

***Impact of Chemometrics:
Industrial Perspective and The
View from Eigenvector***

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Outline

- Results from 2006 Survey for FACSS
- Eigenvector's view
 - Some favorite applications
 - Eigenvector stats

Chemometrics and Industry: A Successful Marriage?

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Survey for FACSS 2006 Session on Chemometrics and Industry

The upcoming Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) meeting will include a session titled "Chemometrics and Industry: A Successful Marriage?" The following survey was developed to help answer that question. We'd appreciate it if you'd take a few minutes to fill it out. Please note that this survey is intended for those working in **industry** rather than **academics**.

The survey responses will be kept **strictly confidential** and can be **ANONYMOUS** (absolutely NO personally-identifying information will be logged, not even your IP address). However, as an incentive for filling it out, the first 50 participants who include their mailing address (or an anonymous PO box) will receive one of Eigenvector's new "Ergo Aluminum Bottle Openers".

The results of this survey will be presented at FACSS and made available by request.

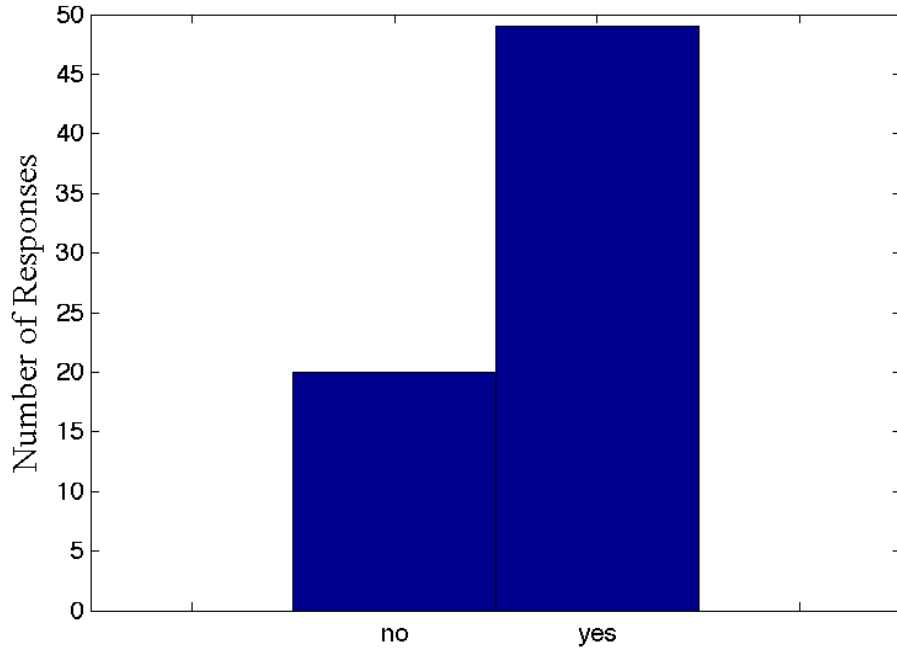
Please indicate how strongly you agree or disagree with the following statements using the scale:
 -2 = strongly disagree, -1 = disagree, 0 = neutral, 1 = agree, 2 = strongly agree.

	< strongly disagree		Neutral		agree strongly >
1. The availability of chemometrics technology has improved my company's bottom line.	<input type="radio"/> -2	<input type="radio"/> -1	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2
2. Having a trained chemometrician on staff has improved my company's bottom line.	<input type="radio"/> -2	<input type="radio"/> -1	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2
3. Our chemometric applications have been highly successful.	<input type="radio"/> -2	<input type="radio"/> -1	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2
4. The percentage of our chemometric applications still in use one year after development is about	<input type="radio"/> 10%	<input type="radio"/> 30%	<input type="radio"/> 50%	<input type="radio"/> 70%	<input type="radio"/> 90%

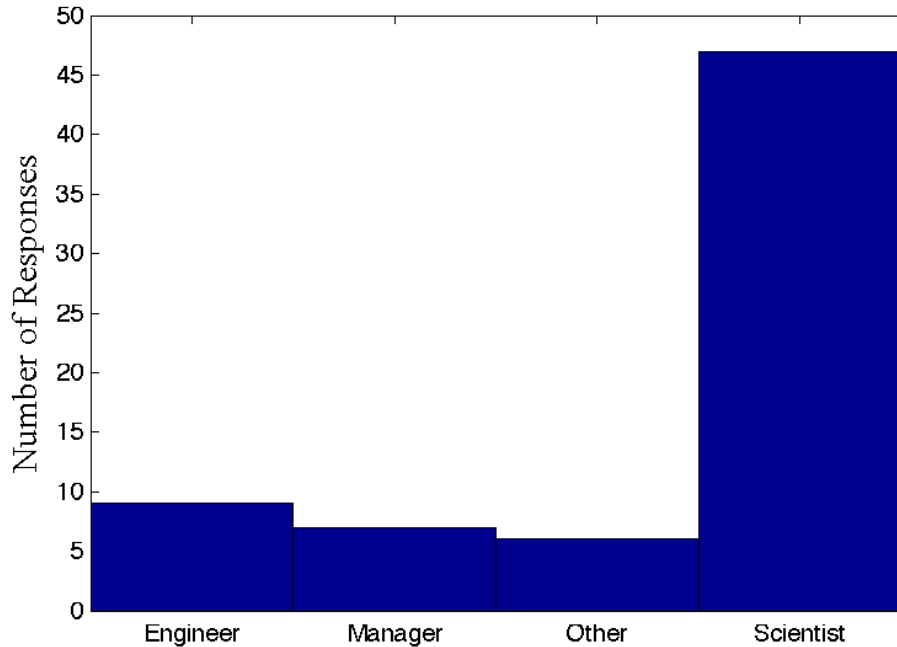
Who took the survey?

69 responses

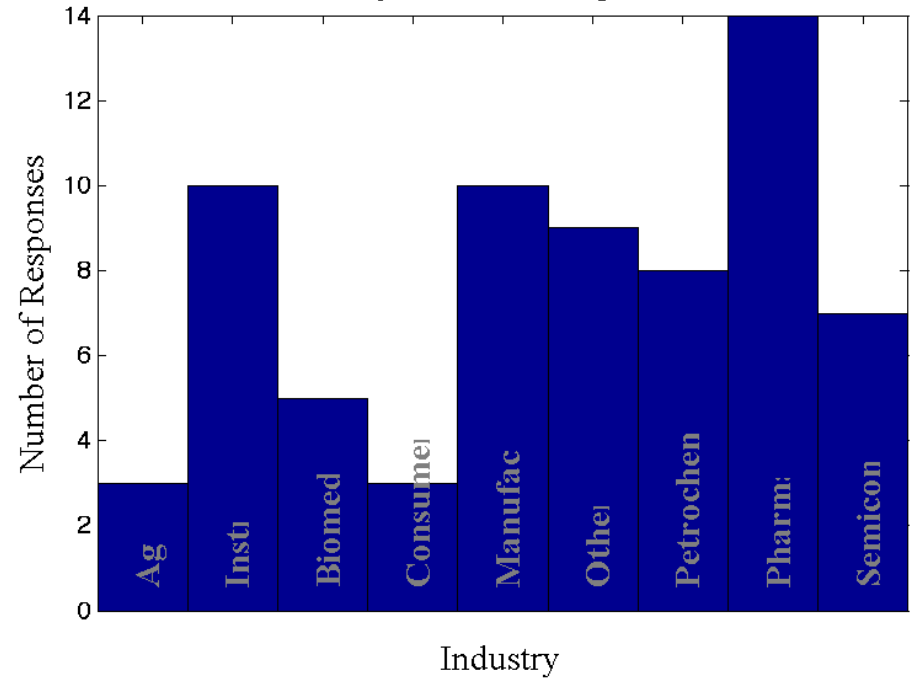
Are you a chemometrician?



