Center for Practice Engaged Education Research (C-PEER)

SCHOOL OF EDUCATION & HUMAN DEVELOPMENT

UNIVERSITY OF COLORADO **DENVER**

Teaching and Learning Conditions Colorado Survey 2026 Technical Report

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Introduction

Teaching and Learning Conditions Colorado (TLCC) is a statutorily required biennial survey administered by the Colorado Department of Education (CDE). It gathers information about the learning and working conditions in Colorado's public PK-12 schools. This anonymous survey targets four categories of school staff: teachers, education support professionals (including teacher assistants and paraprofessionals), special service providers (such as psychologists and social workers), and school leaders (principals, assistant principals, deans). TLCC is administered using a census approach, distributing the instrument to every eligible respondent across the state. This strategy is intended to ensure representation of perspectives from all corners of Colorado's public education system to provide data to educational leaders and policy makers to inform decision-making and improve educational conditions statewide.

This technical report is the fifth since the 2018 administration of the TLCC. It was developed and provided by the Center for Practice Engaged Education Research (C-PEER). See Appendix A for more information about C-PEER. The report focuses on the 2026 administration of the TLCC survey and includes results of analyses related to the validity of TLCC results for various uses including public reporting.

Changes from 2024

C-PEER's technical report on the 2024 TLCC survey administration found strong internal reliability for all constructs reported by individual respondent groups, supporting key uses of the results. However, C-PEER also found that changes made in 2024 to the survey instrument and aggregation methods for cross-group reporting introduced errors and inconsistencies compared to prior years. Specifically, item-level means were averaged across respondent groups to calculate school-wide construct-level percent favorable ratings. This was done without weighting means including when the items within the constructs differed by the respondent group and the number of respondents by group varied significantly. C-PEER recommended the following revisions for 2026:

- Use a roll-up method for all public reporting that avoids distortions and misrepresentations due to improper weighting.
- Allow users to filter and compare construct-level ratings by respondent group.
- Capture data needed to report response rates and counts by group for any ratings that combine data across respondent groups.

CDE prioritized:

- Treating schools as units of analysis and summarizing school-level perceptions (e.g., across respondent groups) whenever possible.
- Preserving longitudinal trends.
- Ensuring respondents answer questions appropriate for their role.
- Ensuring results are actionable for schools and districts.

C-PEER and CDE staff worked together through repeated cycles of technical review, multiple focus groups with key TLCC users, and collaborative interpretation with CDE staff and TLCC Partners to establish an empirically grounded architecture for the 2026 and subsequent TLCC administrations.

While not all aspects of the recommended architecture were implemented[1], this led to the following changes for 2026:

1. Core TLCC constructs (with associated items) were established as similar and meaningful to all Teachers, SSPs and ESPs, including the following: Professional Climate (leadership), Staff (Teacher) Evaluation, Student Behavior, Professional Development, Time, Student Supports, Support for own Wellbeing, and General Reflection (about the school). These items were administered to all respondents.
2. Instructional practice constructs (with associated items) were designated and administered to all Teachers as well as ESPs and SSPs who indicated they spend at least 50% of their time working in classrooms directly with students. Empirically reorganizing the large and unstable number of items in the 2024 (and prior) grouping under "Instructional Practices & Support" provided three meaningful constructs: Instructional Practice—Shared Responsibility for Learning, Instructional Practice—Meeting Diverse Student Needs, Instructional Practice—Supportive Conditions. Instruction-specific items within the Time and Professional Learning constructs were also separated to administer only to instructional staff.
3. Separate Leader-only constructs (with associated items) were established including Recruitment and Retention, District Support, and Leader Evaluation.
4. All constructs included the same items for all respondents to which they were administered.
5. The results of the Core Constructs (with associated items) were reported at the school level across all respondent groups and disaggregated by respondent groups. School-wide Construct-Level results (e.g., % favorable average across all included items) were aggregated across all respondents without an intermediate step of averaging at the respondent group level first. This avoided overweighting groups with fewer numbers of respondents.
6. Items related to three AI topic areas were added: Use of AI (all respondents), AI for Instruction (respondents with an instructional role), AI Leadership Support (school leaders). The degree to which the AI topics should be reportable as a construct is an additional focus of analysis reported here.

