



Exploratory Factor Analysis of Parent Survey Data

Technical Report

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Introduction

This project was an attempt to use Exploratory Factor Analysis (EFA) to identify the underlying structure of the annual Knox County Schools (KCS) Parent Survey. This analysis used the response data from the Spring 2019 Parent Survey administration. The goal of this analysis is to identify if there are latent factors affecting the responses from parents that can explain most of the variance within the response data, and if so, determine the number, nature, and relative strength of each factor.

In terms of survey data, EFA was used to see whether there are certain groups of survey items where the variance in response patterns tends to move in tandem. For example, if for a certain survey, there were several items to which respondents would differ based on some underlying construct, such as “attitude towards authority” or “sense of community”, then it might be said that the underlying construct affecting the patterns of responses in relatively consistent ways is a factor. By using this analysis, the interpretation of a broad battery of survey items can be condensed into a smaller number of factors instead of many individual questions.

The hope of EFA is to discover a model that not only accounts for a large amount of variance among the measured variables (i.e., individual survey items) using the fewest possible latent variables (i.e. factors), but also that the groups of items loading onto each factor make logical sense upon interpretation. There will always be some level of subjectivity involved in the EFA process, as one’s interpretation of the output depends more on the researcher’s judgment and interpretation than more traditional statistical analysis.

In this process, it was found that some variation in output arises purely from differences in the methodologies used to model the data, including different factor extraction methods, rotation strategies, and the number of expected factors. Given how much the factor loadings could change with the same data set given these parameters, instead of trying to find which individual model was best, combinations of each parameter were run for a total of 18 models. Ideally, it would be found that items consistently loaded onto the same factor regardless of the model differences.

After a theoretical structure was established using EFA, evidence was found of a pre-existing intended structure for the survey based on the page headings and item proximity on the survey. This paper will conclude with a review of how well the items loading onto each extracted factor line up with the expected groupings of the items from the original survey design. This was carried out after the factor extraction and interpretation process was complete to avoid influencing the interpretation with pre-existing assumptions. While confirmatory factor analysis (CFA) was not a part of this project, CFA may be useful in the future to test whether that structure holds when tested using new data sets.

Methodology

This analysis uses survey response data collected from parents and guardians in April and May of 2019 through an online instrument (SurveyMonkey). Invitations to complete the survey were sent via email to all contacts from the KCS student information system (Aspen) listed at priority level 1. Participation was voluntary. Parents were asked to select the grade band and school name for their student(s) before providing their responses. If parents had students at more than one school, they had the opportunity to repeat the survey for another school upon completion.

Invitations were sent to 54,689 email addresses. Of these, 3,824 responded to the survey. Taking into account cases where a parent responded for more than one school, there were a total of 4,188 responses.

In preparing the dataset, it was decided to exclude responses in which more than five percent of items were left blank. After removing these cases, 3,064 responses remained. If any of these responses containing missing data, multiple imputation by chained equations (MICE) was used to fill in those values. MICE uses imputation to substitute estimated values where data is missing. Whereas single imputation does not establish a range of possible responses to account for uncertainty, MICE imputes multiple times to take uncertainty into account before substituting the final values using the R package “mice.”

Next, outliers were excluded from the dataset. A response was considered an outlier if it contained values with a mahalanobis distance greater than the cutoff value. The mahalanobis distance is an estimate of the difference between an individual point and the distribution taking into account the standard deviation of the distribution. The cutoff value was set as the mahalanobis distance for cases greater than 2.58 standard deviations from the mean of the distribution. In this case, it was a mahalanobis distance of 85.35.

Once the dataset had been cleaned, a series of tests were run to ensure that there was an adequate sample for carrying out the factor analysis. The Kaiser-Meyer-Olkin test (KMO) looks at the shared variance in the data to test how adequate the sample is for factor analysis. No survey item had a KMO value lower than 0.97, which means all items met the “Marvelous” (0.9-1.0) criterion for common variance. The KMO value for the model as a whole was 0.99.

Finally, a correlation matrix was calculated to see the correlations between each pair of individual variables. If two or more variables are perfectly correlated, it can impede the ability to run the exploratory factor analysis. A correlation close to 1 (0.977) was found between items Q24 and Q25. Upon inspection of the items, the content was very similar:

Q24: How well is this school doing at recognizing equity issues?

Q25: How well is this school doing at addressing equity issues?

Given the similarity between the two items, item Q24 was removed to help the overall factor analysis run properly.

Parallel analysis was used to estimate the number of factors in the data. The following packages in R version 3.4.3 were used to complete the factor analysis: psych, GPArotation, lavaan, and semPlot. Depending on the factor method used, parallel analysis suggested that there are 6 to 8 unique factors in the data. When principal axis factoring (“pa”) and the minimal residual method (“minres”) were designated as the factor method, parallel analysis suggested that 8 factors were present in the data. When maximum likelihood (“ml”) and generalized least squares (“gls”) were used, parallel analysis suggested that only 6 factors were present. It was decided to test models containing 6, 7, and 8 factors during the exploratory factor analysis.

Proceeding with the factor analysis itself, multiple iterations were run with varying parameters set. For factor rotation, models using both orthogonal (varimax) and oblique (oblimin and promax) rotation were run. For factor method, the four methods previously mentioned (principal axis, minimal residual, maximum likelihood, and generalized least squares) were applied. For the number of expected factors, models were run with 6, 7, and 8 factors for each combination of the previously mentioned parameters. In all, there were 36 models in the initial run.

Upon inspection of the loadings, it soon became clear that orthogonal (varimax) rotation was not optimal for the dataset. Orthogonal rotation does not attempt to account for shared variance between different factors. Because of this, significant cross-loading onto multiple factors was seen whenever varimax rotation was applied. Almost all items on the survey had a loading of at least 0.3 on the first two factors in addition to any loadings on additional factors. As a result, the interpretability of these models is limited.

There is currently no theoretical basis for arguing against shared variance between the different factors in our model. Looking at the survey content and instrument, it makes sense that responses across the whole survey would share patterns in addition to the shared patterns of variance within each identified factor. Consequently, the analysis proceeded with only oblique rotation (oblimin and promax).

Results: Factor Structure and Descriptions

Initially, a factor loading of 0.3 or higher was used as the cutoff to indicate whether an item loaded onto a particular factor. With this as the cutoff, there were frequently items that loaded on to two factors within the same model, especially when promax rotation was applied [Appendix B]. Once the cutoff was raised to a factor loading of 0.4 or higher, this issue was mostly resolved [Appendix C].

In deciding how to best report these findings, the decision was made to report the results with both cutoffs set. The items listed under each factor in the following tables were

included if they loaded onto that factor with a loading of at least 0.3 in at least 50 percent of the models (i.e., at least 9 of 18).

An important note about the naming of the items: the first 33 items are labeled Q1 through Q33 and are presented in the form of a question, while the final 15 items are labeled A1 through A15 and are presented in the form of a statement [Appendix A]. All items beginning with “Q” have the following prompt at the top of the page: “How well is this school doing at...?”. The respondent is asked to rate various actions by the school on a scale that goes from “Not very well” to “Excelling”.

The final 15 items (A1 through A15) ask respondents to indicate their level of agreement with a statement. The prompt leading into each statement is “In general, I feel that...” and respondents have to respond on a scale from “Strongly disagree” to “Strongly agree.”

