Electronic Transcript Data Exchange: Building Common Digital Layout(s) for PESC XML Transcripts

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Common Digital Layout Working Group

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Contents

Revision History

Version	Date	Author	Description of Change
1.0	6-Jan-2021	CDL working group	First draft of document

About the Working Group:

The Canadian Postsecondary Electronic Standards Council User Group (CanPESC), "is an open, collaborative group of volunteer stakeholders ensuring PESC's Mission, PESC Approved Standards, Technology & Services support and incorporate the needs and interests of Canadian students, institutions and stakeholders." (https://www.pesc.org/canadian-pesc-user-group-1.html) CanPESC's participants include representation from institutions and organizations throughout almost every province and territory in Canada. (Canadian PESC User Group n.d.) CanPESC saw that many stakeholders were interested in pursuing a digital layout(s) of the electronic transcript data that they were receiving. As a result, the Common PDF Layout Working Group was established in 2019 to develop options to solve this problem. Now renamed the Common Digital Layout (CDL) working group, six members representing organizations and institutions across three provinces, meet once a month to contribute to the development of a feasible solution.

Background and context of the higher education landscape:

More and more institutions are becoming capable of sending electronic transcripts. PESC XML is being used as the de facto standard for electronic data exchange within and among Canadian provinces for both secondary and postsecondary transcripts. Globally, postsecondary institutions and Student information System (SIS) vendors alike have pledged "to develop and offer best practices and globally accepted standards" as they relate to the subject of Digital Student Data Portability (DSDP) by becoming signatories to the Groningen Declaration Network. (https://www.groningendeclaration.org/signatories/) (Groningen Declaration Network n.d.) Many of these same institutions and organizations also participate in various groups and initiatives operating voluntarily under PESC (https://www.pesc.org/groups-and-initiatives-1.html). Many European countries are already exchanging XML using a proprietary ELMO standard which are mapped to PESC's XML standards. (https://www.pesc.org/standards-development.html) In the near future, a significant amount of transcript exchange will happen securely by electronic means. Not only is this a great technological advancement for postsecondary institutions, but also an exciting opportunity to further support our institutions with student mobility.

In 2020, the global COVID-19 pandemic affected nearly every facet of our daily lives. What quickly became apparent within the higher education sector was the reliance on paper in the delivery and receipt of official transcripts. Many provinces exchange secondary and post secondary transcripts electronically within their province. Even so, each of our respective organizations or institutions saw a direct impact almost immediately as secondary and post secondary institutions around the world, along with most of our regional offices closed and pivoted to staff working from home. Many institutions evolved quickly to temporarily provide a PDF version of the accepted official hard copy transcript that most of us were accustomed to receiving physically through courier services or the mail. Focus shifted to receiving PDF transcripts via email. We aren't sure how many future terms will be impacted by this global pandemic, or

what longer term effects this shift to accepting emailed PDFs will have on the post secondary education landscape; however, a need for trusted data exchange has never been more pressing.

Using and viewing electronic transcripts:

As Canadian and international institutions move from traditional, paper-based transcript formats to data exchange based on internationally recognized technical standards, access to viewable versions of the students' academic records becomes a challenge. While the data may be available within an institution's student information system, the way that the data is presented may not be conducive to what registrarial and admissions staff, transfer credit evaluators, and faculty have become accustomed to, in order to make efficient important admission decisions. When institutions are dealing with a significant amount of transcript data, whether it is printed on official watermarked paper, or presented within a student information system, the vital pieces of information are typically found in various locations depending on the sending institution. Imagine, if all the different sending institutions' electronic data could be transformed using the same template so that an admissions team, faculty members, or credit transfer assessment team could look for data in the same location on every transcript. This would allow end users to sift through the documents in a student's file more efficiently.

The way forward:

The CDL working group has taken on the task of collaboratively creating a human readable representation of the electronic transcript data conforming to PESC's XML schemas. Our goal is to have a tool which would bridge the gap between a reliance on the formatting of paper transcripts and the complexity of viewing electronic transcript data. This tool would allow for a smoother transition and hopefully a greater uptake of PESC XML transcript exchange within and between Canadian provinces and territories, as student mobility across Canada and the world continues to increase. It would also provide data recipients with a way to display the transcript data in a human readable and standard format. Evaluators would be able to look to the same spot visually for the key pieces of information needed to make their decisions regardless of which institution the transcript is coming from. Having this common layout automatically accounts for the variability in how different senders choose to represent their data within the standard College Transcript XML transaction.

