

## LEARNING INNOVATION AND TEACHING ENHANCEMENT (LITE) GRANTS

**a) Descriptive project title**

Gamifying history: Designing and implementing a game-based learning course design framework

**b) Project summary:**

This project aims to research the design and implementation of a game-based course design framework. Research on gamification and game-based learning in education has primarily focused on two directions: either traditional gamification elements are embedded into educational contexts to observe the effect, or the tenets of game-based learning are discussed and applied to a single activity or assessment in the course. Rather than attempt to improve student learning as a result of game-based learning, we instead focus on encouraging and improving learner engagement.

In order to provide much-needed structure to game-based learning approaches, we will propose a game-based course design framework and implement it in a third-year history course at St. Jerome's University. We will compare select gamified lessons to non-gamified lessons, and by collecting data from student pre- and post-questionnaires, focus groups, and in-class observations, analyze the efficacy of this framework and its ability to engage and motivate learners.

**c) Project goals/outcomes and, where applicable, research question(s) to be investigated:**

The goals of the project are to first create an engaging learning environment for students by designing and implementing the game-based course design framework, and secondly, to share evidence-based findings related to the framework to encourage other instructors to incorporate game-based learning into their courses.

Our research questions are as follows:

- 1) How effective is the game-based course design framework, and which aspects of the framework resonate most with learners?
- 2) To what extent does implementing the game-based course design framework result in increased student engagement?

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We intentionally focus on improving student engagement, rather than learning, as research conducted on the learning gains of gamification are inconclusive (Papastergiou, 2009; Perrotta, Featherstone, Aston, & Houghton, 2013; Zapata-Rivera & Bauer, 2012). These research questions allow us to critically examine the proposed game-based course design framework and its implementation in the third-year history course.

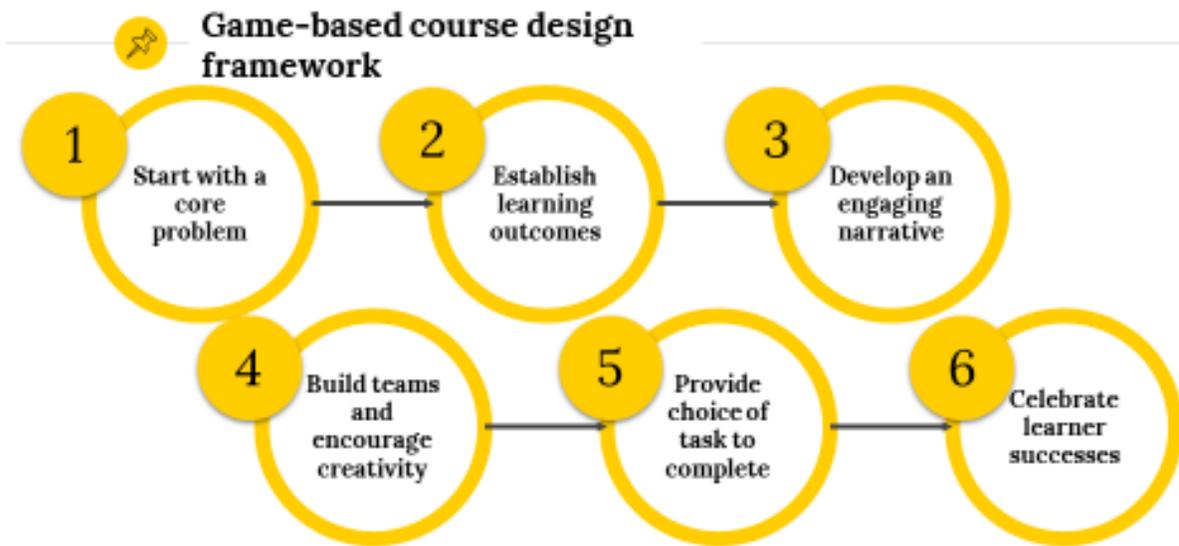
**d) Project rationale and description, including review of relevant literature (where applicable) and contextual information:**

Gamification and game-based learning in higher education is becoming increasingly popular (Burke, 2016); however, there is little consensus on how best to gamify a learning experience. Existing models focus on either the design of the gamification element, or guide the coding of a digital computer game; they do not examine integration into the course itself and its alignment (Whitton, 2014). As a result, alignment between intended learning outcomes, assessments, and teaching and learning activities is rarely considered.