Upon inspection, the following factors were hypothesized to exist within the analyzed data:

- A. Community/Parent Engagement
- B. Inclusivity
- C. School Culture/Environment
- D. Academic Progress
- E. Student Behavior
- F. Communication
- G. Organizational Structure

The factors were named based on common themes among the items that loaded onto them that seemed unique when looking across the whole array of items. While these seven identified factors were not necessarily present in every model, particularly those only assuming the presence of six factors, the items associated with each factor showed enough of a consistently unique pattern to be worth mentioning. The common themes identified among the items tending to load onto each factor are as follows:

A. Community/Parent Engagement

A. Community/ Family Engagement		Loading of at least 0.3		Loading of at least 0.4	
		#	%	#	%
Item	Content				
Q29	Linking families to community resources?	18	100	18	100
Q30	Organizing support from community partners?	18	100	18	100
Q31	Being an active partner to the community?	18	100	18	100
Q32	Expanding learning experiences for students into the community?	18	100	18	100
Q33	Partnering with community groups to strengthen families and support student success?	18	100	18	100
Q27	Connecting families to local school officials?	17	94.4	16	88.9

Q26	Developing parent leadership?	17	94.4	14	77.8
Q28	Developing an effective parent involvement organization that represents all families?	17	94.4	14	77.8
Q21	Sharing information about resources available to families?	17	94.4	13	72.2
A1	This school is increasing the focus on parent engagement.	15	83.3	9	50
Q17	Sharing the school's progress?	13	72.2	8	44.4
Q19	Understanding how the school and district operate?	13	72.2	8	44.4
Q8	Surveying families to identify issues and concerns?	12	66.7	8	44.4
Q12	Facilitating connections among families?	12	66.7	8	44.4
Q23	Ensuring that families have a voice in all decisions that affect children?	11	61.1	11	61.1
Q25	Addressing equity issues?	11	61.1	8	44.4
Q20	Understanding parent rights and responsibilities under federal and state law?	10	55.6	7	38.9
A2	The Central Office is a place that supports all stakeholders.	10	55.6	0	0

Factor A tended to be the strongest among all models, often with the highest number of items loading and the strongest individual loadings among items. In every model among the 18 tested, this factor explained the largest amount of overall variance within the survey. Within this factor, the items that typically loaded most strongly were those containing the word “community” (Q29 through Q33). Coincidentally, these were also the items on the sixth page of survey items (out of eight), which was the last page for prompts beginning with “How well is this school doing at...?” before the item structure and response scale changed for items A1-A15. It is possible that both the content of these items and the manner in which they were presented were causes for these items to load consistently together.

When looking for common themes among these items, one thing that stood out was the consistent use of verbs implying tangible actions taken by the school (e.g. linking, organizing, partnering, sharing, addressing). There seems to be a common theme asking how well the school does in terms of taking actionable steps. Another thing that stands out is that these items mostly emphasize the experience of families and community partners and not necessarily their day-to-day experience within the school. Some items (e.g. Q20, Q21, Q27, Q29, Q31) ask respondents to address how well the school does at making information and resources available to families and the community. Other items (e.g. Q23, Q26, Q30, Q33) ask about family and community involvement in terms of the benefits they can provide to the school and how well the school leverages these assets.

The breadth of topics among the items that loaded onto this factor also raises the question of whether this factor might reflect the overall positive or negative attitude of the respondent when completing the survey. In this case, the content of particular items might be less important than a general positive or negative trend in responses. For example, items Q19 (“Understanding how the school and district operate?”) and A2 (“The Central

Office is a place that supports all stakeholders.”) do not seem explicitly aligned with the themes of connections between the school, family, and community that are present in the other factors. Respondents may be projecting their experiences with the school onto central office or vice versa. Additionally, there are items from several different pages of the survey that loaded onto Factor A, from Q8 on the second page to A2 on the second to last page. Looking at the full table of factor loadings across models [Appendix D], there are items as early as Q1 and as late as A7 that loaded onto this factor at least some of the time.

B. Inclusivity

B. Inclusivity		Loading of at least 0.3		Loading of at least 0.4	
		#	%	#	%
Item	Content				
Q2	Creating a family-friendly atmosphere?	18	100	18	100
Q4	Respecting and valuing diversity for all families?	18	100	18	100
Q5	Removing obstacles to participation?	18	100	18	100
Q6	Ensuring accessible programming for all families?	18	100	18	100
Q1	Developing personal relationships?	18	100	16	88.9
Q3	Providing opportunities for volunteering?	17	94.4	17	94.4
Q13	Being sensitive to the challenges or barriers faced by some families?	14	77.8	10	55.6

The items loading consistently onto Factor B tended to address themes of opportunities for all students, appreciation of diversity, and acknowledgement of the various obstacles to participation in school activities that some families face. There are similarities to the items that loaded strongly onto Factor A, but these items loaded together onto a separate factor from those items in most of the models run. Some of these items (Q5, Q6, Q13) ask explicitly about barriers to engagement with the school that some families face and about how well the school does to address these barriers.

The high consistency with which these items loaded strongly together across all models is evident when looking at the full table of factor loadings [Appendix D]. In particular, Q1 through Q6 loaded strongly onto Factor B in almost every model run. Q13 stands out because it comes from a different page of the survey than these six items, which all appear together on the first page. The content of Q13 addresses sensitivity to diverse needs and accessibility at the school, which aligns well with the content of the other six items. This provides some evidence of an underlying factor structure where responses to these items all reflect the same latent attitude or belief due to their content.

The fact that this item doesn't load as cleanly onto Factor B as the six items from the first page could also be evidence that the survey structure itself affected the way items loaded together, as seen in Factor A with all items from the sixth page of the survey (Q29 through Q33) loading at 0.4 or higher in all 18 models. It could be enlightening to deploy future

iterations of the survey in two or more versions to see how well these associations hold up when the items are not presented together or in the same order.

C. School Culture/Environment

C. Culture/ Environment		Loading of at least 0.3		Loading of at least 0.4	
Item	Content	#	%	#	%
A4	This school is a safe and secure place.	18	100	18	100
A5	Administrators and teachers support and encourage students at this school to do their best.	18	100	18	100
A6	Administrators and teachers have high expectations for students at this school.	18	100	18	100
A7	Parents/guardians at this school regularly attend school sponsored events, conferences, games, and performances.	18	100	18	100
A8	Teachers at this school are well organized and prepared to teach.	18	100	18	100
A9	Administrators and teachers at this school do their jobs with enthusiasm.	18	100	18	100
A12	Student behavior is usually positive at this school.	18	100	18	100
A14	This school's building(s) and grounds are well maintained at this school.	18	100	18	100
A15	This school does a good job at helping to prepare students to be college and career ready.	18	100	18	100
A3	Positive relationships with parents are important at this school.	18	100	16	88.9
A13	School rules are enforced fairly among all students at this school.	18	100	12	66.7

There are two things that immediately stand out when looking at the items that consistently loaded together onto Factor C. One is that these items almost always loaded together, with little to no cross-loading onto other factors. Among these items, the only ones that also loaded onto another factor at 0.3 or higher were A3 (Factor E, 16.7% of models), A7 (Factor A, 22.2% of models), A12 (Factor D, 55.6% of models), and A13 (Factor D, 61.1% of models).

The second thing that stands out is that the way in which these items were presented to respondents were fundamentally different from those items associated with the preceding factors. The items loading onto Factor C come from the final two pages of the survey, which have a different item structure and response scale. The first six pages of items start with the prompt “How well is this school doing at...?”, while the final two start with the prompt “In general, I feel that...”. Furthermore, while Q1 through Q33 are on a 4-point scale [Not very well – Fairly well – Very well – Excelling], A1 through A15 are on a 5-point scale [Strongly disagree – Disagree – Neutral – Agree – Strongly agree].