We are actively monitoring and participating in the ARUCC Groningen and Student Mobility Project, MyCreds (mycreds.ca). The ARUCC Project seeks to develop "a National Network for Canadian learners, post-secondary institutions, and transcript hubs that supports official, permission-based, academic document and related data sharing and exchange." (Association of Registrars of the Universities and Colleges of Canada n.d.) Our working group of representatives is aiming to assist with readying Canadian postsecondary institutions in this ever-evolving landscape. Building a common digital layout (which could

be printed as a PDF or any other kind of on-screen representation) from the PESC XML transcript data would mean that institutions and organizations wouldn't need to redevelop this same piece of work. Instead, attention could be focused on implementation and integration, while still providing the end business users with the information they have come to rely on.

Important considerations:

The working group has identified a few of the most common transcript layouts and provided them as templates. However, the templates included are meant as a starting point of investigation for postsecondary institutions. Implementation of the CDL and transformation process, like with any project, will require various decisions to be made. During this decision-making process, there may be external pressures or requirements that your organization or institution will need to consider. These considerations may require minor adjustments to the general layout. For example, your jurisdiction may have specific layout requirements that need to be satisfied in order for the representation of the data to be considered "official". These layout requirements may be mandated by an external body, like the department or ministry of education in your region. This could mean that multiple layout templates are needed and applied to the PESC XML transcript data depending on the source.

The intent of the working group is to allow each institution to customize the template for its own specific use cases. For example, the transfer credit process may prioritize the display or inclusion of specific AP/IB courses at the beginning of the transcript, while a university admissions team may want to see upper year Highschool Mathematics or English courses or focus attention on credit values and grades instead.

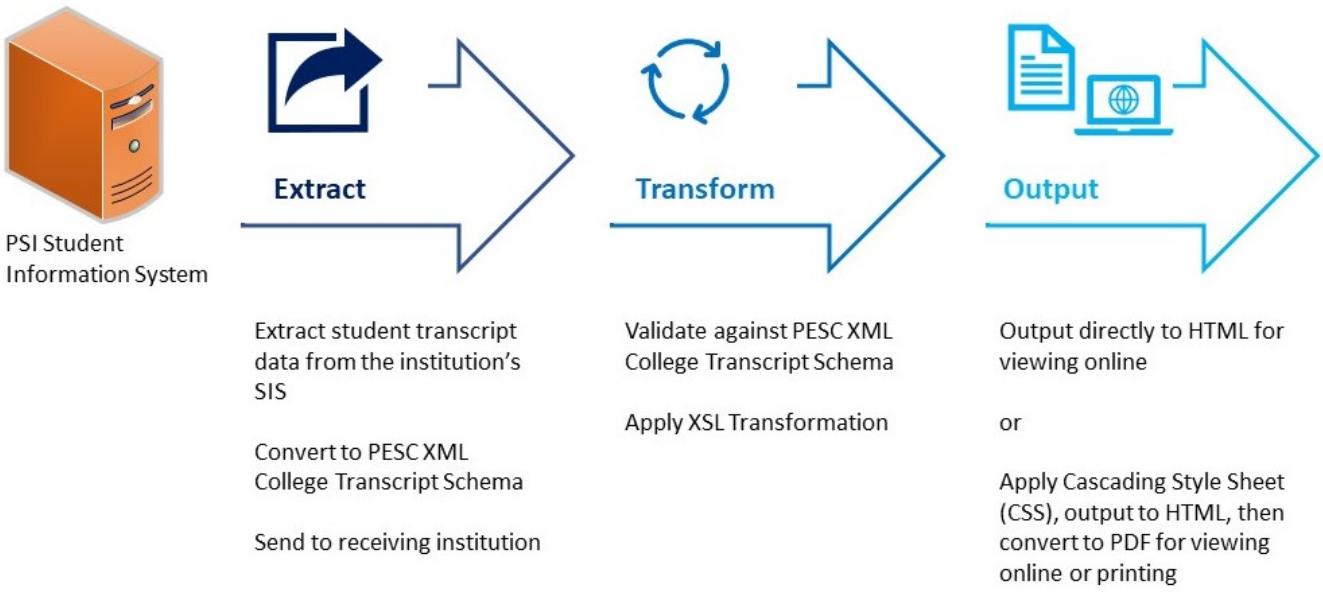
Another important consideration is that the common digital layout itself cannot account for all of the possible allowable pieces of data that could be sent within the PESC XML schema. Instead, it only contains those fields that the working group deemed to be the most necessary elements. The fields chosen as essential reflect the student information section, the academic award(s), academic standing, reported GPA, academic sessions, and course details. The institution's address, contact and transcript legend information has also been included and deemed an integral element of the visual representation of a transcript. The PESC XML schemas do not currently have a specified tag or location for the transcript legend, at present some institutions are sending this data in the form of a link within a note message tag. The working group recognizes the importance of the transcript legend in terms of its vital role in the interpretation and assessment of transcript data. If a link to the legend is not included in the PESC XML data sent by the issuing institution, we encourage that it be stored or loaded for end users to be able to reference.

