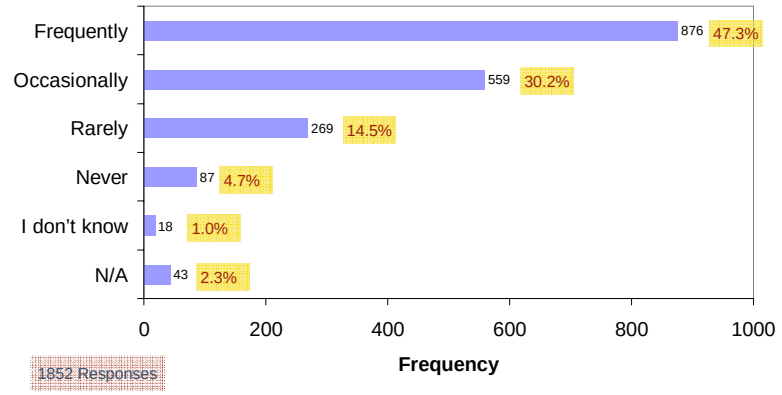
Documented Process for Collecting Measurement Data



1852 Responses

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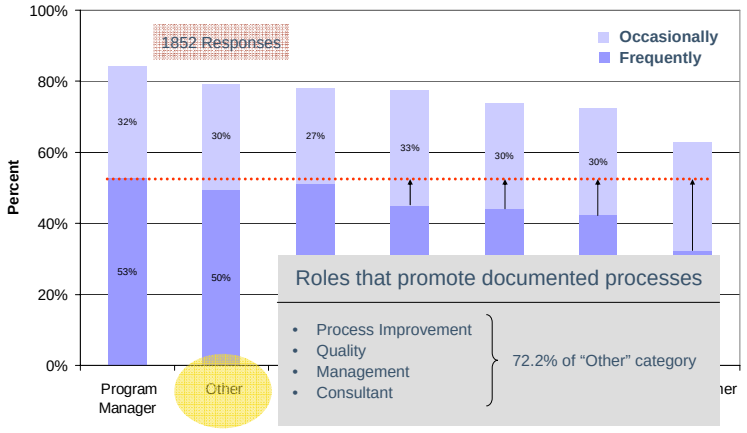
Documented Process for Collecting Measurement Data



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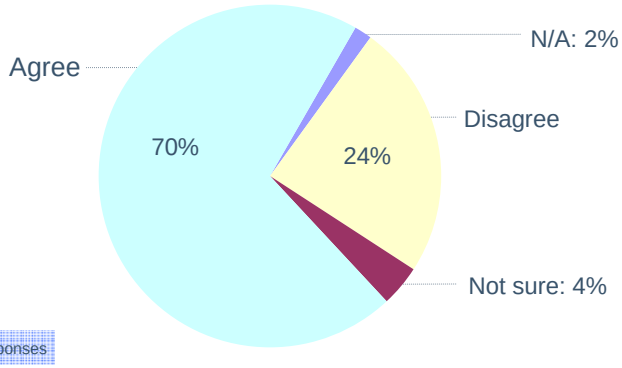
Measurement Definitions Are Understood & Consistent



1868 Responses

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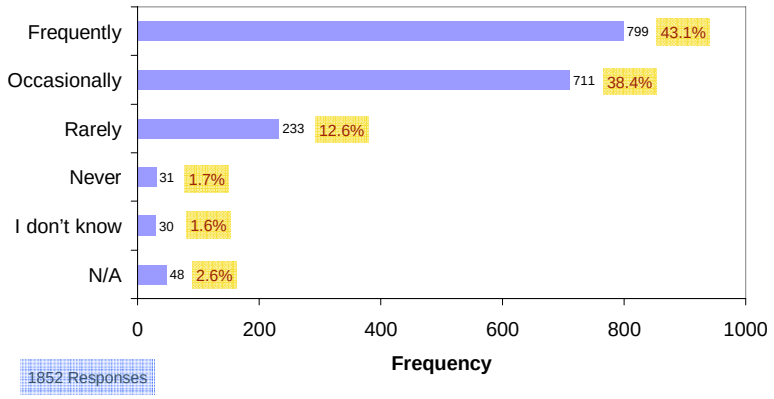
Measurable Criteria Exist for Products & Services



1852 Responses

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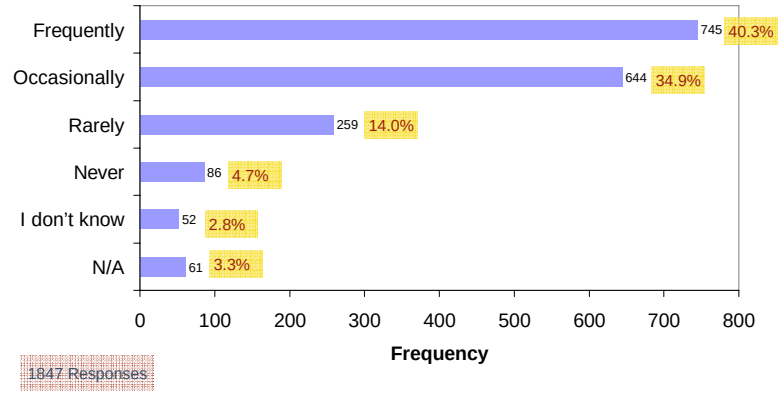
Corrective Action Taken When Measurement Threshold Exceeded