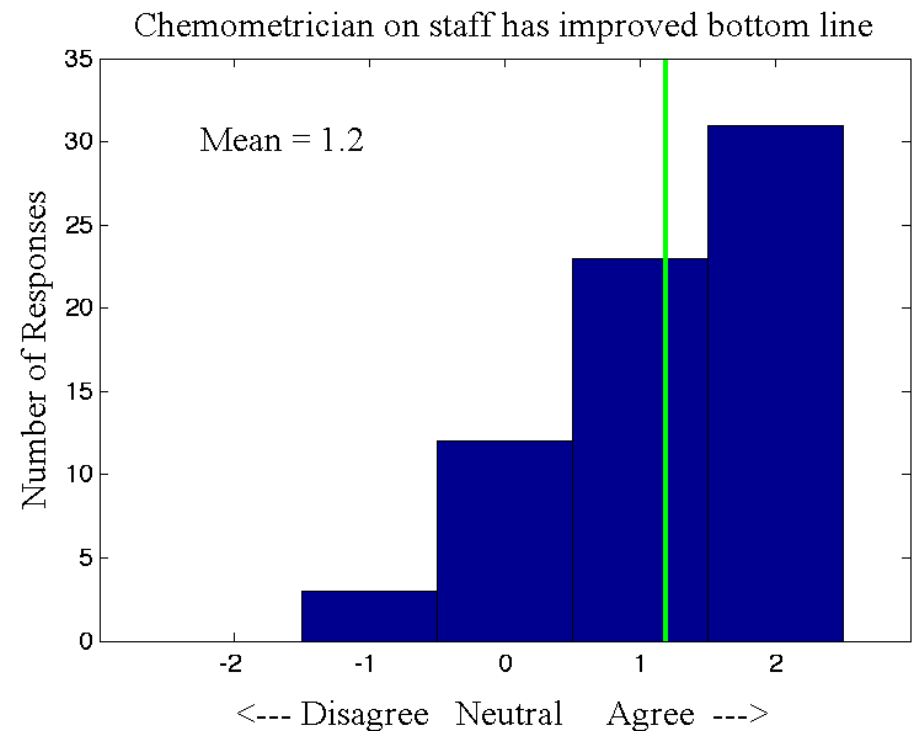
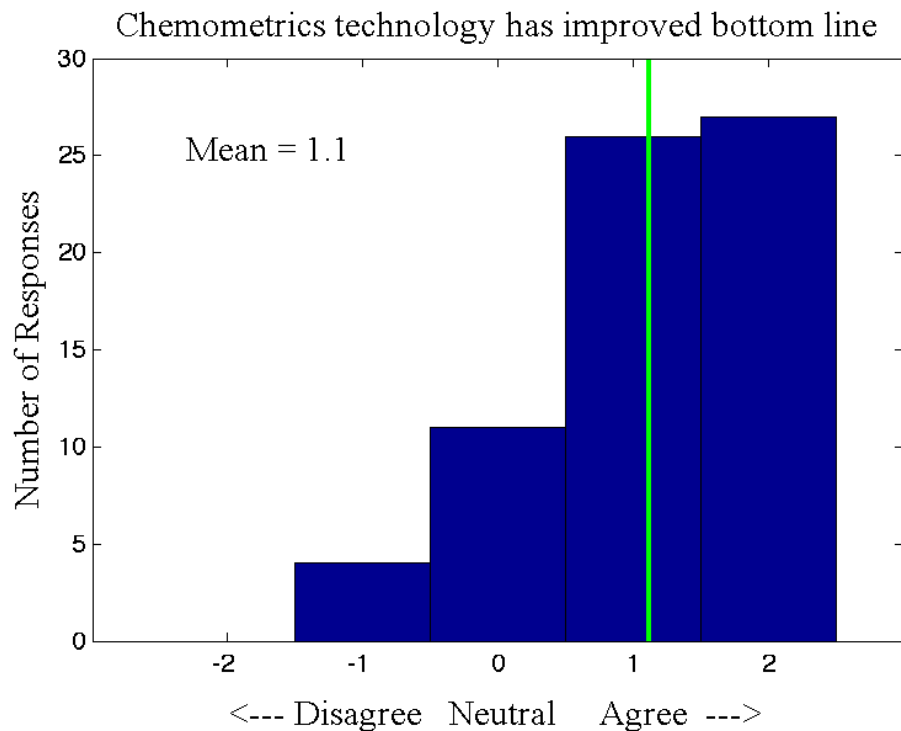
Job Function



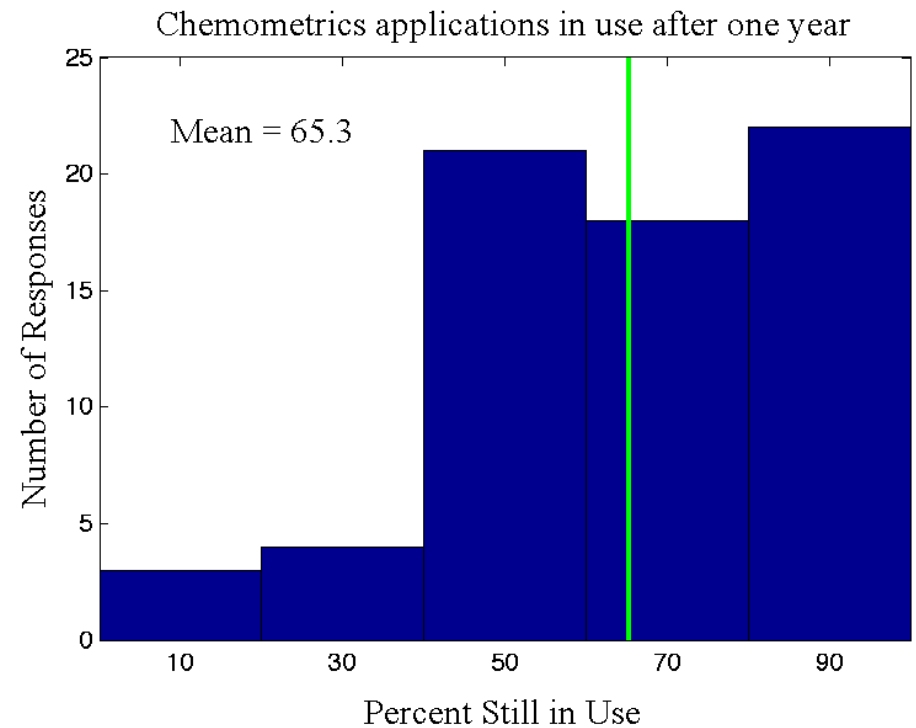
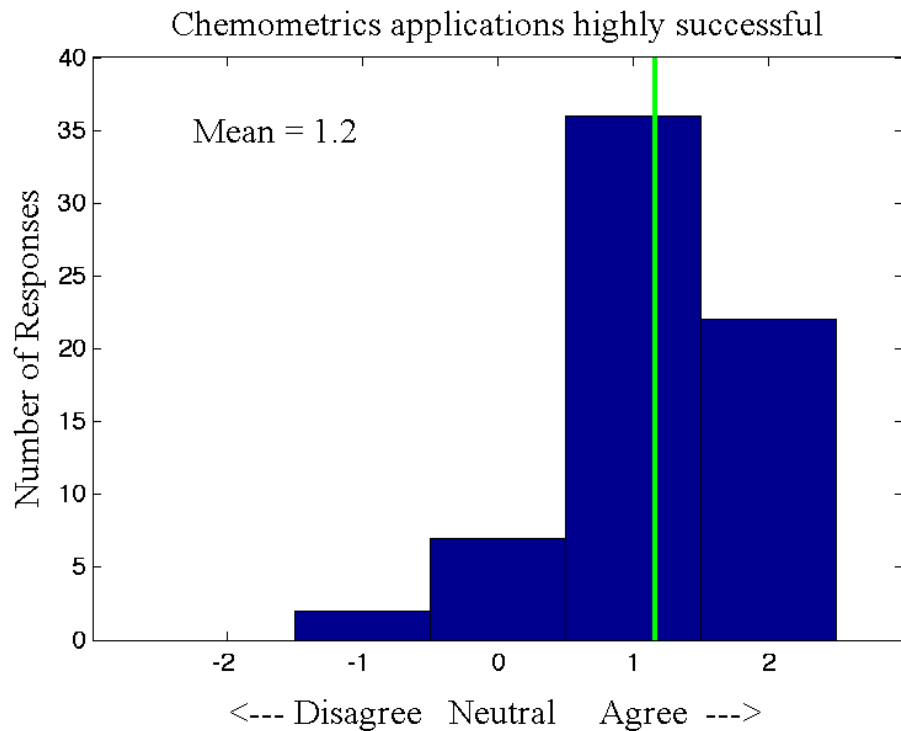
Industry Sector of Respondents



