The Game Education Matrix (GEM) Beta

Facilitating Pathways in Post-Secondary Games Education

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Presentation Agenda

1. Description and Purpose of the GEM
2. Conceptual and Theoretical Underpinnings
3. How GEM Works (input and output)
4. Goals of the Beta
5. Beta Updates
6. Articulation Wizard (Andrew)
7. Challenges and Limitations
What is the GEM?

• The Game Education Matrix was designed by Jean Bridge (Brock) and a multi-institutional team to help facilitate student transfer and articulation agreements among games programs in Ontario.

• Through an online tool, users provide data for their program and core courses by selecting from a pre-defined database of competencies and Learning Outcomes (LOs) related to games education.
The Game Education Matrix enables Ontario Colleges and Universities to compare game-related programs for the purpose of developing new transfer pathways. Participating institutions demonstrate the emphasis, specialization and depth of their programs through the identification of the competencies and learning outcomes. This information supports more seamless transfer for students.

MORE ABOUT THE GEM TOOL

Participating Institutions

- McMaster University
- UOIT
- Algonquin College
- University of Windsor
- Carleton University
- Durham College
- Humber College
- Niagara College
- York University
- Brock University
- Western University
- Fanshawe College
Why GEM?

• There are roughly 30* games and interactive media programs in the province, each with their own specializations (e.g. programming, 3D modelling, animation, design).

• How do we get them to “talk” to each other?
The problem
### Programs make and study games

<table>
<thead>
<tr>
<th>Making Games requires</th>
<th>Studying Games requires</th>
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<tbody>
<tr>
<td>- Art</td>
<td>- History</td>
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<tr>
<td>- Sound</td>
<td>- Ludology</td>
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<tr>
<td>- Narrative</td>
<td>- Critical theory</td>
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<td>- Programming</td>
<td>- Rhetoric</td>
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<td>- Design</td>
<td>- Semiotics</td>
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<td>- Project management</td>
<td>- Gender studies</td>
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<td>- Documentation</td>
<td>- Aesthetics</td>
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To make matters worse, each program uses its own language to describe its outcomes.
How do we handle this diversity in terms of transfer when each program is unique?
• We look for all possible competencies and learning outcomes related to games and put them into a database. Individual programs can then tell us which outcomes they achieve, and which they don’t.
• The database becomes a Rosetta Stone of sorts.
Some Conceptual Underpinnings

• Learning Outcome Statements (Bologna Process; Fitzgibbon, 2014). Credits can be transferred based on shared LOs rather than instructional hours or other metrics.

• Competency Tuning: a “faculty-led process to develop common frameworks for disciplinary fields” (GEM Prototype Final Report, 2014).

• Taxonomies, especially Biggs’ SOLO (Structure of Observed Learning Outcomes) Taxonomy, which tracks the progression of learning from simple to increasingly complex/abstract.
The Matrix

Through consultations with faculty and industry, the GEM team discovered 5 core Disciplines: Design, Production, Content, Programming, Scholarship, plus Literacies
The Matrix

Each **Discipline** contains a number of competencies related to it. For instance, within the **Design** competency, there is Game Design, Experience Design, and Concept Design.
Profile a Program

MORE INFORMATION ABOUT THE PROFILE PROGRAM TOOL

Create a program if you do not see yours below.

CREATE PROGRAM

Please choose your program.

- Interactive Arts and Science
- BSc – Game Programming
- BA – Game Design

Please choose your discipline.

- Design
- Production
- Content
- Programming
- Scholarship
- Literacies

Please choose your competency.

- Game Design
- Experience Design
- Concept Design
- Environment/Level Design
- Narrative/Storytelling
- Gameplay Mechanics
The Matrix

Each **Competency** contains **Learning Outcomes** related to it according to 4 levels of complexity. The program must fulfill a certain number of LOs to move on to the next level.
4 Levels of Competency

