Student Pathways in Higher Education Conference

Conférence sur le parcours des étudiants dans les études supérieures

ONCAT 5 CATON

Game Education Matrix (GEM) Prototype tool for **Collection and Comparison of Learning Outcomes Data** to Support Transfer

April 26 from 2:00 - 3:00 PM

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Game Education Matrix (GEM) Prototype tool for **Collection and Comparison of Learning Outcomes Data** to Support Transfer

1. Ways to frame, structure and populate viable and sustainable learning outcomes databases

2. Methods for interpretation of learning outcomes data that may improve transfer

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GEM GAME EDUCATION MATRIX **PROTOTYPE TOOL** Completed in January 2016

Purpose:

    Compare multidisciplinary programs using learning outcomes

Based on:

- framework of disciplines, competencies, levels of proficiency
- database of learning outcomes from which programs select to build their profile
- comparative interpretation of profiles to build transfer agreements

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- GEM is a tool for comparing multidisciplinary programs that is built upon a comprehensive set of learning outcomes at successive proficiency levels.

- Learning Outcome statements (agreed upon by the participants) form the database from which programs can select to profile their programs.

- All programs that participate (create profiles) can look at and compare the their profiles -- to help them develop transfer agreements.
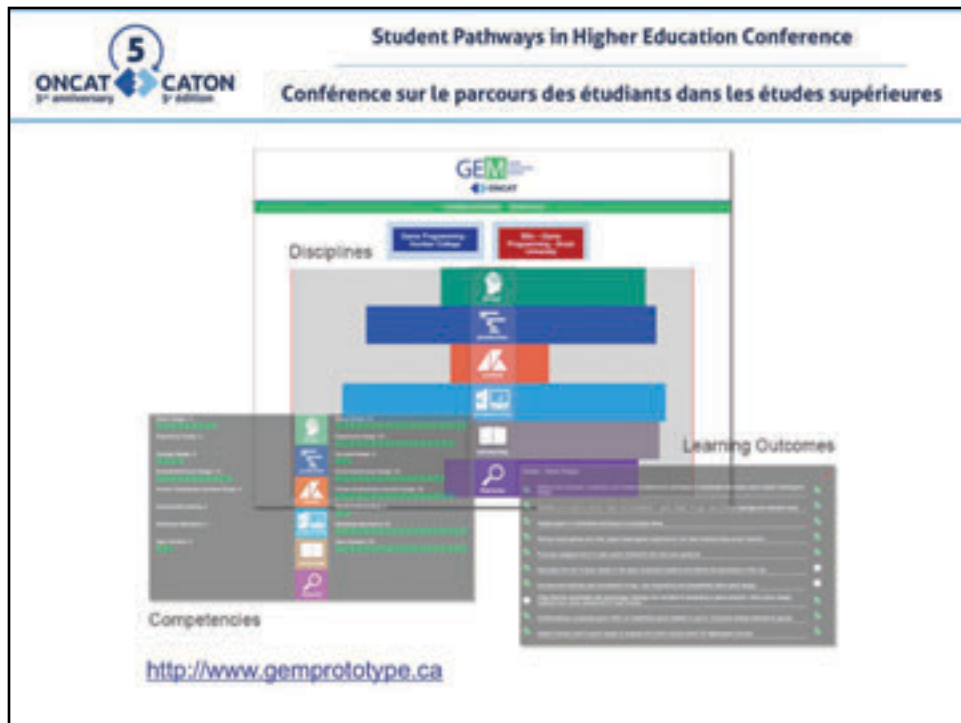
- Disciplines,
- Competency Areas
- Learning Outcomes
      statements that progress through what students know, be, and do

- Designed for Multidisciplinary field - like many others

- Behind the GEM is a method that could be applied in other complex fields to assist in the development transfer possibilities.
    - Agreed-upon Learning Outcome Statements that rest on the:
        - establishment of trust between faculty, administrators in different types of programs and institutions, and
        - capacity to obtain consensus about what learning our students possess and are capable of achieving
            - If the data is LOs, there must be **consensus around the validity and completeness of those LOs**
            - Our method for developing the GEM sought to achieve trust and consensus through a process of:
                - faculty interviews to query what and how their students should and do learn,
                - use of data from course outlines;

WHY USE LEARNING OUTCOMES?

