

Introduction

Smarter Balanced has agreed to accept test results from its member states in multiple binary formats. To ensure that each format meets baseline requirements Smarter Balanced is publishing this Data Dictionary and Logical Data Model. Since it is a logical, not binary, specification it applies to all formats for transmitting test results data within the SmarterApp assessment infrastructure.

The [Four-Layer Framework for Data Standards](#) offers context for how this specification relates to other SmarterApp specifications. The four layers are:

1. Data Dictionary: Definition of data elements including name and interpretation.
2. Logical Data Model: Logical definition of entities as groups of elements and inter-entity relationships.
3. Serialization: Concrete digital format for storage or transmission of entities.
4. Protocol: Transport layer and message formats for exchanging serialized entities.

This specification describes test results at the Data Dictionary and Logical Data Model layers (layers 1 and 2). Other specifications address serialization and transmission protocols (layers 3 and 4). Field names and descriptions are mostly drawn from the [Common Education Data Standards](#) (CEDS) which also operates at layers 1 and 2.

Extensibility

Nearly every test result format we have encountered includes additional information beyond the fields defined here. Data serialization formats should not be constrained to just these fields. Certain serialization formats like XML and JSON include standard extension mechanisms. Accordingly, extensions should be made at the serialization level. Future updates to the data dictionary and logical data model may incorporate fields from the various serialization formats.

Logical Data Model

The entity-relationship diagram in Figure 1 represents the logical data model for test results.

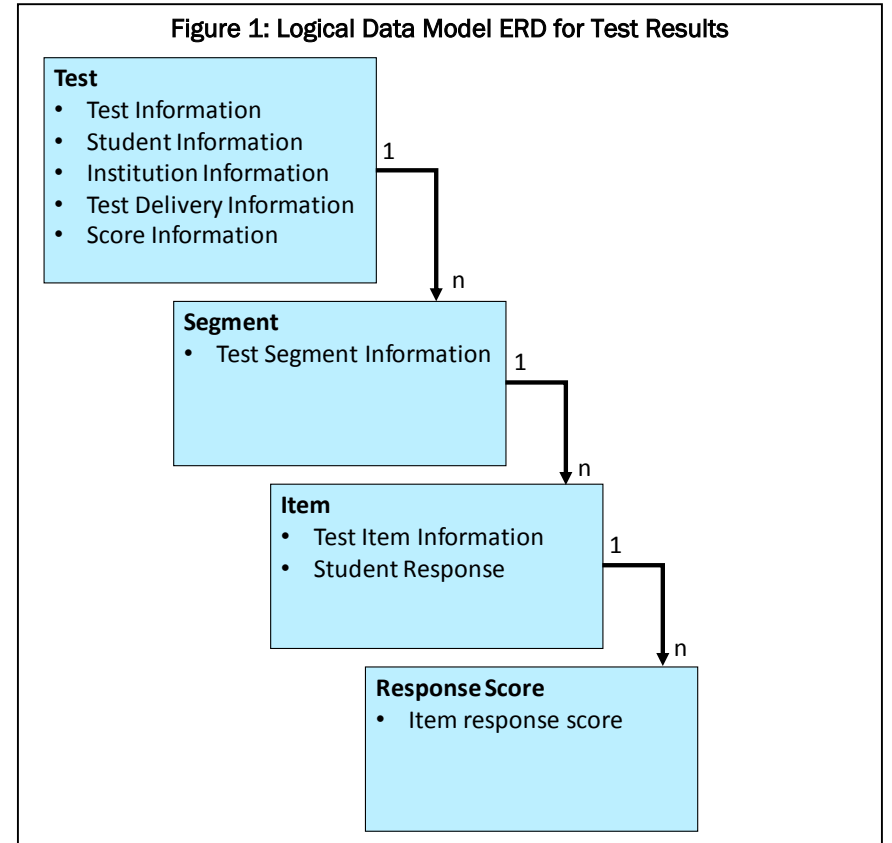
The data follows a strict hierarchy. Each test result has one **Test** record which contains information about the test itself; about the student and the institution to which the student belongs; about test delivery including date, time, and environment; and the overall test score information.

Each Test has one or more **segments**. In current Smarter Balanced tests there is always only one segment but the test delivery system and associated data formats support multiple segments and Smarter Balanced or other organizations may make use of this feature in the future.

Each segment is composed of multiple assessment **items**. For fixed-form segments, all students are presented the same set of items in the same order. For computer-adaptive segments, the items presented and the order varies according to performance and other factors managed by the adaptive assessment engine. Each item record contains information about the assessment item and the full student response to the item.

An item has one or more **response scores** most items have a single score. However, certain items are scored on multiple dimensions each representing a different skill family. For multidimensional items there is one response score record per scoring dimension.

The hierarchical data organization is well-suited to certain serialization formats like XML and JSON. However, CSV is a more popular format for transmitting test results and it is not well-suited to hierarchical data. When rendering test results in tabular formats like CSV a common approach is to use two tables. One table represents the test information. The second table (usually in a different CSV file) collapses the segment, item, and response score information into a single table. Segment and item information is repeated for each score. Since most items have only one score and there is very little segment information in the data model, this approach can be quite efficient.



Data Dictionaries

The following tables are the data dictionaries for each of the four entities: Test, Segment, Item, and ResponseScore.

Cross References

The rightmost column has cross-references to the following layer 3 formats:

- **TRT:** The [SmarterApp Test Results Transmission format](#).
- **DWSA:** The [SmarterApp Data Warehouse Student Assessment format](#)
- **DWIL:** [The SmarterApp Data Warehouse Item Level format](#)
- **AIR:** The AIR CSV format for certain states.

When a cross reference includes “(opt)” it means the field is designated as optional in the referenced format.

Entity: **Test**

Description: All fields that appear once per test report.

Includes:

- Test Information
- Student Information
- Institution Information
- Test Delivery Information
- Score Information

Relationships 1:n Test to Segment

Occurrence One per test report.

