ADL Enterprise Learner Record Repository Database Design Description

21 October 2021

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Flamer, Eric
Adusei-Poku,Adjoa
Franki Schafrik

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Deloitte Consulting LLP
1919 North Lynn Street
Arlington, VA 22209

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Defense Support Services Center
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13501 Ingenuity Drive, Suite 248
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The purpose of this document is to define the detailed Database Design Description for the ELRR. The document determines that the data architecture is complying the best architecture principles, leading practices, and conceptual target application architectures. The target state includes business, enabling and support services that are either reused from the current portfolio, leveraged from existing enterprise services, or established as new services via projects to develop them. As the requirements are further defined and the solution designed, this deliverable will be updated as required and may have significant changes to the architecture. The security of the databases will be compliant with the system architecture and the requirements of the DoD. The details of the security architecture will be available in the System Architecture Report that is also being worked on concurrently by the Deloitte team.

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The following people are designated recipients of the final version of this document:

Name	Organization/Title
Dr. Sae Schatz	Contracting Officer Representative
Ashley Reardon	Government Technical Point of Contact
Brent Smith	Government Technical Lead

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1.0 ELRR Solution Overview

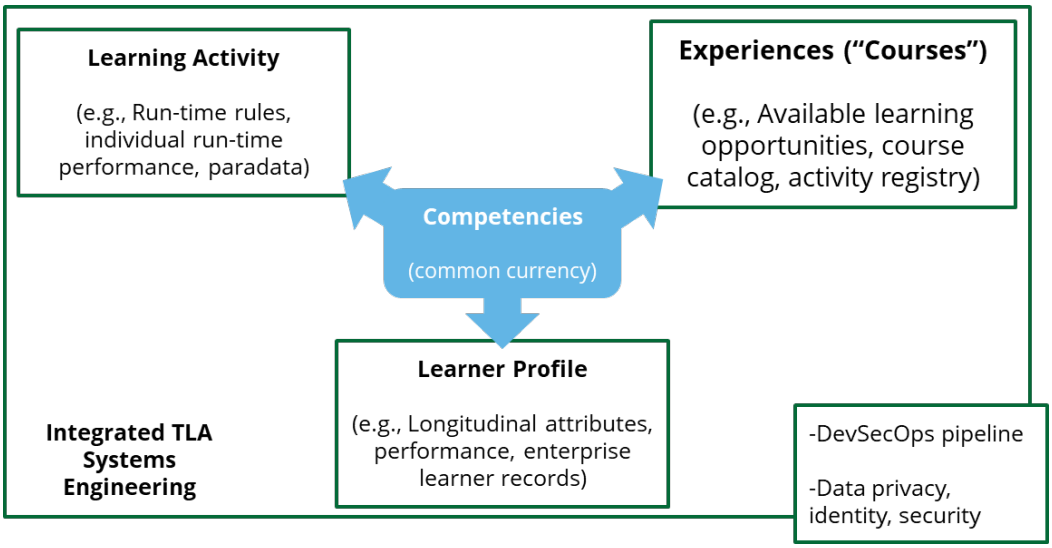
In July 2018, the Department of Defense (DoD) Chief Management Officer (CMO) and the Reform Management Group formally initiated the Enterprise Digital Learning Modernization (EDLM) reform initiative. The goal of the EDLM initiative is to build an enterprise-wide integrated digital learning ecosystem that enables efficient acquisition and spending management for DoD education and training products and services. The Enterprise Learner Record Repository (ELRR) is one of the three EDLM lines of effort supported by the Advanced Distributed Learning (ADL) Initiative.

The end goal of this project is in the development of a prototype that demonstrates a minimum viable product (MVP) that is 1) integrated into the ADL Initiative's Total Learning Architecture (TLA) Sandbox DevSecOps environment, and 2) connected to the ADL Initiative's authoritative learning record store to capture various learner record use cases, evidentiary chains, and credentialing/competency frameworks, while 3) using the ADL Initiative's DATASIM project to stream simulated learner data across the ELRR data fabric.

The prototype will demonstrate at scale (i.e., thousands of simulated) learner records aggregated from multiple and disparate (simulated) digital learning-delivery platforms in a sandbox environment replicating real DoD systems. The learning records data will also federate with semantic information (e.g., competencies, credentials) and simulated profile data (e.g., learner attributes, individual identities). The resulting records will maintain their data lineage at the enterprise level and be collectively interrogable from a single human-usable portal.

The ADL Initiative's TLA data strategy includes three functional pillars connected via a fourth pillar that creates a "common currency" for semantic interoperability across the other pillars. In an operational TLA system, the creation of authoritative statements would be logic driven, including layers of business logic encoded in the Competency Framework. Consequently, ELRR's scope includes all four data pillars of the ADL Initiative's TLA data strategy, highlighted in Figure 1 below. The business objective is to develop a method – via a data fabric and microservices application - for connected and searchable record repositories of detailed learner performance data are made available to any command, learning system, or activity across the DoD to support adaptive instruction, improved decision making, and analytical insights into learners and the systems they interact with.

Figure 1: ADL Initiative TLA Data Strategy



The purpose of this document is to define the detailed Database Design Description for the ELRR. The document determines that the data architecture is complying the best architecture principles, leading practices, and conceptual target application architectures. The target state includes business, enabling and support services that are either reused from the current portfolio, leveraged from existing enterprise services, or established as new services via projects to develop them.

As the requirements are further defined and the solution designed, this deliverable will be updated as required and may have significant changes to the architecture. The security of the databases will be compliant with the system architecture and the requirements of the DoD. The details of the security architecture will be available in the System Architecture Report that is also being worked on concurrently by the Deloitte team.

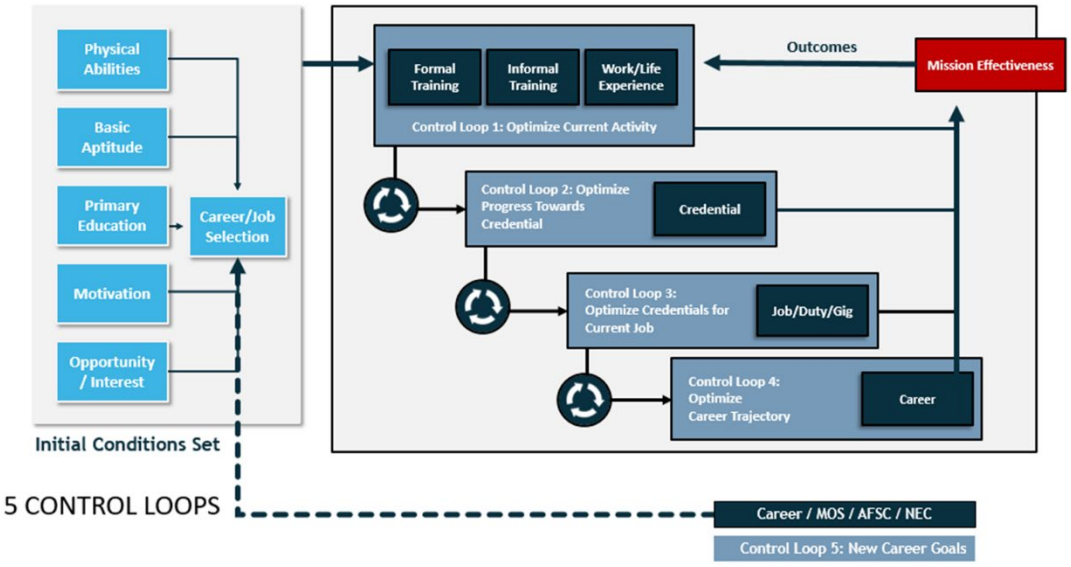
2.0 ELRR Data Architecture Overview

Over the last several years, the ADL Initiative has shepherded the greater adoption of capturing learning activities with the Experience API (xAPI), contributing to a data set with formatted consolidated learning event and learner state records, adhering to the JavaScript Object Notation (JSON) open standard file format and data interchange format defined for the xAPI (IEEE P9274). Critical to ELRR, the ADL Initiative is focused on establishing tools, technologies, and policies that maximize the adoption of xAPI to enable the collection of learner-related data to support enterprise learner analytics. In its 2019 TLA report, the ADL Initiative noted that there were several key factors hindering the quality of an enterprise learner record data set that would allow TLA to meet its business objectives, including: inconsistency in statement naming patterns, missing statement fields, a loss of traceability into competency management, inconsistency in labeling competency levels, and difficulty describing relationships between external competency documentation, internal competency levels, and learning resources.