However, not all the variance among the final 15 items can be explained by the way in which the item was presented. Four items from this section (A1, A2, A10, A11) did not have a loading of 0.3 or higher on this factor in any of the models run. Items A1 and A2 load more strongly onto Factor A, with some cross-loading onto Factor E. As will be discussed below, items A10 and A11 consistently loaded together to form Factor D, Student Behavior. Items A12 and A13 would also frequently cross-load onto this factor, although they still loaded more consistently onto Factor C.

In terms of content, these items seem to focus more on the day-to-day operation of the school, the attitudes of administrators and teachers, and whether the school has a positive culture. Items A5, A6, A8, and A9 ask respondents how prepared, enthusiastic, and student-focused they perceive teachers and administrators to be. While most of the items from Factor C seem to ask about the environment of the school in a social or emotional sense, items A4 and A14 ask explicitly about the physical security and maintenance of the school grounds.

D. Student Behavior

D. Student Behavior		Loading of at least 0.3		Loading of at least 0.4	
		#	%	#	%
Item	Content	#	%	#	%
A10	This school addresses bullying in a timely manner.	18	100	18	100
A11	This school communicates with families about bullying in a timely manner.	18	100	18	100
A13	School rules are enforced fairly among all students at this school.	11	61.1	2	11.1
A12	Student behavior is usually positive at this school.	10	55.6	0	0

Factor D was interesting in that while relatively few items tended to load onto it, the ones that did had a clear common theme related to school rules and student behavior. Two of the items, A10 and A11, loaded very strongly onto this factor in all the models. In addition, they did not have a loading of 0.3 or higher on any other factor in any of the models run. The content of these two items explicitly ask respondents about bullying at the school. The other two items that made the cutoff of a 0.3 loading in at least 50% of the models (A12 and A13) also address the topic of school rules and student behavior. However, both items loaded more strongly and frequently on Factor C, School Culture/Environment.

As with the items associated with Factor C, all four of these items come from the final two pages of the survey and have a different structure from the first six pages. Of the 33 items on these pages, only Q22 (“Resolving problems and conflicts?”) loaded onto this factor at 0.3 or higher in any of the models (11.1% of models).

E. Communication

E. Communication		Loading of at least 0.3		Loading of at least 0.4	
Item	Content	#	%	#	%
Q9	Having access to the principal(s)?	12	66.7	0	0
Q11	Providing information on current issues?	11	61.1	0	0
Q10	Having access to teachers?	9	50	9	50
Q14	Making it easy for parents to communicate with teachers about student progress?	9	50	9	50

The items loading onto Factor E addressed themes of communication and access to teachers and principals. Items addressing communication would often cross-load onto other factors and have low overall internal consistency (i.e. many cross-loaded items with low loadings).. While factors A, B, C, and D all had at least some items with a loading of 0.4 in all 18 models, none of the items associated with this factor did so. Items Q9 and Q11 loaded onto this factor more frequently, but never with a loading of 0.4 or greater. Items Q10 and Q14 only loaded on to this factor half of the time.

It does seem there is some latent attitude around communication, however weak, that causes respondents to answer these items differently than others. The four items associated with Factor E all address the flow of information to and from teachers and principals. While they didn't meet the cutoff of a 0.3 loading in at least half of models, items Q7, Q8, Q12, Q15, Q16, and Q17 did load onto this factor at 0.3 or higher at least some of the time [Appendix B, Appendix D]. Three of these specifically address communication from the school:

- Q7: Using multiple communication paths?
- Q8: Surveying families to identify issues and concerns?
- Q17: Sharing the school's progress?

While Factor E is relatively weaker in terms of consistency than the preceding factors, there is some evidence of latent attitudes around communication that can be measured. As will be discussed in the next section, the items currently intended to measure this factor may be too vaguely defined or affected by cross-loadings with other factors (particularly Factors A and F) to give as clear of a picture as may be desired.

F. Academic Progress

F. Academic Progress		Loading of at least 0.3		Loading of at least 0.4	
Item	Content	#	%	#	%
Q16	Using standardized test results to increase achievement?	16	88.9	7	38.9
Q15	Linking student work to academic standards?	12	66.7	12	66.7
Q10	Having access to teachers?	9	50	9	50
Q14	Making it easy for parents to communicate with teachers about student progress?	9	50	9	50
Q17	Sharing the school's progress?	9	50	0	0

As with the preceding section on Factor E, the structure of Factor F is less consistent than the first four discussed. Most of the items that loaded onto this factor would also load onto another factor at least some of the time. Some items would occasionally load more strongly onto Factor E and sometimes more strongly onto this factor. Specifically, items Q10 and Q14 had loadings of 0.4 or higher in half of the models for both factors.

One argument worth considering is that the items identified as belonging to Factors E and F are all reflecting the same latent factor and the distinction is not necessary. However, these items would not always load together onto the same factor, and the items that did cross-load would usually load predominately onto one factor over the other (with the exception of Q10 and Q14).

Looking at the content of these items, the overlap with the preceding factor regarding communication is apparent. However, there is a distinction in that most of these items more explicitly address academic progress and communication around student performance. If it is important to capture these attitudes separately from attitudes about non-academic communication, the structure and content of these items may need to be revised.

G. Organizational Structure

G. Organizational Structure		Loading of at least 0.3		Loading of at least 0.4	
Item	Content	#	%	#	%
Q20	Understanding parent rights and responsibilities under federal and state law?	14	77.8	13	72.2
Q19	Understanding how the school and district operate?	14	77.8	4	22.2

Factor G had the fewest items that loaded consistently together, with only items Q19 and Q20 making the cutoff for inclusion in these results. Additionally, both items also loaded onto Factor A, Community/Parent Engagement, although with less frequency. This factor may be unnecessary for the analysis and may seem irrelevant given the scope of the survey. Still, the fact that these items would often behave differently from most other items and form a unique factor seems worth mentioning.

Furthermore, the content of these two items may not reflect the same aspects of school performance as the other factors. While most items focus on perceived attitudes and behavior at the school, especially when interacting with families, Q19 and Q20 seem to ask about how well staff at the school understand the structure in which the school and families operate in terms of procedures, laws, and norms. While distinct in focus, these items seem to ask about school staff competency like item A8 from Factor C (“Teachers at this school are well organized and prepared to teach.”).

Results: Poorly Fitting Items

There were three items that did not meet the cutoff of loading 0.3 or greater onto a factor in at least half (9 of 18) of the models run:

	A. Community/ Family Engagement		B. Inclusivity		C. Culture/ Environment		D. Student Behavior		E. Communi- cation		F. Academic Progress		G. Organizational Structure	
	Percent of Models with a Loading of At Least:													
Item	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4
Q7	5.6	0	0	0	0	0	0	0	38.9	0	5.6	0	0	0
Q18	44.4	0	0	0	0	0	0	0	0	0	0	0	0	0
Q22	44.4	0	0	0	0	0	11.1	0	0	0	0	0	16.7	0

The content of these items is below:

Item	Content
Q7	Using multiple communication paths?
Q18	Responding to the social, emotional, and personal needs of students?
Q22	Resolving problems and conflicts?

Q7 loaded most consistently onto Factor E, which makes sense given the item is explicitly about communication. Still, it did not load consistently enough to make the cutoff. Perhaps the item is not specific enough for respondents to understand what “multiple communication paths” means in the same way. It also does not explicitly say with whom the school is communicating, i.e. whether it is internal or external.

For Q18, it is possible that the triple-barreled nature of the question (asking about social, emotional, and personal needs) caused some confusion and inconsistent interpretations among respondents, with some parents potentially focusing in on different aspects of the question. Furthermore, parents may not all have the same beliefs about what these needs may be.

Q22 may also be double-barreled, although the two topics (problems and conflicts) are not very different from one another. This item is also relatively vague and open to interpretation about the types and severity of problems and conflicts. Some may interpret it as asking about conflicts between, students, whereas others may be thinking of a specific problem or conflict that they had with school staff. Both Q18 and Q22 loaded most strongly onto Factor A, which aligns with the theory that it captures the overall attitude of the respondent with less regard for the specific content of the items.

