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# SOFTWAREQUAL: The Case of SPSS Statistical Software

Michael VIEREGGE

*University Centre IMI Lucerne, [mvieregge@western.edu](mailto:mvieregge@western.edu)*

Shobana SEHKARAN

*Manchester Metropolitan University, [S.Sehkaran@mmu.ac.uk](mailto:S.Sehkaran@mmu.ac.uk)*

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## **SOFTWAREQUAL: THE CASE OF SPSS STATISTICAL SOFTWARE**

### **ABSTRACT**

Anecdotal evidence suggests that today's students (Generation Y members) do well with the internet, but struggle with applied software. Zeithaml, Parasuraman and Malhotra (2000) developed service quality measures for service encounters in an electronic environment (e.g.SITEQUAL). This preliminary study measures the gap between GenY students' expectation of and satisfaction with SPSS software. Altogether, n=43 students participated in the experiment. The results suggest that GenY students seek functionality and not fancy gimmicks in application software. While overall reporting satisfaction with SPSS, some criteria do not meet very high expectations and companies should note and address these gaps.

**Keywords:** Service Quality, Applied Software, GenY Students

## **BACKGROUND**

This study has been inspired by anecdotal evidence from hospitality educators that their students are efficient and creative in the use of online games and presentation software, but feel challenged when asked to use applied software programs, particularly mathematical or statistical applications. The objective of this study is to establish preliminary insights into what GenY students expect from software and how they assess the quality of one particular statistical software package.

Service quality studies go back to Parasuraman, Zeithaml and Berry (1985) and their work with SERVQUAL in physical service encounters focusing on possible gaps between guests' expectations and the perceived quality of the actual services. The three authors established five dimensions for which gaps in service quality are measured including responsiveness, assurance, empathy, and tangibles. Numerous studies support that gaps between expectations and performances are directly related to customer satisfaction or dissatisfaction. Knutsen, Stevens, Wullaert, and Yukoyoma (1990) later applied the SERVQUAL dimensions to measure service quality for accommodation providers (LODSERV), while MacKay and Crompton (1990) employed them for recreation centers (REQUAL). Stevens, Knutson and Patton (1995) then introduced DINSERV for fine-dining restaurants. With service businesses moving online, Zeithaml, Parasuraman and Malhotra (2000), developed dimensions for service quality measures in online B2C service encounters and established that the service quality dimensions hold true for physical as well as online service encounters. Yoo and Danthu (2003) later developed four dimensions which assess the quality of websites and these dimensions have become known as SITEQUAL. Additional studies by Wolfinbarger and Gilly (2001), Cox and

Dale (2002) and Madu and Madu (2003) have added to and expanded service quality studies of websites of online businesses. Review of pertinent literature shows that no research has addressed the quality of applied software to establish what authors suggest to be called 'SOFTWAREQUAL'. The authors posit that research in this area might help to make software more appropriate and acceptable to GenY students and professionals.

Generation Y is also known as the Millennial Generation, Echo Boomers, I-Generation, Einstein Generation or Google Generation (Yan, 2006). Persons born between 1980 and 2000 are considered part of this generation. This generation represents currently the majority of students in tertiary education and is the largest generation in history to enter the labor market (Huntley, 2006). This generation has grown up in a digital world, making its members technologically savvy and comfortable in the use of technology. GenYers expect technology to work and to be easy to operate supporting their mobility. They spend much time on cell phones and computers to support their desire to be mobile and connected in e-networks (Huntley, 2006; Raines, 2002).

Based on the above mentioned evidence the authors posit that GenYers might hold different criteria for application software than previous generations, expecting software to integrate technology with ease of operation supporting flexibility and high mobility.

## **METHODOLOGY**

For epistemology, the researchers adopted the philosophy reflecting the principles of interpretivism positing that this preliminary research is unique to a particular set of circumstances and persons. Generalizations are not of crucial importance and focus is placed on explanation of a current situation (Saunders, Lewis and Thornhill, 2007). The authors combined this philosophy with an inductive approach to support the exploratory purpose of this research.

The researchers selected an experiment as the strategy for this research using a questionnaire to collect feedback.

Since GenY members are targeted, the development of a new questionnaire was critical to this study. In all, 90 GenY students from 14 countries formed 15 focus groups of six students for brainstorming sessions to produce criteria for application software evaluation. This yielded a 40 item scale to measure first expectations and later satisfaction with software. A seven-point Likert-style scale was adopted from 1=very important to 7=very unimportant. Part two of the questionnaire, contained demographic and general computer-use background questions. Part three included open-ended questions for best and least favorite features of software. A cover letter ensured informed consent and adherence to research ethics. Two versions of the questionnaire with identical scales were drafted: One to measure expectations and one to measure satisfaction scores. Only the wording on the scale was adjusted to reflect the different purposes of the tool in the two rounds of administration.

