**Service Description**: Interface to Precedented Assessments-Data Source

**This Service Description describes the Services IBM will provide to the Client.**

**Service Description**.

Implementing an aligned educational curriculum is a necessary prerequisite for optimization of each individual student’s *Opportunity to Learn* (OTL). At best, educators can only mitigate many of the other key OTL factors. Targeting the curriculum to learning objectives is one of the facets over which they exercise the most-direct control. This allows the educational system’s scarce resources to be deliberately focused on where they produce the greatest benefits.

Moreover, digitization of core components of the Curriculum, Instruction, and Assessments (CIA) framework can provide classroom teachers — as well as supervisory and curriculum administrators — with deep insights about what individual students are taught, how they are assessed, and what they probably actually know. Improvement of instructional efficiency and effectiveness, and reduction of cognitive load of instructional planning for diverse groups of learners are among the benefits. Digitization also paves the way for later adoption of emerging Artificial-Intelligence (AI) technologies supporting at-scale management of competency-based personalized learning or differentiated instruction.

Incorporating standards-aligned evidence of learning into the digitized curriculum often represents a formidable obstacle to an aligned, digitized curriculum. Many digital grade books do not support learning-standard attribution of individual-student learning activities. Extraction of data from some third-party peer systems is nontrivial.

IBM produces and operationalizes an interface between a third-party assessments-data system and Watson-Education’s Cloud-Based offerings. The third-party system extracts standards-aligned evidence of learning — individual-student measurements of proficiency with respect to distinct learning standards — and pushes it to a Watson-Education-accessible location. Data extracts from these third-party peer systems can be employed for curriculum-alignment analysis using indicators, or for emerging AI-assistive technologies for at-scale management of competency-based learning.

IBM configures an interface between a third-party assessments-data system and Watson-Education’s Cloud-Based offerings. The third-party system extracts standards-aligned evidence of learning — individual-student measurements of proficiency with respect to distinct learning standards — and pushes it to a Watson-Education-accessible location. This automates the data transfer according to a schedule specified by the school district. This offering pertains to a precedented, third-party assessments-data source. It is precedented in the sense that IBM has previously developed an interface for this peer system. The scope of work then includes configuration of the peer system according to the school district’s local curriculum. This offering also equips the school district to become self-sufficient in management of the alignment — construction of a learning-standards cross-walk table — between the third-party assessments-data system and its digitized curriculum. IBM configures its Watson Education Curriculum-Management tool for the school district and provides designated school-district representatives with training in its use.

**Definitions**.

**Aligned Curriculum**. A Curriculum, Instruction, Assessments (CIA) framework within which instructional goals, materials, and measurements are explicitly articulated in terms of system-wide, consistent knowledge, skills, and indicators (<http://ibm.biz/Porter-Curric-Indicators>). In U.S. K-12 education, these desired outcomes are largely specified in terms of educational learning standards. IBM Watson Education contains for most U.S. states’ sets of educational learning standards in a digitized format.

**Competency-Based Learning**. “…a system of education, often referred to as proficiency- or mastery-based, in which students advance and move ahead on their lessons based on demonstration of mastery. In order for students to progress at a meaningful pace, schools and teachers provide differentiated instruction and support.” (<http://ibm.biz/NCSL_Comp_Learning>)

**Curriculum-Alignment Indicators**. Quantitative characterization (e.g., <http://ibm.biz/Porter-Curric-Indicators>) of the extent to which an educational curriculum is *aligned*. In an aligned curriculum, the learning objectives — knowledge, skills, abilities — specified by policy explicitly guide instructional delivery and education measurements. In U.S. K-12 education, knowledge, skills, and abilities are extensively articulated in terms of learning standards.

**Curriculum Map**. The instructional scope in terms of instructional units and learning standards for an academic course (for illustration, see <http://ibm.biz/Engage_NY>). Also referred to as “course blueprint”, “scope and sequence”, “year at a glance”, etc. A minimal curriculum map contains the following attributes for each course

**Course Catalog**. A list all offered courses by school district. A *digitized* course catalog identifies courses in terms of course-identification codes used by the Student-Information System (SIS).

**Differentiated Instruction**. A style for the management of classroom instruction by which teachers “…engage students in instruction through different approaches to learning, by appealing to a range of interests, and by using varied rates of instruction along with varied degrees of complexity and differing support systems.” (<http://ibm.biz/ASCD_Diff_CR_Book>)

**Digitized Curriculum**. The condition in which the CIA framework is captured in a homogenous, machine-processible format (for illustration, see <http://ibm.biz/ETS_ECD_TraceFile>) so that distinct aligned facets can be employed for artificial-intelligence purposes.