Table 1: Test Entity Fields

Test Field Name (TRT Field Name)	Data Type	Width (char s)	Description	Acceptable Values	Required	Reference	Cross Reference
Test Information							
AssessmentId	xsd:token	40	A unique number or alphanumeric code assigned to an assessment by its publisher.	One or more printable characters	Always	https://ceds.ed.gov/element/001067	TRT:testId DWSA:AssessmentGuid AIR:AssessmentSubtestIdentifier
AssessmentName	xsd:token	250	The name given to an assessment event.	One or more printable characters	Always	https://ceds.ed.gov/element/000977	TRT:name AIR:AssessmentSubtestTitle

Test Field Name (TRT Field Name)	Data Type	Width (char s)	Description	Acceptable Values	Required	Reference	Cross Reference
Subject	xsd:token	10	The subject of the test	Math, ELA, etc.	Always	See ¹ https://ceds.ed.gov/CEDSElementDetails.aspx?TermId=7021	TRT:subject DWSA:AssessmentAcademicSubject AIR:AssessmentAcademicSubject
DeliveryMode	xsd:token	10	Mode of the test. Either 'online', 'paper' or 'scanned'. Here 'paper' means it was a data entry test (meaning the student took the test on paper and someone else then entered the responses in the online system).	online paper scanned Defaults to "online".	Paper or scanned: Required Online: Optional		TRT:mode AIR:TestMode (opt)
TestGrade	xsd:token	2	The typical grade or combination of grade-levels, developmental levels, or age-levels for which an assessment is designed.	IT, PR, PK, TK, KG, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, PS, UG	Always	https://ceds.ed.gov/element/000177	TRT:grade DWSA:AssessmentLevelForWhichDesigned AIR:AssessmentLevelForWhichDesigned
AssessmentType	xsd:token	50	The category of an assessment based on format and content.	Summative Interim	Always	https://ceds.ed.gov/element/000029	TRT:assessmentType DWSA:AssessmentType
SchoolYear	xsd:integer	4	The school year in which the test is administered. For academic years that span a calendar year this is the four digit year-end. E.g. 2013 for 2012-2013	1900 <= YYYY <= 9999	Always	https://ceds.ed.gov/element/000243	TRT:academicYear DWSA:AssessmentYear AIR:SchoolYear
AssessmentVersion	xsd:token	30	The version number of the Assessment Form.	Alphanumeric	Optional	https://ceds.ed.gov/element/001183	TRT:assessmentVersion
Student Information							
StudentIdentifier	xsd:token	40	State-issued student ID	One or more printable characters	Identified: Required Deidentified: Prohibited	https://ceds.ed.gov/element/001071	TRT:ExamineeAttribute-StudentIdentifier DWSA:StudentIdentifier DWIL:studentId AIR:StudentIdentifier

¹ The field definition for "Subject" matches CEDS. But the CEDS value enumeration is not used.

Test Field Name (TRT Field Name)	Data Type	Width (char s)	Description	Acceptable Values	Required	Reference	Cross Reference
AlternateSSID	xsd:token	40 Present 65 Future	Alternate State Student ID. This ID is required with de-identified student data so that the recipient match data that corresponds to the same student but cannot identify the student. ²	One or more printable characters	Identified: Optional Deidentified: Required	https://ceds.ed.gov/element/001071	TRT:ExamineeAttribute-AlternateSSID DWSA:ExternalSSID
FirstName	xsd:token	35	Student first name	One or more printable characters.	Identified: Required Deidentified: Prohibited	https://ceds.ed.gov/element/000115	TRT:ExamineeAttribute-FirstName DWSA:FirstName
MiddleName	xsd:token	35	Student middle name	One or more printable characters.	Identified: Optional Deidentified: Prohibited	https://ceds.ed.gov/element/000184	TRT:ExamineeAttribute-MiddleName DWSA:MiddleName
LastOrSurname	xsd:token	35	Student last name	One or more printable characters.	Identified: Required Deidentified: Prohibited	https://ceds.ed.gov/element/000172	TRT:ExamineeAttribute-LastOrSurname DWSA:LastOrSurname
Birthdate	xsd:date	10	Student's birthdate	YYYY-MM-DD. For example 2006-07-15	Identified: Required Deidentified: Prohibited	https://ceds.ed.gov/element/000033	TRT:ExamineeAttribute-Birthdate DWSA:Birthdate
GradeLevelWhenAssessed	xsd:token	2	The grade or developmental level of a student when assessed.	IT, PR, PK, TK, KG, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, PS, UG	Always	https://ceds.ed.gov/element/000126	TRT:ExamineeAttribute-GradeLevelWhenAssessed DWSA:GradeLevelWhenAssessed AIR:GradeLevelWhenAssessed
Sex	xsd:token	6	The student's gender.	Male, Female	Always	https://ceds.ed.gov/element/000255	TRT:ExamineeAttribute-Sex DWSA:Sex AIR:Sex

² Any method that generates a consistent alternate ID for each student is acceptable, Smarter Balanced recommends applying a keyed-hash algorithm like HMAC-SHA1 to the StudentIdentifier. The algorithm is described here: <https://tools.ietf.org/html/rfc2104>. When using a keyed-hash algorithm, the key should be kept private to the state and their service provider and not disclosed to Smarter Balanced. Possession of the key will allow the state to match the AlternateSSID to the state-issued StudentIdentifier. However, Smarter Balanced will not have that ability. There have been some security concerns raised relative to SHA1 and MD5 but they do not apply to this use pattern. Newer algorithms like HMAC-SHA256 are free of known issues but they generate codes that are too long for the reserved field length of 40 characters. Future updates will increase the maximum field length to allow longer values.

Test Field Name (TRT Field Name)	Data Type	Width (char s)	Description	Acceptable Values	Required	Reference	Cross Reference
HispanicOrLatinoEthnicity	xsd:token	3	An indication that the person traces his or her origin or descent to Mexico, Puerto Rico, Cuba, Central and South America, and other Spanish cultures, regardless of race.	Yes, No	Always	https://ceds.ed.gov/element/000144	TRT:ExamineeAttribute-HispanicOrLatinoEthnicity DWSA:HispanicOrLatinoEthnicity AIR:HispanicOrLatinoEthnicity
AmericanIndianOrAlaskaNative	xsd:token	3	A person having origins in any of the original peoples of North and South America (including Central America), and who maintains cultural identification through tribal affiliation or community attachment.	Yes, No	Always	https://ceds.ed.gov/element/000016	TRT:ExamineeAttribute-AmericanIndianOrAlaskaNative DWSA:AmericanIndianOrAlaskaNative AIR:AmericanIndianOrAlaskaNative
Asian	xsd:token	3	A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian Subcontinent. This area includes, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.	Yes, No	Always	https://ceds.ed.gov/element/000020	TRT:ExamineeAttribute-Asian DWSA:Asian AIR:Asian
BlackOrAfricanAmerican	xsd:token	3	A person having origins in any of the black racial groups of Africa.	Yes, No	Always	https://ceds.ed.gov/element/000034	TRT:ExamineeAttribute-BlackOrAfricanAmerican DWSA:BlackOrAfricanAmerican AIR:BlackOrAfricanAmerican
White	xsd:token	3	A person having origins in any of the original peoples of Europe, Middle East, or North Africa.	Yes, No	Always	https://ceds.ed.gov/element/000301	TRT:ExamineeAttribute-White DWSA:White AIR:White
NativeHawaiianOrOtherPacificIslander	xsd:token	3	A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.	Yes, No	Always	https://ceds.ed.gov/element/000192	TRT:ExamineeAttribute-NativeHawaiianOrOtherPacificIslander DWS:NativeHawaiianOrOtherPacificIslander AIR:NativeHawaiianOrOtherPacificIslander