1847 Responses

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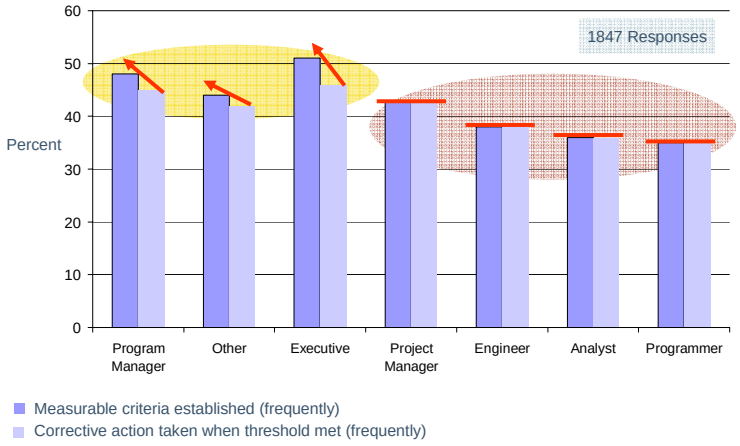
Action-Oriented Response to Measurement Information



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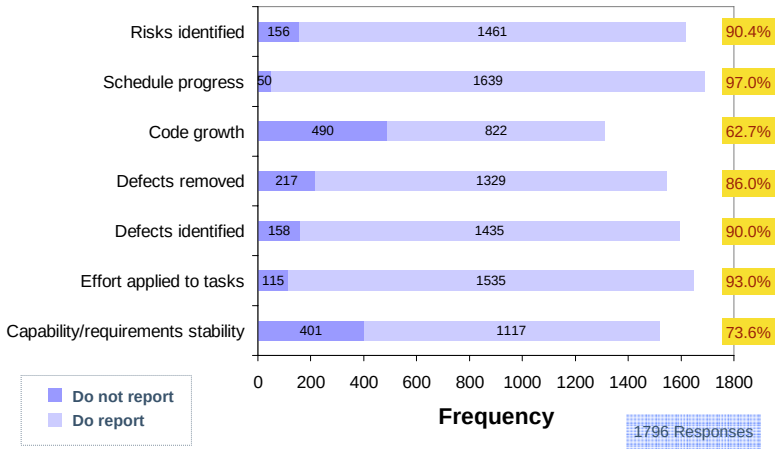
Measurements that Are Reported



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Summary Observations - 1

In general, there were significant differences in response patterns when comparing management versus staff.

Management	Staff
Executive	Engineer
Program Manager	Analyst
Project Manager	Programmer

Statistical tests of significance demonstrated that the differences were significant with confidence of at least 99% in all cases (and 99.9% in some cases.

- Hypothesis test for equality of proportions
- Chi-Square test for significance

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Summary Observations - 2

When compared to staff, management responded more strongly that

- they understand the purposes for measurement
- measurement helps their team perform better than without it
- they use measurement more often to understand the quality of their products and services
- they follow a documented process more often for collecting and reporting measurement data
- measurement definitions are commonly understood and consistent in their organization
- measurable criteria exist for their products and services
- corrective action is taken when a measurement-based threshold has been exceed

In general, the differences are statistically significant.

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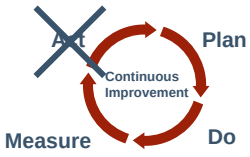
Summary Observations - 3

It is notable and a bit alarming that only 40.3% of all respondents reported that corrective action is taken when a measurement threshold has been exceeded.

Close to 20% of respondents reported that corrective action is rarely or *never* taken when a measurement threshold is exceeded.

Measurement doesn't help much unless the information is acted upon.



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Summary Observations - 4

Measures Reported

Schedule and time-on-task measures are most often reported.

- 97% of respondents indicated that schedule progress was a measure most often reported.
- 93% indicated that effort applied to task was reported.
- In addition, some respondents listed other measures that they report and 19.2% of these were related to time tracking.

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Summary Observations - 5

Measures Reported, continued

Code growth and Capability & Requirements Stability are measurements least reported by respondents.

- 27.3% do not report Code Growth
- 22.3% do not report Capability & Requirements Stability

Frequency of reporting measurement information varied depending on the measurement. However, most are reported on a weekly, monthly, or daily basis.

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Acknowledgements

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Laura Malone	Robert Stoddard	

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Finally, thank you to the individuals that took the time to assist us with this research by responding to this survey.