Results: Factor Fit to Expected Structure

After the exploratory factor analysis had been carried out, it was sought to validate the factor structure by looking further at the parent survey.

The majority of items on the parent survey were taken from the PTA National Standards for Family-School Partnerships. These standards are referenced in state law and local Knox County Schools board policy. Under the Every Student Succeeds Act (ESSA), school districts must incorporate a parent and family engagement policy into the district's plan. KCS school board policy refers to the PTA National Standards as the TN Department of Education Parent Involvement Standards resulting from a 2009 TN Senate bill. The six standards included in KCS board policy are as follows [Appendix E]:

- **Standard One: Welcoming All Families into the School Community.**
- **Standard Two: Communicating.**
- **Standard Three: Supporting Student Success.**
- **Standard Four: Speaking Up for Every Child.**
- **Standard Five: Sharing Power.**
- **Standard Six: Collaborating with Community.**

The items themselves were interpreted from a rubric provided by the PTA National Standards. When parents and guardians took the survey, the items belonging to each standard were grouped together, with the name of each standard listed above as a title. In other words, respondents could only see the items from one standard at a time. Theoretically, it would make sense for the items belonging to each standard to load more strongly with one another than with items from another page. However, these findings show that this is not always the case. While the items from one standard would sometimes all load cleanly onto one factor, there are cases where some relationship seems to exist between items belonging to different standards. In some cases, the items within a particular standard load across two or more identified factors.

In the following section, the consistency of factor loadings among the items belonging to each standard will be discussed:

- **Standard One: Welcoming All Families into the School Community.** Families are active participants in the life of the school, and feel welcomed, valued, and connected to each other, to school staff, and to what students are learning and doing in class.

How well is this school doing at...		
Page Title	Item	Content
Welcoming families into the school community	Q1	Developing personal relationships?
	Q2	Creating a family-friendly atmosphere?
	Q3	Providing opportunities for volunteering?
	Q4	Respecting and valuing diversity for all families?
	Q5	Removing obstacles to participation?
	Q6	Ensuring accessible programming for all families?

Item	A. Community/ Family Engagement		B. Inclusivity		C. Culture/ Environment		D. Student Behavior		E. Communication		F. Academic Progress		G. Organizational Structure	
	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4
Percent of Models with a Loading of At Least:														
Q1	38.9	0	100	88.9	0	0	0	0	0	0	0	0	0	0
Q2	5.6	0	100	100	0	0	0	0	0	0	0	0	0	0
Q3	38.9	5.6	94.4	94.4	0	0	0	0	0	0	0	0	0	0
Q4	0	0	100	100	0	0	0	0	0	0	0	0	0	0
Q5	0	0	100	100	0	0	0	0	0	0	0	0	0	0
Q6	0	0	100	100	0	0	0	0	0	0	0	0	0	0

With the exception of Q13, all of the items making the cutoff for Factor B come from the items associated with Standard One. All the items belonging to this first standard loaded onto the same factor consistently across all 18 models. This makes sense in terms of the content of the items and the description of the standard. Looking at all of the standards, the cleanest one-to-one match between a PTA Standard and an identified factor seems to be that between Standard One and Factor B.

Beyond the relative uniformity of this section, items Q1 and Q3 display the most interesting behavior. They begin a pattern that continues throughout the survey, with items cross-loading onto Factor A even when they load more consistently onto another factor. These items align well in terms of content with the other items loading onto Factor B, but their loading with the items from Factor A makes theoretical sense. As discussed in previous

sections, the items loading onto Factor A often emphasize concrete actionable steps that the school has taken to engage families and the community, and Q1 and Q3 make sense in this context.

• **Standard Two: Communicating.** Families and school staff engage in regular, meaningful communication about student learning.

How well is this school doing at...		
Page Title	Item	Content
Communicating Effectively	Q7	Using multiple communication paths?
	Q8	Surveying families to identify issues and concerns?
	Q9	Having access to the principal(s)?
	Q10	Having access to teachers?
	Q11	Providing information on current issues?
	Q12	Facilitating connections among families?
	Q13	Being sensitive to the challenges or barriers faced by some families?

	A. Community/Family Engagement		B. Inclusivity		C. Culture/Environment		D. Student Behavior		E. Communication		F. Academic Progress		G. Organizational Structure	
Percent of Models with a Loading of At Least:														
Item	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4
Q7	5.6	0	0	0	0	0	0	0	38.9	0	5.6	0	0	0
Q8	66.7	44.4	5.6	0	0	0	0	0	22.2	0	0	0	0	0
Q9	44.4	0	5.6	0	0	0	0	0	66.7	0	0	0	0	0
Q10	0	0	0	0	0	0	0	0	50	50	50	50	0	0
Q11	44.4	5.6	0	0	0	0	0	0	61.1	0	22.2	0	0	0
Q12	66.7	44.4	11.1	5.6	0	0	0	0	22.2	0	0	0	0	0
Q13	44.4	27.8	77.8	55.6	0	0	0	0	0	0	0	0	0	0

The description of Standard Two is relatively brief and centers on student learning when discussing communication. However, the wording of the items does not make this explicit. If the goal of these items is to collect attitudes about communication specifically regarding student learning, more context might be needed for respondents to be aware of this. For example, it is open to interpretation what is meant by “information on current issues” in Q11. While some parents may have thought of student learning and academics when responding to this item, others could have just as easily been thinking of extracurricular activities or inclement weather. This ambiguity is reflected in the fact that Q11 loaded onto three different factors across the various models.

While items Q8 and Q12 are related to communication, these items tended to load more strongly and consistently on Factor A. It could be that “surveying families” and “facilitating

connections” come across as more direct engagement with families and do not necessarily draw from the same latent variable as the items more explicitly about modes of communication (e.g. Q9, Q11).

Items Q9 (“Having access to the principal(s)?”) and Q10 (“Having access to teachers?”) are similar in phrasing, but they exhibit somewhat distinct behavior in terms of factor loadings. While Q10 is split somewhat evenly between Factor E (Communication) and Factor F (Academic Progress), Q9 only loads onto Factor E consistently. Since teachers engage more directly with individual student learning, it makes sense that communication between parents and teachers would address academic performance more directly. On the other hand, parents may associate communication with principals more frequently with other concerns (social, behavioral, etc.). When responding to Q9, respondents did not seem to draw from the same latent variable as the items associated with Factor F. This lends some evidence to the theory that Factors E and F, while related, are in fact reflecting distinct latent variables.

Q13 also stands out for loading strongly with the items from Standard One onto Factor B. The content of this item aligns well with the identified factor and with the emphasis on the diversity of experience among families. The fact that this item loaded consistently onto the same factor as the first six items despite being on the following page provides some evidence that the items associated with Factor B are measuring a distinct latent variable.

• **Standard Three: Supporting Student Success.** *Families and school staff continuously work together to support students’ learning and healthy development both at home and at school, and have regular opportunities to strengthen their knowledge and skills to do so effectively.*

How well is this school doing at...		
Page Title	Item	Content
Supporting Student Success	Q14	Making it easy for parents to communicate with teachers about student progress?
	Q15	Linking student work to academic standards?
	Q16	Using standardized test results to increase achievement?
	Q17	Sharing the school's progress?
	Q18	Responding to the social, emotional, and personal needs of students?