To date, no other known framework for incorporating a game-based learning approach into course design exists. Kiili's (2005) experiential gaming model presents an approach to gamify an activity, but is not integrated within broader course design. Likewise, Pivec and Dziabenko (2004) develop a framework that incorporates collaborative learning and teamwork, but does so within a very specific, contextualized digital environment. Tan, Ling, and Ting (2007), and van Staalduinen and de Freitas' (2011), both propose different game-based learning frameworks, but these are intended for the design of digital games that can be used for higher education.

As a result, this project proposes one possibility by which the underlying principles of game-based learning can be combined with the structure of course design to ensure that game-based learning is thoughtfully designed and implemented into a pre-existing course. Our game-based course design framework (see Figure 1) proposes both a model that can be used to structure the design of an entire course with gamified instruction in mind (Sheldon, 2011), but also can be employed to gamify a single lesson. The framework focuses on three core elements to promote student engagement: an authentic narrative to draw student interest, the element of choice through quests (or active learning tasks)

LEARNING INNOVATION AND TEACHING ENHANCEMENT (LITE) GRANTS that give students a say in how they demonstrate their learning, and team-based collaboration, not competition. This framework draws inspiration from task-based learning (Willis, 1996), but emphasizes team cohesion and rewards team success, in order to sustain motivation between tasks; the incorporation of a narrative and task choice further immerses learners into the course so that they are invested in the success of their team.



*Figure 1. Game-based course design framework*

This project will study a class of approximately 25 students in a third-year history course offered at St. Jerome's University. The study will analyze the game-based course design framework's efficacy and ability to engage students. We will also explore whether or not extrinsic motivation based upon rewarding the learners' successes, in conjunction with intrinsic motivation from learning, is meaningful or not. Once studied and refined, our intention is to apply the framework to other courses in other contexts/disciplines.

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**e) Plan/methods/procedures for carrying out and assessing the project:**

Intended outcomes, including project outcomes, student learning outcomes, and/or teaching enhancement outcomes	Sources of evidence and how evidence will be collected related to project, student learning, and/or teaching enhancement outcomes	Plan for analyzing evidence to assess the project, student learning, and/or teaching enhancement outcomes
<b>Project outcomes</b>		
Develop and validate a game-based course design framework	Test the implementation of the framework in the proposed third-year history course	Reflect on student feedback, graduate research assistant observation, and our own perceptions of its efficacy for improving student engagement and motivation and how necessary elements of the framework are to inspire student engagement
Share the game-based course design framework widely with broader University of Waterloo community	Prepare and facilitate workshop on game-based course design framework; discuss framework with other instructors on one-to-one basis	Collect feedback from participants of workshop
<b>Student learning outcomes</b>		

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<p>Increase motivation and engagement to learn through a gamified course/lessons</p>	<p>Pre/post questionnaires; focus groups; in-class observations</p>	<p>Compare results of pre- and post-questionnaires to see how student perceptions of their engagement in the class have changed, comparing student engagement in gamified lessons to non-gamified lessons; focus groups will allow students to further clarify what aspects of the gamified course were most effective at improving motivation/engagement; detailed observation notes collected by graduate research assistant (GRA) will also help expand upon what the students themselves report</p>
<p>Engage in collaborative and team-based learning to solve complex problems (<i>UDLE 5 – Awareness of Limits of Knowledge</i>)</p>	<p>Pre/post questionnaires; focus groups; in-class observations</p>	<p>Gauge student willingness and ability to work in teams through questionnaire and focus groups; GRA will observe the interactions in the class to determine how well the team-based approach works and what needs to be modified for increased success in the future</p>
<p><b>Teaching enhancement outcomes</b></p>		
<p>Facilitate game-based lesson to promote active learning through innovative teaching approach</p>	<p>Pre/post questionnaires; focus groups; in-class observations; instructor reflection</p>	<p>Analyze questionnaires and focus group discussions to determine if students note any element of the approach that felt unnatural or forced; GRA will observe class and take notes; instructor can reflect on own experience teaching gamified lesson to determine what elements could be improved in the future</p>

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**f) Statement regarding areas of expertise of project applicant(s)**

The principal investigator has conducted research exploring game-based learning in higher education. He has published multiple articles on the utility of games for language learning, and has facilitated workshops on gamification and game-based learning.

The co-investigator is a subject matter expert in her discipline, and has sought out and implemented innovative teaching approaches in previous courses. Her willingness and aspiration to innovate her teaching through game-based learning will help to ensure that the validity of this project is not based upon an instructor's own understanding of game-based learning, or how well he or she can explain its tenets to students, but rather upon the efficacy of the intervention itself.