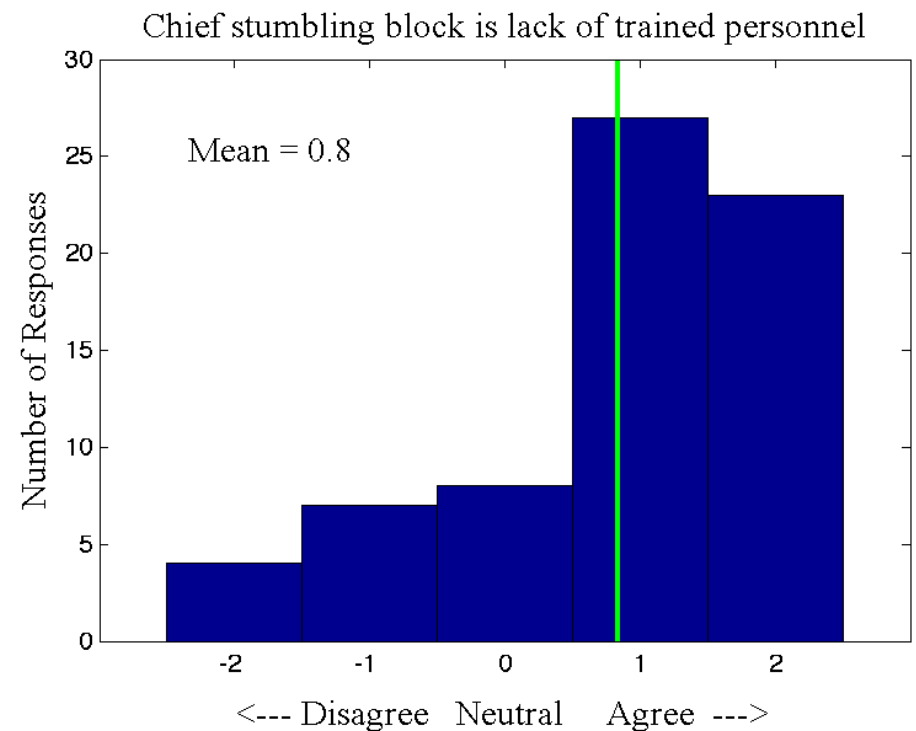
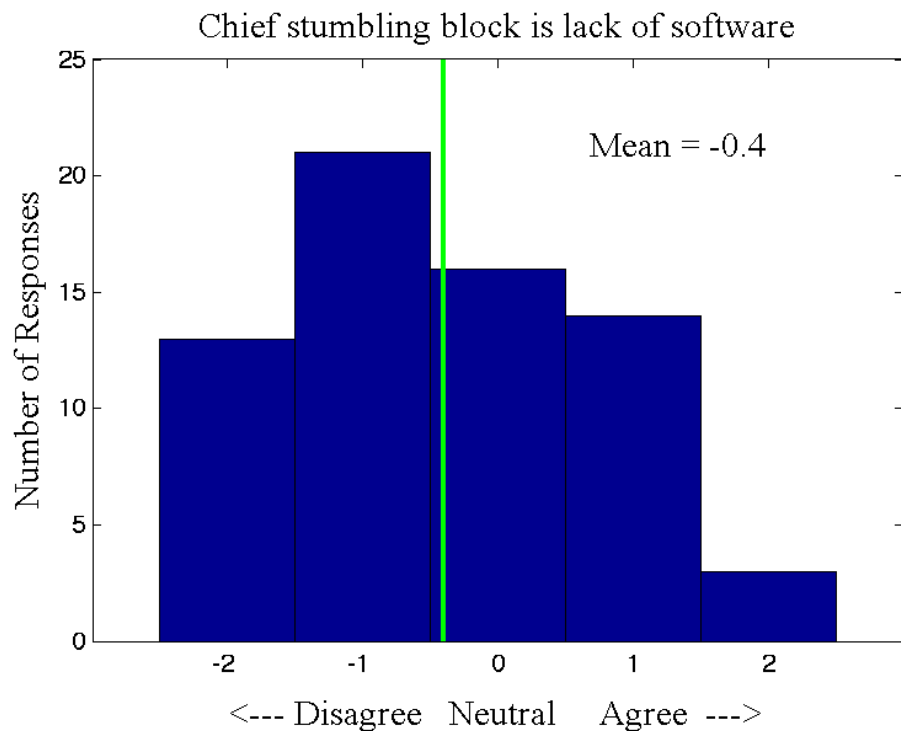
Chemometrics has positive impact on bottom line