Pros:
- Student-centred
- Progression of learning rather than progression of courses
- Potential to use learning that is achieved rather than aspirational
- Based on shared understanding of the field and common language
- Account for many facets of learning
- Drive constructive alignment of curriculum, pedagogies and assessment
- Open a window to look into the depth, breadth and order of the development of knowledge, skills and values throughout a program

Pros:

- LOs are fundamentally student centred. They describe what a student is expected to know, be and do, to a specific level of competency, and under specific conditions, as a consequence of intentional cultivation through teaching, learning and assessment activities

- They do not need to be 'contained' and completed within discrete courses but rather can be structured around progression of learning

- LOs are cultivated and can be achieved in one or several courses

- LOs, if written in commonly understood terms, can perhaps be more easily or meaningfully compared than course or program descriptions
- e.g. A course titled Introduction to 3D Modeling and Animation such as we have at Brock is a mad dash through Maya 3D in 12 weeks. A course titled Introduction to 3D Modeling of the same duration at Niagara College goes into greater depth in the use of polygonal and nurb modeling, surfaces and textures.

- Allow us to look differently at the progress of student learning – rather than course by course, term by term, and year by year, look at leveling up and the

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WHY USE LEARNING OUTCOMES?

Cons:
- Do not yet have currency in registrarial process and decision-making
- Methods of establishment are currently complex and diffuse
- Time and resource-intensive
- Challenge for maintenance and sustainability
- Risk of standardized approaches
- Excessive granularity
- Trust
- Varied problems in addressing breadth and depth of learning
- Difficult to capture the complex nature of interrelationships in learning

Cons:

- LOs don't yet have the same currency as do course syllabi when administrators are figuring transfer credit

- Systems, processes and methods for using LOs are not yet established

- Developing and refining commonly agreed upon LOs for a discipline or field is a time and resource-intensive process

- Maintaining the currency of LOs is a challenge
Including the dynamic collection and integration of faculty submissions

- Accommodating unique LOs that do not fit with standard approaches -- risk of obscuring important outliers that   can mark the emergent areas of a field

- LOs are a far more granular set of information/data to work from when trying to achieve transfer

- The establishment of trust related to the use of LOs is a challenge -- not all in post-secondary believe that LOs are a valid, reliable basis for program comparison;

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1. WAYS TO FRAME, STRUCTURE AND POPULATE VIABLE AND SUSTAINABLE LEARNING OUTCOMES DATABASES

FRAMEWORK
- Taxonomy
- Engagement of faculty
- Relevance to discipline
- Facets of learning (know, be, do)
- Breadth
- Progression of learning
- Time and trust
- Testing

Relies on a framework for structuring LO data as well as careful **consideration of the sources, collection methods and validation of data** are needed to make LOs function as a way to compare programs and advance credit transfer and student mobility.

Framework

The GEM began with meeting **based framing of the disciplines and competencies** that make up the field.

- Then in the GEM project we **created a taxonomy** (based on SOLO Taxonomy) - a way to break down what would otherwise be an overwhelming array of data.
  The GEM taxonomy took into consideration the following:
     The extent of the field (disciplines and competencies)
     Facets of learning (know, be, do)
     Progression of learning (Levels of proficiency)
- **What makes a good Framework upon which to build a LO Database?** - it is shared
     - In the ideal, all fields/disciplines would consider and construct a taxonomy that is **internally relevant**
       (speaks to the nature of the field)
     - This **reflects the principles and processes of Tuning**

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1. WAYS TO FRAME, STRUCTURE AND POPULATE VIABLE AND SUSTAINABLE LEARNING OUTCOMES DATABASES

SOURCES OF DATA ON THE OUTCOMES OF LEARNING
- Insights from faculty leaders and others
- Program curriculum documents – course outlines
- Textbooks
- Program descriptors
- Evidence of student work