Based on the xAPI standard, adjudicated performance records are routinely collected in a Learning Record System (LRS), the system with specific data storage and retrieval capabilities for xAPI statements. However, these statements typically exist to capture the first and primary control loop for abstracting and organizing learner records throughout the continuum of learning, capturing the learner activity. Assertions include other information such as physical/psychological/behavioral attributes, personal preferences, and competencies not associated with a credential. Assertion of competence – the progress made based on the mapping of the learning event towards a defined credential – is based on the combination of individual learner records and represents the second control loop; multiple credentials together form competency-based assertions in relation to a learner's job, duty, gig, or assignment.

Taken together across multiple jobs, duties, gigs, or assignments in a learner's lifecycle of work and training performance, the sum total of learning activities, learning credentials, and the current job form the basis of a career trajectory, which may or may not include a separate career trajectory (e.g., Control Loop 5) should a learner entertain or embark on a new career trajectory unrelated to the expected one described above. The data exchange across this control loop hierarchy, demonstrated in Figure 2 below, forms the abstract basis of the evidentiary chain critical to the reference implementation of ELRR.

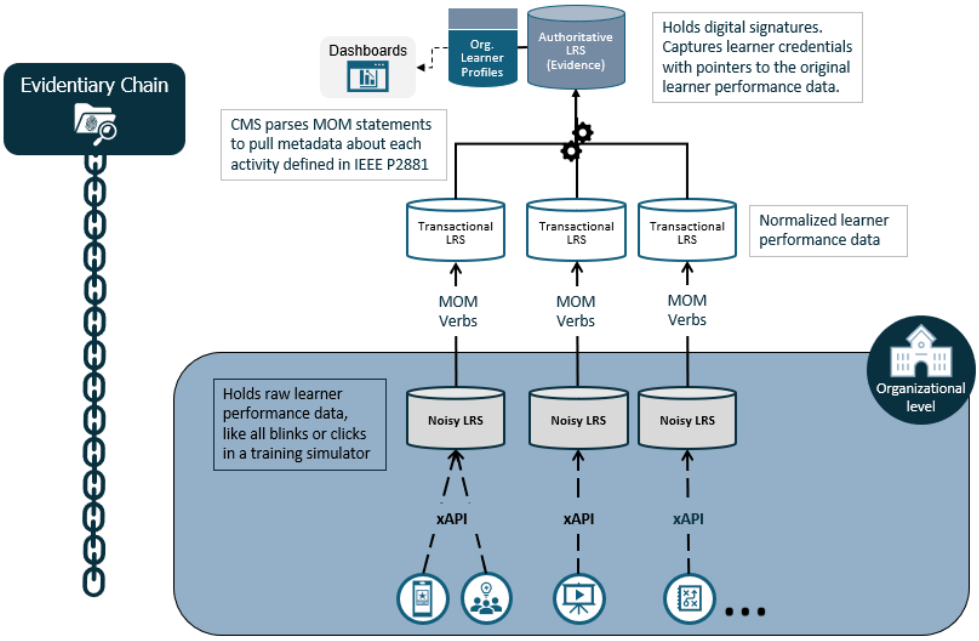
Figure 2: Learning Data Exchange Across Organizational Echelons



In addition to this persistent reconciliation of credential, job, and career information that "rolls up" at the enterprise level based on individual learner activity records, the evidentiary chain also includes the reconciliation and management of the individual local learner profiles that, taken together, contribute to the view of an enterprise learner record. Again, this important given that a great many learners will have or maintain a local learner profile associated with one or more assignments taking place across organizational boundaries and across edge systems.

In the management of federated learner identities, one challenge has been that not all systems store user information the same way. Learners may also use different local account names for different purposes. There is no guarantee these accounts, or systems know about each other, so a federated approach to Identity Management is required to resolve this issue. Taken together, the identity and credentialing evidentiary chains follow the pattern from local learning record systems to the ELRR, as demonstrated in the figure below.

Figure 3: Demonstration of the Evidentiary Chain Across Local and Enterprise Systems



3.0 ELRR Database Design Decisions

The ELRR data architecture will rely on the ELRR requirements and ELRR system architecture provided in the System Architecture Report. At this time, the conceptual and logical data models are based on the following conceptual data models:

- IEEE P2997 Enterprise Learning Records (ELR) or IMS Global Comprehensive Learner Record (sub-set of Draft 1484-2 Integrated Learner Record v4_20201111) – Learner profile standards do not currently meet all TLA requirements. These new standards are actively being developed and modified based on input from numerous industry groups and associations.
- IEEE P9274.1 Experience API (xAPI) 2.0 – Learning activity tracking uses the xAPI to capture learning activity streams. The xAPI standard also includes xAPI profiles such as cmi5 and the TLA's Master Object Model. xAPI 2.0 is targeted for approval in 2020.
- IEEE P2881 Learning Activity Metadata (LAM) – Descriptions of learning activities and their associated content are stored in the TLA's Experience Index and use a modified version of the Learning Resource Metadata Initiative standard. A draft standard is being submitted for finalization in early 2020.
- IEEE 1484.20.1 Reusable Competency Definitions – The definition of a competency, the relationship to other competencies, and the alignment of evidence to help measure proficiency of the competency, are included in this standard. This standard is expected for approval in 2020.

For the proposed ELR and LAM conceptual models, there are more data elements in these models than the resulting ELRR prototype solution, and some elements may not be populated depending on the simulated data records that will be used by the prototype. Many of the data elements anticipated in the final version of the ADL Initiative's ELR standard may not be reflected or included as a requirement in the scope of this prototype. The database and the ELRR application will be able to support the full standard, however, the prototype will focus on competencies and a sub-set of the elements contained in the standards. Table 1 below provides a high-level summary of each ELR category and an initial set of data attributes.

Table 1: Summary of ELR Categories

ELR Category	Category Description	Types of Learner Record Attributes
Person	Descriptive information about the individual learner, either at the enterprise or local level.	Name, Human Resource Identifier, Address, Contact Information, Birthdate, Medical Conditions and History, Biometrics, Devices
Organization	Descriptive information about the organization related to the record's learning credential or learning activity.	Organization Name, Organization Identifier, Organization Relationships, Organization Description, Organization Contact Information, Accreditation Type
Employment	Descriptive information about the organization related to the record's learner profile the associated learner employment information.	Employer Name, Employer Department, Employer Description, Employer Identifier, Employee ID, Position Title, Job Level, Occupation
Career	Descriptive information about high-level outcomes associated with learner activities.	Career Goal, Career Goal Type, Career Goal Description

ELR Category	Category Description	Types of Learner Record Attributes
Course	Descriptive information about the course or associated learning activity.	Course Title, Course Description, Course Identifier, Course Type, Course Start Date, Course End Date, Course Activities
Credential	Descriptive information about the credential, including type, organizational accrediting authority, and credential status.	Credential Name, Credential Title, Credential Identifier, Credential Description
Competency	Descriptive information on the competency framework.	Competency Framework Title, Framework Version, Framework Identifier, Framework Description, Definition Sequence, Learner Proficiency Level
Program of Study	Descriptive information on the administration of learning activities associated with formal post-secondary education.	Program of Study Name, Program of Study Institution, Enrollment Date, Academic Year, Credits Earned

The final attribute in the Learning Experience element presented above represents the LAM standard, which is currently in the process of being updated using recommendations provided by the ADL Initiative. Many of the data elements anticipated in the final version of the ADL Initiative's updated LAM standard may not be reflected or added as requirements in the scope of this prototype. Table 2 below provides a high-level summary of each LAM category and an initial set of data attributes.