[1] See Teaching and Learning Conditions Colorado Survey 2024 Technical Report available at: https://ed.cde.state.co.us/tlcc

Overview of Analyses

This TLCC 2026 technical report includes the following analyses relate to the qualities of the instrument and responses which are relevant for any use or reporting of the 2026 TLCC results:

- Item- and Construct-level Validity Analysis (within and across respondent groups)
- Construct-level TLCC Results Reporting (in both the Classic and Enhanced Panorama dashboards)
- Appropriate Use of TLCC Results at the School, District and State Levels

Item- and Construct-Level Validity Analysis

To assess validity of item level TLCC response data we explored the following:

- Patterns in Missing Data
- Item Completion Rates (overall and by constructs)
- Nonresponse Bias (how well the respondents to the TLCC survey in 2026 represent the characteristics of the state)
- Construct Internal Reliability (within and across respondent groups)

Patterns in Missing Data

We analyzed items from all core constructs in SPSS using a Missing Value Analysis, Expectation-Maximization (EM) imputation method[2]. The full Likert scale of 1 to 4 response options was used rather than percent favorability to increase the power of the estimation. For teacher respondents (n = 29,425), while the EM was significant (Chi-square = 498.85, DF = 286, $p < .0001$), the number of cases falling outside the expected range was trivial, 0.04 cases low extremes, and 0 high.

Item Completion Rates

To assess the overall completion rates of items by respondents, we reviewed the items answered in each of the "core" constructs of the TLCC for patterns of the degree to which each respondent answered (or did not answer) specific items. These analyses included items in common among all response groups in the constructs listed below (see TLCC 2026 Item Map for a complete list of items by construct). Note that the "Instructional Practice" items were not administered to non-instructional staff. The following TLCC constructs were included in the analysis:

- Professional Climate
- Staff Evaluation
- Staff Leadership

[2] e.g., see: Therese D. Pigott (2001) A Review of Methods for Missing Data, *Educational Research and Evaluation, 7*:4, 353-383, DOI: 10.1076/edre.7.4.353.8937

- Student Behavior
- Student Supports
- Instructional Practice: Shared Responsibility for Learning
- Instructional Practice: Meeting Diverse Student Needs
- Instructional Practice: Supportive Conditions
- Professional Development
- Time
- Support for Own Wellbeing
- Overall General Reflection (topic)

As **Table 1** summarizes, the percentage of items within core constructs that were missing less than 20% of responses (generally acceptable) by group was very low, especially for instructional staff. We believe it is worth noting that the groups with the largest number of missing responses greater than 20% are the non-instructional ESPs and SSPs. It may be worth exploring patterns of items missing to potentially remove items from the 2026 TLCC for the 2028 TLCC survey that do not seem meaningful to these two groups.

Table 1

Summary of Sizes by Response Groups

Response group	Original N	n, missing <20%	# removed	% removed
teachers	29,591	29,428	163	**0.6%**
instructional ESP	4,804	4,736	68	1.4%
instructional SSP	1,069	1,054	15	1.4%
total instructional	35,464	35,218	246	**0.7%**
non- instructional ESP	1,919	1,744	175	9.1%
non- instructional SSP	2,439	2,351	88	3.6%
total non- instructional	4,358	4,095	263	6.0%
leaders	1,809	1,781	28	1.5%

Post-hoc Nonresponse Bias Analysis

The TLCC uses a "census" administration. With this approach, who responds to the TLCC can introduce error or bias into inferences related to the TLCC results representing a school, district or the state. To examine whether there may be missing cases (individuals in the state who were part of the group surveyed but did not response to the survey) related to representation of schools, districts, or communities in the state that would require attention, we conducted a "post-hoc nonresponse bias analysis." Nonresponse bias analysis checks to see if a group of respondents is representative of the whole population of interest, and if responses vary by subgroups related to how they are to be used in analysis[3]. For the TLCC this includes for example, the known state proportions of Title I classification, school size, grade level makeup, and type of community setting. When statistically significant and non-trivial nonresponse differences are found, weighting of responses based on population mismatch may be possible (if an adequate subset of responding schools have the under-represented characteristics) and appropriate (e.g., for those population characteristics considered especially important for policy decisions).

For this technical report, bias analyses were conducted for schools-in-state based on demographic comparison variables. We checked representativeness of school levels, charter designation, school settings, attendance and truancy rates, state performance rating levels, and percentage in the school of students by race/ethnicity and by special education, not- or limited-English proficiency, and Free/Reduced Lunch classifications. See Appendix B for a chart of the findings of the comparison of all variables tested.