Sources

- **Meetings, committees, interviews, surveys** of faculty leadership (primarily full-time and some teaching administrators) as well as of industry
- **Program curriculum documents** - especially course outlines will inform our understanding of LOs in particular competencies
- These can be supplemented by **textbooks** in common usage especially to confirm language and learning sequences appropriate to the discipline.
- LOs need **context**. Therefore it is useful to capture broad **program descriptors**:
    the conditions of learning - e.g. the program's duration, credential, faculty, signature pedagogies, etc.
    description of any distinctive institutional, culminating or capstone learning experiences (deliverables)

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1. WAYS TO FRAME, STRUCTURE AND POPULATE VIABLE AND SUSTAINABLE LEARNING OUTCOMES DATABASES

PROCESS OF COLLECTING DATA ON THE OUTCOMES OF LEARNING
- Delphi method (interviews, feedback, surveys)
- Tuning process (meetings)
- Aggregating and mining documents

Process of collecting

The Delphi method relies on interviews, reporting and feedback for developing consensus among a diverse and distant set of constituents.
(The GEM project gathered data using this method.)
- The Delphi method produces a **drive toward inclusion** rather than conflation or reduction of institutionally-provided descriptions of LOs It focuses on **listening** for language that resonated with the unique focus of the institutions contributing
- Such an outreach type approach **recognizes the tension between differentiation and standardization** to encourage people to speak freely with a complete focus on what is specific to their program and process
- It allows for **the mutability of disciplines** (in this case, a multi-disciplinary field).
- The interview process at the core of the Delphi method requires **careful methodology and a lot of documentation**

    (The GEM project employed an interview team that included a facilitator and a writer/scribe.

    Interviews took a great deal of time but yielded information beyond our expectations.

    They worked best where there was an opportunity for the facilitator and the writer scribe were able to verify their understanding of input.

    Interviewees typically found this process was of value to them in examining

Validation of LO Data

AS PREVIOUSLY SHOWN IN THE CONTEXT OF THE COLLECTION OF DATA…

- The **Tuning process** in which faculty in disciplines assemble to negotiate and agree upon core competences for their field is a well established method for not only gathering LO data but also validating it.

- The **interview-based Delphi method** of collecting data for writing LOs (used in the GEM project) can achieved a high level of validity because it focuses on inclusion rather than conflation or reduction of institutionally-provided descriptions of LOs.
  further enhanced by by the mere act of listening for and reflection of language that is fundamentally couched in the discipline and that resonates with the unique focus of the institutions that contributed to our process.
  The interview process is more likely to recognize the tension between differentiation and standardization and to allow for the mutability of disciplines.
  - **Surveys** provide can verify LOs
    They also enabled the checking for and confirmation of consensus
  - **Program descriptions** provided by schools are 'facts on the ground'.
    These are most useful when collected in terms that are comparable and thus enable users to quickly sort through differentiators such as

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1. WAYS TO FRAME, STRUCTURE AND POPULATE VIABLE AND SUSTAINABLE LEARNING OUTCOMES DATABASES

VALIDATION OF LEARNING OUTCOME-BASED PROGRAM PROFILES
- Assumptions around assessment and achievement
- Leveling-up mechanism
- Discipline of transparency
- Use of shared language and framework
- Evidence of student work
- Metrics such as graduate outcomes
- Tracking success of transfer students
- Widespread adoption

Data Validation of Program Profiles

The **collection** and inclusion of exhaustive LO statements is only one side of the LO data selection process

The other side of the LO data formulation process consists of the LO statements **that each program generates** as a result of the LOs it selects to represent itself.
- Thus, each **program's 'profile'** (a selection of learning outcomes) is a set of data whose validity is determined through use in building comparisons.
- It is **hard to confirm the veracity of a program's profile** (entered by humans and we tend not to be infallibly informed, objective and consistent).
- It assumes that **LOs are, by definition, assessed** and that the average student achieves the LO.
   Some LOs cover the types of student work which might be tested - such as oral/ written assignments and or practical/ project assignments; individual and collaborative work; work submitted for marks, critique or public scrutiny.
- The GEM tool uses the **'leveling-up' mechanism** to ensure that programs first achieve LOs at each progressive level of proficiency