Table 2: Summary of LAM Categories

LAM Category	Category Description	Types of Experience Metadata
General Information	Descriptive information on the learning resource and information about the instance of the learning resource.	Identifier, Title, Language, Description, Keyword, Coverage, Structure, Aggregation Level
Lifecycle Information	Descriptive information on the maintenance of the learning resource.	Version, Status, Contribute
Meta-Metadata	Descriptive information on the metadata associated with the learning resource.	Identifier, Contribute, Metadata Schema, Language
Technical Information	Information on the technical requirements and specifications related to the learning resource, including the technology required to launch the experience.	Format, Size, Location, Requirement, Installation Remarks, Other Platform Requirements, Duration
Learning Content	The logical aggregation of resources that can be assembled and delivered via 1 or more activities.	Learning Content Type, Resource Description, Time Required.
Learning Activity	A set of interactions or events that deliver content.	Learning Activity Type, Learning Activity Description, Learning Activity Data Type.
Courses	A sequence of learning activities delivering Learning Content in pursuit of a goal (e.g., TLO, Competency) – formerly listed as LearningExperience.	Course Title, Course Subject Matter, Course Description, Course Audience, Course Prerequisites, Course Academic Grade, Course Provider Name

LAM Category	Category Description	Types of Experience Metadata
Alignment	Relationship between the learning resource and a particular framework (e.g., competency or credential framework).	Educational Alignment
Rights	Information on the copyright/legal permissions related to the ownership and distribution of the learning resource.	Cost, Copyright, Description
Relationships	Descriptive information on the learning resource in relation to other learning resources.	Kind, Resource
Annotation	Descriptive information on the comments associated with the learning resource.	Entity, Date, Description
Classification	Descriptive information on the framework or system used to classify the learning resource in relation to other learning resources.	Purpose, Taxon Path, Description, Keyword

More information on the ELR and LAM standards and the ADL Initiative's draft update to this standard are provided and tracked on the ELRR SharePoint.

The data elements will be expanded in the future as requirements are submitted but will not be addressed in the scope of the prototype. The ELRR will support the full standard; however, the prototype will be limited to a subset for demonstration purposes. They will align with the data dictionary for the integrated learner record and the data dictionary for learning activity metadata attributes. Once completed, the conceptual data model can be used to classify use cases for the learner records. This will allow for consolidation of use cases coming from Air Force, Army, and Navy. They can also be used to show the potential complexity of a use case (e.g., the more entities required for a use case, the more complex it may be).

4.0 ELRR Database Design Details

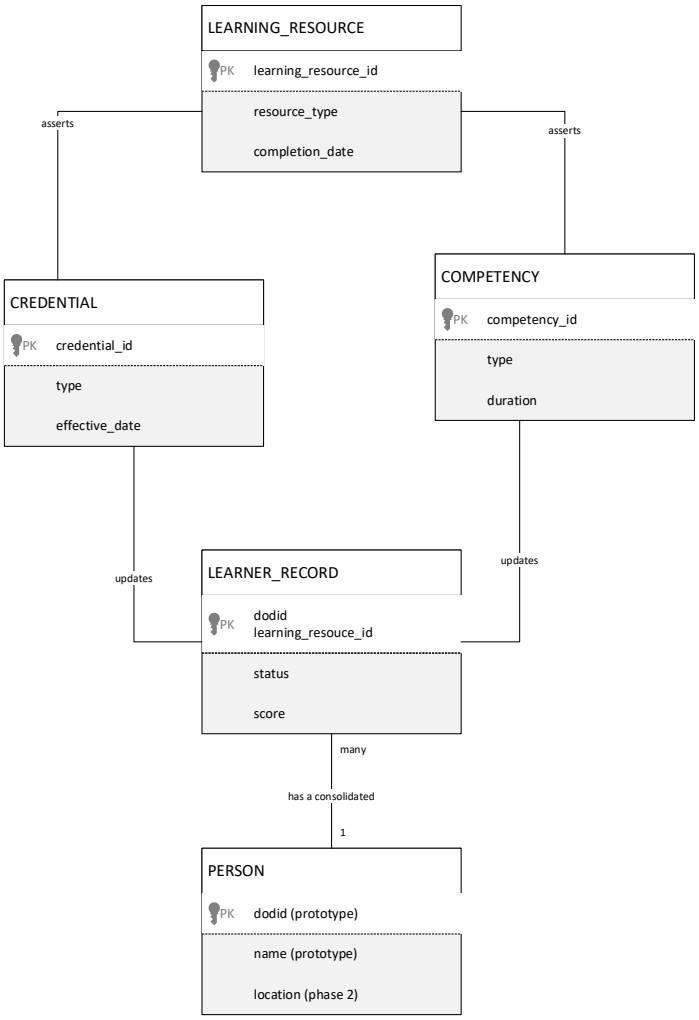
The development team will be responsible for creating and implementing the following artifacts upon initial review and feedback on the ELRR solution design based on the validated prototype requirements. Upon review and initial confirmation of the design, as applicable, the Database Design will have the following artifacts:

- Logical Data Model (DIV-2), currently presented in Appendix A of this document.
- Physical Data Model (DIV-3), currently presented in Appendix B of this document.
- Data Dictionary currently presented in Appendix C of this document.
- Indexes that will be required for the data objects.
- Planned implementation factors (e.g., distribution and synchronization) that impact the design.
- Traceability matrix for external data sources (e.g., ADL Initiative LRS).

The logical data models can be used to identify business rules for the data. For example, the relationships between the entities may reflect a business rule (e.g., a learner must have one or more learner records, meaning a learner must have at least 1 learner record). Additionally, the cardinality (one or more) indicates that within the database design multiple records may be linked to a single key value in another table. Notional examples of conceptual and logical data models, as well as modeling techniques, are provided in the figures below.

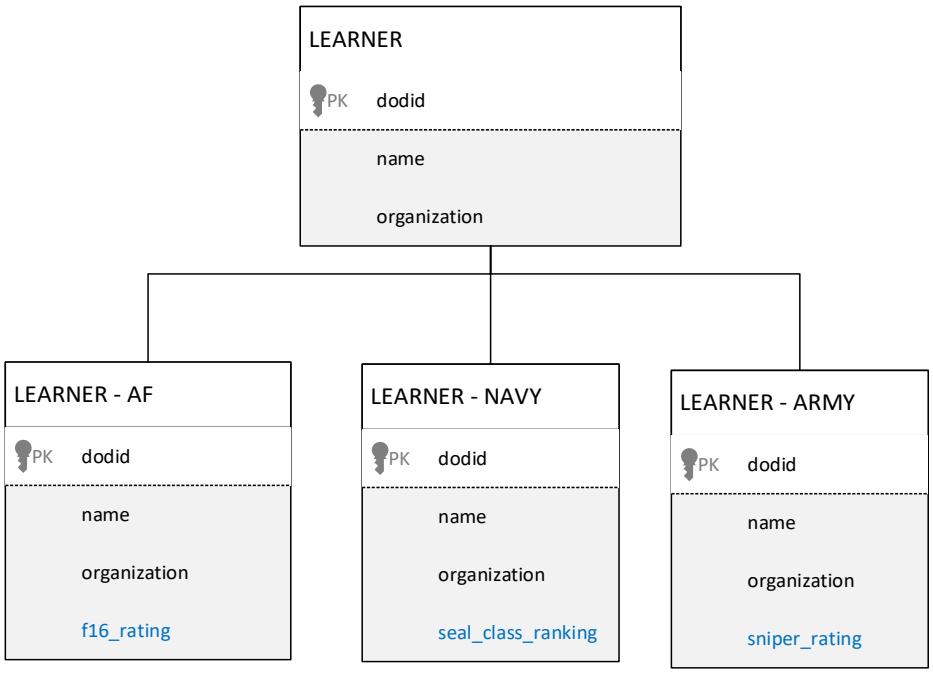
Figure 4 is a notional example of a Logical data model (DIV-2). As data elements are finalized the Logical data model will be updated to reflect this. Use cases can be aligned with the entities to show what data is available (as shown on the PERSON attributes). Additional data elements can be added as new use cases are identified.

Figure 4: Notional Logical Data Model (DIV-2)



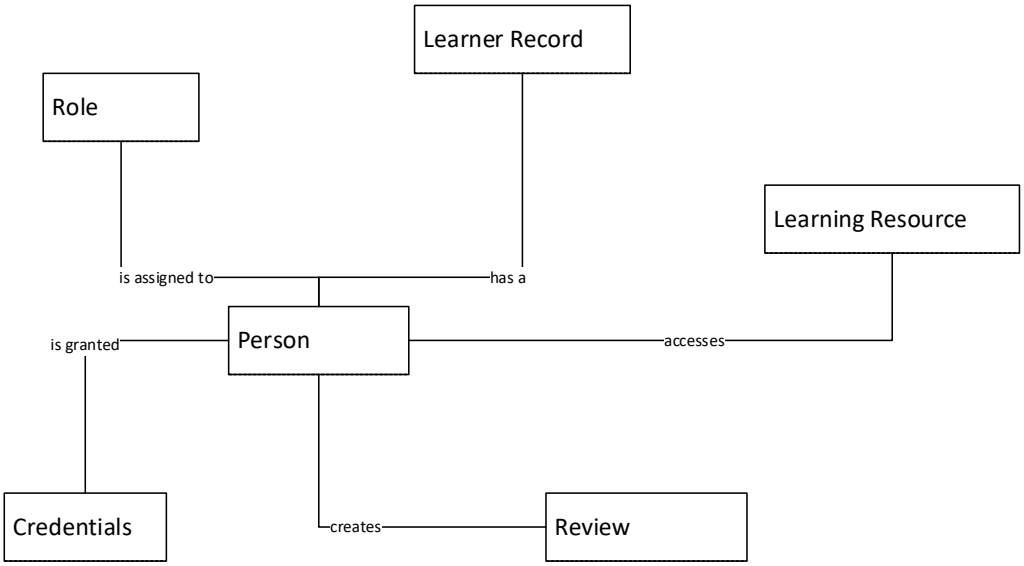
A modeling technique that can be used to show data elements unique to a service is the use of categorizations. Figure 5 below shows a notional categorization that captures shared data elements for a learner and then data elements that may be unique to a service (shown in blue). For example, an Air Force learner may have an F-16 rating, which is unique to the Air Force, whereas an Army learner record may track a sniper rating.