Expert review established validation of the items while the internal reliability of the scales was tested with Cronbach Alpha for the 40 items in both versions. The test of the expectation scale yielded a  $\alpha=.917$  and the satisfaction scale showed a  $\alpha=.951$ . This suggested sufficient internal reliability for both scales well above the generally recommended .7 level (Saunders, Lewis and Thornhill, 2007).

The experiment involved a sample of  $n=43$  GenY senior-level students from 12 countries, who had extensive computer skills, but not with statistical application programs. The students completed the questionnaire at the beginning of the experiment to measure overall software expectations. The students then participated in a one-week full-immersion SPSS 17.0 module.

Upon completion of the module, the same students answered the 40 questions about satisfaction with quality the SPSS software.

Due to the small sample size descriptive statistics and non-parametric Wilcoxon Signed Rank tests for same group comparisons of the expectation and perception scores were used. For the statistical analysis SPSS 17.0 was utilized.

## RESULTS & DISCUSSION

Of the 43 students, 24 (55.8%) were female and 19 (44.2%) were male. The average age was 22.98 years (Std.Dev. 2.891) identifying all participants as GenYers.

First the students' expectations of applied software were measured with the 40 items developed for the questionnaire. Table 1 summarizes the findings.

Table 1: Expectations of Software in General (n = 43)

Rank	Question #	Question	Mean	Std.Dev.
1	1	Well defined and easy to use interface	1.40	.660
2	8	Reliable	1.49	.597
2	11	Does not slow down performance of computer	1.49	1.203
4	17	Good access speed	1.63	.846
5	18	Good technical support	1.81	.917
5	27	Good data security features	1.81	1.277
5	30	Easy to up- and download	1.81	1.180
5	38	Easy data input	1.81	.852
9	34	Compatibility with other software	1.84	1.132
10	13	Good warranty	1.88	1.028
10	9	Compatibility with different operating systems	1.88	1.197
18	19	Price	2.21	1.489
30	31	Can run from mobile devices	2.95	1.430
35	24	Available on open sources	3.14	1.885
36	29	User comments are provided	3.30	1.520
37	22	Brand of Software	3.35	1.526
38	26	Use of animation	3.63	1.381
39	28	Touch screen compatible, visual GUI	3.77	1.645
40	20	Web 2.0 components embedded	3.88	2.217
		Overall Mean for all items	2.562	.740 <sup>5</sup>

Table I shows that all items are considered important. The item with the lowest mean (Web 2.0 components embedded) still shows a mean score of 3.88 and the grand mean for all 40 items is 2.562. The highest scores were recorded for functional and practical aspects to operate the software (Well defined and easy to use interface, 1.40; Reliable, 1.49; Does not slow down performance of computer, 1.49; Good access speed, 1.63) while advanced technical application aspects were less important (Use of animation, 3.63; Touch screen compatible and visual GUI, 3.77; Web 2.0 components embedded, 3.88). The expectation scores in regards to software shows a desire of GenY students that software should not slow down access to channels of communication and other operations so they can stay mobile and flexible with open communication lines. The other group of items with high scores relates to the desire that the software is 'easy' and user-friendly for immediate functionality, backed-up by good support from the provider (Easy to up- and download, 1.81; Easy data input, 1.81; and Good technical support, 1.81; Good warranty, 1.88). The GenYers expect software to work immediately without any operational problems. The results seem to support what was suggested by Raines (2002) and later by Huntley (2006), that the members of this 'digital' generation expect technology and software to be easy to use, reliable and compatible with other applications and operating systems for flexibility and mobility at work and when travelling.

At the end of the one-week full-immersion module, in which the SPSS 17.0 software was taught and applied, the same questions were asked about the quality and the students' satisfaction with the SPSS 17.0 software. The same students completed both questionnaires allowing paired-sample comparisons. Table 2 summarizes the results from this round of surveying.

Table 2: Satisfaction with SPSS Software (n=35)  
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Rank	Question #	Question	Mean	Std.Dev.
1	9	Compatibility with different operating systems	2.07	1.595
2	1	Well defined and easy to use interface	2.21	1.457
3	38	Easy data input	2.26	1.115
4	8	Reliable	2.39	1.046
5	37	Easy data export	2.58	1.622
6	3	Step by Step installation guide	2.65	1.510
6	17	Good access speed	2.65	1.557
6	21	Trial use	2.65	1.675
9	35	Student version	2.70	1.833
10	4	Good selection of language options	2.81	2.038
35	24	Available on open sources	3.14	1.885
35	12	Self-updates and download add-ons	4.53	2.693
36	19	Price	4.63	2.664
37	26	Use of animation	4.67	2.270
38	29	User comments are provided	4.98	2.355
39	31	Can run from mobile devices	5.28	2.482
40	28	Touch screen compatible, visual GUI	5.51	2.354

Table 2 shows that all mean scores for perceived satisfaction with quality are lower than those reported for expectations (range from 2.07 to 5.51) and that only few items ranked high for expectations received also high scores for satisfaction (Well defined and easy to use interface; Easy data input; Reliable; Good access speed). Again, the items ranked highly relate to ease of access and operation agreeing with GenY students' expectation that technology should be easily accessible and operational. Overall user-friendliness was rated very positively, suggesting that students found SPSS 17.0 easy to work with, but falling short of what they expect of software.