Test Field Name (TRT Field Name)	Data Type	Width (char s)	Description	Acceptable Values	Required	Reference	Cross Reference
DemographicRaceTwoOrMoreRaces	xsd:token	3	A person having origins in any of more than one of the racial groups. To support backward compatibility for systems that cannot derive this, i.e. systems that use a single race/ethnicity element rather than separate flags that can indicate one or more ethnicities	Yes, No	Always	https://ceds.ed.gov/element/000973	TRT:ExamineeAttribute-DemographicRaceTwoOrMoreRaces DWSA: DemographicRaceTwoOrMoreRaces AIR:DemographicRaceTwoOrMoreRaces
IDEAIndicator	xsd:token	3	Student has an Individual Education Plan according to the IDEA act. (See reference for the full definition).	Yes, No	Always	https://ceds.ed.gov/element/000151	TRT:ExamineeAttribute-IDEAIndicator DWSA: IDEAIndicator AIR:IDEAIndicator
LEPStatus	xsd:token	3	Student with Limited English Proficiency. See reference for the full definition).	Yes, No	Always	https://ceds.ed.gov/element/000180	TRT:ExamineeAttribute-LEPStatus DWSA: LEPStatus AIR:LEPStatus
Section504Status	xsd:token	3	Individuals with disabilities who are being provided with related aids and services under Section 504 of the Rehabilitation Act of 1973, as amended.	Yes, No	Always	https://ceds.ed.gov/element/000249	TRT:ExamineeAttribute-Section504Status DWSA: Section504Status AIR:Section504Status
EconomicDisadvantageStatus	xsd:token	3	An indication that the student met the State criteria for classification as having an economic disadvantage.	Yes, No, Unspecified	Always	https://ceds.ed.gov/element/000086	TRT:ExamineeAttribute-EconomicDisadvantageStatus DWSA: EconomicDisadvantageStatus AIR:EconomicDisadvantageStatus
LanguageCode	xsd:token	3	The code for the specific language or dialect that a person uses to communicate.	See http://ceds.ed.gov/languageCodes.aspx	Optional	https://ceds.ed.gov/CEDSElementDetails.aspx?TermId=7317	TRT:ExamineeAttribute-LanguageCode (opt)
EnglishLanguageProficiencyLevel	xsd:token	20	A state-specific indication of the student's English language proficiency level.	Should match a state-specific taxonomy,	Optional	Related to https://ceds.ed.gov/CEDSElementDetails.aspx?TermId=5527	TRT:ExamineeAttribute-EnglishLanguageProficiencyLevel (opt) AIR:EnglishLanguageProficiencyLevel (opt)
MigrantStatus	xsd:token	3	Student and/or parents are migratory. (See reference for the complete definition.)	Yes, No	Optional	https://ceds.ed.gov/element/000189	TRT:ExamineeAttribute-MigrantStatus AIR:MigrantStatus (opt)

Test Field Name (TRT Field Name)	Data Type	Width (char s)	Description	Acceptable Values	Required	Reference	Cross Reference
FirstEntryIntoUSSchool	xsd:date	10	The year, month and day of a person's initial enrollment into a United States school.	YYYY-MM-DD	Optional	https://ceds.ed.gov/element/000529	TRT: ExamineeAttribute-FirstEntryIntoUSSchool AIR: FirstEntryIntoUSSchool (opt)
LimitedEnglishProficiencyEntryDate	xsd:date	10	The year, month and day a student classified as limited English proficient entered the LEP program.	YYYY-MM-DD	Optional	https://ceds.ed.gov/element/001247	TRT: ExamineeAttribute-LimitedEnglishProficiencyEntryDate AIR: LimitedEnglishProficiencyEntryDate (opt)
LEPExitDate	xsd:date	10	The year, month and day a student classified as limited English proficient exited the LEP program.	YYYY-MM-DD	Optional	https://ceds.ed.gov/element/000570	TRT: ExamineeAttribute-LEPExitDate AIR: LEPExitDate (opt)
TitleIIILanguageInstructionProgramType	xsd:token	20	The type of Title III language instructional programs.	See the reference for the set of acceptable codes and definitions.	Optional	https://ceds.ed.gov/element/000447	TRT: ExamineeAttribute-TitleIIILanguageInstructionProgramType AIR: TitleIIILanguageInstructionProgramType (opt)
PrimaryDisabilityType	xsd:token	3	The major or overriding disability condition that best describes a person's impairment.	See the reference for the set of acceptable codes and definitions.	Optional	https://ceds.ed.gov/element/000218	TRT: ExamineeAttribute-PrimaryDisabilityType AIR: PrimaryDisabilityType (opt)
Institution Information							
StateAbbreviation	xsd:token	2	Abbreviation for the state or territory in which the student attends school.	A two-letter state or territory abbreviation according to U.S. Postal standards.	Required	https://ceds.ed.gov/element/000267	TRT: ExamineeRelationship-StateAbbreviation DWSA: StateAbbreviation
DistrictId	xsd:token	40	The ID of the district responsible for specific educational services and/or instruction of the student.	Alphanumeric	Identified: Required Deidentified: Optional ³	https://ceds.ed.gov/element/000637	TRT: ExamineeRelationship-DistrictId DWSA: ResponsibleDistrictId identifier AIR: ResponsibleDistrictIdentifier

³ DistrictId, DistrictName, SchoolId, and SchoolName are optional in de-identified data. In certain areas, the school or district may be small enough that the school and/or district combined with gender, race, and ethnicity can identify the student. In those cases, the district and school information should be omitted to preserve student privacy. However, doing so prevents the generation of anonymous aggregate reports and the school and district level. Accordingly, states may choose their policy for inclusion according to local policy, population patterns, and requirements.