Figure 5: Notional Categorization



A final data modeling technique that will be used to model the LRS data is a subject area model, demonstrated in Figure 6. A subject area model is a collection of architectural entities related to a given subject of interest, and the relationships among them. The given subject area of interest can be any subject at any level of the business or technical architecture. A subject area model focuses on a specific topic of interest and is a subset of the overarching data model. It is typically used to make complex data models easier to understand. Below is a notional subject area model for Person. It shows only the entities directly related to the Person entity.

Figure 6: Notional Person Subject Area Model



Along with the above artifacts, other areas of design critical for consideration and documentation include the database management system files. Other artifacts detailing the design for consideration and future submission include:

- Lookup tables and values – store data in key-value pairs which also provide for faster searches, easy data modification/data modification flexibility, data centralization and other advantages.
- Taxonomy – classify the data into hierarchical groups for structure and standardize terminology (identity, profile, credential, competency, course, activity, etc.). A few benefits are better data quality, metadata is organized in an easy format, and it may assist in identifying trends and patterns in machine learning.
- Critical data elements including associated business rules – the development intends to document this information in the ELRR Prototype's user documentation, tracking updates incrementally as the data services are further developed and the ELRR external services grow in scope.

Though the core logical data model will have detailed entities, attributes, and relationships defined, the actual design will depend on the source data availability and actual detailed requirements included in the ELRR Requirements Verification and Traceability Matrix (RVTM). Key functional requirements like the minimum set of data elements to support a learner record, the roles involved, the auditing and monitoring requirements, and the record update implementation will all have a direct influence in the data architecture design. Additionally, the data fabric implementation and the transformations required will also influence the data base design.

Besides the technical requirements – like the database and ETL tool used – security, privacy, availability, downtime, and other technological requirements will influence the database design. Our Database Management System Decisions will be detailed as the requirement and system design are approved. Security and Privacy Design Decisions will be designed on the DoD system requirements and policies which will be detailed in the System Architecture Document. Performance and Maintenance Design Decisions will be based on the technology and detailed business requirement.

5.0 Database Administration and Monitoring

The ELRR Postgres database tables and relationships are established by executing the database definition language (DDL), which is generated from the physical data model. This maintains the integrity between the physical data model and the database instantiations. One of the features of our the licensed Idera tool Deloitte has selected for the initial development and management of the ELRR Prototype data model is the ability to generate DDLs based on the specified logical and physical data models developed in the tool.

Additionally, Deloitte deploys the ELRR Prototype is on Kubernetes, an open-source orchestration tool, which orchestrates container deployments, including our database services. Kubernetes also is used to deploy, manage and scale the containers. Kubernetes allows the application to self-heal when failures occur by re-launching the container(s).

APPENDIX A: ELRR Prototype Logical Data Model (DIV-2)

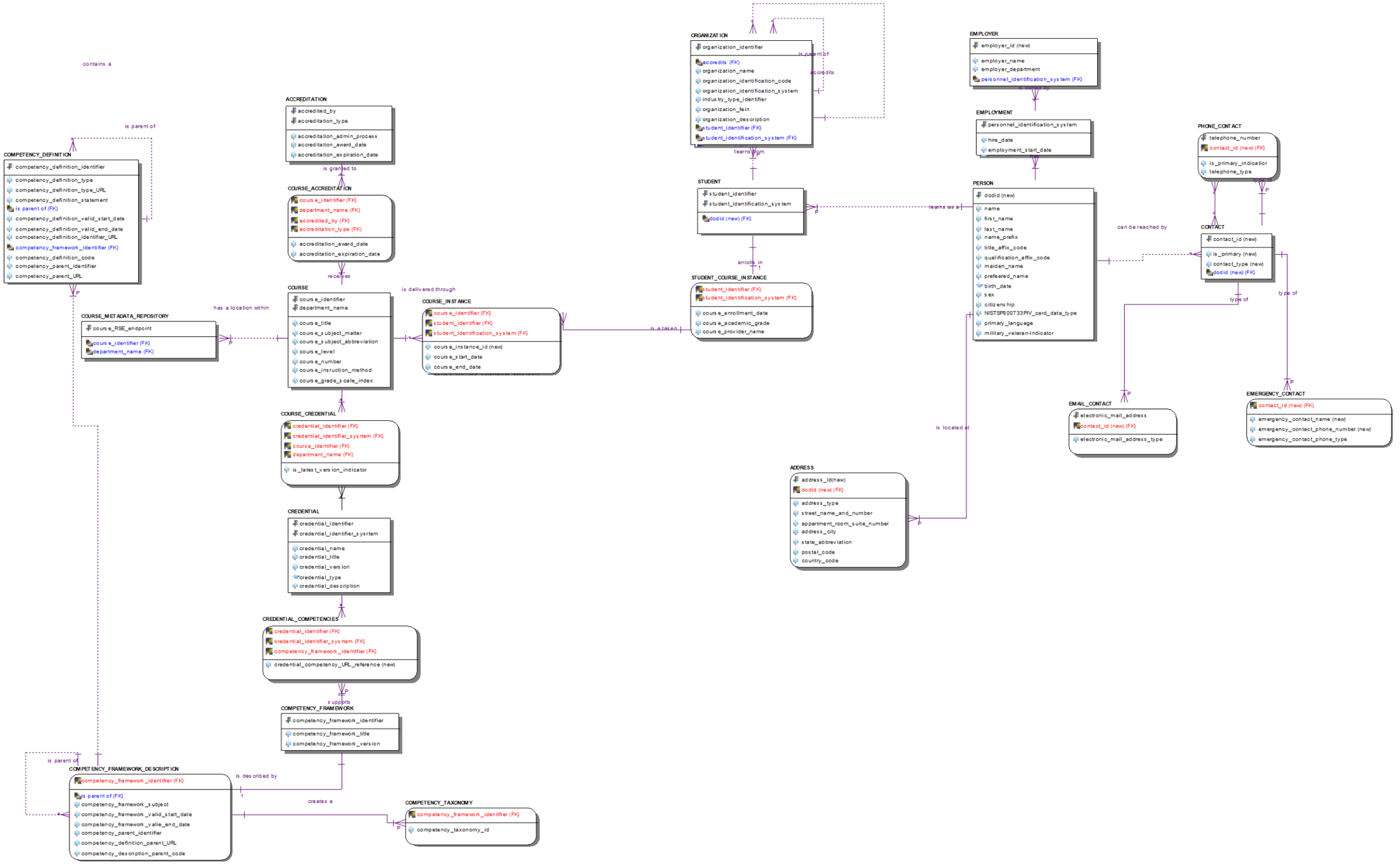
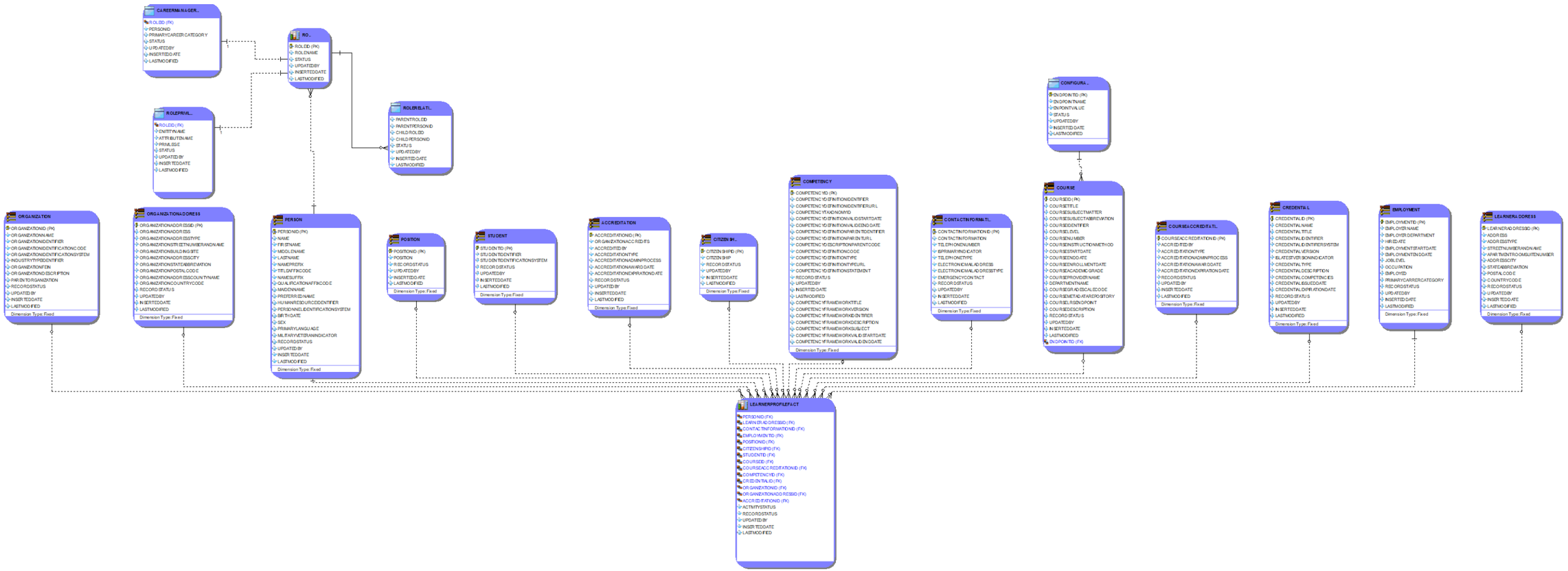


