

Student Evaluation of Teaching at Lakehead University

At the Senate Meeting # 2009-4 (Friday, April 17, 2009) there was a motion to approve a new Student Evaluation of Teaching at Lakehead University survey. The Senate Teaching and Learning Subcommittee stated in their report (April 2009) (<http://senate.lakeheadu.ca/uploads/meetings/2009-04-17/StudentEval.pdf>) that, pending acceptance of the new survey instrument, the Committee would conduct additional analyses during the first year of implementation to verify validity and reliability measures.

Student Evaluation of Teaching at Lakehead University Pilot - Phase 3 Full report October 26, 2010

Research Methodology

The subcommittee responsible for the examination of student evaluation of courses at Lakehead University engaged in a final analysis of the new Student Evaluation of Teaching at Lakehead University survey instrument during the 2010 winter term in order to reaffirm evidence of validity and reliability based on the internal structure and response processes.

Following approval by the Lakehead University Research Ethics Board, a notice was forwarded to the University community inviting tenured instructors to take part in the study during the winter term course evaluation period. Volunteers were provided with a cover letter and consent form, which outlined the study and described how the methods ensured that the responses provided on the revised survey instrument would be handled in a way to ensure anonymity and confidentiality for both the students and the instructors. For this report student responses were not used to assess instructor's performance but rather to provide valuable information about the quality of the items included on the survey.

The Student Evaluation of Teaching at Lakehead University survey was distributed, collected (March 2010) and analyzed according to the procedures currently in place in each of the Faculties in order to comply with the Senate approved policy (<http://policies.lakeheadu.ca/policy.php?pid=8>). The Office of Institutional Analysis and Government Relations was provided with the names of the instructors who volunteered to participate along with a copy of each of the signed consent forms. Once the survey results were computed by the Technology Services Centre, the Office of Institutional Analysis and Government Relations gathered a copy of the results for each of the participants and removed all identifying information. A copy of the survey results, with all identifying information removed was forwarded to the Subcommittee for further analysis.

Data Analysis

Eighteen instructors volunteered to participate in the pilot study. Data was captured from 638 surveys collected from 35 different courses delivered during the winter semester of 2010. Frequency distributions for each item were generated to highlight the patterns, frequencies and percentage of responses. The data was analyzed using the *Cronbach's Alpha Procedure* to establish an estimate of internal consistency for the survey. Correlation coefficients were generated for use in a principal component analysis to determine if distinct factors (constructs) were identified within the questionnaire. All statistical analyses were completed using Statistical Analysis Software (SAS®).

Results

Frequency distribution of responses: The survey consists of 23 questions using an ordinal based scoring system. In 21 of the questions, the response options ranged from strongly agree to strongly disagree, with an option to state when the respondent felt that the item was not applicable. Two of the questions, presented at the end of the survey were also scored on an ordinal scale but where the response options ranged from very good to very poor.

Visual inspection of the frequency data for the responses to each of the items revealed highly skewed response distributions; that is, the majority of students referred mostly to the positive end of the scale (i.e., “Strongly Agree” and “Agree”) to rate their instructors. These results may suggest that the students’ responses were consistent throughout the series of items, providing evidence to support the reliability of the ratings.

There were no anomalous patterns in the responses across questions based on the 638 responses. The data presented in Table 1, represents the frequency distributions from a SAS (The Statistical Analysis System) analysis of each of the questions in the survey.