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2. METHODS FOR INTERPRETATION OF LEARNING OUTCOME DATA TO IMPROVE STUDENT TRANSFER

PRINCIPLES TO GUIDE INTERPRETATION OF LEARNING OUTCOMES
- Transparency
- Alignments between programs
- Gaps between programs
- Complementarity of programs
- Relate learning outcomes to courses and curriculum
- Optimization of transfer credit
- Consider admissions and registrarial practices
- Test in the implementation of transfer agreements

Principles that can be applied to the interpretation of learning outcomes for transfer
= Analysis and interpretation of LO-based program profiles (Mary and Jean alternating)

Transparency
- The **unprecedented level of sharing** around student outcomes generates greater understanding the preparedness of a student.
- It also **takes the lid off of curriculum**; opens faculty up to new sequences, topics and approaches such that we can see how others constitute their programs
- The greater the **transparency**, the greater will be trust between faculty at different institutions and in distinct programs.

Alignment
- The fit between a sending and receiving program can be quickly identified
- There is clarity around where (in what subject areas or disciplines) and how (through what facets of learning) students are prepared for subsequent learning.
- The correspondence to common frameworks where they exist, such as the credentials framework, program standards, UDLEs, Disciplinary Tuning documents, the Lumina Degree Qualifications Profile, the LEAP outcomes and rubrics, professional accrediting body standards and similar shared points of reference also

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2. METHODS FOR INTERPRETATION OF LEARNING OUTCOME DATA TO IMPROVE STUDENT TRANSFER

WHAT WE'VE LEARNED FROM THE GEM PROTOTYPE

1. Gathering and structuring a learning outcome database
   * Requires common language
   * Ideal is data drawn from standard inputs

Gathering and Structuring LO Database

* **Data gathering** is a weighty part of this methodology and we wonder if it would be better to have data pulled **from standard inputs** -- perhaps routinely harvested from course outlines and program cyclical review documents, from evidence of student learning in portfolios, teaching portfolios/CVs, program guides and the like -- assuming that such data can be tagged and referenced to LOs successfully

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2. METHODS FOR INTERPRETATION OF LEARNING OUTCOME DATA TO IMPROVE STUDENT TRANSFER

WHAT WE'VE LEARNED FROM THE GEM PROTOTYPE

2. The challenge of capturing breadth
- Breadth inherent in the discipline
- Breadth stemming from program range and options
- Breadth in facets of learning

Capturing Breadth

- GEM frames a **wide range of learning** - in so far as it addresses the scope **and array of disciplines** and **competencie**s associated with the field as well as the facets of learning (know, be, do). This breadth, however, **exists more or less within the confines of the field or vocation**.
    - To achieve true breadth; on a system level, it will be necessary, **going forward, to define learning outcomes that more fully embrace breadth and can be applied to for every program.**

- **We struggled to fully reflect outcomes required and recommended by programs** – including the range of **options** within requirements (i.e. one of several courses to be taken at two or more levels to fulfill a single LO requirement)

- It was also a challenge for the GEM to capture **all of outcomes of learning** in some programs -- especially **where much of their learning falls outside of the matrix**. This was the case in programs such as McMaster's Software Engineering program that has a game concentration or OCADU's Digital Futures program.

Untangling applied and theoretical learning

We also felt challenged in our efforts to capture the nuances between applied and theoretically focused learning and any resulting differences in expression of competency that stem from different program orientations. In an effort to get at this, we looked to differences in
• Projects vs Lectures / Seminars
• Layered learning
• Introduced, reinforced and mastered learning outcomes

However, we feel that further consideration of the importance of this theory/practice balance of focus in programs is needed.