1. Discuss/Use (definitions, vocabulary, exploration...)
2. Organize (manipulate, differentiate, contextualize...)
3. Mobilize/Create (formulate, assess, correct...)
4. Originate/Judge (invent, propose, expand, systematize...)
<table>
<thead>
<tr>
<th>Level</th>
<th>Mobilize/Create Considering Complex Relations</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Formulate, Develop, Relate, Leverage, Combine, Review, Reflect, Assess, Refine, Clarify, Iterate, Balance, Optimize, Correct, Solve, Plan, Select, Document, Implement, Establish, Collaborate, Critique, Transfer, Coordinate, Negotiate</td>
</tr>
</tbody>
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### Design

| Game Design | Relates concepts and requirements for art, narrative, and user experience from assignment and/or documentation to experience design. | Assesses and iterates on a game design to optimize balance and consistency. | Combines feedback from testing, observations and critique to solve problems with game design. | Collaborates to create a functioning digital game in a creative group project based on documented requirements. |
| Experiences Design | Relates concepts and creative requirements from assignment and/or documentation to form unique experience design. | Assesses and iterates on an experience design to optimize creative and functional coherence. | Combines feedback from testing, observations and critique to solve problems with experience design. | Collaborates to create a functioning user experience in a creative group project based on documented requirements. |
| Concept Design | Relates concepts and requirements for art, narrative, and user experience from assignments and/or documentation to art and narrative design. | Assesses and iterates on a character and prop design through digital painting, sculpture, and motion capture to optimize balance and consistency. | Combines feedback from testing, observations and critique to solve problems with concept design. | Refines character and prop concepts through research and diverse creative techniques based on documented requirements. |
| Environment/Level Design | Relates concepts and requirements for art, narrative, and user experience from assignments and/or documentation to environment and level design. | Assesses and iterates on an environment design using visual and narrative elements. | Combines feedback from testing, observations and critique to solve problems with environment and level design. | Refines complex environments and balanced level designs through research and diverse creative techniques based on documented requirements. |
| Narrative/Storytelling | Relates concepts and requirements for art, design, and user experience from assignments and/or documentation to narrative and storytelling. | Assesses and iterates on back story, character, and environment design through level design, dialogue and narrative. | Combines feedback from testing, observations and critique to solve problems with narrative and storytelling. | Collaborates to create an interactive narrative experience through research and diverse creative techniques based on documented requirements. |
| Gameplay Mechanics | Relates concepts and requirements for design, art and narrative from assignments and/or documentation to gameplay mechanics. | Assesses and iterates on gameplay mechanics through tool optimization and testing. | Combines feedback from testing, observations and critique to solve problems with gameplay mechanics. | Collaborates to create a functioning system of gameplay mechanics in a creative group project based on documented requirements. |

### Production

| Documentation | Relates concepts and requirements of design, art, narrative and detailed production goals, etc. from assignment and/or documentation to project documentation and methods of project production. | Assesses and iterates on project documentation and methods of project production. | Combines feedback from observation, consultation with project team/leaders and feedback to ensure clear and efficient project production. | Collaborates in creative group project to conceive and refine project documentation that synthesizes concepts. |
| Production Process | Relates concepts and requirements of multiple workflows and production pipelines from assignment and/or self-organizing teams. | Assesses and iterates on production scope, process, management and peer assessment during project production. | Combines feedback from observation, consultation and collaboration with project team/leaders to solve production problems. | Collaborates in creative group project to conceive, refine and document production processes and management strategies. |
| Production Tools | Relates features of diverse production tools and requirements from assignment and/or documentation to formulate schedule and production tools during project production cycle to ensure optimal pipeline efficiency. | Assesses production tools during project production cycle to identify and iterate on tool design. | Combines feedback from observation, consultation with project team/leaders and requests for input to identify and edit project tools. | Collaborates in creative group project to conceive, refine and document tools and processes for use in game engine development. |
| Prototyping | Relates concepts and requirements for animations, mechanics, and interfaces from assignment and/or documentation to formulate and /or iterate on prototyping during project production cycle through testing against clear and defined requirements. | Assesses and iterates on prototypes during project production cycle through testing against clear and defined requirements. | Combines feedback from observation, consultation with project team/leaders and requests for input to identify and edit project tools. | Collaborates in creative group project to conceive, refine and document prototyping strategies to support the production of game projects. |
| Organizational Behavior | Relates concepts and requirements from assignments and/or documentation to formulate organizational plan with decision making and team dynamics to optimize communication and team building. | Assesses and iterates on team dynamics and norms during project production cycle through testing against clear and defined requirements. | Combines feedback from observation, consultation with project team/leaders and requests for input to identify and edit project tools. | Collaborates in creative group project to conceive, refine and document organizational strategies to support the production of game projects. |
DISCUSS/USE - DESIGN - GAME DESIGN

Please select which LOs apply to your program.