Table 1. Frequency Distribution with percent responses for each question

	Strongly Agree		Agree		Neither agree nor disagree		Disagree		Strongly Disagree		Not applicable	
	f	%	f	%	f	%	f	%	f	%	f	%
1. A comprehensive course outline was provided.												
	368	58.6	236	37.58	15	2.39	6	0.96	3	0.48	0	0
2. Learning objectives were clearly presented.												
	273	42.79	276	43.26	57	8.93	19	2.98	4	0.63	0	0
3. The course content matched what was presented in the course outline.												
	311	48.75	270	42.32	38	5.96	5	0.78	4	0.63	0	0
4. The course materials were useful in promoting learning of the course concepts.												
	246	38.56	276	43.26	62	9.72	36	5.64	6	0.94	1	0.16
5. The instructor encouraged student participation.												
	312	48.9	226	35.42	58	9.09	19	2.98	8	1.2	0	0
6. The instructor responded to all questions in a respectful manner.												
	341	53.45	192	30.09	48	7.52	26	4.08	16	2.51	0	0
7. The instructor respected diversity among the students.												
	354	55.49	199	31.19	50	7.84	6	0.94	7	1.1	9	1.41
8. The instructor clearly explained the course concepts.												
	273	42.79	242	37.93	58	9.09	14	2.19	36	5.64	0	0
9. The instructional method(s) enhanced student learning.												
	239	37.46	247	38.71	76	11.91	36	5.64	24	3.76	1	0.16
10. The instructor monitored student learning in order to make any necessary adjustments to the pace of delivery.												
	185	29	250	39.18	124	19.44	50	7.84	16	2.51	2	0.31
11. The instructor appeared enthusiastic about teaching the course.												
	348	54.55	217	34.01	40	6.27	7	1.1	5	0.78	3	0.47
12. The instructor was accessible to students outside of the class.												
	286	44.83	236	36.99	78	12.23	7	1.1	1	0.16	16	2.51
13. The instructor appeared well prepared for class.												
	356	55.8	228	35.74	26	4.08	12	1.88	1	0.16	1	0.16

14. I found the course appropriately challenging.												
	255	39.97	267	41.85	65	10.19	24	3.76	14	2.19	0	0
15. I found the course stimulating.												
	239	37.46	236	36.99	89	13.95	37	5.8	20	3.13	1	0.16
16. I have acquired new knowledge as a result of taking this course.												
	303	47.49	244	38.24	46	7.21	16	2.51	9	1.41	0	0
17. The knowledge from this class can be applied to a variety of situations.												
	233	36.52	264	41.38	83	13.01	37	5.8	9	1.41	0	0
18. The instructor provided opportunities to further develop my analytical skills.												
	213	33.39	260	40.75	107	16.77	38	5.96	7	1.1	2	0.31
19. Graded materials were aligned with the learning objectives for the course.												
	228	35.74	303	47.49	64	10.03	20	3.13	8	1.25	1	0.16
20. Feedback on graded materials was timely.												
	244	38.24	267	41.85	68	10.66	29	4.55	6	0.94	6	0.94
21. Feedback on materials was valuable.												
	223	35.85	239	38.4	89	14.31	51	8.20	15	2.41	5	0.8
22. Overall, I would rate this instructor as:												
	Very Good	Good	Average	Poor	Very Poor	Not applicable						
	333	52.19	187	29.31	53	8.31	26	4.08	23	3.61	1	0.16
23. Overall, I would rate this course as:												
	Very Good	Good	Average	Poor	Very Poor	Not applicable						
	283	44.36	204	31.97	80	12.54	33	5.17	17	2.66	0	0

The survey data were also analyzed using a customized frequency distribution program written in php-html and presented in tabular format online. Example 1, shown below, used the customized analysis to produce frequencies and percent of responses to each option in the survey for each question.

EXAMPLE 1. Frequency Distribution of data from 2009-2010 Undergraduate Course Evaluation Survey – Example of web output for Question #1(Data generated by php and html)

1. A comprehensive course outline was provided.		
ITEM OPTIONS	FREQUENCY	PERCENT of COMPLETED
Strongly Agree	368	58.6
Agree	236	37.58
Neither agree nor disagree	15	2.39
Disagree	6	0.96
Strongly Disagree	3	0.48
Not applicable	0	0
Number that completed this item	628	---
Number that left item blank	10	---

CRONBACH'S ALPHA

The data were next analyzed using the *Cronbach's Alpha Procedure* to establish an estimate of internal consistency for the items in the survey. Cronbach's alpha is a statistical procedure, which measures how well a set of items describe a single, uni-dimensional latent construct. Cronbach's alpha will generally increase when the correlations between the items increase. Some professionals, as a rule of thumb, require the Cronbach alpha estimate to be 0.70 or higher, and to be obtained on a substantial sample before they will consider an instrument to be useful. The Cronbach's alpha term is an estimate of reliability.