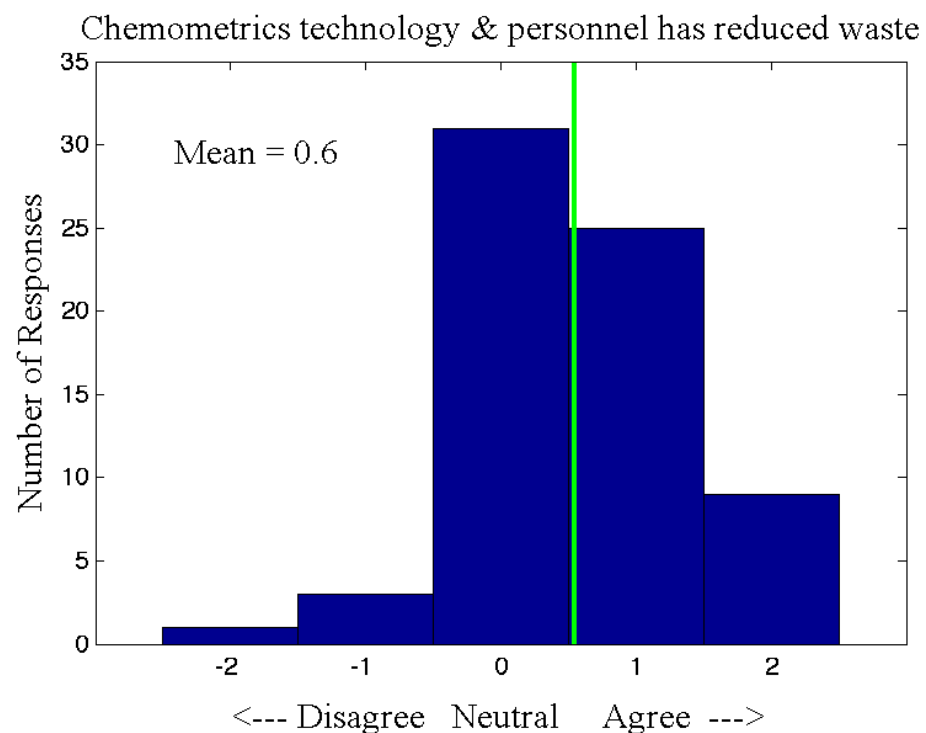
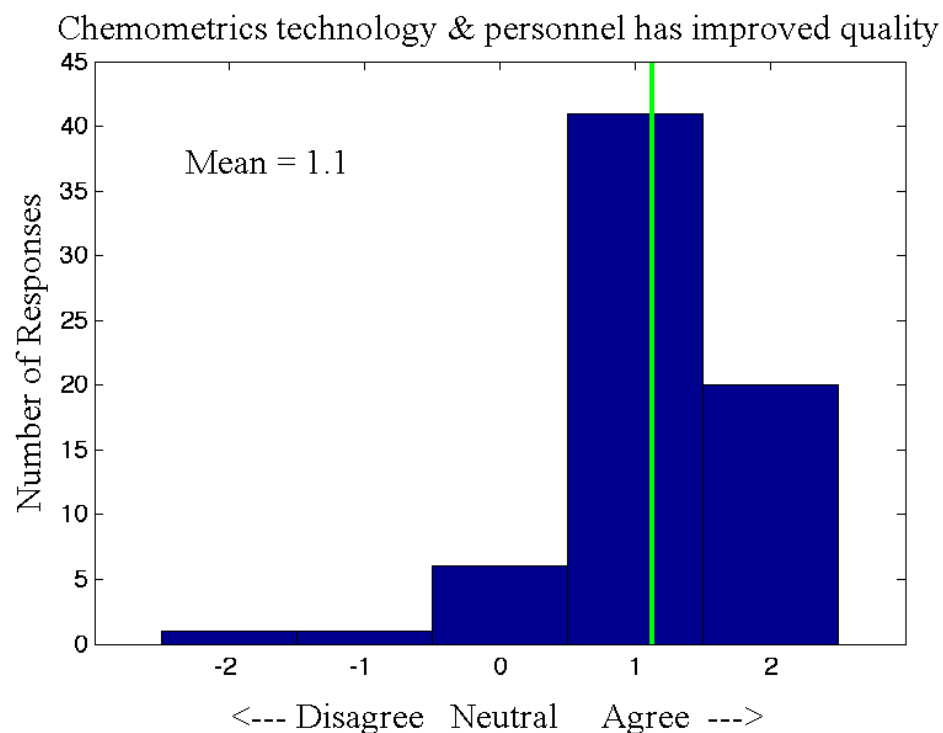
Applications successful and remain in use



Implementation problems due to lack of people, not software

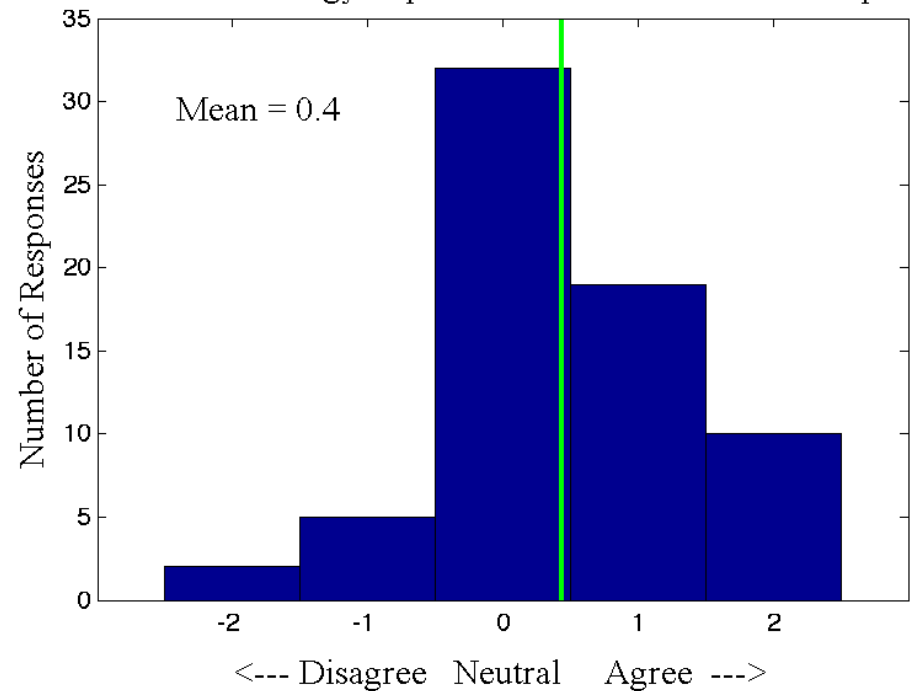
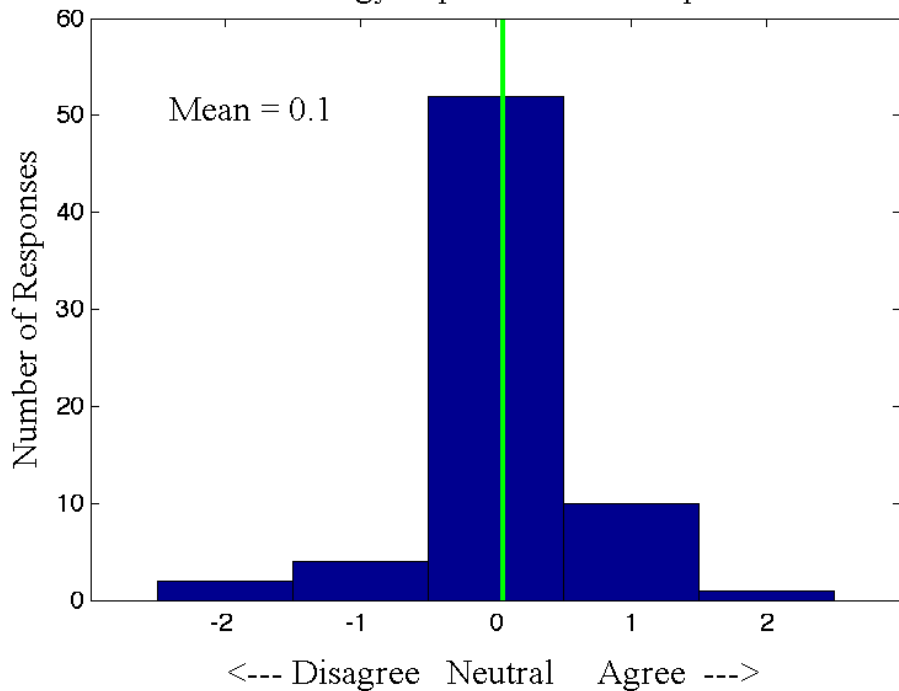