It's important to note, the templates may not allow for additional (free hand) data comments or less commonly used (but still conforming to PESC XML standards) fields. If there are specific fields that the

recipient may want to see on the transcript, edits should be made on the template to include them. In addition to the elements chosen in the layout, only the data and elements included by the transcript sender within the raw XML can be rendered. The layout cannot account for any missing data even if the elements are considered essential. As such, during implementation, your team will want to consider how to handle reporting any anomalies and also make decisions on how to display both missing or extra data.

Process

The following diagram presents a high-level view of the process from the point of extraction to the point of output for use at the institution.



Technical details:

The approach we have focused on uses Extensible Stylesheet Language Transformations (XSLT) to transform the PESC XML College or High School transcript data into HTML at which point a Cascading Style Sheet (CSS) can be applied. Once the CSS has been applied, the formatted object can be rendered in a browser and/or printed as a PDF. From there it can be used just the same as an official transcript would in an institution's admissions office, or in transfer credit assessment.

The technical artifacts of the CDL would comprise of a set of .xsl files used together to define the HTML transformation. With that will be one or more exemplar CSS files to demonstrate how the HTML can be

styled to make layouts with which to generate a printable PDF or simply to match a website's style. An examples of technical artifacts, which can be used by institutions and customized, are available at GitHub.

The CDL requires an implementation by each institution – it is not a complete solution unto itself. The methodology does not pre-suppose a platform or technology to execute the transformation; this can be completed using any appropriate technology that aligns to the institution's technical ecosystem and standards.

A full solution would be capable of loading the .xsl files and for each transcript to process, apply the transformation on the XML file using a software library/engine that implements the XSL standard. As needed by the institution, the solution would then take the output HTML combined with the .css stylesheets and feed this into another software library/engine capable of generating a PDF document from a web page. This tool would need to be configured to set the appropriate page size, orientation, margins etc.

Like the PESC XML and JSON schemas, the CDL would represent a minimally agreed-upon layout. The CDL can then be extended and adapted to meet each institution's needs.

Use Cases:

This methodology promotes the production of institutional transcripts in a PESC XML standard through the provision of a tool/methodology that makes XML data more easily converted into a PDF and HTML format.

For institutions with limited SIS import capabilities, due to technical limitations or the complexity of data consolidation, the CDL methodology would allow for bypassing the import of data and allow institutions to print to Document Management Systems or make transcript information available internally through other web-based applications.

Using the methodology, post-secondary institutions can create their own XSLT/CSS template of the institutional (standard) transcript, to allow for consumption of their credential as curated by the originating institution. Ideally this could be provided along with the XML when it is sent through to the transcript destinations as a set of instructions as to how the data should be rendered.
The methodology allows for standardization of transcripts across institutions for an easier user experience, content comparison and consumption.

Continued progress:

Developers from each of our respective organizations/institutions are contributing to this endeavour. The XSLT is based upon the PESC XML standards and schemas and assumes that the transcript or file has already been validated to conform to these standards. Our working group continues to consider the impact of using different versions of the PESC standards and how the community can keep the common digital layout flexible and current with what our Canadian institutions are exchanging.

The current iteration is focused on the PESC XML schemas but can be used for JavaScript Object Notation (JSON) transcripts by way of a JSON-to-XML crosswalk. Native transformation of JSON transcripts can be considered in the future.

Resources:

Common Digital Layout GitHub, https://github.com/canpesc/common-digital-layout

CanPESC User Group, https://www.pesc.org/canadian-pesc-user-group-1.html

ARUCC National Network, https://www.aruccnationalnetwork.ca/

PESC XML Schemas, https://www.pesc.org/pesc-approved-standards-1.html

The Groningen Declaration Network, https://www.groningendeclaration.org/

MyCreds, https://mycreds.ca/

References:

Association of Registrars of the Universities and Colleges of Canada. n.d. ARUCC Groningen & Student Mobility Project. Accessed February 25, 2020. https://arucc.ca/en/projects/task-force-groningen.

Canadian PESC User Group. n.d. PostSecondary Electronic Standards Council: Canadian PESC User Group. Accessed March 11, 2020. https://www.pesc.org/canadian-pesc-user-group.html.

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