Table: ELRR MVP Logical Data Model Relationships

Origin Table Name	Verb Phrase	Destination Table Name
COMPETENCY_FRAMEWORK	is described by	COMPETENCY_FRAMEWORK_ DESCRIPTION
COMPETENCY_FRAMEWORK_ DESCRIPTION	creates a	COMPETENCY_TAXONOMY
COMPETENCY_FRAMEWORK_ DESCRIPTION	contains a	COMPETENCY_DEFINITION
COMPETENCY_DEFINITION	is parent of	COMPETENCY_DEFINITION
COMPETENCY_FRAMEWORK_ DESCRIPTION	is parent of	COMPETENCY_FRAMEWORK_ DESCRIPTION
COMPETENCY_FRAMEWORK	supports	CREDENTIAL_COMPETENCIES
ORGANIZATION	is parent of	ORGANIZATION
STUDENT_COURSE_INSTANCE	is a taken	COURSE_INSTANCE
ORGANIZATION	accredits	ORGANIZATION
CONTACT	type of	EMERGENCY_CONTACT
CONTACT	type of	EMAIL_CONTACT
CONTACT	type of	PHONE_CONTACT
PERSON	learns as a	STUDENT
PERSON	has	EMPLOYMENT
PERSON	can be reached by	CONTACT
PERSON	is located at	ADDRESS
STUDENT	learns from	ORGANIZATION
COURSE	has a location within	COURSE_METADATA_REPOSITORY
COURSE	is delivered through	COURSE_INSTANCE
EMPLOYMENT	is owned by	EMPLOYER
STUDENT	enrolls in	STUDENT_COURSE_INSTANCE
COURSE	receives	COURSE_ACCREDITATION
ACCREDITATION	is granted to	COURSE_ACCREDITATION

APPENDIX B: ELRR Prototype Physical Data Model (DIV-3)



APPENDIX C: ELRR Prototype Data Dictionary

TYPE OF TABLE	TABLE NAME	ATTRIBUTE	KEY TYPE	DATA TYPE	CONTRAINTS
FACT	LEARNER_PROFILE_FACT	PERSON_ID	FOREIGN	INT	NOT NULL
FACT	LEARNER_PROFILE_FACT	LEARNER_ADDRESS_ID	FOREIGN	INT	
FACT	LEARNER_PROFILE_FACT	ORGANIZATION_ADDRESS_ID	FOREIGN	INT	
FACT	LEARNER_PROFILE_FACT	CONTACT_INFORMATION_ID	FOREIGN	INT	
FACT	LEARNER_PROFILE_FACT	CITIZENSHIP_ID	FOREIGN	INT	
FACT	LEARNER_PROFILE_FACT	POSITION_ID	FOREIGN	INT	
FACT	LEARNER_PROFILE_FACT	EMPLOYMENT_ID	FOREIGN	INT	NOT NULL
FACT	LEARNER_PROFILE_FACT	ORGANIZATION_ID	FOREIGN	INT	NOT NULL
FACT	LEARNER_PROFILE_FACT	COURSE_ID	FOREIGN	INT	
FACT	LEARNER_PROFILE_FACT	COURSE_ACCREDITATION_ID	FOREIGN	INT	
FACT	LEARNER_PROFILE_FACT	ACCREDITATION_ID	FOREIGN	INT	
FACT	LEARNER_PROFILE_FACT	CREDENTIAL_ID	FOREIGN	INT	
FACT	LEARNER_PROFILE_FACT	STUDENT_ID	FOREIGN	INT	
FACT	LEARNER_PROFILE_FACT	COMPETENCY_ID	FOREIGN	INT	
FACT	LEARNER_PROFILE_FACT	AMERICAN_COUNCIL_ON_EDUCATION_ACE		CHAR	
FACT	LEARNER_PROFILE_FACT	CONTINUING_EDUCATION_UNITS_CEU		INT	
FACT	LEARNER_PROFILE_FACT	CONTINUOUS_LEARNING_POINTS_CLP		INT	
FACT	LEARNER_PROFILE_FACT	RESERVE_RETIREMENT_POINTS_RRP		INT	
FACT	LEARNER_PROFILE_FACT	VOCATIONAL_CERTIFICATE_CATEGORY_VCC		INT	
FACT	LEARNER_PROFILE_FACT	RECORD_STATUS		VARCHAR(10)	
FACT	LEARNER_PROFILE_FACT	INSERTED_DATE		DATETIME	
FACT	LEARNER_PROFILE_FACT	UPDATEDBY		VARCHAR(20)	
FACT	LEARNER_PROFILE_FACT	LAST_MODIFIED		DATETIME	
DIMENSION	LEARNER_ADDRESS	LEARNER_ADDRESS_ID	PRIMARY	INT	NOT NULL

TYPE OF TABLE	TABLE NAME	ATTRIBUTE	KEY TYPE	DATA TYPE	CONTRAINTS
DIMENSION	LEARNER_ADDRESS	ADDRESS		VARCHAR(255)	
DIMENSION	LEARNER_ADDRESS	ADDRESSTYPE		VARCHAR(50)	
DIMENSION	LEARNER_ADDRESS	STREETNUMBERANDNAME		VARCHAR(255)	
DIMENSION	LEARNER_ADDRESS	APARTMENTROOMSUITENUMBER		VARCHAR(255)	
DIMENSION	LEARNER_ADDRESS	ADDRESSCITY		VARCHAR(255)	
DIMENSION	LEARNER_ADDRESS	STATEABBREVIATION		VARCHAR(255)	
DIMENSION	LEARNER_ADDRESS	POSTALCODE		INT	
DIMENSION	LEARNER_ADDRESS	COUNTRYCODE		CHAR	
DIMENSION	LEARNER_ADDRESS	RECORD_STATUS		VARCHAR(10)	
DIMENSION	LEARNER_ADDRESS	INSERTED_DATE		DATETIME	
DIMENSION	LEARNER_ADDRESS	UPDATEDBY		VARCHAR(20)	
DIMENSION	LEARNER_ADDRESS	LAST_MODIFIED		DATETIME	
DIMENSION	ORGANIZATION_ADDRESS	ORGANIZATION_ADDRESS_ID	PRIMARY	INT	NOT NULL
DIMENSION	ORGANIZATION_ADDRESS	ORGANIZATIONADDRESS		VARCHAR(255)	
DIMENSION	ORGANIZATION_ADDRESS	ORGANIZATIONADDRESSTYPE			
DIMENSION	ORGANIZATION_ADDRESS	ORGANIZATIONSTREETNUMBERANDNAME		VARCHAR(255)	
DIMENSION	ORGANIZATION_ADDRESS	ORGANIZATIONBUILDINGSITE		VARCHAR(255)	
DIMENSION	ORGANIZATION_ADDRESS	ORGANIZATIONADDRESSCITY		VARCHAR(255)	
DIMENSION	ORGANIZATION_ADDRESS	ORGANIZATIONSTATEABBREVIATION		VARCHAR(50)	
DIMENSION	ORGANIZATION_ADDRESS	ORGANIZATIONPOSTALCODE		INT	
DIMENSION	ORGANIZATION_ADDRESS	ORGANIZATIONADDRESSCOUNTYNAME		VARCHAR(255)	
DIMENSION	ORGANIZATION_ADDRESS	ORGANIZATIONCOUNTRYCODE		CHAR	
DIMENSION	ORGANIZATION_ADDRESS	RECORD_STATUS		VARCHAR(10)	
DIMENSION	ORGANIZATION_ADDRESS	INSERTED_DATE		DATETIME	
DIMENSION	ORGANIZATION_ADDRESS	UPDATEDBY		VARCHAR(20)	
DIMENSION	ORGANIZATION_ADDRESS	LAST_MODIFIED		DATETIME	
DIMENSION	PERSON	PERSON_ID	PRIMARY	INT	NOT NULL