**Learning**-**Standards Cross-Walk Table**. Different systems represent learning standards using a different notation. Watson-Education cloud-based offerings use these as join keys when integrating data from different systems. Consider for example learning standard 3.MD.1 from the Common-Core State Standards (CCSS) for Mathematics <http://ibm.biz/CCSS-Math>. The CCSS-Math standards hierarchically group individual learning standards into grade levels, domains, clusters, and standards. For 3.MD.1, “3” is the grade level, “MD” for “measurements and data” is the domain, and “1” is the number of the individual learning standard.

Many systems — including IBM Watson — do not explicitly indicate the cluster. But some do. If for example a third-party system represents 3.MD.1 as 3.MD.A.1, introducing “A” to denote the learning-standard cluster, then that must be communicated to Watson. We employ a cross-walk (or cross-mapping) table to explicitly associate the third-party’s learning-standard-proficiency measurement coded as 3.MD.A.1 with learning standard 3.MD.1 in Watson.

**Opportunity to Learn** (OTL). “…inputs and processes within a school context necessary for producing student achievement of intended outcomes (<http://ibm.biz/Oxford-Hbk-OTL>).”

**Personalized Learning**. A CIA structure “…that creates flexibility, allows students to progress as they demonstrate mastery of academic content, regardless of time, place, or pace of learning. Competency-based strategies provide flexibility in the way that credit can be earned or awarded, and provide students with personalized learning opportunities.” (<http://ibm.biz/US_DoEd_Comp_Pers_Learn>)

**Standards-Aligned Evidence of Learning**. An instrument, system, or set of methods for digital collection of evidence of learning by individual students with respect to distinct learning standards. This includes "...evidence gathered through a variety of formal and informal assessments during a unit of study or a course … «including» traditional quizzes and tests, performance tasks and projects, observations and dialogues, as well as students’ self-assessments gathered over time." (<http://ibm.biz/ASCD_UBD_Book>).

**IBM Responsibilities**.

In executing this order, IBM undertakes the following activities.

* 1. **Assessments-Data Interface to Unprecedented Third-Party Source**.

IBM implements an automated operational interface between Watson-Education Mastery and a precedented third-party assessments-data system. The interface receives data extracts pushed out of the third-party system. The data contain evidence-of-learning measurements of individual students’ proficiency with respect to distinct learning standards. The measured standards are contained within the client’s curriculum, digitized into a Watson-conforming structured representation. The source is precedented in the fact that IBM has previously developed a data interface for it. IBM accomplishes the following task.

* + 1. Align measured learning standards reported out of third-party assessments-data system to those supported by Watson Education. Watson Education’s Cloud-Based Offering supports most state learning standards for Mathematics; English, Language Arts, and Reading (ELAR); Science; and Social Studies subject areas.
       1. Develop cross-walk table between learning standards regarding which the third-party system reports individual-student proficiency measurements, and the learning standards supported by Watson Education.
       2. Produce a report of alignment between learning standards for which the third-party system produces individual-student proficiency measurements and the learning standards in the course blueprints from its digitized curriculum.
    2. Prepare the School District to become self-sufficient in maintaining alignment between learning standards for which the third-party assessment system provides individual-student proficiency measurements and the learning-standards in course blueprints within the school district’s digitized curriculum.
       1. Configure the Watson-Education Curriculum-Management tool with the school district’s digitized curriculum, and the cross-mapping between the third-party assessment-data system.
       2. Provide school-district representatives designated by the supervisory administrator with training in the sue of the Watson-Education Curriculum-Management tool.
    3. Deploy, Integrate, and Test the automated interface between Watson-Education Cloud-Based offerings and the third-party assessments-data system.
       1. Establish system workflows. Explain to the school-district education-technology systems administrator system workflows supported by the Watson-Education Cloud-Based offerings. Review workflows supported by the third-party system. Advise the school district on an optimum, functionally-complete workflow by which individual-student proficiency measurements for distinct learning standards are pushed into a Watson-Education-accessible location and subsequently loaded into the Watson-Education Cloud-based offerings.
       2. Integrate the data-conversion logic for the third-party system developed in Task 1 into the Watson-Education Data-Integration services.
       3. Once the third-party assessments-data export is functional, conduct end-to-end testing of the interface. Provide the school district with sample Watson-conforming assessments-data input to review for completeness and correctness.
       4. Provide the school district with training in the use of the Watson-Education problem-reporting tool to report anomalies in the performance of the automated interface.

1. IBM begins Curriculum-Alignment Analysis and schedules the final review when the following conditions are satisfied.
   * + - 1. A mutually-agreeable Non-Disclosure Agreement (NDA) has been executed that allows IBM to receive, store, and process in its corporate systems data required for the development of the interface.
         2. The school district provides IBM with an assessments calendar and other information showing the scope of curricular use — subjects, grade levels, courses — and frequency of use of the third-party system to collect individual-student proficiency measurements with respect to distinct learning standards.
         3. The school district provides IBM with an operationally representative extract of individual-student proficiency measurements with respect to distinct learning standards provided by the third-party system.
         4. The school district’s supervisory administrator furnishes IBM with evidence that the third-party system operator is committed to and capable of automating the export of individual-student proficiency measurements with respect to distinct learning standards into a Watson-Education-accessible location.