Construct Internal Reliability

Another indicator of data validity is whether the items comprising the core constructs listed above group together as construct scales as they have in previous TLCC administrations. We used Cronbach's alpha measure of internal reliability. Interpretation of the Cronbach's alpha statistic is:

- >= .90: Excellent
- 0.80 to 0.89: Good
- 0.70 to 0.79: Acceptable for published, established research
- < 0.60: Unacceptable. Not a reliable scale and lack internal consistency

All TLCC 2026 construct scales reached Cronbach's alpha near 0.80 or higher, except for "Job Satisfaction" which was unacceptably low, ranging from just 0.463 to 0.589 across all respondent groups.

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[3] Seastrom, M.M., National Center for Education Statistics. (2002). NCES Statistical Standards. Publication number: NCES 2003601. Online at: https://nces.ed.gov/national-center-education-statistics-nces/products?searchTerms=2003601

Based on these findings, which we present in detail in **Appendix C**, we strongly recommend not including the Job Satisfaction group of items in the next TLCC administration in 2028.

Factor Analysis of New AI Items

In addition to assessing the internal validity of the three new AI scales by respondent group (shown in Appendix C), we analyzed the AI items for instructional respondents with the items in the three Instructional Practice constructs (Shared Responsibility for Learning, Meeting Diverse Student Needs, Supportive Conditions). A factor analysis (principal components, Varimax rotation, KMO = .923, Bartlett's < .001) showed that the AI instructional items both cluster as two unique factors and that they are independent of the three Instructional Practice constructs with which they were tested. **We recommend keeping the three AI items constructs in future TLCC administrations.**

Factor Analysis of New Leadership Items

A new leader-respondent construct, Recruitment and Retention, was added for 2026. In addition, the 2024 District Supports group was split into two based on our analysis of 2024 data. The two new groupings in 2026 were 1) District Support and 2) Leader Evaluation. A new item was added in the new District Support grouping (*District leadership provides timely support when district priorities change)* and in the new Leader Evaluation grouping (*My effectiveness is accurately assessed through the district's evaluation process*). All leaders-only items were factored together to examine where the new leader questions related to each other, including AI items (items given to all respondents plus the leaders-only set of items). We used principal components analysis, Varimax rotation, which had a KMO = .926 and Bartlett's test < .001.

The new 2026 District Support grouping (including the new item) split out from the 2024 District Supports grouping as a unique construct, with item loadings between 0.601 and 0.819. In addition, the internal reliability statistic (Cronbach's alpha) of these seven items is 0.902. We found that the new 2026 Leader Evaluation grouping (including the new item) split out from the District Supports grouping is also a unique construct, with item loadings between 0.732 and 0.798, and the alpha statistic for these four items is 0.891. The four Leader Evaluation items had small cross-loadings with the new District Supports construct items. We interpret this to mean that one might consider Leader Evaluation to be a sub-construct within the 2024 grouping. **We recommend the 2026 District Support and Leader Evaluation groupings be retained as constructs in 2028.**

Factor analysis of the items added in 2026 to represent Recruitment and Retention group together but are not an empirically strong construct. The items *I am confident in my ability to retain staff other than teachers at my school,* and *I am confident in my ability to retain teachers at my school,* are independent of other items and strongly correlated with each other. Two of the remaining three items, *the district provides effective support to help schools recruit new staff* and *the district provides effective support to help schools retain staff*, have significant overlap with the new District Supports construct and also with the two "I am confident..." items, and the item, *staffing*

shortages have a significant impact on my ability to lead my school. **We recommend that the 2026 Recruitment and Retention items have value as independent items, but to not consider them a construct for use in 2026 or for the 2028 TLCC administration.**

Factor Analysis of Reorganization of Professional Development Items

In keeping with the 2026 focus on getting a more valid and reliable understanding of TLCC results based on instructional and non-instructional subgroups of respondents, items regarding professional development were split into two sections, one for all respondent groups, and an additional set that were only administered to teachers and ESPs and SSPs who indicated they spend more than 50% of their time in instructional tasks.