TYPE OF TABLE	TABLE NAME	ATTRIBUTE	KEY TYPE	DATA TYPE	CONTRAINTS
DIMENSION	PERSON	NAME		NVARCHAR(150)	NOT NULL
DIMENSION	PERSON	FIRSTNAME		NVARCHAR(50)	NOT NULL
DIMENSION	PERSON	MIDDLENAME		NVARCHAR(50)	
DIMENSION	PERSON	LASTNAME		NVARCHAR(50)	NOT NULL
DIMENSION	PERSON	NAMEPREFIX		NVARCHAR(50)	
DIMENSION	PERSON	TITLEAFFIXCODE		NVARCHAR(50)	
DIMENSION	PERSON	NAMESUFFIX		NVARCHAR(50)	
DIMENSION	PERSON	QUALIFICATIONAFFIXCODE		NVARCHAR(50)	
DIMENSION	PERSON	MAIDENNAME		NVARCHAR(50)	
DIMENSION	PERSON	PREFERREDNAME		NVARCHAR(50)	
DIMENSION	PERSON	HUMANRESOURCEIDENTIFIER		TEXT	
DIMENSION	PERSON	PERSONNELIDENTIFICATIONSYSTEM		TEXT	
DIMENSION	PERSON	BIRTHDATE		DATE	MM-DD-YYYY
DIMENSION	PERSON	SEX		CHAR(1)	
DIMENSION	PERSON	PRIMARYLANGUAGE		VARCHAR(50)	
DIMENSION	PERSON	MILITARYVETERANINDICATOR		CHAR(1)	
DIMENSION	PERSON	RECORD_STATUS		VARCHAR(10)	
DIMENSION	PERSON	INSERTED_DATE		DATETIME	
DIMENSION	PERSON	UPDATEDBY		VARCHAR(20)	
DIMENSION	PERSON	LAST_MODIFIED		DATETIME	
DIMENSION	CONTACTINFORMATION	CONTACT_INFORMATION_ID	PRIMARY	INT	NOT NULL
DIMENSION	CONTACTINFORMATION	CONTACTINFORMATION		VARCHAR(20)	NOT NULL
DIMENSION	CONTACTINFORMATION	TELEPHONENUMBER		VARCHAR(20)	
DIMENSION	CONTACTINFORMATION	ISPRIMARYINDICATOR		CHAR(1)	
DIMENSION	CONTACTINFORMATION	TELEPHONETYPE		VARCHAR(20)	
DIMENSION	CONTACTINFORMATION	ELECTRONICMAILADDRESS		VARCHAR(320)	
DIMENSION	CONTACTINFORMATION	ELECTRONICMAILADDRESSTYPE		VARCHAR(20)	
DIMENSION	CONTACTINFORMATION	EMERGENCYCONTACT		VARCHAR(20)	

TYPE OF TABLE	TABLE NAME	ATTRIBUTE	KEY TYPE	DATA TYPE	CONTRAINTS
DIMENSION	CONTACTINFORMATION	RECORD_STATUS		VARCHAR(10)	
DIMENSION	CONTACTINFORMATION	INSERTED_DATE		DATETIME	
DIMENSION	CONTACTINFORMATION	UPDATEDBY		VARCHAR(20)	
DIMENSION	CONTACTINFORMATION	LAST_MODIFIED		DATETIME	
DIMENSION	CITIZENSHIP	CITIZENSHIP_ID	PRIMARY	INT	NOT NULL
DIMENSION	CITIZENSHIP	CITIZENSHIP		VARCHAR(127)	NOT NULL
DIMENSION	CITIZENSHIP	RECORD_STATUS		VARCHAR(10)	
DIMENSION	CITIZENSHIP	INSERTED_DATE		DATETIME	
DIMENSION	CITIZENSHIP	UPDATEDBY		VARCHAR(20)	
DIMENSION	CITIZENSHIP	LAST_MODIFIED		DATETIME	
DIMENSION	POSITION	POSITION_ID	PRIMARY	INT	NOT NULL
DIMENSION	POSITION	POSITION		VARCHAR(50)	NOT NULL
DIMENSION	POSITION	RECORD_STATUS		VARCHAR(10)	
DIMENSION	POSITION	INSERTED_DATE		DATETIME	
DIMENSION	POSITION	UPDATEDBY		VARCHAR(20)	
DIMENSION	POSITION	LAST_MODIFIED		DATETIME	
DIMENSION	EMPLOYMENT	EMPLOYMENT_ID	PRIMARY	INT	NOT NULL
DIMENSION	EMPLOYMENT	EMPLOYERNAME		VARCHAR(100)	NOT NULL
DIMENSION	EMPLOYMENT	EMPLOYERDEPARTMENT		VARCHAR(100)	
DIMENSION	EMPLOYMENT	HIREDATE		DATE	MM-DD-YYYY
DIMENSION	EMPLOYMENT	EMPLOYMENTSTARTDATE		DATE	MM-DD-YYYY
DIMENSION	EMPLOYMENT	EMPLOYMENTENDDATE		DATE	MM-DD-YYYY
DIMENSION	EMPLOYMENT	JOBLEVEL		VARCHAR(100)	
DIMENSION	EMPLOYMENT	OCCUPATION		VARCHAR(100)	
DIMENSION	EMPLOYMENT	EMPLOYED		CHAR(1)	
DIMENSION	EMPLOYMENT	RECORD_STATUS		VARCHAR(10)	

TYPE OF TABLE	TABLE NAME	ATTRIBUTE	KEY TYPE	DATA TYPE	CONTRAINTS
DIMENSION	EMPLOYMENT	INSERTED_DATE		DATETIME	
DIMENSION	EMPLOYMENT	UPDATEDBY		VARCHAR(20)	
DIMENSION	EMPLOYMENT	LAST_MODIFIED		DATETIME	
DIMENSION	ORGANIZATION	ORGANIZATION_ID	PRIMARY	INT	NOT NULL
DIMENSION	ORGANIZATION	ORGANIZATIONNAME		VARCHAR(100)	NOT NULL
DIMENSION	ORGANIZATION	ORGANIZATIONIDENTIFIER		VARCHAR(100)	
DIMENSION	ORGANIZATION	ORGANIZATIONIDENTIFICATIONCODE		VARCHAR(100)	
DIMENSION	ORGANIZATION	ORGANIZATIONIDENTIFICATIONSYSTEM		VARCHAR(100)	
DIMENSION	ORGANIZATION	INDUSTRYTYPEIDENTIFIER		VARCHAR(100)	
DIMENSION	ORGANIZATION	ORGANIZATIONFEIN		VARCHAR(100)	
DIMENSION	ORGANIZATION	ORGANIZATIONDESCRIPTION		TEXT	
DIMENSION	ORGANIZATION	PARENTORGANIZATION		VARCHAR(100)	
DIMENSION	ORGANIZATION	RECORD_STATUS		VARCHAR(10)	
DIMENSION	ORGANIZATION	INSERTED_DATE		DATETIME	
DIMENSION	ORGANIZATION	UPDATEDBY		VARCHAR(20)	
DIMENSION	ORGANIZATION	LAST_MODIFIED		DATETIME	
DIMENSION	COURSE	COURSE_ID	PRIMARY	INT	NOT NULL
DIMENSION	COURSE	COURSETITLE		VARCHAR(300)	NOT NULL
DIMENSION	COURSE	COURSESUBJECTMATTER		VARCHAR(100)	
DIMENSION	COURSE	COURSESUBJECTABBREVIATION		VARCHAR(20)	
DIMENSION	COURSE	COURSEIDENTIFIER		VARCHAR(50)	
DIMENSION	COURSE	COURSELEVEL		VARCHAR(50)	
DIMENSION	COURSE	COURSENUMBER		VARCHAR(50)	NOT NULL
DIMENSION	COURSE	COURSEINSTRUCTIONMETHOD		VARCHAR(50)	
DIMENSION	COURSE	COURSESTARTDATE		DATE	MM-DD-YYYY
DIMENSION	COURSE	COURSEENDDATE		DATE	MM-DD-YYYY
DIMENSION	COURSE	COURSEENROLLMENTDATE		DATE	MM-DD-YYYY

