



Center for Business and Economic Research

MEMORANDUM

TO: Dr. Andy Whisman, Director, Office of Data Analysis and Research, West Virginia
Department of Education

FROM: Dr. Bo Feng, Director, Center for Business and Economic Research, Marshall University
and Assistant Professor of Economics, Lewis College of Business, Marshall University
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RE: Assessment of Computer-Assisted Approach in Classification of Qualitative Survey
Responses

DATE: April 29, 2019

The Center for Business and Economic Research at Marshall University has completed this study to examine the effectiveness of the computer-assisted approach in classification of qualitative education survey responses. We examined the computer code (in R language) and generated results, and conclude that this approach used by West Virginia Department of Education (WVDE) is valid and effective.

We first tested the R code provided by WVDE and found that its generated results are consistent with documents provided by WVDE. Three software engineers went further through the code and came to the same conclusion that it is well-written and does not contain malicious sections intended to manipulate the results.

Next, we selected nine human readers to check whether survey responses were correctly assigned to their corresponding policy topics. Each human reader went through responses in one or two policy areas. All responses in each policy area were reviewed by four human readers independently. For each policy topic, we averaged the accuracy rates given by all four human readers to mitigate human error and differences in individual interpretations. The overall accuracy rate for all four policy areas is 84% (see Table below), meaning the computer-assisted approach had successfully assigned responses under the correct policy topics. In “Other” type questions, many participants restated the same or similar comments covered by existing policy topics. By default, our human readers treated this type of responses as “misclassification.” Removing “Other” type questions within each policy topic would bring the overall accuracy rate to 87%. The Funding Opportunities policy area contains the least accurate topic assignments, with accuracy rates between 45% and 70%. These topics should receive special attention by reviewers in the next stage of analysis in terms of applicability.

For most policy topics, the computer-assisted approach is a meaningful and sufficient contribution to the study of WVDE and will provide human readers enough well-categorized information to conduct sentiment analysis.

Table. Accuracy Results of Policy Topic Assignment to Written Survey Responses

Policy Area	Policy Topic	Accuracy Rate (#Responses, Percent)							
		Question 1		Question 2		Question 3		All Questions	
Funding Opportunities	Increased Compensation	42	98%	28	40%	19	53%	89	70%
	Enrollment Floor	0		0		0		0	
	Local Levy Rates	25	39%	90	57%	54	27%	169	45%
	Local Share Cap	7	71%	15	45%	2	63%	24	54%
	Other - Funding Opportunities	11	0%	1	50%	8	66%	20	29%
Instructional Quality	Teacher Leaders	44	97%	11	77%	7	57%	62	89%
	Teacher Preparation Programs	34	99%	9	89%	6	92%	49	96%
	Support for Math Teachers	14	96%	8	100%	2	88%	24	97%
	County Salary Supplements	24	81%	21	83%	13	25%	58	69%
	Reduction in Force (RIF) Decisions	13	90%	68	95%	10	80%	91	93%
	Other - Instructional Quality	40	46%	49	35%	88	72%	177	56%
School Choice and Innovation	Innovation Zone Expansion	246	96%	37	85%	55	84%	338	92%
	Expanded Preschool	147	99%	40	93%	18	74%	205	95%
	Open Enrollment	48	100%	80	100%	7	95%	135	100%
	Charter Schools	49	93%	365	93%	108	87%	522	92%
	Education Savings Accounts	20	96%	229	90%	108	82%	357	88%
	Other - School Choice and Innovation	9	100%	11	85%	8	88%	28	90%
Social Emotional Supports	Communities in Schools	5	100%	1	100%	3	92%	9	97%
	Student Support Personnel	49	96%	51	89%	40	73%	140	87%
	Increased Student Support Personnel	1	100%	6	100%	4	100%	11	100%
	Training for Teachers	3	100%	0		0		3	100%
	Other - Social Emotional Supports	28	65%	19	75%	32	66%	79	68%
Total		859	90%	1139	85%	592	73%	2590	84%

*For each question, the first number represents the number of responses and the second one represents the averaged accuracy rates from four human readers.