Product quality improved and some waste reduced

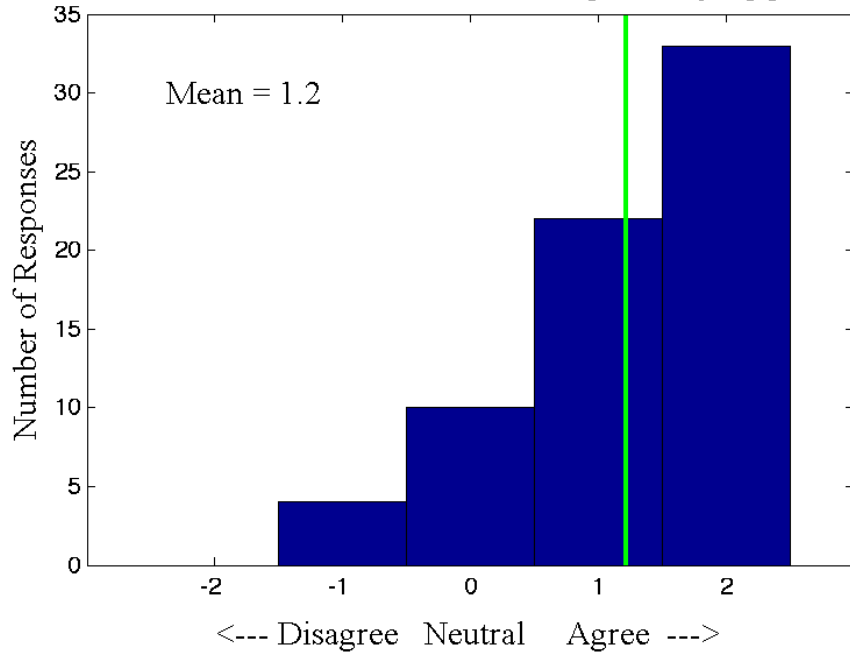


Less impact on environment and development time

Chemometrics technology & personnel has improved environment Chemometrics technology & personnel has decreased development time