The task is completed when the digitized curriculum has been delivered to and accepted by your designated Supervisory Administrator.

1. ***Digitized Curriculum. A set of comma-separated-variable (csv)-formatted files representing the school district’s curriculum including:***

* ***Course blueprints representing the instructional-unit structure and learning-standard content of each academic course within scope of this digitization effort;***
* ***A “bridge” table indicating the academic courses — distinguished by course-identification numbers from the school district’s Student Information System (SIS) to which each course blueprint applies;***
* ***A listing of educational learning standards articulated in the course blueprints; and***
* ***Tabulated learning-standard progressions showing how the learning standards build upon each other.***

**Your Responsibilities**.

**Your Supervisory Administrator**.

You will designate a Supervisory Administrator to communicate with IBM and act on your behalf regarding this workshop. Your Supervisory Administrator’s responsibilities include the following.

* + - * 1. Specify the scope of the curriculum to be digitized. Articulate in terms of subject level, course, learning-standards grade level.
        2. Coordinate, negotiate with third-party system operator to establish the frequency, format, and transmission channels by which assessments-data extracts are pushed into a Watson-accessible location.
        3. Receive and accept the final deliverable.
        4. Review with the IBM Curriculum-Alignment expert any of your invoice or billing requirements. Such requirements that deviate from IBM's standard invoice format or billing procedures may affect price.
        5. Assign responsibility within the school district for maintenance and update of the learning-standard cross-walk tables produced by this scope of work. Identify specific staff members and ensure that they complete training in the use of the Watson-Education Curriculum-Management tool.

**Your Curriculum Administrator.**

You will designate a Curriculum Administrator to communicate with IBM and act on your behalf regarding this workshop. The Curriculum Administrator represents and provides documents regarding school-district policies about the structure and scope of academic courses throughout the system. Your Curriculum Administrator 's responsibilities are delineated in the following.

* + - * 1. Audit the alignment between individual-student proficiency measurements with respect to distinct learning standards from the third-party system and the school district’s digitized curriculum. Verify that measured learning standards are reflected in the course blueprints and learning-standard progressions for the courses to which the student/learning-standard measurements from the third-party system pertain.
        2. When measured learning standards are not contained in the course blueprints or learning-standard progressions, work with the school-district assessments administrator to either modify course blueprints and progressions, or to change the learning standards that are being measured.
        3. Employ the Watson Education Curriculum-Management tool to apply changes, as necessary, to course blueprints in order to align student/learning-standard assessments from the third-party assessments-data system with learning standards in the corresponding course blueprints. Complete training in the use of the Watson-Education Curriculum-Management tool in preparation to assume these responsibilities.

**Your Assessments Administrator.**

You will designate an Assessments Administrator to communicate with IBM and act on your behalf regarding this workshop. The Assessments Administrator represents and provides documents regarding client-organization policies about assessing student progress, particularly with respect to standards-aligned evidence of learning. Your Assessments Administrator 's responsibilities are delineated in the following.

* + - * 1. Identify the scope of employment of the third-party system. Specifically indicate to IBM the academic courses (subject, grade-level) within which the system is employed, and the frequency of update.
        2. Visually audit for accuracy the cross-mapping between assessed learning standards from the third-party system and those used by Watson Education. Identify disparities in the cross-walk.
        3. Assume responsibility for subsequent management of the cross-walk between learning standards measured in the third-party assessments-data system and those used by the Watson-Education cloud-based offering. Complete training in the cloud-based Watson-Education Curriculum-Management tool and
        4. Audit the alignment between individual-student proficiency measurements with respect to distinct learning standards from the third-party system and the school district’s digitized curriculum. Verify that measured learning standards are reflected in the course blueprints and learning-standard progressions for the courses to which the student/learning-standard measurements from the third-party system pertain.
        5. When measured learning standards are not contained in the course blueprints or learning-standard progressions, work with the school-district curriculum administrator to either modify course blueprints and progressions, or to change the learning standards that are being measured.

**Your Education-Technologies Systems Administrator**.

You will designate an Education-Technology Systems Administrator (ETSA) to support this analysis. The ETSA effects delivery to IBM via agreed-to, secure services of data employed in the Curriculum-Alignment Analysis. Your ETSA performs the following activities in support of this third-party system-interface development.