	A. Community/ Family Engagement		B. Inclusivity		C. Culture/ Environment		D. Student Behavior		E. Communication		F. Academic Progress		G. Organizational Structure	
Percent of Models with a Loading of At Least:														
Item	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4
Q14	0	0	0	0	0	0	0	0	50	50	50	50	0	0
Q15	11.1	0	0	0	0	0	0	0	11.1	11.1	66.7	66.7	0	0
Q16	44.4	22.2	0	0	0	0	0	0	11.1	0	88.9	38.9	0	0
Q17	72.2	44.4	0	0	0	0	0	0	11.1	0	50	0	0	0
Q18	44.4	0	0	0	0	0	0	0	0	0	0	0	0	0

The items belonging to Standard Three seem to be distributed fairly evenly among three factors. Looking at the loadings, there is a pattern of separation between Factor A and Factor F, with some cross-loading onto Factor E. The description of the standard seems to emphasize both the academic and social-emotional development of students. The difference between these two seems to be reflected in the split between the two factors. Q18 makes it explicit that respondents should think about the “social, emotional, and personal needs of students”, which is enough to prevent it from cross loading onto the factor about academic progress.

Four of the five items that loaded onto Factor F (Q10, Q14, Q15, Q16, Q17) came from this section of the survey. This factor was identified in the analysis as reflecting attitudes about student academic performance, which aligns well with Standard Three’s goal of “*work(ing) together to support students’ learning*”. Q15, Q16, and Q17 are the items that provided the most consistent evidence for a factor reflecting attitudes around academic progress. Q15 and Q16 are the items that most explicitly address student academic work, and these two items loaded most consistently and strongly onto Factor F.

Q14 behaves much like Q10 from Standard Two. It is evenly split between Factors E and F. Like Q10 (“Having access to teachers?”), Q14 explicitly mentions communication between parents and teachers. Given that teachers often help students with both academic and non-academic concerns, it makes sense that Q14 and Q10 both exhibit this behavior.

• **Standard Four: Speaking Up for Every Child.** Families are informed and enabled to be advocates for their own and other children, to ensure that students are treated fairly and have access to learning opportunities that will support their success.

How well is this school doing at...		
Page Title	Item	Content
Speaking Up for Every Child	Q19	Understanding how the school and district operate?
	Q20	Understanding parent rights and responsibilities under federal and state law?
	Q21	Sharing information about resources available to families?
	Q22	Resolving problems and conflicts?

	A. Community/ Family Engagement		B. Inclusivity		C. Culture/ Environment		D. Student Behavior		E. Communication		F. Academic Progress		G. Organizational Structure	
Percent of Models with a Loading of At Least:														
Item	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4
Q19	72.2	44.4	0	0	0	0	0	0	0	0	0	0	77.8	22.2
Q20	55.6	38.9	0	0	0	0	0	0	0	0	0	0	77.8	72.2
Q21	94.4	72.2	0	0	0	0	0	0	0	0	0	0	16.7	11.1
Q22	44.4	0	0	0	0	0	11.1	0	0	0	0	0	16.7	0

All four of the items from Standard Four load onto Factor A with varying degrees of cross-loading. The description of this factor reflects the role of families as partners and advocates for their children.

As was discussed earlier when describing Factor G, Organizational Structure, the content of Q19 and Q20 is unique in that they ask how well school staff understand the structures in which they work. Instead of emphasizing the experience of parents and families when engaging with school staff, they ask about staff in terms of personal competency. Q20 in particular asks how prepared staff seem to be to equip parents as advocates for their children. This aligns with the “informed and enabled” part of the description of Standard Five. This difference seems to be enough to cause cross-loading onto Factor G as a distinct factor from Factor A.

Still, both of these items loaded frequently enough onto Factor A to meet the cutoff for inclusion in its description. When looking at the full table of factor loadings across the first 33 items [Appendix D], there seems to be a pattern of items loading onto Factor A with increasing frequency, even when these items show enough of a difference in response patterns to warrant discussion of other latent factors, especially Factors E, F, and G. This brings us back to the hypothesis that some response patterns may be guided more by an overarching sentiment than the specific content of items.

Q22 is interesting because it loaded onto three different factors depending on the model methodologies. In terms of content, the discussion of “problems and conflicts” in Q22 makes sense when one notes that it loaded onto Factor D (Student Behavior) in 2 of the 18 models. The fact that all four items from this section also loaded onto Factor G may be evidence that the order in which items are presented also affects the grouping of response patterns.

• **Standard Five: Sharing Power.** Families and school staff are equal partners with equal representation in decisions that affect students and families and together inform, influence, and create policies, practices, and programs.

How well is this school doing at...		
Page Title	Item	Content
Sharing Power	Q23	Ensuring that families have a voice in all decisions that affect children?
	Q25	Addressing equity issues?
	Q26	Developing parent leadership?
	Q27	Connecting families to local school officials?
	Q28	Developing an effective parent involvement organization that represents all families?

Item	A. Community/ Family Engagement		B. Inclusivity		C. Culture/ Environment		D. Student Behavior		E. Communication		F. Academic Progress		G. Organizational Structure	
	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4
Q23	61.1	61.1	0	0	0	0	0	0	0	0	0	0	0	0
Q25	61.1	44.4	38.9	0	0	0	0	0	0	0	0	0	5.6	0
Q26	94.4	77.8	5.6	0	0	0	0	0	0	0	0	0	0	0
Q27	94.4	88.9	0	0	0	0	0	0	0	0	0	0	0	0
Q28	94.4	77.8	5.6	0	0	0	0	0	0	0	0	0	0	0

These items clearly lined up with the largest factor in the dataset, Factor A (Community/Family Engagement). Occasionally items would load onto Factor B (Inclusivity), but in the preponderance of models they loaded to Factor A. As respondents approached the end of the survey, there was an increasing likelihood of items loading onto Factor A.

The description of Standard Five talks about “equal representation in decisions” and families working with staff to “inform, influence, and create policies, practices, and programs”. This aligns fairly well with the description of Factor A, particularly the part about families and the communities being assets that schools can leverage to support student success.

The item that stands out the most is Q25, which did not meet the cutoff of 0.3 in at least 50% of models, but did load strongly enough onto Factor B in seven of the models (38.9%). The item asks how well schools are doing at “addressing equity issues”, which aligns well with the general themes of inclusivity, accessibility, and appreciation of diverse backgrounds present in Factor B.

• **Standard Six: Collaborating with Community.** Families and school staff work together with community members to connect students, families, and staff to expanded learning opportunities, community services, and civic participation.

How well is this school doing at...		
Page Title	Item	Content
Collaborating with Community	Q29	Linking families to community resources?
	Q30	Organizing support from community partners?
	Q31	Being an active partner to the community?
	Q32	Expanding learning experiences for students into the community?
	Q33	Partnering with community groups to strengthen families and support student success?

A. Community/ Family Engagement		B. Inclusivity		C. Culture/ Environment		D. Student Behavior		E. Communication		F. Academic Progress		G. Organizational Structure		
Percent of Models with a Loading of At Least:														
Item	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4
Q29	100	100	0	0	0	0	0	0	0	0	0	0	0	0
Q30	100	100	0	0	0	0	0	0	0	0	0	0	0	0
Q31	100	100	0	0	0	0	0	0	0	0	0	0	0	0
Q32	100	100	0	0	0	0	0	0	0	0	0	0	0	0
Q33	100	100	0	0	0	0	0	0	0	0	0	0	0	0

Much like with Standards One and Five, all items belonging to this standard loaded strongly onto one factor in the analysis. As with the items from Standard Five, these items overwhelmingly loaded onto Factor A (Community/Family Engagement). However, the loadings for these items were even more consistent. All five items from this standard (Q29-Q33) loaded onto Factor A with a loading of 0.4 or higher in all 18 models considered. These items did not have a loading of 0.3 or higher on any factors other than Factor A (Community/Family Engagement).