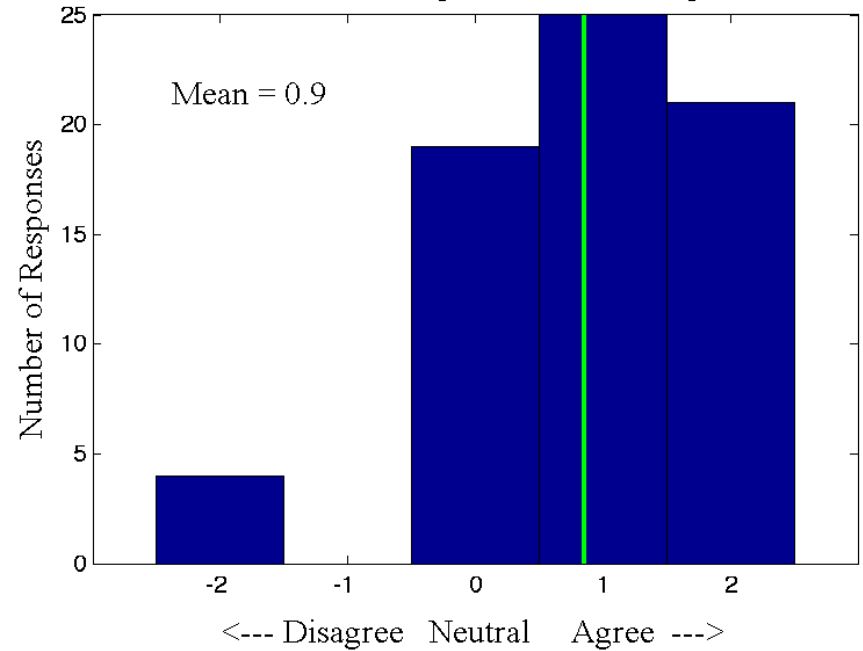


Chemometrics main value is understanding underlying phenomena

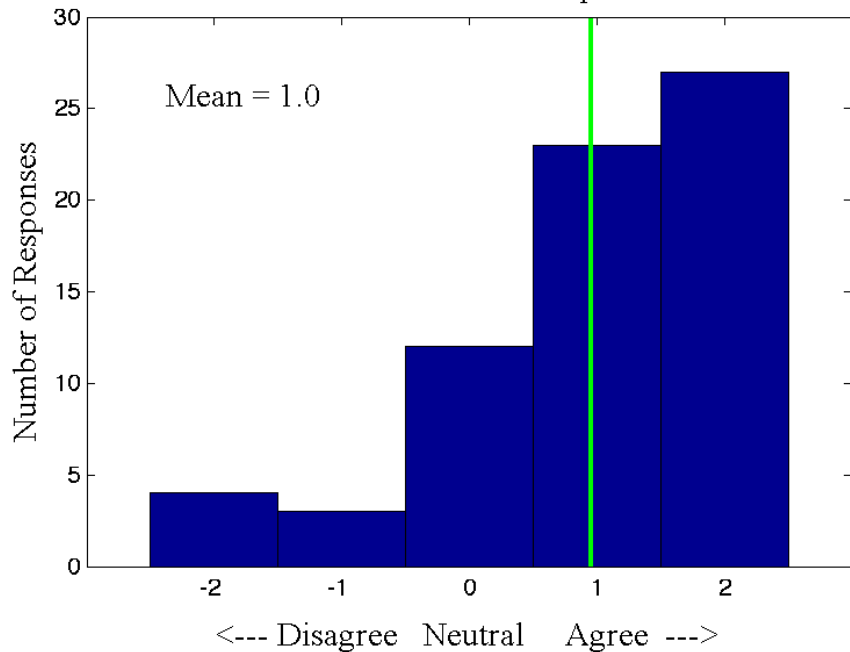


Users see value in several main usage areas

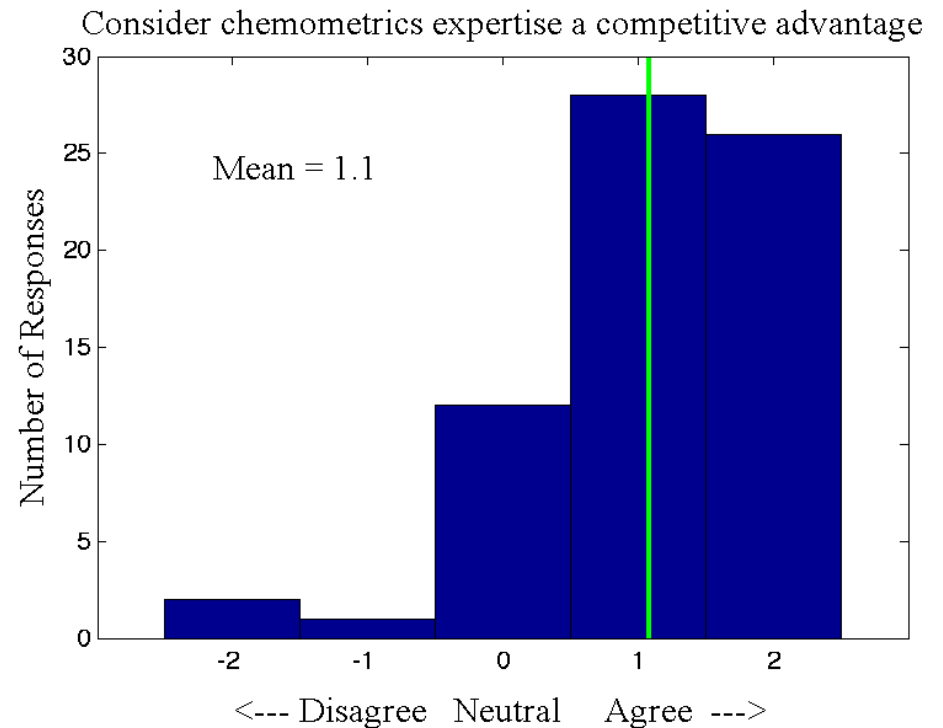
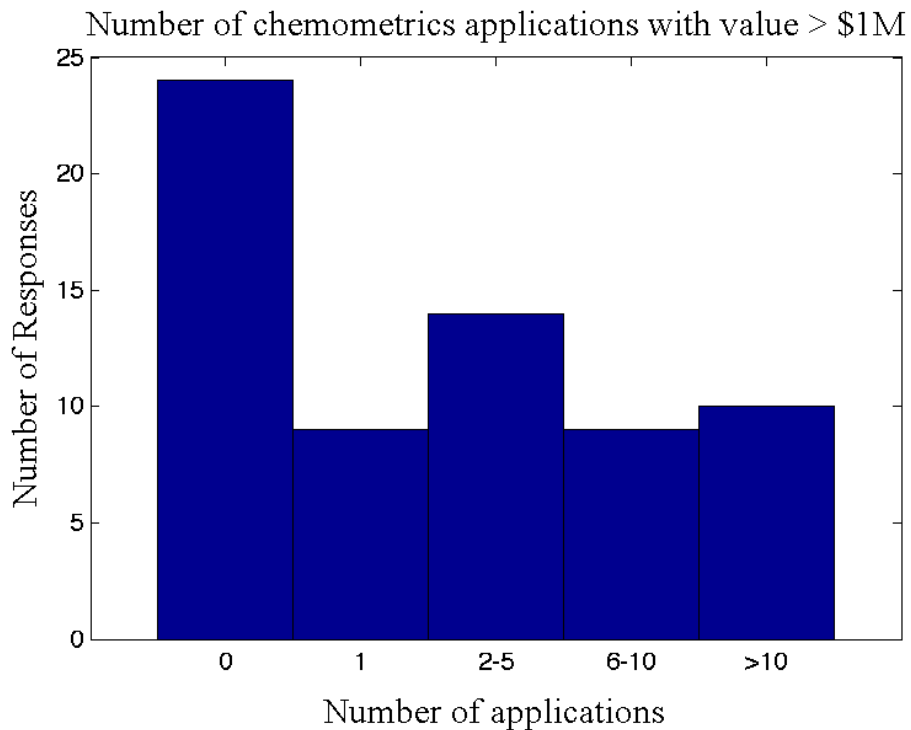
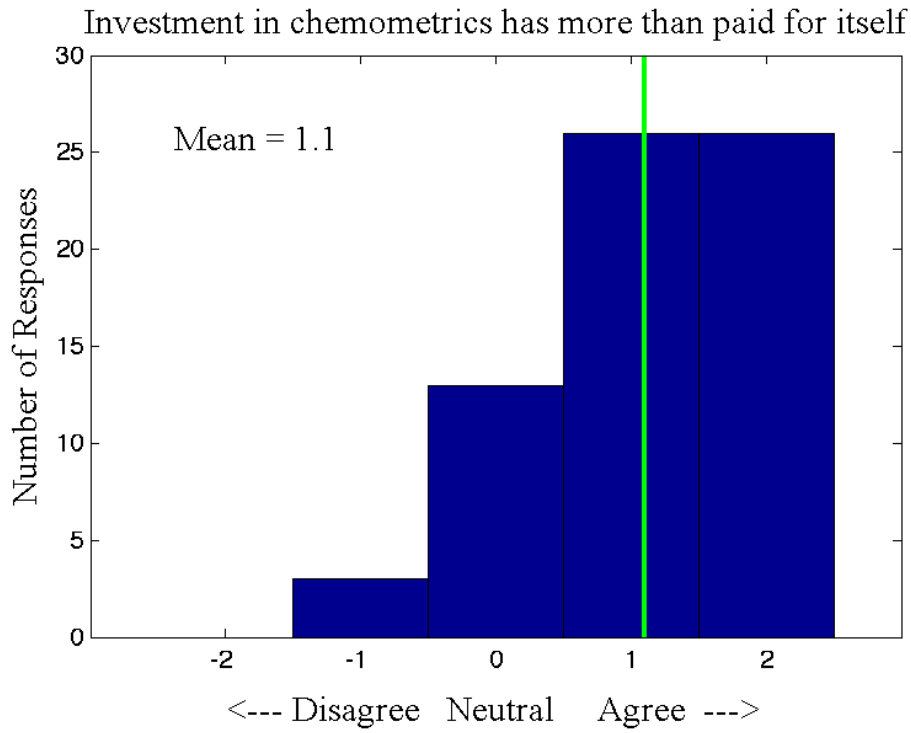
Chemometrics main value is in process monitoring & fault detection



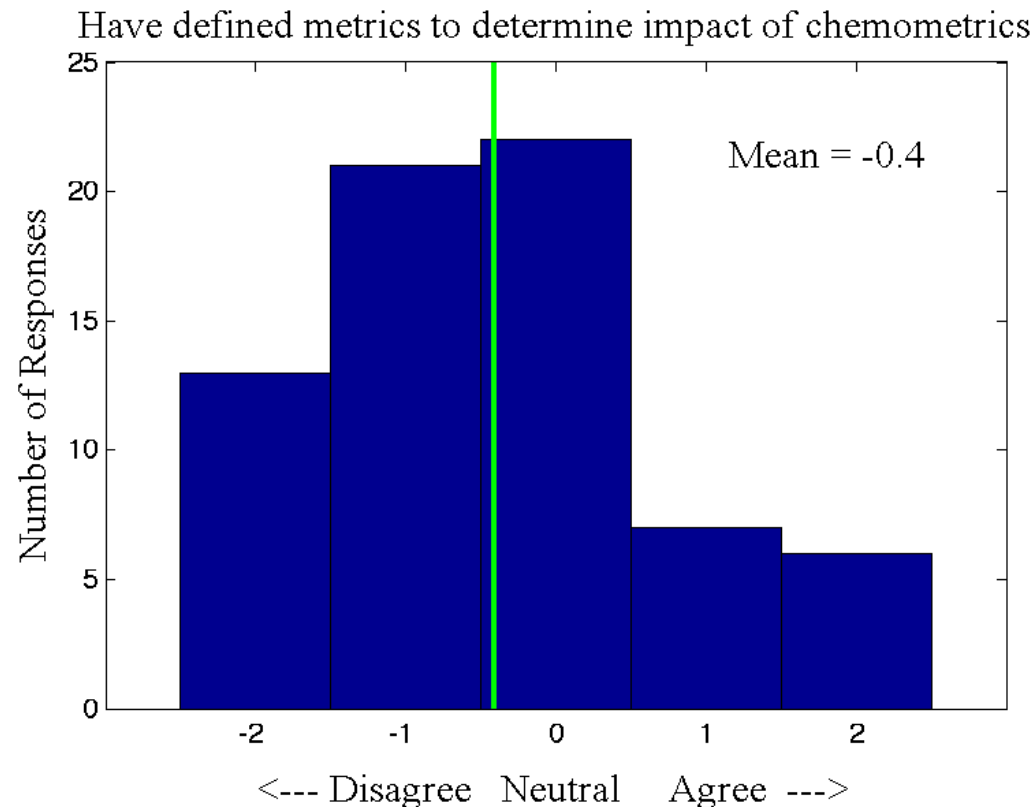
Chemometrics main value is in process control



