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## A game-based learning approach to academic integrity education

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One of the central values motivating Ryerson University's academic integrity policy is education. Research has shown the value of an educative approach to academic integrity with a focus on prevention (Cellier & Krenkel, 2014). Ryerson's Academic Integrity Office (AIO) is a centralist facility that works to support the Ryerson community by promoting a culture of integrity and educational excellence by informing, inspiring and educating the university's community. It is a neutral party whose role is to ensure that Ryerson's academic integrity policy is carried out in a fair and transparent way and to provide educational resources to the Ryerson community regarding academic integrity and misconduct. However, Ryerson is a large institution with approximately 40,000 students and 900 full time faculty. This can present a challenge in terms of reaching the entire community.

One of the ways in which the AIO achieves this is through the use of a number of online resources. These resources include a set of online video episodes and associated quizzes that focus on numerous topics relating to academic integrity, namely, plagiarism, buying or borrowing course work, cheating on tests and exams, misrepresentation, contributing to academic misconduct, unauthorized group work and group work. Studies have shown the effectiveness of tutorials in academic integrity education (Stoesz, & Yudintseva, 2018). Ryerson's current online episodes can be viewed here <http://www.ryerson.ca/academicintegrity/students/tutorial-episodes/>.

These online episodes and associated quizzes, which are non-facilitated, can be assigned to students by faculty members, or can be accessed voluntarily. Previous studies (e.g. Eriksson, Adawi & Stöhr, 2017; Xiong 2015) have demonstrated that existing digital self-initiated learning is disengaging, with low completion rates and is associated with low retention and low motivation. With this in mind, the AIO decided to develop a new online, interactive educational resource that would increase students' knowledge of academic integrity. We decided that the developed learning materials should not be tied to our academic integrity policy and thus would not need to be updated each time our policy changes and to allow ease of sharing this resource with other institutions. We were conscious of developing an accessible resource with built in interoperability for easy integration into learning management systems including tracking and analytics.

The AIO, in collaboration with Digital Education Strategies (DES) at Ryerson, decided to replace the existing video tutorial episodes with a game-based learning (GBL) solution. Our objective was to create a game that motivates and engages students to complete the self-study training and to build their understanding of academic integrity. GBL has a potentially positive impact on student engagement, knowledge acquisition, content understanding and motivational outcomes (Bellotti et al., 2013; Ibrahim, et al., 2010). A multidisciplinary and iterative approach to GBL design was taken, involving many stakeholders from across the university, including Ryerson's Student Game Union.



Accounting for the added layer of complexity in the development of a digital educational game (Rooney, 2012; Petrillo & Pimenta, 2010) and due to the need to incorporate best practices of educational game design and learning theories (Oblinger, 2006; Amory & Seagram, 2003; Klopfer, 2008), the Art of Serious Game Design (ASGD) methodology ([de.ryerson.ca/games/research](http://de.ryerson.ca/games/research)) was used to help our game development team effectively design serious games (SGs) during the conceptual stage. An iterative product development approach was used during the game production stage.

Briefly, ASGD methodology is based on the Mechanics-Dynamics-Aesthetics (MDA) framework, which supports a formal, iterative approach to design, improved game mechanics and ensures that game activities meets core elements to support engagement and motivation (e.g. goals of the game are clear, there is an engaging narrative, frequent feedback, positive reinforcement) (Hunicke et al, 2004). Also, Winn (2009) proposed the Design, Play and Experience (DPE) Framework, which is an adaptation of the MDA framework, thus providing a formal process to guide the game design and a clear structure to analyze educational games. Using ASGD helped the multidisciplinary team to improve game design by ensuring that all game elements (learning, narrative, user experience and gameplay) are optimally merged and ensure that game activities meet core elements to support engagement and motivation through the game's engaging narrative, frequent feedback, and positive reinforcement.

The series of game modules that were developed focus on plagiarism, contributing to academic misconduct and cheating. The narrative for the game was designed from the first-person perspective of a student. It was decided that non-human characters should be used in the game to avoid any potential issues relating to equity, diversity and inclusion. Hence, the game is set in space and the characters are aliens. In each module, the student is faced with a number of scenarios as relating to academic integrity, and is being asked to provide advice to a peer on how best to proceed with an academic integrity dilemma. A number of options are presented with one option being the best course of action, while the others serve as detractor options. The decision that the player makes and the advice they provide to their peers affects their progression through the game. The consequences associated with their decisions are revealed, while best practices for success as a student are embedded throughout.

Taking into account that narrative plays an essential role, as fantasy and role-play fosters learning and engagement (Prensky, 2001), and that from a cognitive load perspective, the reach narrative may distract learners from the learning and degrade the learning outcomes (Mayer et al., 2008), as well as that a complex game environment might have a heavy cognitive load and negatively impact the learning (Kiili et al., 2014) and reduce engagement, the game development team was challenged to keep the story as engaging as possible while keeping the student tasks within the game focused on the learning to ensure the game's learning effectiveness.

There are a number of learning objectives associated with each module. For each module, upon its completion, the student should be able to define and describe behaviours that constitute plagiarism, cheating and contributing to academic misconduct. However, with the digital story or narrative in this game, we are hoping to educate students beyond an understanding of what constitutes these behaviours, but rather why they may not wish to

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engage in academic misconduct more broadly speaking (Camara et al., 2017).

For the purpose of assessing how players interacted with the game, and identify and address any issues in usability, the game underwent user experience testing before production. User experience testing is according to Moreno-Ger et al. (2012) and Olsen, Procci & Bowes (2011) essential for providing a positive, overall experience to player and ensures easy interaction with a digital application, such as a serious game.

Our plan is to implement the game university-wide. It will be available for any student to access at any time. In addition, the game will be promoted to incoming students at orientations, by their program departments, and by the AIO. We expect that individual faculty members will adopt the game and embed it into their classes and into their course shells hosted by our learning management system, allowing for tracking of attempts and completion rates. The GBL approach to the design of this educational resource should serve to engage students and to assist with their understanding of the content (Bellotti et al., 2013; Ibrahim, et al., 2010). The narrative approach that we have adopted will hopefully go beyond simply providing information to students but will affect students' behaviours and attitudes towards academic integrity and misconduct.

In this interactive workshop we will take participants through the process of developing these games. Workshop participants will assume the role of student/player and will have the opportunity to play the game, in real time, at the various decision points that the student or player will have to make, along with the associated consequences, will be demonstrated. Also, the results of user experience testing, and associated improvements to the game will be shared. Participants will gain insights into gamification as an approach to academic integrity education and have an opportunity to provide feedback on the game-based learning modules.

**Keywords:** academic integrity education, game-based learning.

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