Test Field Name (TRT Field Name)	Data Type	Width (char s)	Description	Acceptable Values	Required	Reference	Cross Reference
DistrictName	xsd:token	60	The Name of the district responsible for specific educational services and/or instruction of the student.	Alphanumeric	Optional	https://ceds.ed.gov/element/000204	TRT:ExamineeRelationship-DistrictName DWSA:OrganizationName
SchoolId	xsd:token	40	A unique number or alphanumeric code assigned to an institution by a school, school system, a state, or other agency or entity.	Alphanumeric	Identified: Required Deidentified : Optional	https://ceds.ed.gov/element/001069	TRT:ExamineeRelationship-SchoolId DWSA:ResponsibleSchoolIdentifier AIR:ResponsibleSchoolIdentifier
SchoolName	xsd:token	60	The full legally accepted name of the institution.	Alphanumeric	Optional	https://ceds.ed.gov/element/000191	TRT:ExamineeRelationship-SchoolName DWSA:NameOfInstitution
StudentGroupNames	xsd:token	50	One or more names of groups to which the student belongs. These may be classes, categories, programs or other groups that serve local needs. The physical format specification should indicate the format of the list (e.g. semicolon-delimited string, list of XML elements, JSON array, etc.	Up to ten names of up to 50 characters each.	Optional		TRT:ExamineeRelationship-StudentGroupName DWSA:Group1Id to Group10Id
Test Delivery Information							
TestOpportunityId	xsd:token	40	A unique identifier of the student-test opportunity. (Typically a GUID)	One or more printable characters	Always	https://ceds.ed.gov/element/001540	TRT:Opportunity-Key TRT see also Opportunity-oppld AIR:VndrTstEvent_ID
AssessmentAdministrationStartDate	xsd:date	10	The first date of the first window for a given assessment.	YYYY-MM-DD	Always	https://ceds.ed.gov/element/000962	TRT:effectiveDate
StartDateTime	xsd:dateTime	23	The actual date and time when the individual started taking the test.	YYYY-MM-DDTHH:MM:SS	Always	https://ceds.ed.gov/element/001021	TRT:startDate AIR:AssessmentSessionActualStartDateTime
SubmitDateTime	xsd:dateTime	23	Date the student submitted the opportunity for scoring.	YYYY-MM-DDTHH:MM:SS	Always	https://ceds.ed.gov/element/001022	TRT:dateCompleted AIR:AssessmentSessionActualEndTime

Test Field Name (TRT Field Name)	Data Type	Width (char s)	Description	Acceptable Values	Required	Reference	Cross Reference
ForceSubmitDateTime	xsd:dateTime	23	The date and time in which a test was force-submitted in behalf of the student. This may be an incomplete test (not all questions answered) or a complete test in which the student neglected to submit final answers. When this field is present, SubmitDateTime should be the last time the student answered a question or otherwise interacted with the testing system.	YYYY-MM-DDTHH:MM:SS	Optional		TRT:dateForceCompleted
Status	xsd:token	50	Status of the opportunity. Tracks the status of this test opportunity through the process of administration, resets, scoring, and reporting. (The values of completed and invalidated are deprecated in favor the Validity and Completeness fields.)	appeal completed (deprecated) expired handscoring invalidated (deprecated) paused reported reset scored submitted	Always		TRT:status AIR:TestSTatus
StatusDateTime	xsd:dateTime	23	The date and time the status of this opportunity last changed.	YYYY-MM-DDTHH:MM:SS	Optional		TRT:statusDate
Validity	xsd:token	7	Validity of the test result. <ul style="list-style-type: none"> Valid indicates that the assessment was given in a standardized (proctored) environment. Nonstandardized indicates that the assessment was given in an informal context. Invalid indicates that the test result has been marked invalid due to problems in the test administration or environment. 	valid nonstandardized invalid	Always (If not present, will be calculated in the 2014-2015 school year)		
Completeness	xsd:token	8	Completeness of the test (whether student responded to all items in the test).	none partial complete	Always (If not present, will be calculated in the 2014-2015 school year)		

Test Field Name (TRT Field Name)	Data Type	Width (char s)	Description	Acceptable Values	Required	Reference	Cross Reference
AccessibilityCodes	xsd:token	40	A list of accessibility feature codes paired with accessibility feature use codes indicating the accessibility resources that were made available to the student. The physical format of the list and delimiters should be specified in the data serialization specification.	See Table 5 for accessibility feature codes and Table 6 for Accessibility feature use codes.	Always	See: https://ceds.ed.gov/element/000385	TRT: Accommodation-Code DWSA: Accommodation ⁴ AIR: AssessmentAccommodation
NumberOfResponses	xsd:unsignedInt	8	Number of items in this report. (Early software releases may include prefetched items that the student never saw but this behavior is discouraged).	Integer, 0 or greater	Always	https://ceds.ed.gov/element/001009	TRT: ItemCount AIR: AssessmentNumberOfItems
FieldTestCount	xsd:unsignedInt	8	Number of field test items included in Itemcount	Integer, 0 or greater	Optional		TRT: ftCount (opt)
PauseCount	xsd:unsignedInt	8	number of times Examinee paused the opportunity	Integer, 0 or greater	Optional		TRT: pauseCount (opt) AIR: TotNbrPaused (opt)
GracePeriodRestarts	xsd:unsignedInt	8	The number of times the student paused the test and restarted it within the grace period (typically 20 minutes).	Integer, 0 or greater	Optional		TRT: gracePeriodRestarts (opt) AIR: NbrPauseRet (opt)
AbnormalStarts	xsd:unsignedInt	8	The number of times the test was restarted after an abrupt end to a test (browser crash, power shutdown, network loss etc.).	Integer, 0 or greater	Optional		TRT: abnormalStarts
OpportunityCount	xsd:unsignedInt	8	A the number of times the student has taking this test including the present opportunity.	Integer, 1 or greater	Optional		TRT: opportunity (opt) AIR: Opportunity
TestWindowId	xsd:token	50	the ID of the window in which the test was administered (E.g. SBAC-Spring-2015)	One or more printable characters	Always		TRT: windowId
TestSessionId	xsd:token	40	Test Delivery System ID for the session in which this test was taken.	Zero or more printable characters	De-identified: Prohibited Otherwise: Optional		TRT: sessionId DWSA: AssessmentSessionLocationId AIR: TestMonitorSessionID (opt)

⁴ The DWSA format uses separate fields for each accessibility code family. The columns correspond to the families in table 5. Field names are AccommodationAmericanSignLanguage, AccommodationBraille, AccommodationClosedCaptioning, AccommodationTextToSpeech, AccommodationAbacus, AccommodationAlternateResponseOptions, AccommodationCalculator, AccommodationMultiplicationTable, AccommodationPrintOnDemand, AccommodationPrintOnDemandItems, AccommodationReadAloud, AccommodationScribe, AccommodationSpeechToText, AccommodationStreamlineMode, AccommodationNoiseBuffer.