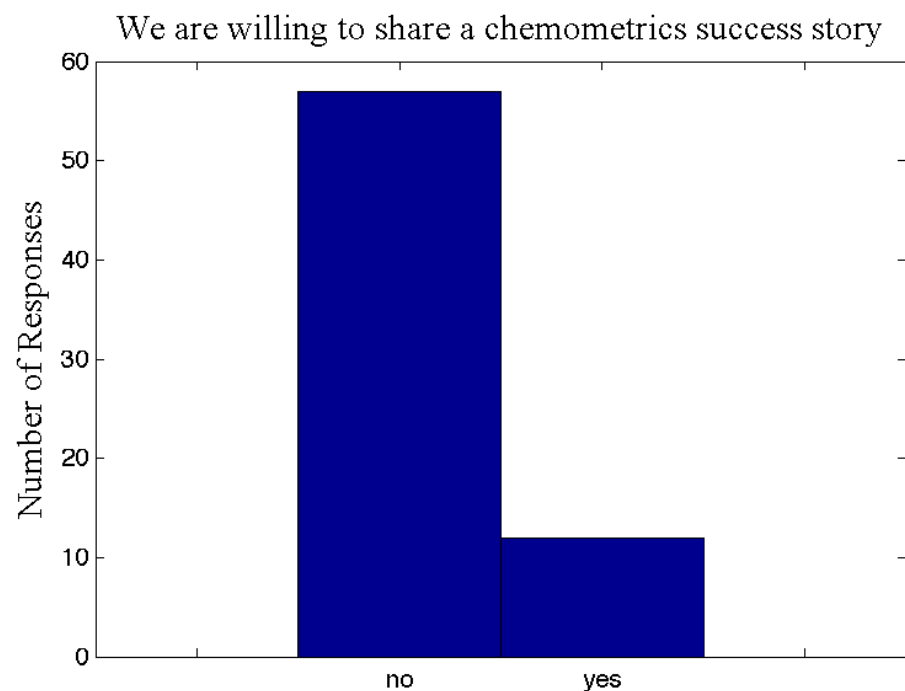
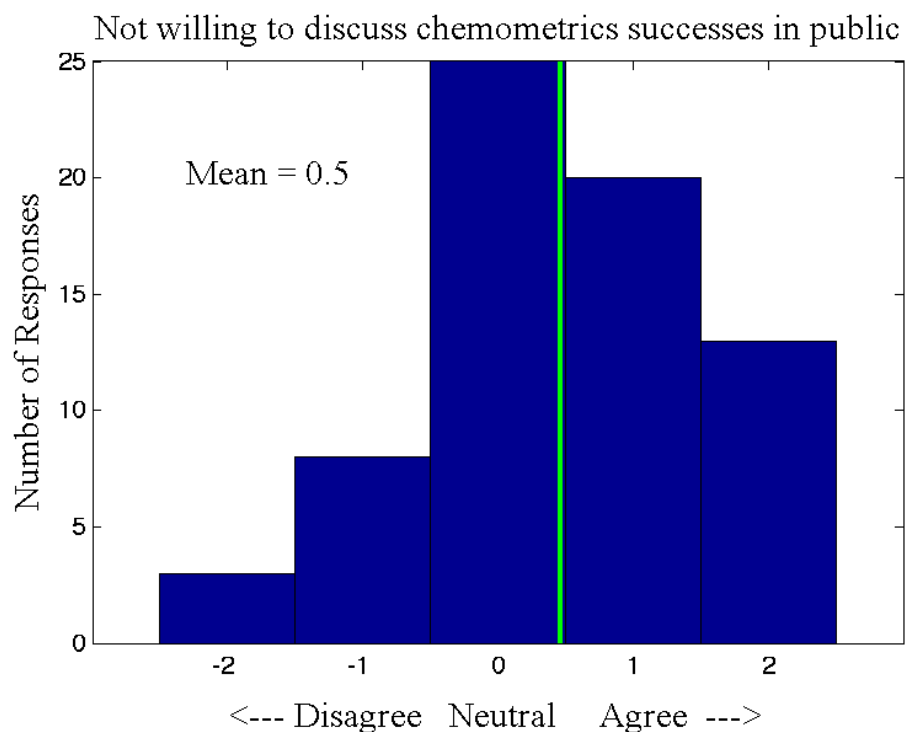
Chemometrics appears to be paying for itself...



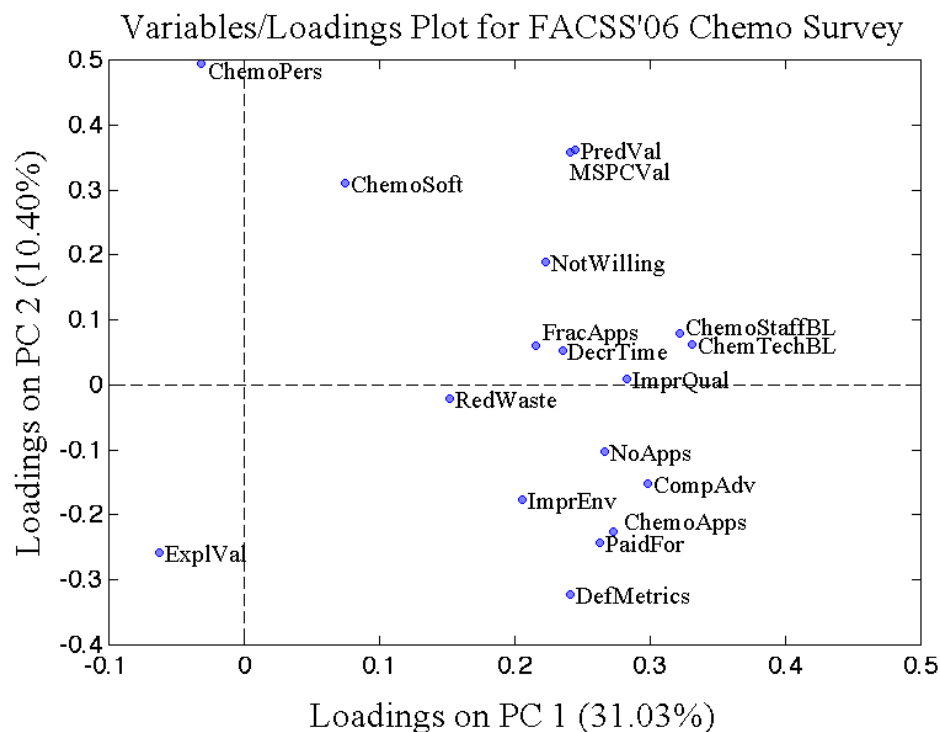
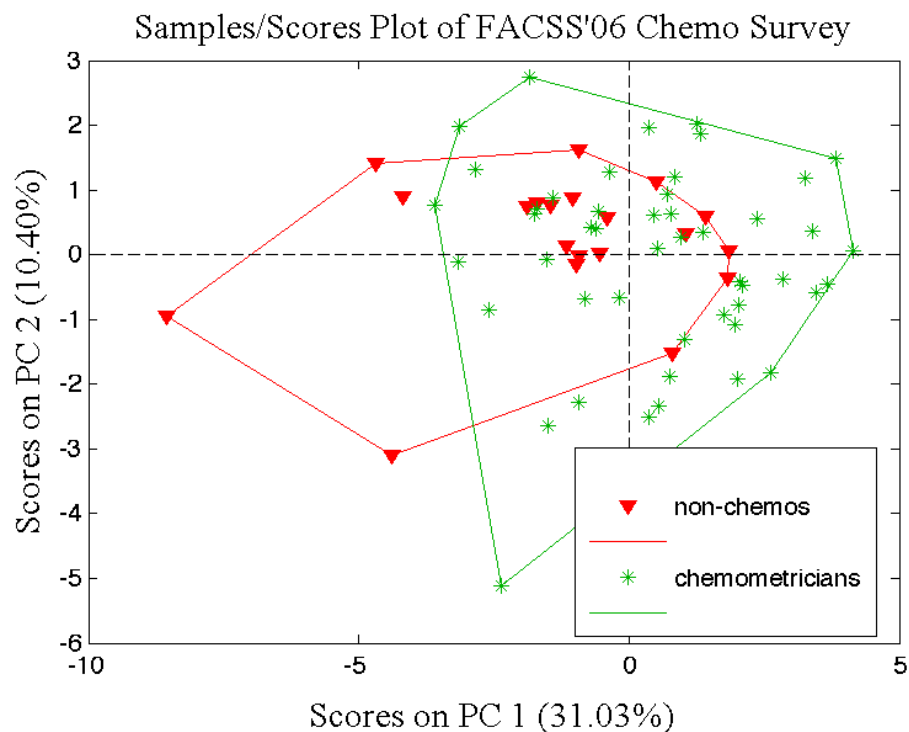
...but most haven't defined metrics to quantify impact



Majority are not willing to share their success stories!