As mentioned before, it is possible that the breadth of topics among the items that loaded onto Factor A reflects the overall attitude of respondents toward the school in general. Perhaps some respondents selected positive responses across the board if they were satisfied with their school experience, regardless of item content, and vice versa. The fact that later survey items load consistently onto this factor could be evidence of respondent fatigue, with less and less discrimination in responses from one item to the next.

Looking at the items for Standards Five and Six, it is possible to see how their responses could correlate to the same latent attitude. Both sections address building partnerships and strong connections between school staff and outside actors. However, looking at the

descriptions, it is clear that Standard Five is about the relationship between school staff and families, while Standard Six is about the relationship between both of these parties and other community partners who may not necessarily have a student at the school. If this distinction is important to KCS stakeholders, it may be valuable to adjust the content of these items for greater discrimination between the two groups. If the respondent fatigue theory is true, moving these items earlier in the survey may also have some effect on the consistency of the factor structure.

Among the six PTA Standards for Family-School Partnerships, Standards One, Five, and Six seem to have the most internally consistent structure, with relatively fewer cross loadings than the items belonging to other standards. Among these three, Standard One is unique in that its items loaded strongly on a factor that tended not to overlap with items from other standards (Factor B – Inclusivity). In contrast, the items from Standards Five and Six mostly loaded onto Factor A (Community/Family Engagement), which had at least one item from all six standards load onto it in some of the models. In fact, only Q4, Q5, Q6, Q10, and Q14 never loaded onto Factor A with a loading of at least 0.3.

Culture Items

How well is this school doing at...		
Page Title	Item	Content
Culture Questions	A1	This school is increasing the focus on parent engagement.
	A2	The Central Office is a place that supports all stakeholders.
	A3	Positive relationships with parents are important at this school.
	A4	This school is a safe and secure place.
	A5	Administrator and teachers support and encourage students at this school to do their best.
	A6	Administrators and teachers have high expectations for students at this school.
	A7	Parents/guardians at this school regularly attend school sponsored events, conferences, games, and performances.
Culture Questions Continued	A8	Teachers at this school are well organized and prepared to teach.
	A9	Administrators and teachers at this school do their jobs with enthusiasm.
	A10	This school addresses bullying in a timely manner.
	A11	This school communicates with families about bullying in a timely manner.
	A12	Student behavior is usually positive at this school.
	A13	School rules are enforced fairly among all students at this school.
	A14	This school's building(s) and grounds are well maintained at this school.
	A15	This school does a good job at helping to prepare students to be college and career ready.

	A. Community/ Family Engagement		B. Inclusivity		C. Culture/ Environment		D. Student Behavior		E. Communication		F. Academic Progress		G. Organizational Structure	
Percent of Models with a Loading of At Least:														
Item	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4
A1	83.3	50	0	0	0	0	0	0	22.2	0	0	0	0	0
A2	55.6	0	0	0	0	0	0	0	5.6	0	0	0	0	0
A3	0	0	0	0	100	88.9	0	0	16.7	0	0	0	0	0
A4	0	0	0	0	100	100	0	0	0	0	0	0	0	0
A5	0	0	0	0	100	100	0	0	0	0	0	0	0	0
A6	0	0	0	0	100	100	0	0	0	0	0	0	0	0
A7	22.2	0	0	0	100	100	0	0	0	0	0	0	0	0
A8	0	0	0	0	100	100	0	0	0	0	0	0	0	0
A9	0	0	0	0	100	100	0	0	0	0	0	0	0	0
A10	0	0	0	0	0	0	100	100	0	0	0	0	0	0
A11	0	0	0	0	0	0	100	100	0	0	0	0	0	0
A12	0	0	0	0	100	100	55.6	0	0	0	0	0	0	0
A13	0	0	0	0	100	66.7	61.1	11.1	0	0	0	0	0	0
A14	0	0	0	0	100	100	0	0	0	0	0	0	0	0
A15	0	0	0	0	100	100	0	0	0	0	0	0	0	0

One result that stands out immediately is that the final 15 items about school culture rarely loaded onto the same factors as items created from the national PTA standards. This could be evidence that the items derived from the PTA standards are in fact measuring something distinct from the items created by our department.

However, it is important to keep in mind that these items were asked in a manner different from the items that preceded it. The prompt for these items asked respondents to state their level of agreement with a statement, whereas the preceding items were in the form of a question. Additionally, the preceding items that make up the bulk of the survey had four possible responses on the Likert scale (Not Very Well – Fairly Well – Very Well – Excelling). In addition to having five options, the items in the culture section also had the option for a neutral response (Strongly Disagree – Disagree – Neutral – Agree – Strongly Agree).

For the most part, it seems most of these items are consistently measuring the same latent construct and may therefore be redundant. However, items A11 and A12 are notable for never loading strongly onto any other factor than Factor D. These two items both explicitly address bullying at the school and the responses seemingly indicate that respondents found them to be addressing a different latent construct than most of the items loading onto Factor C.

Additionally, the first two items from this section tended to load more strongly onto the same factor as the items from the preceding page (Factor A) instead of loading onto the same factors as the other culture items (Factors C and D). This could be evidence of respondent fatigue as described in the preceding section on Standard 6. Item A1 does seem to line up with the other items in Factor A in terms of content, asking explicitly about parent engagement. However, Item A2 is distinct from most items on this survey because it asks about the Central Office instead of something happening at the school.

Moving Forward

This was a useful exercise to understand the responses to the KCS Parent Survey on a level beyond individual items. Since it was discovered after the analysis that the items originally chosen for the survey were developed from the PTA National Standards for Family-School Partnerships, and since these six standards are included in the Knox County Board of Education policy for Family and Community Engagement, this information could be useful in developing future iterations of the survey to get a better read on those standards where we might feel less confident in the strength of our findings.

After the analysis was carried out, the results were presented to the KCS Ombudsman. The Ombudsman is a parent representative within the administrative structure of the school system. The results of the parent survey are shared with the KCS Family Advisory Council (FAC). The following description comes from an Information Sheet published by the FAC:

FAC will be composed of parent representatives from each of the nine KCS districts and other stakeholders from BOE, Knox County PTA, community, and district. Participation will seek to include representation that reflects the diversity of parent/family stakeholders from various school levels in the district.

The REA department met with the Ombudsman and talked through the proposed factor structure and those items that did not seem to load well when compared to the expected structure. It had previously been proposed to deploy a paper version of the survey in the Spring 2020 administration of the Parent Survey concurrently with the existing SurveyMonkey version. Due to space constraints on the paper survey forms, it was proposed that some redundant or poorly aligned items be dropped.

While some of the proposed items were dropped, others were still considered valuable to the Ombudsman and were retained or modified instead. As a result of this discussion, the following changes were made for the Spring 2020 Parent Survey:

Items Dropped

Item	Content
How well is this school doing at...	
Q5	Removing obstacles to participation?
Q9	Having access to the principal(s)?
Q10	Having access to teachers?
Q25	Addressing equity issues?
To what extent do you agree or disagree with the following statements? In general, I feel that . . .	
A5	Administrator and teachers support and encourage students at this school to do their best.
A8	Teachers at this school are well organized and prepared to teach.
A9	Administrators and teachers at this school do their jobs with enthusiasm.
A11	This school communicates with families about bullying in a timely manner.