TYPE OF TABLE	TABLE NAME	ATTRIBUTE	KEY TYPE	DATA TYPE	CONTRAINTS
DIMENSION	COURSE	COURSEACADEMICGRADE		VARCHAR(50)	
DIMENSION	COURSE	COURSEPROVIDERNAME		VARCHAR(100)	
DIMENSION	COURSE	DEPARTMENTNAME		VARCHAR(100)	
DIMENSION	COURSE	COURSEGRADESCALECODE		VARCHAR(50)	
DIMENSION	COURSE	COURSEMETADATAREPOSITORY		VARCHAR(50)	
DIMENSION	COURSE	COURSELRSENDPOINT		VARCHAR(50)	
DIMENSION	COURSE	COURSEDESCRIPTION		TEXT	
DIMENSION	COURSE	RECORD_STATUS		VARCHAR(10)	
DIMENSION	COURSE	INSERTED_DATE		DATETIME	
DIMENSION	COURSE	UPDATEDBY		VARCHAR(20)	
DIMENSION	COURSE	LAST_MODIFIED		DATETIME	
DIMENSION	COURSEACCREDITATION	COURSE_ACCREDITATION_ID	PRIMARY	INT	NOT NULL
DIMENSION	COURSEACCREDITATION	ACCREDITEDBY		VARCHAR(100)	NOT NULL
DIMENSION	COURSEACCREDITATION	ACCREDITATIONTYPE		VARCHAR(100)	
DIMENSION	COURSEACCREDITATION	ACCREDITATIONADMINPROCESS		TEXT	
DIMENSION	COURSEACCREDITATION	ACCREDITATIONAWARDDATE		DATE	MM-DD-YYYY
DIMENSION	COURSEACCREDITATION	ACCREDITATIONEXPIRATIONDATE		DATE	MM-DD-YYYY
DIMENSION	COURSEACCREDITATION	RECORD_STATUS		VARCHAR(10)	
DIMENSION	COURSEACCREDITATION	INSERTED_DATE		DATETIME	
DIMENSION	COURSEACCREDITATION	UPDATEDBY		VARCHAR(20)	
DIMENSION	COURSEACCREDITATION	LAST_MODIFIED		DATETIME	
DIMENSION	ACCREDITATION	ACCREDITATION_ID	PRIMARY	INT	NOT NULL
DIMENSION	ACCREDITATION	ORGANIZATIONACCREDITS		VARCHAR(100)	NOT NULL
DIMENSION	ACCREDITATION	ACCREDITEDBY		VARCHAR(100)	NOT NULL
DIMENSION	ACCREDITATION	ACCREDITATIONTYPE		VARCHAR(100)	
DIMENSION	ACCREDITATION	ACCREDITATIONADMINPROCESS		TEXT	
DIMENSION	ACCREDITATION	ACCREDITATIONAWARDDATE		DATE	MM-DD-YYYY

TYPE OF TABLE	TABLE NAME	ATTRIBUTE	KEY TYPE	DATA TYPE	CONTRAINTS
DIMENSION	ACCREDITATION	ACCREDITATIONEXPIRATIONDATE		DATE	MM-DD-YYYY
DIMENSION	ACCREDITATION	RECORD_STATUS		VARCHAR(10)	
DIMENSION	ACCREDITATION	INSERTED_DATE		DATETIME	
DIMENSION	ACCREDITATION	UPDATEDBY		VARCHAR(20)	
DIMENSION	ACCREDITATION	LAST_MODIFIED		DATETIME	
DIMENSION	CREDENTIAL	CREDENTIAL_ID	PRIMARY	INT	NOT NULL
DIMENSION	CREDENTIAL	CREDENTIALNAME		VARCHAR(100)	NOT NULL
DIMENSION	CREDENTIAL	CREDENTIALTITLE		VARCHAR(100)	
DIMENSION	CREDENTIAL	CREDENTIALIDENTIFIER		VARCHAR(100)	
DIMENSION	CREDENTIAL	CREDENTIALIDENTIFIERSYSTEM		VARCHAR(100)	
DIMENSION	CREDENTIAL	CREDENTIALVERSION		VARCHAR(100)	
DIMENSION	CREDENTIAL	ISLATESTVERSIONINDICATOR		CHAR(1)	
DIMENSION	CREDENTIAL	CREDENTIALTYPE		VARCHAR(100)	
DIMENSION	CREDENTIAL	CREDENTIALDESCRIPTION		TEXT	
DIMENSION	CREDENTIAL	CREDENTIALCOMPETENCIES		TEXT	
DIMENSION	CREDENTIAL	CREDENTIALISSUEDDATE		DATE	MM-DD-YYYY
DIMENSION	CREDENTIAL	CREDENTIALEXPIRATIONDATE		DATE	MM-DD-YYYY
DIMENSION	CREDENTIAL	RECORD_STATUS		VARCHAR(10)	
DIMENSION	CREDENTIAL	INSERTED_DATE		DATETIME	
DIMENSION	CREDENTIAL	UPDATEDBY		VARCHAR(20)	
DIMENSION	CREDENTIAL	LAST_MODIFIED		DATETIME	
DIMENSION	STUDENT	STUDENT_ID	PRIMARY	INT	NOT NULL
DIMENSION	STUDENT	STUDENTIDENTIFIER		VARCHAR(100)	NOT NULL
DIMENSION	STUDENT	STUDENTIDENTIFICATIONSYSTEM		VARCHAR(100)	NOT NULL
DIMENSION	STUDENT	RECORD_STATUS		VARCHAR(10)	
DIMENSION	STUDENT	INSERTED_DATE		DATETIME	
DIMENSION	STUDENT	UPDATEDBY		VARCHAR(20)	

TYPE OF TABLE	TABLE NAME	ATTRIBUTE	KEY TYPE	DATA TYPE	CONTRAINTS
DIMENSION	STUDENT	LAST_MODIFIED		DATETIME	
DIMENSION	COMPETENCY	COMPETENCY_ID	PRIMARY	INT	NOT NULL
DIMENSION	COMPETENCY	COMPETENCYFRAMEWORKTITLE		VARCHAR(100)	NOT NULL
DIMENSION	COMPETENCY	COMPETENCYFRAMEWORKVERSION		VARCHAR(100)	
DIMENSION	COMPETENCY	COMPETENCYFRAMEWORKIDENTIFIER		VARCHAR(100)	
DIMENSION	COMPETENCY	COMPETENCYFRAMEWORKDESCRIPTION		TEXT	
DIMENSION	COMPETENCY	COMPETENCYFRAMEWORKSUBJECT		VARCHAR(100)	
DIMENSION	COMPETENCY	COMPETENCYFRAMEWORKVALIDSTARTDATE		DATE	MM-DD-YYYY
DIMENSION	COMPETENCY	COMPETENCYFRAMEWORKVALIDENDDATE		DATE	MM-DD-YYYY
DIMENSION	COMPETENCY	COMPETENCYDEFINITIONIDENTIFIER		VARCHAR(100)	
DIMENSION	COMPETENCY	COMPETENCYDEFINITIONIDENTIFIERURL		TEXT	
DIMENSION	COMPETENCY	COMPETENCYTAXONOMYID		VARCHAR(100)	
DIMENSION	COMPETENCY	COMPETENCYDEFINITIONVALIDSTARTDATE		DATE	MM-DD-YYYY
DIMENSION	COMPETENCY	COMPETENCYDEFINITIONVALIDEENDDATE		DATE	MM-DD-YYYY
DIMENSION	COMPETENCY	COMPETENCYDEFINITIONPARENTIDENTIFIER		VARCHAR(100)	
DIMENSION	COMPETENCY	COMPETENCYDEFINITIONPARENTURL		TEXT	
DIMENSION	COMPETENCY	COMPETENCYDESCRIPTIONPARENTCODE		VARCHAR(100)	
DIMENSION	COMPETENCY	COMPETENCYDEFINITIONCODE		VARCHAR(100)	
DIMENSION	COMPETENCY	COMPETENCYDEFINITIONTYPE		VARCHAR(100)	
DIMENSION	COMPETENCY	COMPETENCYDEFINITIONTYPEURL		TEXT	
DIMENSION	COMPETENCY	COMPETENCYDEFINITIONSTATEMENT		TEXT	
DIMENSION	COMPETENCY	RECORD_STATUS		VARCHAR(10)	
DIMENSION	COMPETENCY	INSERTED_DATE		DATETIME	
DIMENSION	COMPETENCY	UPDATEDBY		VARCHAR(20)	
DIMENSION	COMPETENCY	LAST_MODIFIED		DATETIME	
DIMENSION	CAREERMANAGERROLE	CAREERMANAGERROLEID	PRIMARY	INT	NOT NULL
DIMENSION	CAREERMANAGERROLE	ROLEID	FOREIGN	INT	NOT NULL

