



# Ed-Fi Extension and Semantic Analysis: Minnesota

## Purpose and Brief of the Analysis

The purpose of this report is to work with the Minnesota Department of Education (MDE) as the partner of Ed-Fi Alliance (Ed-Fi) and share Ed-Fi's findings for the assessment of extensions and semantic alignment of the state's usage of data elements in Ed-Fi's core data standard.

Our analysis has concluded that Minnesota is well-aligned with Ed-Fi core semantically, which means the data elements in the Ed-Fi core are always used by the State as intended.

Minnesota has used the extension mechanism in Ed-Fi for areas where the core data standard did not meet specific needs of the state in areas that include course and course offering, discipline, school and section enrollments, student information, school information, programs, and student assessment administration. As found in the section below, the extension analysis looked at areas where there are current options available in the core; where there might be better alternatives for extension; and where extensions should be considered by Ed-Fi for inclusion into the core data model.

## Body of the State Analysis

The Ed-Fi Alliance is committed to sustaining the Ed-Fi data standard to support the capture, usage, reporting, and exchange of educational data. As such the Ed-Fi data standard promotes data interoperability in the industry, enables data-driven decision making, and hence contributing to the advancement of educational outcomes.

In a continuing effort to better serve the community of users, this analysis is the first of a periodic evaluation of how the various Ed-Fi states are using and extending the Ed-Fi data model. In particular, the analysis is meant to investigate the following questions:

- Is the State using the core Ed-Fi data model as semantically defined and intended?
- Does the State follow good practices in extending the Ed-Fi data model, adhering to the overall conventions embodied in the data standard?
- Do extensions duplicate what could be reflected in the Ed-Fi core model, or are there subsequent updates to the core that now cover what previously required an extension?
- Are there extensions that point to common needs across states and/or potential model changes that would benefit the community at large?



The analysis findings specific to Minnesota are summarized in the following sections: *extension analysis* has a focus on the extensions the state introduced, and the *semantic analysis* evaluates the usage of the core data standard any deviations from the original purpose of the data element. The intent of this analysis is to improve the Ed-Fi data standard and its usage in the community. The analysis should be taken as an *opinion* based upon published materials by Ed-Fi and the states to stimulate further collaboration.

## Extension Analysis

The Minnesota extensions comprise 7 new entities, 12 new associations, and 241 attributes as outlined below.

- Attribute extensions are made to Calendar, as follows:
  - Calendar.CalendarDescription
  - Calendar.DaysInSession
  - Calendar.InstructionalDays
    - Note Ed-Fi also has Session.TotalInstructionalDays which could be used to derive the same information.*
  - Calendar.KinderGartenScheduleDescriptor
  - Calendar.LengthofDay
- An attribute extension is made to ClassPeriod: ClassPeriod.classPeriodTypeDescriptor.:
- Attribute extensions are made to Course, as follows:
  - Course.AssessmentTool common with attributes:
    - Course.AssessmentTool.AssessmentToolDescriptor
    - Course.AssessmentTool.implementationStatusDescriptor
  - Course.CareerClusterDescriptor
    - Note: Ed-Fi has Course.CareerPathwayDescriptor which appears to be similar.*
  - Course.CourseLevelTypeDescriptor
  - Course.CurriculumUsed common with attributes:
    - Course.CurriculumUsed.CurriculumUsedDescriptor
    - Course.CurriculumUsed.ImplementationStatusDescriptor
  - Course.EarlyEducationCourseLocationDescriptor
  - Course.Program
  - Course.SequenceLimit
  - Course.learningStandards.StandardsAddressedDescriptor
- An association extension CourseCourseAssociation used to support associations from State, District, and College courses, with attributes as follows:



- CourseCourseAssociation.Course
  - CourseCourseAssociation.ToCourseCourse
- Attribute extensions are made to CourseOffering, as follows:
  - CourseOffering.InstructionalApproach common with attributes:
    - CourseOffering.InstructionalApproach.ImplementationStatusDescriptor
    - CourseOffering.InstructionalApproach.InstructionalApproachDescriptor
  - CourseOffering.SiteBasedInitiative common with attributes:
    - CourseOffering.SiteBasedInitiative.ImplementationStatusDescriptor
    - CourseOffering.SiteBasedInitiative.SiteBasedInitiativeDescriptor
- Attribute extensions are made to DisciplineAction, as follows:
  - DisciplineAction.AesTypeDescriptor
  - DisciplineAction.AesNoServiceProvidedExplanation
  - DisciplineAction.NoResponseExplanation
  - DisciplineAction.OtherExplanation
- Attribute extensions are made to DisciplineIncident, as follows:
  - DisciplineIncident.CostToPropertyDescriptor
  - DisciplineIncident.TimeOfIncidentDescriptor
- New entity DisciplineIncidentAnonymousNonOffender is defined with attributes:
  - DisciplineIncidentAnonymousNonOffender.DisciplineIncident
  - DisciplineIncidentAnonymousNonOffender.NonOffenderTypeDescriptor
  - DisciplineIncidentAnonymousNonOffender.NonOffenderCount
  - DisciplineIncidentAnonymousNonOffender.EstimatedStudentsEnrolled
  - DisciplineIncidentAnonymousNonOffender.EstimatedStudentsNotEnrolled
  - DisciplineIncidentAnonymousNonOffender.DidInjuryOccur
  - DisciplineIncidentAnonymousNonOffender.DidSeriousBodilyInjuryOccur
  - DisciplineIncidentAnonymousNonOffender.CostToVictim
  - DisciplineIncidentAnonymousNonOffender.PhysicalAssaultState
- New entity UnenrolledOffender for those not involved with the school where the incident occurred, with attributes:
  - UnenrolledOffender.DisciplineIncident
  - UnenrolledOffender.Behavior
  - UnenrolledOffender.SecondaryBehavior
  - UnenrolledOffender.UnenrolledStudentCount
  - UnenrolledOffender.WeaponAttribute
- Attribute extensions to StudentDisciplineIncidentNonOffenderAssociation, are as follows:
  - StudentDisciplineIncidentNonOffenderAssociation.costToVictimDescriptor



- StudentDisciplineIncidentNonOffenderAssociation.didInjuryOccur
- StudentDisciplineIncidentNonOffenderAssociation.DidSeriousBodilyInjuryOccur
- Attribute extensions for StudentDisciplineIncidentBehaviorAssociation are as follows:
  - StudentDisciplineIncidentBehaviorAssociation.SecondaryBehavior
  - StudentDisciplineIncidentBehaviorAssociation.BullyingHarrassmentTypeDescriptor
  - StudentDisciplineIncidentBehaviorAssociation.DrugInformation common with attributes:
    - StudentDisciplineIncidentBehaviorAssociation.DrugInformation.DrugTypeDescriptor
    - StudentDisciplineIncidentBehaviorAssociation.DrugTypeOtherDescription
  - StudentDisciplineIncidentBehaviorAssociation.WasArrestedLawEnforcement
  - StudentDisciplineIncidentBehaviorAssociation.WasReferredLawEnforcement
  - StudentDisciplineIncidentBehaviorAssociation.WasUnderCurrentSuspension
  - StudentDisciplineIncidentBehaviorAssociation.WeaponAttributes common with attributes:
    - StudentDisciplineIncidentBehaviorAssociation.WeaponAttributes.WeaponIdentifier
    - StudentDisciplineIncidentBehaviorAssociation.WeaponAttributes.WeaponDescriptor
    - StudentDisciplineIncidentBehaviorAssociation.WeaponAttributes.NumberOfWeaponsInvolved
    - StudentDisciplineIncidentBehaviorAssociation.WeaponAttributes.isGunCased
    - StudentDisciplineIncidentBehaviorAssociation.WeaponAttributes.isGunInTrunk
    - StudentDisciplineIncidentBehaviorAssociation.WeaponAttributes.isGunLoaded
- Attribute extension to Grade are as follows:
  - Grade.AcademicSubjectDescriptor  
*Note: The academic subject can alternatively be captured from Grade->StudentSectionAssociation->Section->CourseOffering->Course.AcademicSubject*
  - Grade.CollegeCreditsEarned
  - Grade.CollegeGradeEarned
  - Grade.LocalCreditEarned  
*Note: in Ed-Fi Course Transcript is typically used to record credits earned; consider moving these extensions to Course Transcript.*
- Attribute extensions to LocalEducationAgency are as follows:
  - LocalEducationAgency.DistrictTypeDescriptor
  - LocalEducationAgency.EdFiSubmissionAccessDescriptor
- Attribute extensions for Parent are as follows:



- Parent.BirthDate
- Parent.ClassroomVolunteerDescriptor
- Parent.HouseholdIncome
- Parent.HouseholdSize
- Parent.IdentificationCode
- Parent.ReceivingInterpreterAssistance
- An attribute extension for School is School.SchoolClassificationDescriptor.
- A new entity SchoolAttribute is defined that contains additional attributes about schools. The entity has attributes as follows:
  - SchoolAttributes.School
  - SchoolAttributes.EducationOrganizationIndicator
  - SchoolAttributes.TitlePartASchoolDesignationDescriptor
  - SchoolAttributes.HasAntibullyingPolicy
  - SchoolAttributes.HasAntiViolencePolicy
  - SchoolAttributes.HasCrisisPlan
  - SchoolAttributes.HasDrugEducation
  - SchoolAttributes.HasSafetyPlan
  - SchoolAttributes.HasZeroTolerancePolicy
  - SchoolAttributes.NumberOfHabitualTruants
  - SchoolAttributes.SafetySpecialistEmail

*Consider using a multi-valued descriptor in place of the many Booleans. This entity has many of the same attributes as the SchoolAttribute extension.*
- A new entity SchoolDisciplineAttribute is defined that contains additional discipline attributes about schools, as follows:
  - SchoolDisciplineAttribute.School
  - SchoolDisciplineAttribute.HasAntiBullyingPolicy
  - SchoolDisciplineAttribute.HasAntiViolencePolicy
  - SchoolDisciplineAttribute.HasCrisisPlan
  - SchoolDisciplineAttribute.HasDrugEducation
  - SchoolDisciplineAttribute.HasSafetyPlan
  - SchoolDisciplineAttribute.HasZeroTolerancePolicy
  - SchoolDisciplineAttribute.SafetySpecialistEmail

*Consider using a multi-valued descriptor in place of the many Booleans.*
- Attribute extensions for Section are as follows:
  - Section.InstructionalDeliveryModeDescriptor
  - Section.instructionMinutesPerTerm



- An attribute extension for Session is Session.DaysInSession.
- A new association Student21stCenturyLearningCenterGrantProgramAssociation is a specialization of the GeneralStudentProgramAssociation with additional attributes:
  - Student21stCenturyLearningCenterGrantProgramAssociation.AttendanceDays
  - Student21stCenturyLearningCenterGrantProgramAssociation.AttendanceHours
- A new association StudentADSIProgramAssociation is a specialization of the GeneralStudentProgramAssociation with no additional attributes.
- A new association StudentCEISProgramAssociation is a specialization of the GeneralStudentProgramAssociation with no additional attributes.
- A new association StudentEarlyChildhoodScreeningProgramAssociation is a specialization of the GeneralStudentProgramAssociation with additional attributes:
  - StudentEarlyChildhoodScreeningProgramAssociation.EarlyChildhoodScreener
  - StudentEarlyChildhoodScreeningProgramAssociation.EarlyChildhoodScreeningExitStatusDescriptor

*Note: consider moving to use of the new Student Program Evaluation domain in Ed-Fi 5.x.*