Test Field Name (TRT Field Name)	Data Type	Width (char s)	Description	Acceptable Values	Required	Reference	Cross Reference
TestAdministratorId	xsd:token	128	ID of the Test Administrator that administered this test. (Often the email address of the TA has been used but this is discouraged for privacy reasons.)	Zero or more printable characters	De-identified: Prohibited Otherwise: Optional	https://ceds.ed.gov/element/001572	TRT:TAID (opt) AIR:TestMonitorUserID (opt)
OrganizationName	xsd:token	60	The name of the organization with overall responsibility for the assessment event. Typically the name of the state (e.g. "Oregon")	One or more printable characters	Optional	https://ceds.ed.gov/element/000966	TRT:clientName
UserAgent	xsd:string	512	A space-delimited list of product tokens (keywords) with optional comments that identifies the client hardware and software with which the assessment was delivered to the student during the assessment session. In most cases, this is the User Agent String from a web browser. In other cases, it should follow the same format.	Alphanumeric	Online: Always	https://ceds.ed.gov/element/001152	TRT:assessmentParticipantSessionPlatformUserAgent
TestDeliveryServer	xsd:token	128	Name of the Test Delivery Service (TDS) server that was used to administer this test.	One or more printable characters	Optional		TRT:server
TestDeliveryDatabase	xsd:token	128	Name of the TDS DB that was used to administer this test.	Zero or more printable characters	Optional	https://ceds.ed.gov/element/001539	TRT:database
WindowOpportunityCount	xsd:unsignedInt	8	The number of times a student has taken this test in this window.	Integer, 1 or greater	Optional		TRT>windowOpportunity
Test Score Information							
ScaleScore	xsd:float	8	The overall Scale Score earned by the student on this test.	A positive number, typically an integer.	Always	https://ceds.ed.gov/element/000245	TRT:Score/value ⁵ DWSA:AssessmentSubtestResultScoreValue AIR:SS_TOT

⁵ The TRT format uses the <Score> element for all scores and standard errors. See Appendix A for how to locate each particular score.

Test Field Name (TRT Field Name)	Data Type	Width (char s)	Description	Acceptable Values	Required	Reference	Cross Reference
ScaleScoreStandardError	xsd:float	8	The standard error for the TestScaleScore	Floating point number	Always	https://ceds.ed.gov/element/001546	TRT:Score/standardError DWSA:AssessmentSubtestMinimumValue ⁶ AIR:SEM_TOTSS (opt)
ScaleScoreAchievementLevel	xsd:integer	1	The achievement level corresponding to the scale score.	For Smarter Balanced, overall achievement levels are 1 to 4.	Always	https://ceds.ed.gov/element/000245	TRT:Score/value DWSA:AssessmentPerformanceLevelIdentifier AIR:Performance_Level (opt)
OverallTheta	xsd:float	8	The overall theta value	Floating point number	Optional		AIR:THETA_TOT (opt)
OverallThetaStandardError	xsd:float	8	The standard error for the overall theta	Floating point number	Optional		AIR:SEM_TOT_THETA (opt)
Claim1Score	xsd:float	8	Score for claim #1 For Smarter Balanced: ELA Claim 1 is Reading Math Claim 1 is Concepts & Procedures	A positive number, typically an integer.	Conditional ⁷	https://ceds.ed.gov/element/000245	TRT: Score/value DWSA:AssessmentSubtestResultScoreClaim1Value AIR:SS_SRC1
Claim1ScoreStandardError	xsd:float	8	Standard error for claim #1	Floating point number	Conditional	https://ceds.ed.gov/element/001546	TRT: Score/standardError DWSA:AssessmentSubtestResultScoreClaim1MinimumValue AIR:SEM_SRC1
Claim1ScoreAchievementLevel	xsd:integer	1	The achievement level corresponding to claim score #1	For Smarter Balanced, claim achievement levels are 1 to 3.	Conditional	https://ceds.ed.gov/element/000245	TRT: Score/value DWSA:AssessmentClaim1PerformanceLevelIdentifier AIR:PL_SRC1
Claim1Theta	xsd:float	8	The theta value for claim #1	Floating point number	Optional		AIR:THETA_SRC1
Claim1ThetaStandardError	xsd:float	8	Standard error for the claim 1 theta	Floating point number	Optional		AIR:SEM_THETA_SRC1
Claim2Score	xsd:float	8	Score for claim #2 For Smarter Balanced: ELA Claim 2 is Writing Math combines the scores for Claim 2- Problem Solving, and Claim 4-Modeling and Data Analysis into ClaimScore2	A positive number, typically an integer.	Conditional	https://ceds.ed.gov/element/000245	TRT:Score/value DWSA:AssessmentSubtestResultScoreClaim2Value AIR:SS_SRC2

⁶ In place of Standard Error, the DWSA format uses AssessmentSubtestMinimumValue and AssessmentSubtestMaximumValue which are the scale score minus and plus the standard error respectively. The same principle is applied to subscores which use AssessmentSubtestClaim1MinimumValue and AssessmentSubtestClaim1MaximumValue (substituting the claim number for 1 in subsequent claims).

⁷ Claim scores are required if the associated test produces them. For example, the Smarter Balanced summative tests produce four claim scores for ELA and three for Mathematics. When a claim score is present, the associated standard error and achievement level are also required.

Test Field Name (TRT Field Name)	Data Type	Width (char s)	Description	Acceptable Values	Required	Reference	Cross Reference
Claim2ScoreStandardError (Score/standardError)	xsd:float	8	Standard error for claim #2	Floating point number	Conditional	https://ceds.ed.gov/element/001546	TRT:Score/standardError DWSA:AssessmentSubtestResultScoreClaim2MinimumValue AIR:SEM_SRC2
Claim2ScoreAchievementLevel	xsd:integer	1	The achievement level corresponding to claim score #2	For Smarter Balanced, claim achievement levels are 1 to 3.	Conditional	https://ceds.ed.gov/element/000245	TRT:Score/value DWSA:AssessmentClaim2PerformanceLevelIdentifier AIR:PL_SRC2
Claim2Theta	xsd:float	8	The theta value for claim #1	Floating point number	Optional		AIR:THETA_SRC1
Claim2ThetaStandardError	xsd:float	8	Standard error for the claim 1 theta	Floating point number	Optional		AIR:SEM_THETA_SRC1
Claim3Score	xsd:float	8	Score for claim #3 For Smarter Balanced: ELA Claim 3 is Speaking and Listening Math Claim 3 is Communicating Reasoning	A positive number, typically an integer.	Conditional	https://ceds.ed.gov/element/000245	TRT:Score/value DWSA:AssessmentSubtestResultScoreClaim3Value AIR:SS_SRC3
Claim3ScoreStandardError	xsd:float	8	Standard error for claim #3	Floating point number	Conditional	https://ceds.ed.gov/element/001546	TRT:Score/standardError DWSA:AssessmentSubtestResultScoreClaim3MinimumValue AIR:SEM_SRC3
Claim3ScoreAchievementLevel	xsd:integer	1	The achievement level corresponding to claim score #3.	For Smarter Balanced, claim achievement levels are 1 to 3.	Conditional	https://ceds.ed.gov/element/000245	TRT:Score/value DWSA:AssessmentClaim3PerformanceLevelIdentifier AIR:PL_SRC3
Claim3Theta	xsd:float	8	The theta value for claim #1	Floating point number	Optional		AIR:THETA_SRC1
Claim3ThetaStandardError	xsd:float	8	Standard error for the claim 1 theta	Floating point number	Optional		AIR:SEM_THETA_SRC1
Claim4Score	xsd:float	8	Score for claim #4 For Smarter Balanced: ELA Claim 4 is Research/Inquiry Math does not use this value as claim 4 is combine with claim 2.	A positive number, typically an integer.	Conditional	https://ceds.ed.gov/element/000245	TRT:Score/value DWSA:AssessmentSubtestResultScoreClaim4Value AIR:SS_SRC4
Claim4ScoreStandardError	xsd:float	8	Standard error for claim #4	Floating point number	Conditional	https://ceds.ed.gov/element/001546	TRT:Score/standardError DWSA:AssessmentSubtestResultScoreClaim4MinimumValue AIR:SEM_SRC4