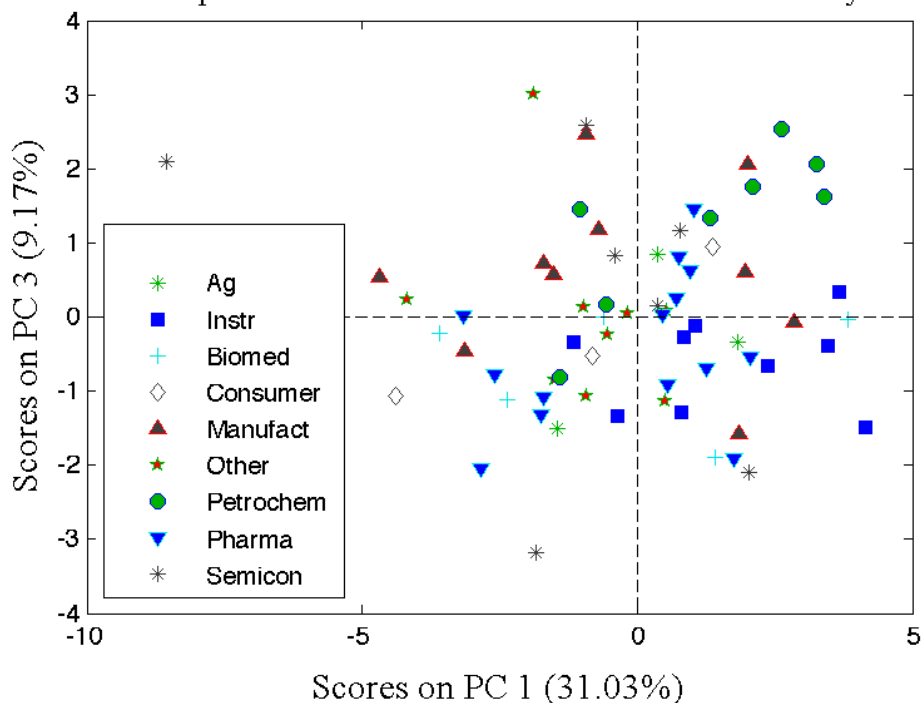


Chemometricians a little more enthusiastic than non-chemos

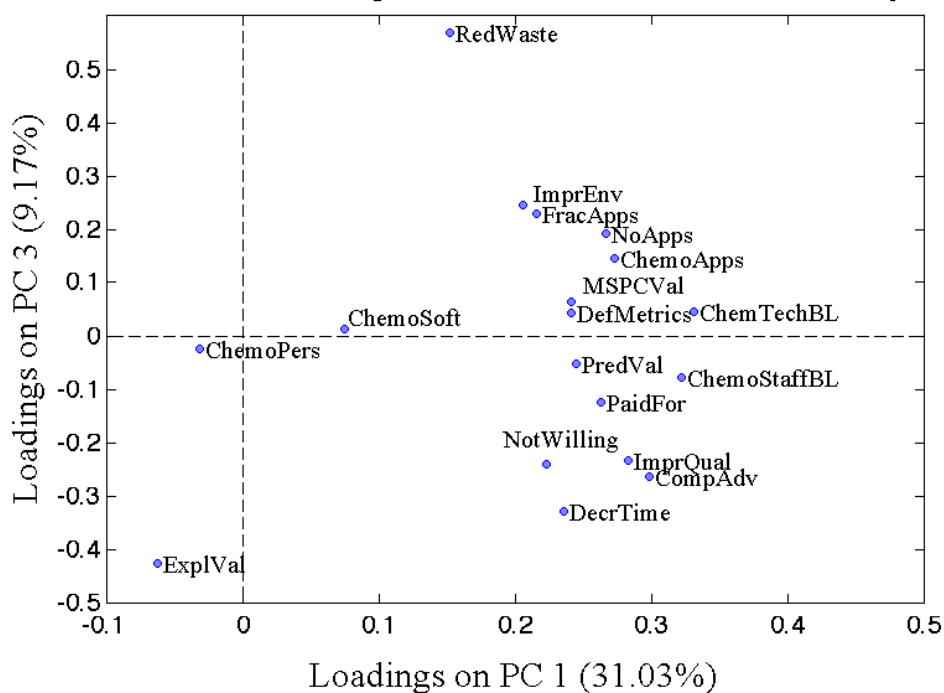


Split between petrochemical and instrument makers

Samples/Scores Plot of FACSS'06 Chemo Survey



Variables/Loadings Plot for FACSS'06 Chemo Survey



Comments...

Many of the questions seemed to... [say] that importance is based on amount of money saved. In my area of work (in Research as opposed to Development or Engineering), the impact and value of chemometrics has been to enable things that weren't possible before. The impact in dollars of this is difficult to quantitate.

A Pharmaceutical Scientist

...comments...

A very vital yet scarce skill set. Universities that offer science based courses should include a chemometrics module in all undergraduate courses.

A Pharmaceutical Manager

...comments...

Questions 5 and 6 would have benefited from "more choices". The chief obstacle that I encounter is the lack of software interoperability.

A Manufacturing Engineer

...comments...

Our reasons for not being willing to share may have more to do with bureaucratic hassles than actually trying to keep things secret for competitive advantage purposes.

A Manufacturing Engineer

...last comment.

Unless we can make Chemometrics easier and cheaper to use I believe it will be relegated within the process analytics community to a very small role.

At this point I think its more of an expensive hooker than a marriage.

A Petrochemical Engineer

Survey Conclusions

- Chemometrics is playing a crucial role in many important industrial applications
- Still some areas that need attention
 - Software interoperability
 - Cost
 - Lack of trained personnel
- Like any marriage, still some areas to work on
- Successful-I think so!

Eigenvector Projects

- Prediction of Ozone Forming Potential of automobile exhaust
- Fault detection and classification in semiconductor plasma etch
- Detection of atherosclerotic (vulnerable) plaques
- Cervical cancer detection
- Measurement of natural gas energy content at the wellhead
- Hyper-spectral remote sensing
- Typing urinary tract infections
- Muscle oxygenation monitoring (Children's Orthopedic)
- Multimodal analysis of limb ischemia
- Many, many more

Eigenvector Stats

- License seats: 2000-3500
 - 50+ countries
 - 800+ companies
 - 700+ universities
- Short courses
 - 100+ courses given
 - 1000+ students
 - Planning 9th Annual Eigenvector University
 - six days, 15 courses, ~45 participants