☐ I. Defines key concepts, vocabulary and frames of reference to participate in meaningful discussion about digital media/game design.

☐ II. Identifies and explores primary topics and precedents in game design through case studies, readings and standard texts.

☐ III. Adopts paper or multimedia techniques to prototype ideas.

☐ IV. Derives board games and other paper-based game experiments from idea brainstorming and/or research.

This program does not address this competency.

SUBMIT
Goals of the Beta Phase
Goals of the Beta Phase

1. Better understand the audience and field (consult)
2. Cut down on the sheer amount of LOs (responsibly)
3. Make the profiling process more user-friendly
4. Expand the pool of profiled programs
5. Add functionality (automation, output reports)
6. Develop 2 articulation agreements
Who are the end users of the GEM?

1. Faculty. Most articulation agreements and transfer protocols start with faculty (depending on institution).

2. Registrars and admissions personnel. They want easy to read data on the exiting program. Transfer tends to happen on an ad-hoc, case-by-case basis.

3. Students (eventually). The GEM could aid students looking at transfer options.
What does the industry want (n=15)?

• A credential (university slightly preferred to college)
• A portfolio
• Strong communication and interpersonal skills
Q16 On a scale of 1 (Strongly Disagree) to 5 (Strongly Agree), how well does the following statement describe you: “I believe soft skills are equally as important as technical skills”

Answered: 15  Skipped: 0

Q17 On a scale of 1 (Not Important) to 5 (Very Important), please rate how important you find EFFECTIVE COMMUNICATION WITH COLLEAGUES, MANAGERS AND DEPARTMENT HEADS to be when assessing job applicants based on their resume or during the interview process.

Answered: 15  Skipped: 0
Beta Updates (Apr. 2016 - Feb. 2018)

• The project team consists of members from 6 institutions: Algonquin College, Brock University, Durham College, Niagara College, UOIT, York University
• We mostly kept the conceptual framework with a few tweaks
• We cut down on the LOs based on redundancy and competencies not profiled in the Prototype phase (e.g. Rhetoric)
• Consulted with a UX/UI professor to improve the UX
• We doubled the pool of profiled programs (agreed)
• Added new functionality, e.g. the Articulation Wizard
GEM Wizard
Problem

• Program directors have a hard time understanding how students from another institution should integrate into their program.
• GEM helps by mapping each program through learning outcomes (LOs).
• How do we use these LOs practically?
Design of a wizard
What if we could visualize how the LOs from two programs map to each other?

We could see if the programs are compatible and identify "holes" that need to be filled
Imagine a simple interface like a wizard that guides program directors through the creation of a bridge using the LO data from GEM.
Imagine an interface that lets you drag and drop courses to create a program map.

Allows for easy use and maintenance of individualized program maps for bridge students.
LO_SCORE is the number of LOs satisfied by the students exiting program

Lower # means better candidate for inclusion
Higher # means student has already satisfied many LOs
Select 2 programs to see how they map at a high level across disciplines

For this example I have selected a student who has completed DC's game dev program and is entering UOIT's game dev program
Courses can be rearranged and dragged to create the bridge

Shows how many LOs each course satisfies and how many of those LOs have already been satisfied through DC
Identified best candidates for the bridge because DC didn't satisfy the LOs for these core courses
Identified best candidates for the bridge because DC didn't satisfy the LOs for these core courses
Removed courses that DC satisfied most of the LOs

DCs program is art heavy so it makes sense that the art courses are identified to be removed
The final individualized bridge program
Can be emailed and saved for later editing
Wizard thoughts

- Gives program directors the data needed to make decisions on course removal based on LEARNING OUTCOMES rather than course names.
- Removes ambiguity.
- If a course is removed that still has remaining LOs, e.g. DC Course has satisfied 20/25 LOs of a UOIT course you can identify WHICH LOs.
- Opportunity to create individualized online modules for the student to take.
Still just an idea...

- Curriculum maps are a pain to complete.
- The GEM can be a pain to complete.
- What if we could use GEM data to generate curriculum maps based on provincial standards (e.g. DLEs)?
- We’ve developed a proof of concept but it’s still in the early stages.
Challenges and Limitations of the GEM

• A model based on LOs is inherently limiting.
• A tool requires rigid quantification; learning is messier than that.
• Methods and standards of assessment vary.
• Profiler reliability.
• The tool requires a lot of time and monotonous work.
Thank you!

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Bibliography