The factor analysis of these two professional development groupings of items by respondents receiving each resulted in only one factor extracted. This, along with good Cronbach's alpha statistics of internal reliability, provides evidence that these two new groupings of professional learning items do each comprise a construct—one whole-staff and one instructional staff (the whole-staff items plus instructionally-specific items). **We recommend administering the two PD constructs in their current form in 2028 TLCC.**

Appropriate Use of TLCC Results at School, District, and State Levels

TLCC survey data are typically analyzed and reported at multiple levels. Data are collected from individuals anonymously within schools and then are analyzed and reported at various group levels – e.g., school, district, state. The characteristics of these different levels of data must be considered as part of any analysis and reporting of TLCC results.

At the **school level**, TLCC is a "cross-sectional" survey, capturing the point in time when TLCC is administered (Feb-Mar biennially). The same group of individuals within schools are most likely not the same in any two administrations.

If a **school or district** (> 85% of schools) takes the TLCC in multiple years, the cross-sectional survey responses may be understood to **capture trend information**. However, if the site only has data from two surveys, differences in the results from those two surveys should only be considered as an indicator of change from time 1 to time 2, not a trend.

For **districts** with responses from > 85% of its schools (given that schools in a district represent its "universe"), TLCC is a "cross-sectional" survey, capturing the point in time when TLCC is administered (Feb-Mar biennially). The same group of individuals within schools are almost certainly not the same in any two administrations. Districts with fewer than 85% of schools participating should only consider the individual school-level results and possibly trends for schools with more than two years of results.

At the **state level**, schools should be considered "cohort" respondents, and school responses can be used in **longitudinal cohort trend analyses**. Schools not participating every year would be considered missing cohort respondents, which must be accommodated for appropriate

longitudinal analyses to be conducted. Response rates of fewer than 85% of schools require nonresponse bias analysis to appropriately interpret schools' responses as representative of the state or district.

Recommendations

Based on the analyses reported above, we make several specific recommendations. Some of these relate to current use of the 2026 TLCC results – reporting dashboards, how specific district and/or school users should work with their findings. Some relate to working with CDE, Panorama, and the TLCC Research & Partners group in the coming year to prepare for the 2028 administration.

The nonresponse bias analysis confirms that **use of the TLCC 2026 data for statewide policy considerations is appropriate.** Districts with fewer than 85% of schools participating can consider the individual school results and possibly trends but should consider conducting a nonresponse bias analysis.

Where differences in important respondent characteristics are large, responses may be adjusted by appropriately weighting results to better represent the population of interest (e.g., district, state) as though most had responded. **Longitudinal studies (school level, 3 or more years) using multiple years of TLCC data will most likely need to weight responses for each year**, depending on the research questions investigated.

Analysis of the 2024 TLCC data identified that the ESP/SSP respondent groups were extremely variable and often not consistent with teacher respondents, although not in any discernable way. This indicated significant variability among the ESP and SSP respondent groups with both teachers and with each other. To address this, the 2026 survey added a sorter question for ESPs and SSPs, asking if they spend more than 50% of their time working directly with students in an instructional capacity. Some TLCC items were filtered to ask only of teachers and ESPs/SSPs that spend more than 50% time directly working with students in classrooms. Splitting those groups and modifying their questions to identify instruction related data vs. all-respondent data has reduced that variability considerably in the 2026 data. **We recommend keeping the more "customized" versions of the survey as well as instructional set of reporting for these groups for 2028.**

Among the Core groupings of items, "Job Satisfaction" has an unacceptably low internal consistency statistic, indicating it is highly unreliable as a "construct". Our previous analysis of 2024 TLCC data also found this lack of internal consistency and that the items within the Job Satisfaction grouping did not add new information over the other TLCC items. **We recommended dropping the Job Satisfaction group of items for 2026, and even more strongly recommend dropping it in 2028 given our 2024 and 2026 analysis findings.**

The three groupings of AI items for all staff, instructional staff and leaders factored together as constructs. The Instructional AI items were unique from the other instructional practice constructs. **We recommend using construct level-results for Use of AI (all respondents), Instructional AI (Instructional respondents), and Support for AI (school leaders) for 2026 and**

that all three be retained as constructs for the 2028 TLCC administration.