- A new association StudentEarlyEducationProgramAssociation is a specialization of the GeneralStudentProgramAssociation with additional attributes:
  - StudentEarlyEducationProgramAssociation.FundingSource
  - StudentEarlyEducationProgramAssociation.ServiceAttendanceHours
  - StudentEarlyEducationProgramAssociation.ServiceMembershipHours
- A new association StudentGiftedTalentedProgramAssociation is a specialization of the GeneralStudentProgramAssociation with additional attribute:
  - StudentGiftedTalentedProgramAssociation.GiftedTalentedParticipationDescriptor
- An attribute extension to the StudentLanguageInstructionProgramAssociation is
  - StudentLanguageInstructionProgramAssociation.LanguageInstructionProgramServiceOtherDescription
- Attribute extensions to StudentNeglectedOrDelinquentProgramAssociation are as follows:
  - StudentNeglectedOrDelinquentProgramAssociation.ExitedNeglectedOrDelinquentProgramOutcomeDescriptor
  - StudentNeglectedOrDelinquentProgramAssociation.NeglectedOrDelinquentInProgramOutcomeDescriptor
- A new association StudentPSEOProgramAssociation is a specialization of the GeneralStudentProgramAssociation with additional attribute:
  - StudentPSEOProgramAssociation.PSEOHighSchoolHours
- A new association StudentPSEOConcurrentProgramAssociation is a specialization of the GeneralStudentProgramAssociation with no additional attributes.



- A new association StudentSAAPProgramAssociation is a specialization of the GeneralStudentProgramAssociation with additional attributes:
  - StudentSAAPProgramAssociation.IndependentStudyIndicator
  - StudentSAAPProgramAssociation.SAAPConcurrentIndicator
  - StudentSAAPProgramAssociation.SAAPCredits
- A new association StudentSection504PlacementProgramAssociation is a specialization of the GeneralStudentProgramAssociation with no additional attributes.
- Attribute extensions to the StudentSpecialEducationProgramAssociation are as follows:
  - StudentSpecialEducationProgramAssociation.PlacingLocalEducationAgencyReference
  - StudentSpecialEducationProgramAssociation.SpecialEducationServiceHours
- Attribute extensions to the StudentSchoolAssociation are as follows:
  - StudentSchoolAssociation.HomeboundServiceIndicator
  - StudentSchoolAssociation.Membership is a common with attributes:
    - StudentSchoolAssociation.Membership.Attendance
    - StudentSchoolAssociation.Membership.Membership
    - StudentSchoolAssociation.Membership.PercentEnrolled
    - StudentSchoolAssociation.MembershipAttendanceUnitDescriptor
  - StudentSchoolAssociation.ResidentLocalEducationAgency
  - StudentSchoolAssociation.SpecialEducationEvaluationStatus
  - StudentSchoolAssociation.SpecialPupillIndicator
  - StudentSchoolAssociation.StateAidCategoryDescriptor
  - StudentSchoolAssociation.Transportation is a common with attributes:
    - StudentSchoolAssociation.Transportation.TransportationCategoryDescriptor
    - StudentSchoolAssociation.Transportation.TransportingLocalEducationAgencyReference.LocalEducationAgencyId
- Attribute extensions to the StudentEducationOrganizationAssociation are as follows:
  - StudentEducationOrganizationAssociation.Birthdate
  - StudentEducationOrganizationAssociation.FirstName
  - StudentEducationOrganizationAssociation.MiddleName
  - StudentEducationOrganizationAssociation.LastName
  - StudentEducationOrganizationAssociation.GenerationCodeSuffix
  - StudentEducationOrganizationAssociation.OtherName common with attributes:
    - StudentEducationOrganizationAssociation.OtherName.OtherNameType
    - StudentEducationOrganizationAssociation.OtherName.FirstName
    - StudentEducationOrganizationAssociation.OtherName.MiddleName
    - StudentEducationOrganizationAssociation.OtherName.LastName



- StudentEducationOrganizationAssociation.OtherName.GenerationCodeSuffix
- StudentEducationOrganizationAssociation.OtherName.PersonalTitlePrefix

*In Ed-Fi, Birthdate, Name, and OtherName are all captured in Student. By having these reported instead in the StudentEducationOrganizationAssociation it allows each district to uniquely report their data but can create data quality issues when this information may differ.*