Test Field Name (TRT Field Name)	Data Type	Width (chars)	Description	Acceptable Values	Required	Reference	Cross Reference
Claim4ScoreAchievementLevel	xsd:integer	1	The achievement level corresponding to claim score #4.	For Smarter Balanced, claim achievement levels are 1 to 3.	Conditional	https://ceds.ed.gov/element/000245	TRT:Score/value DWSA:AssessmentClaim4PerformanceLevelIdentifier AIR:PL_SRC4
Claim4Theta	xsd:float	8	The theta value for claim #1	Floating point number	Optional		AIR: THETA_SRC1
Claim4ThetaStandardError	xsd:float	8	Standard error for the claim 1 theta	Floating point number	Optional		AIR:SEM_THETA_SRC1

Entity Segment

Description Information about one test segment.

Relationships n:1 Segment to Test
1:n Segment to Item

Occurrence One occurrence per test segment included in a test. Most Smarter Balanced tests have one segment which is either fixed-form or computer-adaptive.

Table 2: Segment Entity Fields

Segment Field Name (TRT Field Name)	Data Type	Width (chars)	Description	Acceptable Values	Required	Reference	Cross Reference
SegmentId	xsd:token	40	Identifier for this test segment (unique per test)	One or more printable characters	Optional	https://ceds.ed.gov/element/000367	TRT: Segment/id (opt) DWIL:segmentId AIR: SegmentId (opt)
SegmentPosition	xsd:unsignedInt	8	Position of the segment on the test.	Positive 32-bit integer, null allowed	Optional		TRT: Segment/position (opt)
SelectionAlgorithm	xsd:token	40	Item selection algorithm that was used for this segment. ("Fixed" for a fixed-form segment.)	One or more printable characters	Optional		TRT: Segment/algorithm (opt)
SelectionAlgorithmVersion	xsd:token	40	Item selection algorithm version	One or more printable characters	Optional		TRT: Segment/algorithmVersion (opt)

Entity Item

Description: Information about one test item.

Includes:

- Item information
- Student response

Relationships: n:1 Item to Segment
1:n Item to ResponseScore

Occurrence: One occurrence per item delivered to a student in a test session.

Table 3: Item Entity Fields

Item Field Name (TRT Field Name)	Data Type	Width (chars)	Description	Acceptable Values	Required	Reference	AIR Proposed CSV
Item Information							
ItemID	xsd:token	40	Item ID. Typically assigned by item authoring. Original Smarter Balanced item IDs are in the form "<bankKey>-<itemKey>" e.g. "200-12345". Future IDs may be in GUID or other forms.	String of printable characters	Always	https://ceds.ed.gov/element/000630	TRT:Item/key Item/bankKey DWIL:key AIR:AssessmentItemIdentifier
ItemPosition	xsd:unsignedInt	8	Ordinal position of item on test. E.g. 1 for the first item presented to the student.	Positive 32-bit integer	Always		TRT:Item/position DWIL:position AIR:ItemOrder
FieldTest	xsd:token	3	Indicates that the assessment item is being field tested on this form of the test, and does not contribute to the test score.	Yes, No	Optional (defaults to "No")	https://ceds.ed.gov/element/001536	TRT:Item/operational DWIL:operational AIR:ItemLifeStage
Dropped	xsd:token	3	Indicates that the item was dropped from the test and is not to be included for scoring.	Yes, No	Optional (defaults to "No")		TRT:Item/dropped DWIL:dropped
ItemType	xsd:token	40	Item type (e.g. MC (multiple choice) or GI (grid item)).	EBSR, EQ, ER, GI, HT, HTQ, MC, MI, MS, NL, SA, TI, TUT, WER, WORDLIST, Stimulus	Optional	https://ceds.ed.gov/element/001158	TRT:Item/format DWIL:format AIR:AssessmentItemType
Student Response Information							
AdminDateTime	xsd:dateTime	23	Date and time item was administered to Examinee	YYYY-MM-DDTHH-MM-SS	Always	https://ceds.ed.gov/element/000959 https://ceds.ed.gov/element/000958	TRT:Item/adminDate

Item Field Name (TRT Field Name)	Data Type	Width (chars)	Description	Acceptable Values	Required	Reference	AIR Proposed CSV
Submitted	xsd:token	3	Indicates whether the student submitted a response to this item	Yes,No	Optional (defaults to "Yes")		TRT:Item/isSelected DWIL:isSelected
SubmitDateTime	xsd:dateTime	23	Date and time the student submitted a response to the item.	YYYY-MM-DDTHH-MM-SS	Optional	https://ceds.ed.gov/element/000959 https://ceds.ed.gov/element/000958	TRT:Item/Response/date DWIL:adminDate
NumberOfVisits	xsd:unsignedInt	8	Number of times the student set or changed a response to the item	Integer 1 or greater	Optional		TRT:numberVisits (opt) DWIL:numberVisits AIR:NbrItemVisits (opt)
ResponseContentType	xsd:token	50	MIME type of item response. E.g. text/plain	One or more printable characters	Optional		TRT:Item/mimeType AIR:RespTypCd
ResponseValue	xsd:string	unlimited	The student's response to the item.		Online: Always	https://ceds.ed.gov/element/001063	TRT:Item/Response AIR:Response (opt)

Entity ResponseScore

Description Represents a student's score for a test item.