The Cronbach's alpha for the overall survey was 0.95, thereby indicating strong internal consistency between the items.

Cronbach Coefficient Alpha	
Variables	Alpha
Raw	0.951592
Standardized	0.951801

The contribution of each individual item to the overall estimate of Cronbach's alpha, was calculated by systematically deleting each question from the survey and recalculating the total Cronbach's alpha score.

Item Analysis: Item analysis was a first step in a series of procedures to evaluate the responses systematically while testing several measurement properties. The results of the item analysis are presented below. The results support earlier pilot work, which suggested that there is a strong internal consistency between the items in the survey. In every case of variable deletion the Cronbach alpha estimate remained over 0.947 which also supports the contention that the survey is only measuring one main factor in this line of questioning. Systematically eliminating individual items did not substantially increase the alpha values.

Cronbach Coefficient Alpha with Systematic Variable Deletion				
Deleted Variable	Raw Variables		Standardized Variables	
	Correlation with Total	Alpha	Correlation with Total	Alpha
a1	0.496852	0.951461	0.506771	0.951851
a2	0.714037	0.948867	0.721871	0.948912
a3	0.671268	0.949570	0.676936	0.949533

Cronbach Coefficient Alpha with Systematic Variable Deletion				
Deleted Variable	Raw Variables		Standardized Variables	
	Correlation with Total	Alpha	Correlation with Total	Alpha
a4	0.684567	0.949196	0.686058	0.949407
a5	0.653966	0.949614	0.648826	0.949919
a6	0.720743	0.948684	0.719295	0.948947
a7	0.654713	0.949620	0.657516	0.949800
a8	0.776943	0.947821	0.774668	0.948177
a9	0.797027	0.947501	0.790912	0.947951
a10	0.776259	0.947835	0.772455	0.948208
a11	0.624071	0.950074	0.626794	0.950221
a12	0.556316	0.950835	0.560990	0.951118
a13	0.654684	0.949807	0.660917	0.949753
a14	0.699623	0.948986	0.696424	0.949264
a15	0.716115	0.948845	0.709916	0.949077
a16	0.714372	0.948812	0.709464	0.949083
a17	0.666110	0.949500	0.659626	0.949771
a18	0.790207	0.947639	0.783235	0.948058
a19	0.704394	0.948984	0.705427	0.949139
a20	0.546267	0.951080	0.546138	0.951319
a21	0.641847	0.950035	0.639067	0.950053