* + - * 1. Define and document technical details of to-be-automated procedures for extracting data from the third-party assessments-data system and pushing to a Watson-accessible location. Ensure that data-transmission media satisfy requirements of the Family Educational Rights and Privacy Act (FERPA) and other state and local policies. Also ensure that the procedures enacted for the third-party system and those for IBM are functionally complete, resulting in a repeatable, automatable capability.
        2. Describe to IBM the attribute-by-attribute (column-by-column) mapping of data from the source system into Watson Education’s data-interface specification.
        3. Provide IBM with an operationally representative extract from the third-party assessments-data system for which the interface is to be developed.
        4. Visually inspect the reshaped (if necessary), transformed assessments-data extract from the third-party system after converted into a Waston-Education-conforming format. Verify the completeness and accuracy of the conversion results.
        5. Provide technical interface between IBM and the third-party system operator for purposes of automating and operationalizing the interface between Watson-Education cloud-based offerings and the third-party system.
        6. Monitor the operation of interface between Watson-Education Cloud-based offering and the third-party assessments-data system. Verify that data transmissions are occurring in accordance with established procedures and schedules. Diagnose failures and deviations. Report causes to IBM or the third-party operator, as appropriate, using their respective, established problem-reporting mechanisms.

**Your Other Responsibilities**

You will fulfill the following responsibilities.

* + - * 1. Obtain any approvals and enable access necessary for IBM to access and use your resources and systems to the extent necessary for IBM to provide the Services.
        2. Sign a mutually-agreeable Non-Disclosure Agreement (NDA) allowing IBM to store and process student and curriculum data on its corporate systems. These data include student
        3. Make suitable staff, information, and materials available as IBM reasonably requires. IBM will not be liable for any damage or delay arising from inaccurate, incomplete, or otherwise defective information and materials supplied by or on behalf of Client.
        4. Be responsible for agreements with, management of, and the input and work of third parties whose work may affect IBM’s ability to provide the Services. Except to the extent IBM specifically agrees otherwise in this Service Description, Client is solely responsible for any third-party hardware, software, data extraction, and communications equipment used in connection with the Services.
        5. Be responsible for the content of any database, the selection and implementation of controls on its access and use, backup and recovery and the security of the stored data. This security will also include any procedures necessary to safeguard the integrity and security of software and data used in the Services from access by unauthorized personnel.
        6. Ensure that IBM is not exposed in performance of the Services to any US regulated data (whether HIPAA, FFIEC or other), any Canadian regulated data (whether PIPEDA or local province regulated health data or other) or any other Personally Identifiable Information (PII) originating from and regulated by any country outside the United States or Canada, beyond what is permitted under the NDA.
        7. School-District participants of the IBM Curriculum-Survey Workshop must include:

Supervisory Administrator;

Curriculum Administrator;

Assessments Administrator; and

Education-Technology Systems Administrator.

* + - * 1. All participants of the Curriculum-Survey Workshop session must actively engage in the analysis and assist in evaluating the school district’s curriculum in terms of AI-adoption readiness criteria.

**Estimated Schedule**.

The Estimated Start Date for these services will be on or after the date of mutual contract execution, as agreed between the parties. The Estimated End Date will be ***45 days*** after the date of mutual contract execution. Estimated Start and End Dates may be agreed by email between the parties.

**Deliverables**.

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| --- | --- |
| **Deliverable** | **Deliverable Type** |
| User-Acceptance Test of Interface between Watson Education and Third-Party System | Test Event |
| Watson-Education Curriculum-Management Tool Training | Training |
| Authorization to Use Watson-Education Curriculum-Alignment Tool | Software License |

In the event a deliverable is inadvertently omitted from the list above, IBM will notify Client of the identity and the appropriate designation of the deliverable.

**Completion Criteria**.

IBM will have fulfilled its obligations under this Order when any one of the following first occurs:

* + - 1. IBM completes the IBM responsibilities, including submission of the deliverables, to the designated Supervisory Administrator; or
      2. The Services are terminated in accordance with the provisions of this Order and the Agreement.

**Charges**.

The Services will be conducted on a fixed price basis. The fixed price for performing the Services defined in this Service Description will be ***$8,000.00***. This fixed price is exclusive of any travel and living expenses and other reasonable expenses incurred in connection with the Services. All charges are exclusive of any applicable taxes.

Travel and living expenses are not expected. Should any travel to your facility under this Service Description be required, estimated travel and living expenses will be paid by you and will be authorized through a Project Change Request (PCR).

IBM will invoice you monthly for the Services performed in equal monthly amounts over the period of the performance specified in the “Estimated Schedule” section, plus applicable taxes, travel and living expenses, and other reasonable expenses incurred in connection with the Services

Following execution of this agreement IBM may perform a credit check on you within 90 days. IBM reserves the right to terminate this agreement without liability if you do not pass this credit check (as determined in IBM's sole discretion).