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2. METHODS FOR INTERPRETATION OF LEARNING OUTCOME DATA TO IMPROVE STUDENT TRANSFER

WHAT WE'VE LEARNED FROM THE GEM PROTOTYPE

4. Learning outcomes approaches are not a silver bullet
   - A lens for transfer
   - Provide a richer data set
   - Require nuanced interpretation

Learning outcomes approaches are not a silver bullet

Can't expect a tool like the GEM to map perfectly and spit out an answer, we have to bring in an interpretive lens to the likely pathways still, but what we do have is a much richer data set and aid in interpretation

Working together as stakeholders

Still need to build and maintain **trust**; a LO-based tool is just a dataset, not a proxy for the relationship.

The **process of developing the tool and dataset is as important as the product**
- Committees **bring people together** to exchange perspectives but they are difficult to manage and consensus is hard to achieve
- The aggregation of **unique perspectives** gathered from interviews and surveys reveals insights for sharing
- **Long-term engagement** of stakeholders is critical
- There must be **incentives and support for this**
    At all levels from department and through the system of quality assurance
    The ongoing support provided from ONCAT is a key factor as well

Note that the data and the tools and the trust are **not necessarily ever going to be perfect**, so we need to
    decide what constitutes LOs that are near **enough** to right
    identify the threshold for a reasonable enough allocation of credit for transfer
        determine whether there is a greater than chance or likelihood that the student will be able to progress

Foster informed approaches to credit transfer that critically engage learning outcomes

Requires widespread understanding and use of learning outcomes as a means for:
- capturing, querying, comparing and visualizing patterns in the vast and complex data that faculty can offer about their programs
- Doing so in a dynamic, manageable, interpretable ways.
- Production of and access to comparative, detailed descriptions of the ways in which knowledge, skills and values are deliberately developed and assessed within programs
- Greater reliance on data-informed, faculty-led analysis of and decision-making about pathways between programs possible.

Establish foundations that will allow learning outcomes approaches to transfer to flourish
Student mobility requires the presence of fertile ground in which to cultivate networked roots systems between and within academic programs and institutions.

Requires:
- the presence of **shared values, principles, and commitments** to supporting student mobility in the province;
- understanding of **methods; the provision of resources, the opportunities and the willingness** to forge and fortify trust relationships between colleges and universities and to use these in actively exploring how LOs (amongst other tools) can advance student mobility,
- development of broadly **shared, detailed understandings** of how different colleges and universities educate students within fields of study;
- willingness to move toward **constructive alignment of policies and practices and governance structures** conducive the development, consistent implementation and maintenance of agreements, but only when helpful without eroding institutional autonomy.

Remove roadblocks to the adoption of pathways generated by learning outcomes

Most challenging practical impediment to using comparative LO-based profiling of programs

- **fundamental mismatch between how the systems and practices function**
  based on **one-to-one comparisons** (simple and often reductivist) system **of courses, hours and credit weights**

    versus

    systems that support pathways for individual learners who have acquired a set of desired **competencies** in a field of studies in unique patterns and **through a range of learning experiences** that may be configured in one-to-many or many-to-one patterns across courses.

Learning outcomes that respect the learning experiences students port from program to program
  - Require complex implementation
  - Challenge us to know and accept when enough is enough
  - Promise high reward

New ONCAT support for enhanced GEM Tool (Beta)

GEM tool is **currently a proof of concept** - a prototype that crudely approximates a fully formed tool

Engage the whole of the field (expanded from a subset or sample of programs) in the development of a fully operational Beta version of the tool that will improve:
- **Structuring of LO data**,
- **Functionality and user interface** so as to ensure that the GEM serves the field as a widely adopted mechanism for the use of learning outcomes to produce program profiles that can be trusted for their ability to generate transfer pathways. This will involve
    - more robust collection and representations of data and information related to program differentiators;
    - advancement of the capacity to connect the program learning outcomes to curriculum, including curriculum maps, learning outcome scores for courses, and tracking of all program outcomes to ensure their relationship to curriculum;
    - accommodation of program options and breadth (e.g. core and optional courses);
    - capacity to facilitate comparison between all programs in the field with

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