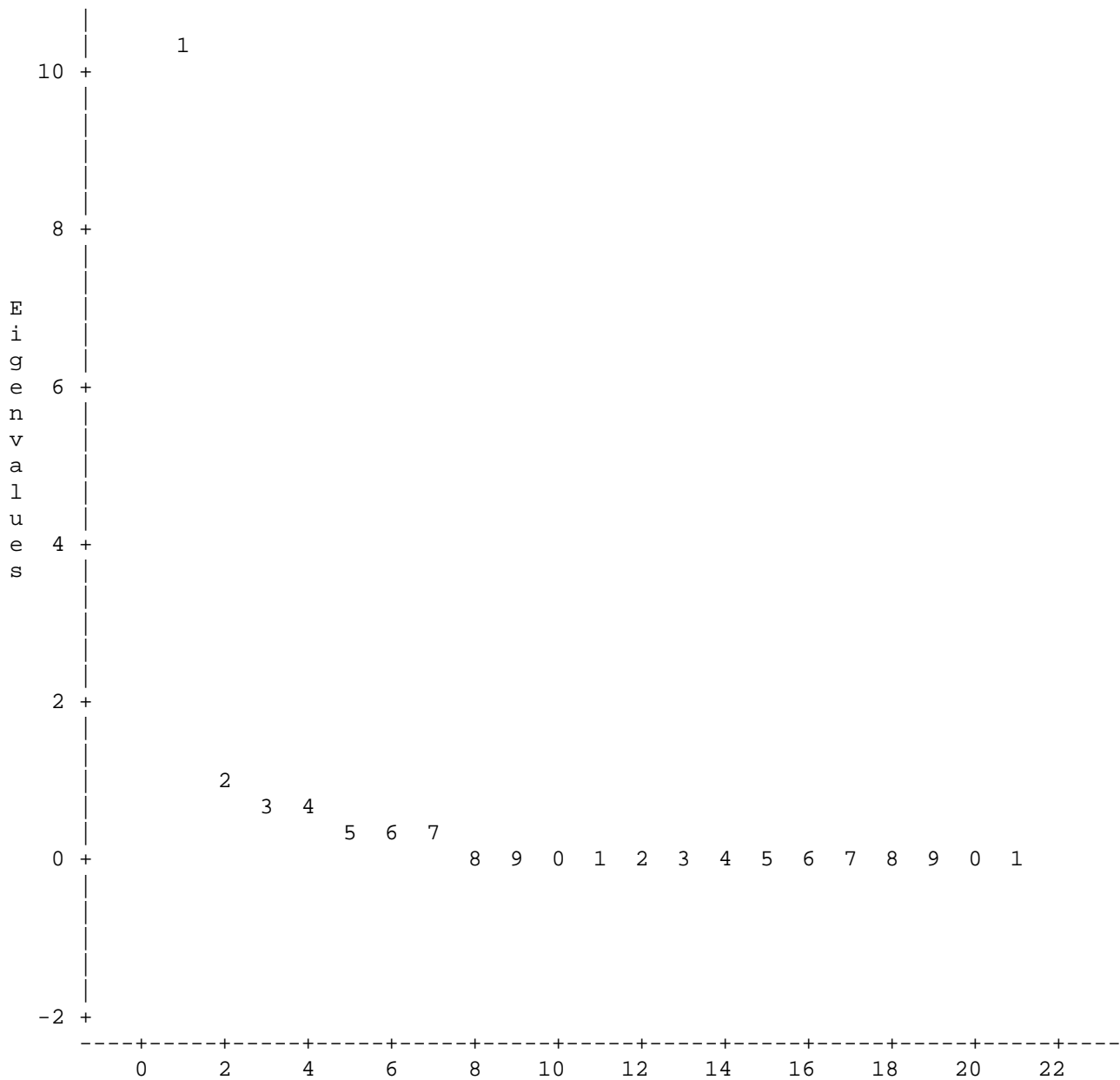
Principal Component Analysis: Following the item analysis, the data were processed using a *Pearson Product Moment Correlation Procedure* to produce correlation coefficients that could be used in a subsequent principal component analysis (PCA). PCA was used to determine if distinct factors (constructs) were identified within the questionnaire, based on the response patterns of the

student sample. The PCA produced seven factors, the results of variance explained by each factor are shown in Table 3. Figure 1. provides a graphical representation of the variance explained by each factor. The data indicate that one main factor emerged from this data.

Table 3. Results for PCA of Survey Items

Variance Explained by Each Factor (Principal Component Analysis)						
Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7
10.450248	0.845273	0.706661	0.608798	0.468269	0.348726	0.203830

Figure 1. Scree Plot of Eigenvalues from PCA



Item Number

SUMMARY

In summary, the results of the data analyses provide us with some supporting evidence for the Student Evaluation of Teaching Survey. The results suggest that the responses are consistent across the items, that the items are highly related, and that a single construct that describes “overall” teaching performance emerges from the students’ responses.

Student feedback is a valuable source of quantitative and qualitative data for instructors, both for the purposes of documenting teaching performance and for reflecting on ways to improve one’s teaching performance. The Subcommittee also recognizes that student evaluations are but one source of information used by faculty to examine their teaching or to document satisfactory teaching.