- StudentEducationOrganizationAssociation.GenderIdentityDescriptor
- StudentEducationOrganizationAssociation.PreferredPronoun
- StudentEducationOrganizationAssociation.LanguageAcademicHonor common with attributes:
  - StudentEducationOrganizationAssociation.LanguageAcademicHonor.AcademicHonorCategoryDescriptor
  - StudentEducationOrganizationAssociation.LanguageAcademicHonor.AchievementCategoryDescriptor
  - StudentEducationOrganizationAssociation.LanguageAcademicHonor.AssessedGradeLevelDescriptor
  - StudentEducationOrganizationAssociation.LanguageAcademicHonor.AssessedSchoolYear
  - StudentEducationOrganizationAssociation.LanguageAcademicHonor.AssessmentCategoryDescriptor
  - StudentEducationOrganizationAssociation.LanguageAcademicHonor.AssessmentTitle
  - StudentEducationOrganizationAssociation.LanguageAcademicHonor.HonorAwardDate
  - StudentEducationOrganizationAssociation.LanguageAcademicHonor.honorAwardExpiresDate
  - StudentEducationOrganizationAssociation.LanguageAcademicHonor.HonorDescription
  - StudentEducationOrganizationAssociation.LanguageAcademicHonor.LanguageDescriptor

*In Ed-Fi academic honors are typically represented using the StudentAcademicRecord.Recognition. This extension should be considered as part of the StudentAcademicRecord.*

- StudentEducationOrganizationAssociation.OptOutIndicatorsDescriptor
- StudentEducationOrganizationAssociation.StudentCrisisEvent common with attributes:





- StudentEducationOrganizationAssociation.StudentCrisisEvent.CrisisEventDescriptor
  - StudentEducationOrganizationAssociation.StudentCrisisEvent.DisplacedStudentIndicator
- Attribute extensions to the StudentSectionAssociation are as follows:
  - StudentSectionAssociation.CollegeCourse
  - StudentSectionAssociation.InstructionalApproach common with attributes:
    - StudentSectionAssociation.InstructionalApproach.implementationStatusDescriptor
    - StudentSectionAssociation.InstructionalApproach.instructionalApproachDescriptor
  - StudentSectionAssociation.SectionEnrollmentTypeDescriptor
  - StudentSectionAssociation.SiteBasedInitiative common with attributes:
    - StudentSectionAssociation.SiteBasedInitiative.implementationStatusDescriptor
    - StudentSectionAssociation.SiteBasedInitiative.siteBasedInitiativeDescriptor
- Attribute extensions to the StudentAssessment are as follows:
  - StudentAssessment.AssessmentCharacteristicDescriptor
  - StudentAssessment.AssessmentFormatDescriptor
  - StudentAssessment.AssessmentTierDescriptor
  - StudentAssessment.CatStudentTestId
  - StudentAssessment.GeneralEnrollmentDescriptor
  - StudentAssessment.LearningLocatorCode
  - StudentAssessment.SiteEducationOrganization
  - StudentAssessment.StudentObjectiveAssessment common extensions:
    - StudentAssessment.StudentObjectiveAssessment.AssessmentFormatDescriptor
    - StudentAssessment.StudentObjectiveAssessment.AssessmentStatusDescriptor
    - StudentAssessment.StudentObjectiveAssessment.AssessmentTierDescriptor
    - StudentAssessment.StudentObjectiveAssessment.ClusterGradeLevelDescriptor
  - StudentAssessment.TimeOnTest
- New entity StudentAssessmentPrecode for pre-code information for assessment vendors, with attributes:
  - StudentAssessmentPrecode.PrecodeTypeDescriptor
  - StudentAssessmentPrecode.StudentEducationOrganizationAssociation
  - StudentAssessmentPrecode.AcademicSubjectDescriptor
  - StudentAssessmentPrecode.AccommodationDescriptor
  - StudentAssessmentPrecode.AssessedGradeLevelDescriptor