Wilcoxon Signed Rank test was selected to run tests for repeated measures to determine, if differences between expectation and satisfaction scores for the software are statistically significant. The tests were run for the top 10 items the students expect from software as the most critical items. Table 3 shows the results of the Wilcoxon tests.



Table 3: Wilcoxon Signed Rank comparison of top 10 Expectation with Satisfaction scores

Question Number	Question	Mean Expectation Scale	Mean Satisfaction Scale	Z-score	Sig.Dif.
1	Well defined and easy to use interface	1.40	2.21	-3.336	.001
8	Reliable	1.49	2.39	-3.926	.000
11	Does not slow down performance of computer	1.49	2.93	-4.249	.000
17	Good access speed	1.63	2.65	-4.057	.000
18	Good technical support	1.81	3.55	-4.358	.000
27	Good data security features	1.81	3.88	-4.357	.000
30	Easy to up- and download	1.81	3.30	-4.161	.000
38	Easy data input	1.81	2.26	-2.104	.035
34	Compatibility with other software	1.84	3.30	-3.518	.000
13	Good warranty	1.88	4.42	-4.851	.000
9	Compatibility with different operating systems	1.88	2.07	-.2660	.791

The results of Wilcoxon tests shown in Table 3 support that statistically significant differences exist for all but one item of the top 10 expectations of software, suggesting that the software company needs to improve the software and close the gaps. The results suggest that the technology savvy GenY participants have very high expectations of software in regards to speed and flawless access. Their high expectations are not easily met which is supported by the significant differences tested for almost all items. Participants expect user-friendly operations supporting flexibility from software that interfaces with other software and operating systems. This is the only item where expectations are met by satisfaction scores with quality of the software. It seems that the SOFTWAREQUAL gap in this study is not caused by poor quality of the software, but rather by the high expectations of the participants. The overall test results from participants in this experiment are in line with what previous research states about GenYers.

The study also included general outcome variables to assess students' overall satisfaction with the SPSS 17.0 software after the one-week module. Here a five-point Likert-style scale was used where 1=very likely and 5=very unlikely. Table 4 summarizes the results.

Table 4: Overall Satisfaction scores for SPSS Software (n=43)

Question #	Question	Mean	Std.Dev.
51 a	Would you use SPSS software?	2.00	1.069
51 b	Would you buy SPSS software?	3.00	.988
51 c	Would you recommend SPSS software?	2.07	1.068

The results suggest that the students developed an overall positive attitude towards the SPSS 17.0 software. A total of 35 of 43 (81.3%) participants are likely to use the software and 33 of 43 (76.7%) are likely to recommend it. Participants are undecided, if they would purchase the software (23 of 43 or 53.5%), still 10 (23.5%) indicate it as very likely that they would purchase the software. These results re-confirm what was stated above, that the students see overall quality in the software, but their expectations in regards to ease and speed of operation and compatibility are extremely high. Addressing the gaps indicated above, SPSS and perhaps other software companies can improve to meet the expectations of these GenY students

## CONCLUSION & RECOMMENDATION

In the response to the research statements above, the results of the study surprise, as practical concerns prevail in students' expectations. Functionality, integration and easy operations and not fancy gimmicks are what the GenY students seek. The results support Huntley (2006) and Raines (2002) who outline GenYers' expectations of easy to use, reliable and integrated technology. While overall happy with the SPSS 17.0 software, the reported SOFTWAREQWUAL gaps suggest that these GenY students have extremely high expectations of software and expect technology to work without flaws. Limited intent to purchase software

also suggests pressure from open source programs. These findings can help SPSS to become more attractive to this generation and certainly support the need to employ SOFTWAREQUAL to identify gaps between what GenY students expect and their satisfaction with the quality of software. After all, the participants are Gen Yers' who will want to use software in their beginning careers.

## LIMITATIONS

The experiment is too limited in scope to draw definite conclusions and generalize findings to all GenY (not desired in the research design and paradigm), but the identified SOFTWAREQUAL gaps should be considered by SPSS and other producers of applied software. Future surveys should use the same questionnaire with a larger sample of GenYers to ascertain that the findings can be supported. The SPSS software was introduced in a one-week module, clearly not enough time to explore all options of the SPSS software. To address this issue, future studies ought to be administered perhaps after a full semester of work with SPSS or other applied software.

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