Relationships n:1 ItemScore to Item

Occurrence Most items have a single score. However, certain items such as extended writing have scores in multiple dimensions. In those cases, there will be one ItemScore instance per dimension.

Table 4: ResponseScore Entity Fields

ResponseScore Field Name (TRT Field Name)	Data Type	Width (chars)	Description	Acceptable Values	Required	Reference	AIR Proposed CSV
Score	xsd:float	8	The score given to a person's response to an assessment item.	unsigned float	Always	https://ceds.ed.gov/element/000724	TRT:Item/score DWIL:score AIR:AssessmentItemResponseScoreValue
ScoreDimension	xsd:token	0	Dimension name or code to which this score corresponds.	One or more printable characters. May be blank or omitted if the item has only one scoring dimension.	Required if item has more than one scoring dimension.		TRT:Item/ScoreInfo/scoreDimension AIR:ScoringDimension (opt)
ScoreRationale	xsd:string	255	Rationale given by the human scorer.	Printable text.	Optional		

ResponseScore Field Name (TRT Field Name)	Data Type	Width (chars)	Description	Acceptable Values	Required	Reference	AIR Proposed CSV
ScorerIDs	xsd:token	50	One or more IDs of users who scored human-scored items.	A list of user IDs, each ID up to 50 characters in length.	De-identified: Prohibited Otherwise: Optional	https://ceds.ed.gov/element/001572	TRT:userId AIR ID_Rater1, ID_Rater2, ID_Rater3 (opt)

Accessibility Feature Codes

Each accessibility feature setting has a specific code. The set of features to be made available to a student can be described by a simple list of codes which are recorded during test registration and provided to the test delivery system.

When reporting, each Accessibility Feature Code is paired with an “accessibility feature use code” which indicates whether the feature was designated, made available, and/or used. One way of combining these is to use a colon to delimit the accessibility feature code from the use code and a semicolon to delimit code pairs in a list. For example:

TDS_CCInvert:6;TDS_ESN:6;NEDS_SS:18

This would indicate that “inverted color contrast”, and “Spanish stacked translation” were made available to the student and that “separate setting” was designated for the student.

The following tables define the accessibility feature codes and the use codes.

Table 5: Accessibility Feature Codes

Feature Family	Feature Code	Description
AmericanSignLanguage	TDS_ASLO	Do not show ASL Videos (default)
	TDS_AS1	Show ASL Videos
ColorContrast	TDS_CC0	Black on White (default)
	TDS_CCInvert	Reverse Contrast
	TDS_CCMagenta	BlackOnRose
	TDS_CCMedGrayLtGray	Medium Gray on Light Gray
	TDS_CCYellowB	Yellow on Blue
ClosedCaptioning	TDS_ClosedCap0	Closed captioning not available (default)
	TDS_ClosedCap1	Closed captioning available
Language	ENU	English (default)
	ENU-Braille	Braille

	ESN	Spanish stacked translation (math only)
Masking	TDS_Masking0	Masking not available (default)
	TDS_Masking1	Masking available: allows blocking of content that is not of immediate need or that might be distracting to the student.
PermissiveMode	TDS_PM0	Permissive mode disabled (default)
	TDS_PM1	Permissive mode enabled: Allows assistive technology software such as screen readers, magnifiers, etc. to be run on the computer. When disabled, only the secure web browser is allowed to run.
PrintOnDemand	TDS_PoD0	Print on demand disabled (default)
	TDS_PoD_Stim	Allows students to request a printout of the item stimulus.
PrintSize	TDS_PS_L0	Default initial print size. (default)
	TDS_PS_L1	Initial print size set to zoom level 1
	TDS_PS_L2	Initial print size set to zoom level 2
	TDS_PS_L3	Initial print size set to zoom level 3
	TDS_PS_L4	Initial print size set to zoom level 4
StreamlinedInterface	TDS_TS_Modern	Standard layout with stimulus displayed alongside assessment items.
	TDS_TS_Accessibility	Streamlined layout with stimulus displayed above and items displayed below. All tool and navigation buttons are on the bottom of the screen. Important: The streamlined interface is not intended to be tablet compatible.
TextToSpeech	TDS_TTS0	No text-to-speech available. (default)
	TDS_TTS_Item	Text-to-speech available for items.
	TDS_TTS_Stim	Text-to-speech available for stimuli.
	TDS_TTS_Stim&TDS_TTS_Item	Text-to-speech available for stimuli and items.
Translation (Glossary)	(default)	If no code is specified, English glossary is made available by default.
	TDS_WL0	No glossary (suppresses all glossaries)
	TDS_WL_Glossary	English glossary
	TDS_WL_ArabicGloss	Arabic glossary
	TDS_WL_CantoneseGloss	Cantonese glossary
	TDS_WL_ESNGloss	Spanish glossary

	TDS_WL_KoreanGloss	Korean glossary
	TDS_WL_MandarinGloss	Mandarin glossary
	TDS_WL_PunjabiGloss	Punjabi glossary
	TDS_WL_RussianGloss	Russian glossary
	TDS_WL_TagalGloss	Filipino glossary
	TDS_WL_UkrainianGloss	Ukrainian glossary
	TDS_WL_VietnameseGloss	Vietnamese glossary
	Multiple	English and translated glossaries can both be included by specifying multiple codes. E.g. TDS_WL_Glossary (English) and TDS_WL_ESNGloss (Spanish).
NonEmbeddedDesignatedSupports	NEDS0	No non-embedded designated supports (default)
	NEDS_BD	Bilingual dictionary
	NEDS_CC	Color Contrast
	NEDS_CO	Color Overlay
	NEDS_Mag	Magnification
	NEDS_RA_Items	Read aloud items
	NEDS_SC_Items	Scribe items (non-writing)
	NEDS_SS	Separate setting
	NEDS_TArabic	Arabic glossary
	NEDS_TCantonese	Cantonese glossary
	NEDS_TFilipino	Filipino glossary
	NEDS_TKorean	Korean glossary
	NEDS_TMandarin	Mandarin glossary
	NEDS_TPunjabi	Punjabi glossary
	NEDS_TRussian	Russian glossary
	NEDS_TSpanish	Spanish glossary
	NEDS_TUkrainian	Ukrainian glossary
	NEDS_TVietnamese	Vietnamese glossary

	NEDS_TransDirs	Translated test directions
NonEmbeddedAccommodations	NEA0	No non-embedded accommodations (default)
	NEA_AR	Alternate response options
	NEA_RA_Stimuli	Read aloud stimuli
	NEA_SC_WritItems	Scribe items (writing)
	NEA_STT	Speech-to-Text
	NEA_Abacus	Abacus
	NEA_Calc	Calculator
	NEA_MT	Multiplication Table
	NEA_NoiseBuf	Noise buffers

Accessibility Feature Use Codes

The Accessibility Feature Use Codes are numeric codes that encapsulate information about whether a feature was designated, made available, and/or used by the student. Version 1 of the test delivery system does not sense whether the student actually uses an accessibility feature. Likewise, it cannot sense whether a non-embedded accommodation or support was made available. Therefore, only a subset of these codes are used in the current system.