Items Modified

Item	Year	Content
How well is this school doing at...		
Q14	2019	Making it easy for parents to communicate with teachers about student progress?
	2020	Ensuring parent-teacher communication about student progress?
Q18	2019	Responding to the social, emotional, and personal needs of students?
	2020	Responding to the social-emotional needs of students?
Q23	2019	Ensuring that families have a voice in all decisions that affect children?
	2020	Providing opportunities for families to have a voice in decisions that affect students?
Q27	2019	Connecting families to local school officials?
	2020	Connecting families to local public officials?
Q29	2019	Linking families to community resources?
	2020	Sharing information about resources available to families in their community?
To what extent do you agree or disagree with the following statements? In general, I feel that . . .		
A10	2019	This school addresses bullying in a timely manner.
	2020	This school does not tolerate bullying.

To continue this project, it is proposed that confirmatory factor analysis (CFA) be carried out using the structure outlined in this EFA using data from future administrations of this survey. Such an analysis would help to determine which parts of this factor structure are stable and which may be due more to year-over-year variance.

Appendix A – Survey Page Titles and Item Names

How well is this school doing at...		
Page Title	Item	Content
Welcoming Families into the School Community	Q1	Developing personal relationships?
	Q2	Creating a family-friendly atmosphere?
	Q3	Providing opportunities for volunteering?
	Q4	Respecting and valuing diversity for all families?
	Q5	Removing obstacles to participation?
	Q6	Ensuring accessible programming for all families?
Communicating Effectively	Q7	Using multiple communication paths?
	Q8	Surveying families to identify issues and concerns?
	Q9	Having access to the principal(s)?
	Q10	Having access to teachers?
	Q11	Providing information on current issues?
	Q12	Facilitating connections among families?
	Q13	Being sensitive to the challenges or barriers faced by some families?
Supporting Student Success	Q14	Making it easy for parents to communicate with teachers about student progress?
	Q15	Linking student work to academic standards?
	Q16	Using standardized test results to increase achievement?
	Q17	Sharing the school's progress?
	Q18	Responding to the social, emotional, and personal needs of students?
Speaking Up for Every Child	Q19	Understanding how the school and district operate?
	Q20	Understanding parent rights and responsibilities under federal and state law?
	Q21	Sharing information about resources available to families?
	Q22	Resolving problems and conflicts?
Sharing Power	Q23	Ensuring that families have a voice in all decisions that affect children?
	Q25	Addressing equity issues?
	Q26	Developing parent leadership?
	Q27	Connecting families to local school officials?
	Q28	Developing an effective parent involvement organization that represents all families?
Collaborating with Community	Q29	Linking families to community resources?
	Q30	Organizing support from community partners?
	Q31	Being an active partner to the community?
	Q32	Expanding learning experiences for students into the community?
	Q33	Partnering with community groups to strengthen families and support student success?

Appendix A – Survey Page Titles and Item Names (continued)

To what extent do you agree or disagree with the following statements? In general, I feel that . . .		
Page Title	Item	Content
Culture Questions	A1	This school is increasing the focus on parent engagement.
	A2	The Central Office is a place that supports all stakeholders.
	A3	Positive relationships with parents are important at this school.
	A4	This school is a safe and secure place.
	A5	Administrator and teachers support and encourage students at this school to do their best.
	A6	Administrators and teachers have high expectations for students at this school.
	A7	Parents/guardians at this school regularly attend school sponsored events, conferences, games, and performances.
Culture Questions Continued	A8	Teachers at this school are well organized and prepared to teach.
	A9	Administrators and teachers at this school do their jobs with enthusiasm.
	A10	This school addresses bullying in a timely manner.
	A11	This school communicates with families about bullying in a timely manner.
	A12	Student behavior is usually positive at this school.
	A13	School rules are enforced fairly among all students at this school.
	A14	This school's building(s) and grounds are well maintained at this school.
	A15	This school does a good job at helping to prepare students to be college and career ready.

Appendix B – Factor Loadings with a cutoff of 0.3

	oblimin									promax								
	pa			ml			minres			pa			ml			minres		
	6	7	8	6	7	8	6	7	8	6	7	8	6	7	8	6	7	8
Q1	B	B	B	B	B	B	B	B	B	AB	AB	AB	B	AB	B	AB	AB	AB
Q2	B	B	B	B	B	B	B	B	B	B	B	B	B	AB	B	B	B	B
Q3	B	B	B	B	B	B	B	B	B	AB	AB	AB	B	AB	B	AB	AB	AB
Q4	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Q5	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Q6	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Q7	E			F		E	E			E		E	BF	A		E		E
Q8	A		A				A		E	A	AE	AE	AB	A	A	A	AE	A
Q9	E		E			E	E		E	AE	AE	AE	B	A	AE	AE	AE	AE
Q10	E	F	E	F	F	E	E	F	E	E	F	E	F	F	F	E	F	E
Q11	E	F	E	F	F	E	E	F	E	AE	AE	AE	BF	A	AE	AE	AE	AE
Q12	A		A	B			A		E	A	AE	AE	AB	A	A	A	AE	A
Q13	B	B	B	B	B	B	B	B	B	AB	A	A	B	AB	AB	AB	A	A
Q14	E	F	E	F	F	E	E	F	E	E	F	E	F	F	F	E	F	E
Q15	EF	F	F	F	F	F	EF	F	F	AE	F	EF	F	F	F	AE	F	EF
Q16	F	F	F	F	F	F	F	F	F	AE	AF	AF	F	AF	AF	AE	AF	AF
Q17	A	AF	F	F	F		A	AF	F	AE	A	A	AF	AF	AF	AE	A	A
Q18										A	A	A		A	A	A	A	A
Q19	A	G	AG	G	G	G	A	G	AG	A	AG	AG	AG	AG	AG	A	AG	AG
Q20	A	G	G	G	G	G	A	G	G	A	AG	AG	G	AG	AG	A	AG	AG
Q21	A	A	A	AG	G	A	A	A	A	A	A	A	AG	A	A	A	A	A
Q22	D		G		G		D		G	A	A	A		A	A	A	A	A
Q23	A						A			A	A	A	A	A	A	A	A	A
Q25	AB	B	B	G			AB	B	B	A	A	A	AB	A	A	A	A	A
Q26	A	A	A	A	A		A	A	A	A	A	A	AB	A	A	A	A	A
Q27	A	A	A	A	A		A	A	A	A	A	A	A	A	A	A	A	A
Q28	A	A	A	A	A		A	A	A	A	A	A	AB	A	A	A	A	A
Q29	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Q30	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Q31	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Q32	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Q33	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

Appendix B – Factor Loadings with a cutoff of 0.3 (continued)

	oblimin									promax								
	pa			ml			minres			pa			ml			minres		
	6	7	8	6	7	8	6	7	8	6	7	8	6	7	8	6	7	8
A1	A	A	A	A			A	A	E	A	AE	AE	A	A	A	A	AE	A
A2	A						A			A	A	AE		A	A	A	A	A
A3	C	C	C	C	C	C	C	C	C	C	CE	C	C	C	CE	C	CE	C
A4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
A5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
A6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
A7	AC	AC	C	C	C	C	AC	AC	C	C	C	C	C	C	C	C	C	C
A8	C	C	C	C	C	C	C	C	C	C	C	C	CF	C	C	C	C	C
A9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
A10	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
A11	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
A12	CD	CD	CD	CD	CD	C	CD	CD	CD	CD	C	C	C	C	CD	C	C	C
A13	CD	CD	CD	CD	CD	CD	CD	CD	CD	CD	C	C	C	C	CD	C	C	C
A14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
A15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