TYPE OF TABLE	TABLE NAME	ATTRIBUTE	KEY TYPE	DATA TYPE	CONTRAINTS
DIMENSION	CAREERMANAGERROLE	PERSONID	FOREIGN	INT	NOT NULL
DIMENSION	CAREERMANAGERROLE	PRIMARYCAREERCATEGORY		VARCHAR(20)	NOT NULL
DIMENSION	CAREERMANAGERROLE	STATUS		VARCHAR(10)	
DIMENSION	CAREERMANAGERROLE	INSERTED_DATE		DATETIME	
DIMENSION	CAREERMANAGERROLE	UPDATEDBY		VARCHAR(20)	
DIMENSION	CAREERMANAGERROLE	LAST_MODIFIED		DATETIME	
DIMENSION	CITIZENSHIP	CITIZENSHIPID	PRIMARY	INT	NOT NULL
DIMENSION	CITIZENSHIP	CITIZENSHIP		VARCHAR(20)	NOT NULL
DIMENSION	CITIZENSHIP	RECORDSTATUS		VARCHAR(20)	
DIMENSION	CITIZENSHIP	UPDATEDBY		VARCHAR(20)	
DIMENSION	CITIZENSHIP	INSERTED_DATE		DATETIME	
DIMENSION	CITIZENSHIP	LAST_MODIFIED		DATETIME	
DIMENSION	ROLE	ROLEID	PRIMARY	INT	NOT NULL
DIMENSION	ROLE	ROLENAME		VARCHAR(20)	NOT NULL
DIMENSION	ROLE	STATUS		VARCHAR(20)	
DIMENSION	ROLE	UPDATEDBY		VARCHAR(20)	
DIMENSION	ROLE	INSERTED_DATE		DATETIME	
DIMENSION	ROLE	LAST_MODIFIED		DATETIME	
DIMENSION	ROLEPRIVILEGE	ROLEPRIVILEGEID	PRIMARY	INT	NOT NULL
DIMENSION	ROLEPRIVILEGE	ROLEID	FOREIGN	INT	NOT NULL
DIMENSION	ROLEPRIVILEGE	ENITITYNAME		VARCHAR(100)	NOT NULL
DIMENSION	ROLEPRIVILEGE	ATTRIBUTENAME		VARCHAR(100)	
DIMENSION	ROLEPRIVILEGE	PRIVILEGE		VARCHAR(20)	
DIMENSION	ROLEPRIVILEGE	STATUS		VARCHAR(20)	
DIMENSION	ROLEPRIVILEGE	UPDATEDBY		VARCHAR(20)	
DIMENSION	ROLEPRIVILEGE	INSERTED_DATE		DATETIME	

TYPE OF TABLE	TABLE NAME	ATTRIBUTE	KEY TYPE	DATA TYPE	CONTRAINTS
DIMENSION	ROLEPRIVILEGE	LAST_MODIFIED		DATETIME	
DIMENSION	ROLERELATIONS	ROLERELATIONSID	PRIMARY	INT	NOT NULL
DIMENSION	ROLERELATIONS	PARENTROLEID	FOREIGN	INT	NOT NULL
DIMENSION	ROLERELATIONS	PARENTPERSONID	FOREIGN	INT	NOT NULL
DIMENSION	ROLERELATIONS	CHILDROLEID	FOREIGN	INT	NOT NULL
DIMENSION	ROLERELATIONS	CHILDPERSONID	FOREIGN	INT	NOT NULL
DIMENSION	ROLERELATIONS	STATUS		VARCHAR(20)	
DIMENSION	ROLERELATIONS	UPDATEDBY		VARCHAR(20)	
DIMENSION	ROLERELATIONS	INSERTED_DATE		DATETIME	
DIMENSION	ROLERELATIONS	LAST_MODIFIED		DATETIME	
DIMENSION	CONFIGURATION	CONFIGURATIONID	PRIMARY	INT	NOT NULL
DIMENSION	CONFIGURATION	CONFIGURATIONNAME		VARCHAR(100)	NOT NULL
DIMENSION	CONFIGURATION	CONFIGURATIONVALUE		VARCHAR(100)	
DIMENSION	CONFIGURATION	STATUS		VARCHAR(20)	
DIMENSION	CONFIGURATION	UPDATEDBY		VARCHAR(20)	
DIMENSION	CONFIGURATION	INSERTED_DATE		DATETIME	
DIMENSION	CONFIGURATION	LAST_MODIFIED		DATETIME	
DIMENSION	LEARNER_PROFILE	LEARNER_PROFILEID	PRIMARY	INT	NOT NULL
DIMENSION	LEARNER_PROFILE	PERSON_ID	FOREIGN	INT	NOT NULL
DIMENSION	LEARNER_PROFILE	LEARNER_ADDRESS_ID	FOREIGN	INT	
DIMENSION	LEARNER_PROFILE	ORGANIZATION_ADDRESS_ID	FOREIGN	INT	
DIMENSION	LEARNER_PROFILE	CONTACT_INFORMATION_ID	FOREIGN	INT	
DIMENSION	LEARNER_PROFILE	CITIZENSHIP_ID	FOREIGN	INT	
DIMENSION	LEARNER_PROFILE	POSITION_ID	FOREIGN	INT	
DIMENSION	LEARNER_PROFILE	EMPLOYMENT_ID	FOREIGN	INT	NOT NULL
DIMENSION	LEARNER_PROFILE	ORGANIZATION_ID	FOREIGN	INT	NOT NULL

TYPE OF TABLE	TABLE NAME	ATTRIBUTE	KEY TYPE	DATA TYPE	CONTRAINTS
DIMENSION	LEARNER_PROFILE	COURSE_ID	FOREIGN	INT	
DIMENSION	LEARNER_PROFILE	COURSE_ACCREDITATION_ID	FOREIGN	INT	
DIMENSION	LEARNER_PROFILE	ACCREDITATION_ID	FOREIGN	INT	
DIMENSION	LEARNER_PROFILE	CREDENTIAL_ID	FOREIGN	INT	
DIMENSION	LEARNER_PROFILE	STUDENT_ID	FOREIGN	INT	
DIMENSION	LEARNER_PROFILE	COMPETENCY_ID	FOREIGN	INT	
DIMENSION	LEARNER_PROFILE	AMERICAN_COUNCIL_ON_EDUCATION_ACE		CHAR	
DIMENSION	LEARNER_PROFILE	CONTINUING_EDUCATION_UNITS_CEU		INT	
DIMENSION	LEARNER_PROFILE	CONTINUOUS_LEARNING_POINTS_CLP		INT	
DIMENSION	LEARNER_PROFILE	RESERVE_RETIREMENT_POINTS_RRP		INT	
DIMENSION	LEARNER_PROFILE	ACTIVITY_STATUS		INT	
DIMENSION	LEARNER_PROFILE	VOCATIONAL_CERTIFICATE_CATEGORY_VCC		VARCHAR(10)	
DIMENSION	LEARNER_PROFILE	RECORD_STATUS		VARCHAR(10)	
DIMENSION	LEARNER_PROFILE	INSERTED_DATE		DATETIME	
DIMENSION	LEARNER_PROFILE	UPDATEDBY		VARCHAR(20)	
DIMENSION	LEARNER_PROFILE	LAST_MODIFIED		DATETIME	