Two new item groupings for school leaders administered during 2026 factored together and were reliable. **We recommend the 2026 District Support and Leader Evaluation groupings be retained as constructs for the 2028 TLCC administration.**

Items administered to school leader that were grouped together as "Recruitment and Retention" did factor together but are not an empirically strong construct. **We recommend that the 2026 Recruitment and Retention items have value as independent items, but to not consider them empirical construct for use in 2026 or for the 2028 TLCC administration.**

Finally, strong evidence supports the two new Professional Development item groupings, one for all respondents and one for instructional staff should be treated as constructs. **We recommend the two PD constructs administered in their current form in 2028 TLCC.**

Appendix A: Center for Practice Engaged Education Research (C-PEER)

Kent Anderson Seidel, Founding Co-Director & Associate Professor
Julie Oxenford O'Brian, Co-Director & Associate Research Professor

The Center for Practice Engaged Education Research (C-PEER) was established at UC Denver in 2014 to extend the partnership orientation of UC Denver School of Education and Human Development (SEHD) preparation programs more intentionally into the school's research efforts. C-PEER merged with the Center for Transforming Learning and Teaching in 2017 under the C-PEER name. C-PEER facilitates and conducts Applied Partnered Educational research that reflects:

- *Research in Context*, conducted with educational practice partner sites to be practically useful addressing persistent problems or opportunities of practice.
- *Participants as Partners*, prioritizing partners gaining value from research (which is different from most historical district IHE research experiences).
- *Immediately Useful Results*, partnered involvement and often the researcher's role with site leadership ensure research findings have quick application and influence.
- *Commitment to* a "research with" stance with particular attention to diverse stakeholders and systemic equity.

Appendix B: Comparisons of Demographic/Descriptive Variables

Variable	*State proportion*	*TLCC proportion*	*Differences of note*
School characteristics			
Elementary designation (E)	.44	.50	Slight **over**-representation in TLCC
Elementary/Middle designation (EM)	.10	.08	
Elementary/Middle/High designation (EMH)	.05	.03	
Middle designation (M)	.13	.14	
Middle/High designation (MH)	.06	.05	
High designation (H)	.17	.17	
Charter classification	.10	.04	Slight **under**-representation in TLCC
Setting: Denver metro	.46	.50	Slight **over**-representation in TLCC
Setting: Urban/suburban	.25	.23	
Setting: Outlying city	.07	.07	
Setting: Outlying town	.13	.13	
Setting: Remote	.09	.07	
Attendance rate average	.91	.91	
Truancy rate average	.04	.04	
State accountability rating: Green	.66	.68	Slight **over**-representation in TLCC
State accountability rating: Yellow	.19	.20	
State accountability rating: Orange/Red	.14	.07	Slight **under**-representation in TLCC
Schools' student body characteristics			
% special education/504	.15	.16	
% NEP/LEP	.11	.12	
% AANHP (Asian Amer, Pac Islander, Nat Hawaiian)	.04	.04	
% Black or African American	.05	.04	
% Hispanic/Latino	.36	.38	Slight **over**-representation in TLCC
% White	.49	.49	
% Free/Reduced-price lunch eligible	.44	.46	Slight **over**-representation in TLCC

Appendix C: Internal Reliability of Constructs

	Cronbach's alpha, by group					
Construct:	**Teachers**	**Instr ESP**	**Instr SSP**	**Non-instr ESP**	**Non-instr SSP**	**Leaders**
Professional Climate	0.896	0.878	0.888	0.889	0.881	0.892
Staff Evaluation	0.849	0.853	0.875	0.859	0.866	0.856
Staff Leadership	0.862	0.847	0.833	0.827	0.830	0.878
Student Behavior	0.824	0.825	0.815	0.822	0.816	0.842
Student Supports	0.782	0.812	0.793	0.818	0.789	0.831
Inst Practice: Shared Responsibility for Learning	0.807	0.842	0.824			
Inst Practice: Meeting Diverse Student Needs	0.822	0.836	0.790			
Inst Practice: Supportive Conditions	0.784	0.828	0.786			
PD - all staff asked	0.820	0.851	0.808	0.824	0.815	0.841
PD - additional asked instructional	0.858	0.892	0.859			
Time	0.888	0.845	0.854	0.836	0.853	0.894
Support for Own Wellbeing	0.753	0.751	0.782	0.775	0.758	0.812
General Reflection	0.826	0.858	0.825	0.852	0.808	0.827
Job Satisfaction	**0.465**	**0.545**	**0.484**	**0.504**	**0.463**	**0.589**
AI - all respondent groups	0.830	0.879	0.829	0.882	0.823	0.836
AI - instructional respondents	0.848	0.911	0.828			
AI - leaders only						0.875