**g) Outline of project's impact -- contribution to UWaterloo community:**

The intention of the project is to make the framework widely available to anyone interested in exploring game-based learning. As discussed in the project rationale, the lack of an available framework for game-based learning suggests that interested instructors are left to either figure out an approach that suits their course, or resort to incorporating gamification elements (points, badges, leaderboards) that only serve to increase extrinsic motivation.

Few courses in the Faculty of Arts explore the utility of consistent, collaborative team-work over an extended period of time, but research suggests the powerful learning potential of team-based, task-based learning (Michaelsen, Knight, & Fink, 2002). Showcasing this potential may spark interest in the wider Faculty of Arts, and eventually, beyond.

**h) Plan for dissemination:**

We envision three approaches to dissemination:

- 1) We will share our findings through local avenues, with an intention to present findings at the 2019 University of Waterloo Teaching and Learning conference, as well as in conjunction with any LITE Grant showcases. We also will share our findings at a national/international

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- 2) We will work towards embedding our findings into broader workshop applications, such that the often-cited concerns regarding game-based learning – namely, the lack of evidence of its efficacy – can start to be resolved by sharing the framework and its application in this project
  
- 3) A manuscript detailing the framework and this study will be written with the aim to publish in a scholarship of teaching and learning journal, such as the Canadian Journal for Scholarship of Teaching and Learning, or Teaching & Learning Inquiry

**i) Budget:**

Item (e.g., Research Assistant(s) )	Rate	# hours	Amount	Justification
Conference registration, travel, and accommodation	-	-	\$2000.00 (registration = \$550.00; flight = ~\$800.00; accommodation = ~\$650.00)	As part of our dissemination strategy, funding will be allocated to ensure attendance at the UWTL 2019 conference, as well as the attendance of a national or international conference for at least one investigator (for the purposes of the budget, we are suggesting presenting at

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				STLHE in 2019 which will be held in Western Canada)
Graduate research assistant (GRA)	\$39.96/ hour	60 (split between fall 2018 and winter 2019)	\$2397.60 + 4% vacation pay = \$2493.50	The GRA will assist in the collection of data (introducing the study to the course, facilitating focus groups, administering questionnaires), as well as observing the game-based lessons and documenting the experience. Aspects of the data analysis, as well as dissemination strategies, will also be undertaken by the GRA as time/funding allows. Our hope is also to provide this opportunity to a graduate student who is interested in pursuing research related to game- based learning/design.

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Participant remuneration (n = 10)	\$10.00/ hour	2	\$200.00	The actual amount will depend on how many students opt-in to participating in focus groups, but two focus groups will be held (one following the first gamified lesson, and the second following the end of the course)
Game-based, in-class incentive (n = 5)	\$20.00/ student	-	\$100.00	To investigate the effect of additional extrinsic motivation embedded in the game-based course design framework, we envision providing an additional incentive (a prize worth approximately \$20.00) to students of the team who collects the most accolades throughout the course. This additional incentive is removed from any grade-related

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				assessment in the course.
<b>Total</b>			\$4793.50	

**j) Sustainability**

This project is intended to validate the design of a game-based course design framework. With the dissemination strategy proposed, workshops at the local level may encourage other instructors to incorporate thoughtful game-based learning into their own courses which requires no additional funding. Furthermore, the principal investigator is invested in increasing awareness of game-based learning and will seek out opportunities to collaborate with other instructors who wish to receive instructional support.

Depending on the success of this project, there is potential to seek additional funding through a LITE full grant to further investigate the framework after making revisions and broadening the scope of the project to the entirety of the University of Waterloo campus, as well as seeking out partnerships with the Games Institute or the Global Business and Digital Arts (GBDA) program.

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**k) Timeline:**

Activities and Milestones	2018-2019												
	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug
<i>Project begins</i>	x												
Recruit graduate research assistant	x												
Finalize design of game-based course design framework	x												
Introduce project to students in course		x											
Recruit participants for focus groups		x											
Disseminate pre-questionnaire		x											
Observe gamified lessons		x	x	x									
Conduct first focus group			x										
Conduct second focus group					x								
Disseminate post-questionnaire					x								

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Analyze results						x	x						
Revise game-based course design framework								x	x				
Disseminate findings									x	x	x	x	
Facilitate workshop on game-based course design framework and collect feedback from participants										x	x	x	
<i>Project ends</i>													x
<b>Submit final report</b>													x

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