Table 6: Accessibility Feature Use Codes

Feature Use Code	Designated	Available	Used	Notes	Reported by v1
0	unknown	unknown	unknown		
1	unknown	unknown	No		
2	unknown	unknown	Yes		
3	unknown	No	unknown		X
4	unknown	No	No		X
5	unknown	No	Yes	Invalid state	
6	unknown	Yes	unknown		X
7	unknown	Yes	No		
8	unknown	Yes	Yes		
9	No	unknown	unknown		
10	No	unknown	No		

Feature Use Code	Designated	Available	Used	Notes	Reported by v1
11	No	unknown	Yes	Testing irregularity	
12	No	No	unknown		
13	No	No	No		
14	No	No	Yes	Invalid state	
15	No	Yes	unknown		
16	No	Yes	No		
17	No	Yes	Yes	Testing irregularity	
18	Yes	unknown	unknown		X
19	Yes	unknown	No		
20	Yes	unknown	Yes		
21	Yes	No	unknown	Testing irregularity	
22	Yes	No	No	Testing irregularity	
23	Yes	No	Yes	Invalid state	
24	Yes	Yes	unknown		X
25	Yes	Yes	No		
26	Yes	Yes	Yes		

Appendix A: Test Results Transmission Format – Scores

The TRT format uses the <Score> element for all scores. In each case, the “value” attribute provides the score value and the “standardError” attribute indicates the standard error value. Scores are distinguished by the “measureOf” and “measureLabel” attributes according to the following table:

	measureOf	measureLabel
Overall test scale score	Overall	ScaleScore
Overall test achievement level	Overall	PerformanceLevel
Math Claim 1 scale score	1	ScaleScore
Math Claim 1 achievement level	1	PerformanceLevel
ELA Claim 1 scale score	SOCK_R	ScaleScore
ELA Claim 1 achievement level	SOCK_R	PerformanceLevel
Math Claim 2,4 scale score	SOCK_2	ScaleScore
Math Claim 2,4 achievement level	SOCK_2	PerformanceLevel
ELA Claim 2 scale score	2-W	ScaleScore
ELA Claim 2 achievement level	2-W	PerformanceLevel
Math Claim 3 scale score	3	ScaleScore
Math Claim 3 achievement level	3	PerformanceLevel
ELA Claim 3 scale score	SOCK_LS	ScaleScore
ELA Claim 3 achievement level	SOCK_LS	PerformanceLevel
ELA Claim 4 scale score	4-CR	ScaleScore
ELA Claim 4 achievement level	4-CR	PerformanceLevel

Appendix B: Omitted Fields

The following fields exist in the cross-referenced physical formats but have not been included in the data model. In many cases, the data is redundant with other fields. In other cases, they have been omitted because the fields have been inherited from previous projects but are not relevant to the Smarter Balanced test administration.

Fields in Test Results Transmission Format (TRT) but not in the data model

- Test/bankKey
- Test/handScoreProject (optional)
- Test/contract (optional)
- Examinee/key (optional)
- Examinee/isDemo (optional)
- ExamineeAttribute/Context
- ExamineeAttribute/ContextDate
- ExamineeRelationship/entityKey
- ExamineeRelationship/Context
- ExamineeRelationship/ContextDate
- Opportunity/TAName
- Accommodation/type
- Accommodation/value (code is the required indicator)
- Accommodation/segment (Smarter Balanced doesn't differentiate accommodations by segment)
- Score/measureLabel
- GenericVariable
- Item/clientId (optional)
- Item/scoreStatus
- Item/strand
- Item/contentLevel
- Item/pageNumber
- Item/pageVisits
- Item/pageTime
- Response/date (redundant with Item/adminDate)
- ScoreInfo
- SubScoreList
- Comment
- Score/conditionCode
- Score/type
- Score/userFirstName
- Score/userLastName
- ToolUsage
- ToolPage

Fields in Data Warehouse Student Assessment (DWSA) but not in the data model

- Group1Text to Group 10Text
- AssessmentSessionLocation
- AssessmentAdministrationFinishDate

Fields in Data Warehouse Item Level (DWIL) but not in the data model

- clientId
- scoreStatus
- strand
- contentLevel
- pageNumber
- pageVisits
- pageTime

Fields in American Institutes for Research CSV (AIR) but not in data model

- AssessmentSubtestResultDateCreated (Optional)
- GradeLevelWhenReported
- LanguageCode (Optional)
- TestMonitorEmailAddress (Optional)
- Num_Items_TOT (Optional)
- AttemptednessIndicator Y=Attempted, N=Non-Participant, P=Participant
- Label_SRC1 (Optional)
- Num_Items_SRC1 (Optional)
- Label_SRC2 (Optional)
- Num_Items_SRC2 (Optional)
- Label_SRC3 (Optional)
- Num_Items_SRC3 (Optional)
- Label_SRC4 (Optional)
- Num_Items_SRC4 (Optional)
- Label_SRC5 (Optional)
- Num_Items_SRC5 (Optional)
- THETA_SRC5 (Optional)
- SEM_THETA_SRC5 (Optional)
- SS_SRC5 (Optional)
- SEM_SRC5 (Optional)
- PL_SRC5 (Optional)
- Label_SRC6 (Optional)
- Num_Items_SRC6 (Optional)
- THETA_SRC6 (Optional)
- SEM_THETA_SRC6 (Optional)
- SS_SRC6 (Optional)
- SEM_SRC6 (Optional)
- PL_SRC6 (Optional)
- Accommodations_Segment1 (Optional)
- SegmentID2 (Optional)
- Accommodations_Segment2 (Optional)
- SegmentID3 (Optional)
- Accommodations_Segment3 (Optional)
- AssessmentFormNumber (Optional)
- Scr_Rater1 (Optional) (Scores from each rater)
- Scr_Rater2 (Optional)
- Scr_Rater3 (Optional)
- CC_Rater1 (Optional) (Condition Code)
- CC_Rater2 (Optional)
- CC_Rater3 (Optional)
- CC_Reso (Optional)