- StudentAssessmentPrecode.AssessmentTitle
- StudentAssessmentPrecode.CustomGroup
- StudentAssessmentPrecode.EnrolledGradeLevelDescriptor
- StudentAssessmentPrecode.GeneralEnrollmentIDDescriptor
- StudentAssessmentPrecode.SiteStudentAssessmentPrecodeSite
- New entity StudentAssessmentPrecodeSite with attributes:
  - StudentAssessmentPrecodeSite.EducationOrganization
  - StudentAssessmentPrecodeSite.PrecodeTypeDescriptor
  - StudentAssessmentPrecodeSite.ContactElectronicMailAddress
  - StudentAssessmentPrecodeSite.ContactFirstName
  - StudentAssessmentPrecodeSite.ContactLastSurname
  - StudentAssessmentPrecodeSite.ContactTelephone
  - StudentAssessmentPrecodeSite.ContactTelephone.TelephoneNumber common with attributes:
    - StudentAssessmentPrecodeSite.ContactTelephone.TelephoneNumberTypeDescriptor
    - StudentAssessmentPrecodeSite.ContactTelephone.DoNotPublishIndicator
    - StudentAssessmentPrecodeSite.ContactTelephone.OrderOfPriority
    - StudentAssessmentPrecodeSite.ContactTelephone.TextMessageCapabilityIndicator
  - StudentAssessmentPrecodeSite.ContactTitle
  - StudentAssessmentPrecodeSite.ShippingInstructionDescriptor
- New entity ExamReimbursementRequest with attributes:
  - ExamReimbursementRequest.StudentEducationOrganizationAssociation
  - ExamReimbursementRequest.TestedDate
  - ExamReimbursementRequest.AssessmentCategory
  - ExamReimbursementRequest.ReimbursementRequested
  - ExamReimbursementRequest.UnableToPay.

## Semantic Analysis

Minnesota is well-aligned with the Ed-Fi data standard with all 148 data elements that are used precisely aligned semantically with the Ed-Fi core. There is one area of note:



The documentation indicated that MDE uses the Course entity to collect local district courses. However, a Minnesota Common Course Catalogue (MCCC) is due to be implemented in the school year 2023-2024, which is consistent with best practices.

## Summary of Finds and Next Steps

The analysis found that Minnesota created a fairly large number of extensions to the Ed-Fi core in the areas that include course and course offering, discipline, school and section enrollments, student information, school information, programs, and student assessment administration. Specific suggestions for the State are as follows.

- There are a few extension attributes that were defined where another Ed-Fi attribute could have been used:
  - `Calendar.InstructionalDays` could be computed from `Session.TotalInstructionalDays`
  - `Course.CareerClusterDescriptor` could use instead `Course.CareerPathwayDescriptor`
  - `Grade.AcademicSubjectDescriptor` can alternatively be captured (however circuitously) from  
`Grade->StudentSectionAssociation->Section->CourseOffering->Course.AcademicSubject`
- The extensions `Grade.CollegeCreditsEarned`, `Grade.CollegeGradeEarned`, and `Grade.LocalCreditEarned` should be considered to move to `CourseTranscript`.
- The extension entities `SchoolAttributes` and `SchoolDisciplineAttributes` should be reviewed:
  - Consider using a multi-valued descriptor in place of the many Booleans.
  - The two entities have many of the same attributes that could be consolidated.
  - The rationale for separate entities versus extending `School` is not known.
- `StudentEarlyChildhoodScreeningProgramAssociation` should consider moving away from using a `Program` to using the new `Student Program Evaluation` domain in Ed-Fi 5.x.
- Extensions to the `StudentEducationOrganizationAssociation` were made for `Birthdate`, `Name`, and `OtherName` that in Ed-Fi are captured in `Student`, presumably to allow each district to report unique data. This practice should be examined to ensure the longitudinal identity of students is uniquely tracked.
- Extensions to the `StudentEducationOrganizationAssociation` were made to report language academic honors. In Ed-Fi academic honors are typically represented using the `StudentAcademicRecord.Recognition`.

In terms of the usage of the data elements in the Ed-Fi core model (aka semantic alignment), Minnesota is found to be well-aligned. An area for discussion is highlighted in using the `Course` entity for local district codes versus State course codes.



Based on these findings of the analyses, Ed-Fi would like to work closely with the Minnesota Department of Education (MDE) as a part of its commitment to sustaining data standards. The following are opportunities for next steps for this collaboration between the State and Ed-Fi.

- There are a set of discipline extensions that should be investigated for inclusion into the Ed-Fi core.
- Similarly, there are a set of student assessment and assessment administration extensions that should be investigated for inclusion into the Ed-Fi core.
- New StudentProgramAssociation extensions defined for new programs should be considered for inclusion into the Ed-Fi core for federal programs.
- Analysis across states may identify specific common extension attributes for consideration into core where cross-state collaboration is recommended.