Appendix C – Factor Loadings with a cutoff of 0.4

	oblimin									promax								
	pa			ml			minres			pa			ml			minres		
	6	7	8	6	7	8	6	7	8	6	7	8	6	7	8	6	7	8
Q1	B	B	B	B	B	B	B	B	B	B	B	B	B			B	B	B
Q2	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Q3	B	B	B	B	B	B	B	B	B	B	B	B	B	A	B	B	B	B
Q4	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Q5	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Q6	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Q7																		
Q8										A	A	A		A	A	A	A	A
Q9																		
Q10	E	F	E	F	F	E	E	F	E	E	F	E	F	F	F	E	F	E
Q11														A				
Q12										A	A	A	B	A	A	A	A	A
Q13	B	B	B	B	B	B	B	B	B	A	A		B	A		A	A	
Q14	E	F	E	F	F	E	E	F	E	E	F	E	F	F	F	E	F	E
Q15		F	F	F	F	F		F	F	E	F		F	F	F	E	F	
Q16			F	F	F			F	A	A			F	F	F	A	A	
Q17									A	A	A		A	A	A	A	A	A
Q18																		
Q19				G	G					A	A	A	G	AG	A	A	A	A
Q20		G	G	G	G			G	G	A	AG	AG	G	G	AG	A	AG	AG
Q21	A		A	G	G		A		A	A	A	A	A	A	A	A	A	A
Q22																		
Q23	A						A			A	A	A	A	A	A	A	A	A
Q25										A	A	A		A	A	A	A	A
Q26	A	A		A			A	A		A	A	A	A	A	A	A	A	A
Q27	A	A	A	A			A	A	A	A	A	A	A	A	A	A	A	A
Q28	A	A		A			A	A		A	A	A	A	A	A	A	A	A
Q29	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Q30	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Q31	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Q32	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Q33	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

Appendix C – Factor Loadings with a cutoff of 0.4 (continued)

	oblimin									promax								
	pa			ml			minres			pa			ml			minres		
	6	7	8	6	7	8	6	7	8	6	7	8	6	7	8	6	7	8
A1	A						A			A	A	A		A		A	A	A
A2																		
A3		C	C	C	C	C		C	C	C	C	C	C	C	C	C	C	C
A4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
A5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
A6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
A7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
A8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
A9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
A10	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
A11	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
A12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
A13	D	C				C	D	C		C	C	C	C	C	C	C	C	C
A14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
A15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

Appendix D – Items by Percent of Models Meeting Cutoff

	A. Community/ Family Engagement		B. Inclusivity		C. Culture/ Environment		D. Student Behavior		E. Communication		F. Academic Progress		G. Organizational Structure	
Percent of Models with a Loading of At Least:														
Item	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4
Q1	38.9	0	100	88.9	0	0	0	0	0	0	0	0	0	0
Q2	5.6	0	100	100	0	0	0	0	0	0	0	0	0	0
Q3	38.9	5.6	94.4	94.4	0	0	0	0	0	0	0	0	0	0
Q4	0	0	100	100	0	0	0	0	0	0	0	0	0	0
Q5	0	0	100	100	0	0	0	0	0	0	0	0	0	0
Q6	0	0	100	100	0	0	0	0	0	0	0	0	0	0
Q7	5.6	0	0	0	0	0	0	0	38.9	0	5.6	0	0	0
Q8	66.7	44.4	5.6	0	0	0	0	0	22.2	0	0	0	0	0
Q9	44.4	0	5.6	0	0	0	0	0	66.7	0	0	0	0	0
Q10	0	0	0	0	0	0	0	0	50	50	50	50	0	0
Q11	44.4	5.6	0	0	0	0	0	0	61.1	0	22.2	0	0	0
Q12	66.7	44.4	11.1	5.6	0	0	0	0	22.2	0	0	0	0	0
Q13	44.4	27.8	77.8	55.6	0	0	0	0	0	0	0	0	0	0
Q14	0	0	0	0	0	0	0	0	50	50	50	50	0	0
Q15	11.1	0	0	0	0	0	0	0	11.1	11.1	66.7	66.7	0	0
Q16	44.4	22.2	0	0	0	0	0	0	11.1	0	88.9	38.9	0	0
Q17	72.2	44.4	0	0	0	0	0	0	11.1	0	50	0	0	0
Q18	44.4	0	0	0	0	0	0	0	0	0	0	0	0	0
Q19	72.2	44.4	0	0	0	0	0	0	0	0	0	0	77.8	22.2
Q20	55.6	38.9	0	0	0	0	0	0	0	0	0	0	77.8	72.2
Q21	94.4	72.2	0	0	0	0	0	0	0	0	0	0	16.7	11.1
Q22	44.4	0	0	0	0	0	11.1	0	0	0	0	0	16.7	0
Q23	61.1	61.1	0	0	0	0	0	0	0	0	0	0	0	0
Q25	61.1	44.4	38.9	0	0	0	0	0	0	0	0	0	5.6	0
Q26	94.4	77.8	5.6	0	0	0	0	0	0	0	0	0	0	0
Q27	94.4	88.9	0	0	0	0	0	0	0	0	0	0	0	0
Q28	94.4	77.8	5.6	0	0	0	0	0	0	0	0	0	0	0
Q29	100	100	0	0	0	0	0	0	0	0	0	0	0	0
Q30	100	100	0	0	0	0	0	0	0	0	0	0	0	0
Q31	100	100	0	0	0	0	0	0	0	0	0	0	0	0
Q32	100	100	0	0	0	0	0	0	0	0	0	0	0	0
Q33	100	100	0	0	0	0	0	0	0	0	0	0	0	0

Appendix D – Items by Percent of Models Meeting Cutoff (continued)

A. Community/ Family Engagement		B. Inclusivity		C. Culture/ Environment		D. Student Behavior		E. Communication		F. Academic Progress		G. Organizational Structure		
Percent of Models with a Loading of At Least:														
Item	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4
A1	83.3	50	0	0	0	0	0	0	22.2	0	0	0	0	0
A2	55.6	0	0	0	0	0	0	0	5.6	0	0	0	0	0
A3	0	0	0	0	100	88.9	0	0	16.7	0	0	0	0	0
A4	0	0	0	0	100	100	0	0	0	0	0	0	0	0
A5	0	0	0	0	100	100	0	0	0	0	0	0	0	0
A6	0	0	0	0	100	100	0	0	0	0	0	0	0	0
A7	22.2	0	0	0	100	100	0	0	0	0	0	0	0	0
A8	0	0	0	0	100	100	0	0	0	0	0	0	0	0
A9	0	0	0	0	100	100	0	0	0	0	0	0	0	0
A10	0	0	0	0	0	0	100	100	0	0	0	0	0	0
A11	0	0	0	0	0	0	100	100	0	0	0	0	0	0
A12	0	0	0	0	100	100	55.6	0	0	0	0	0	0	0
A13	0	0	0	0	100	66.7	61.1	11.1	0	0	0	0	0	0
A14	0	0	0	0	100	100	0	0	0	0	0	0	0	0
A15	0	0	0	0	100	100	0	0	0	0	0	0	0	0

Appendix E – PTA National Standards as described in KCS Board Policy

- **Standard One: Welcoming All Families into the School Community.** Families are active participants in the life of the school, and feel welcomed, valued, and connected to each other, to school staff, and to what students are learning and doing in class.
- **Standard Two: Communicating.** Families and school staff engage in regular, meaningful communication about student learning.
- **Standard Three: Supporting Student Success.** Families and school staff continuously work together to support students’ learning and healthy development both at home and at school, and have regular opportunities to strengthen their knowledge and skills to do so effectively.
- **Standard Four: Speaking Up for Every Child.** Families are informed and enabled to be advocates for their own and other children, to ensure that students are treated fairly and have access to learning opportunities that will support their success.
- **Standard Five: Sharing Power.** Families and school staff are equal partners with equal representation in decisions that affect students and families and together inform, influence, and create policies, practices, and programs.
- **Standard Six: Collaborating with Community.** Families and school staff work together with community members to connect students, families, and staff to expanded learning opportunities, community services, and civic participation.