

# **INCLUSIVE WAYS OF TEACHING, LEARNING, AND ASSESSING WITH THE USE OF SIMULATIONS AND GAMIFIED MOBILE APPS**

**Martine Pellerin**

## **The aims of the collaborative research project:**

Teaching, assessment, and learning are dynamic and relational processes (Wieman et al. 2010; Welsh 2012; Brown 2008) and therefore cannot be dissociated. Thus, the project aims at the following four high-level goals:

1. To promote and support the development of innovative and inclusive ways of teaching, learning and assessing with the use of simulations and gamified mobile apps (S+GMLAs), across interdisciplinary areas at the Faculty Saint-Jean (FSJ).
2. To investigate whether the use of S+GMLAs contribute to the adoption of innovative and inclusive methodological approaches on the part of the instructors to better support their students' ways of learning and influence their level of engagement and motivation across interdisciplinary areas at the Faculty Saint-Jean (FSJ).
3. To investigate whether the use of S+GMLAs contribute in providing diversified and inclusive ways of assessment, learning, and engaging learning experiences and environment for **all** students across interdisciplinary areas at the Faculty Saint-Jean (FSJ).
4. To promote sustainability and transferability of the development of innovative and inclusive ways of teaching, learning and assessment, and with the use S+GMLAs, across other interdisciplinary areas across faculties at U of A (e.g. engineering; nursing; business; arts; education; etc.).

## **Project Objectives**

### **1. Needs assessment**

- 1.1. To recruit of a sample (4-8 faculties) of interdisciplinary faculties (natural sciences - math, biology; physics) and social sciences -economics, arts, languages, education) within the Faculty Saint-Jean in participating into a collaborative research project about the development of innovative and inclusive ways of teaching, learning and assessing with the use simulations and gamified mobile apps;
- 1.2. To assess the instructors' perceptions regarding their teaching practices and their impact in reaching their learners' diversified learning needs in their respective interdisciplinary courses;
- 1.3. To assesses the instructors' needs and criteria in adopting innovative and inclusive methodological ways with the use of S+GMLAs;
- 1.4. To assess the students' perceptions regarding their teachers' methodological practices and their impact on their ways of learning, level of engagement and performance in their interdisciplinary courses;
- 1.5. To assess students' learner's ways of learning and their specific needs and criteria to adopt S+GMLAs as experiential learning tools.

- 2. Design and development of simulations tools and gamified mobile learning app based**
  - 2.1 We will use a model-based methodology for constructing simulations and gamified mobile learning apps, following general architectural patterns and reusable resources (graphical assets, gamification elements, interaction-logging mechanisms, and interaction widgets). Using this software-engineering methodology, we will be able to produce product families of multiple variations on a design idea, which will enable cost-effective experimentation.
  - 2.2 We will test the design of prototypes with designers; researchers; research assistant; instructors; and students using 2 approaches. The first is the application of a design model (i.e., ADDIE). The second will involve the use of methods from human-computer interaction (HCI), such as Neilson's Heuristic Evaluation (1994) and task-based evaluation approaches that include cognitive walkthroughs (Wharton et al., 1994). The use of these HCI methods will help ensure the system is usable
  - 2.3 To get feedback and suggestions from small focus group of instructors and students;
  - 2.4 To make the necessary changes and adaptations to the prototypes
- 3. Implementation of the design and development through pilot project.**
  - 3.1 Implementing the 'in house' designed and developed S+GMLAs within the real-world learning environment;
  - 3.2 Collaboration between the Innovation team at the FSJ and the CTL and ITS teams in providing diversified scaffolding strategies and ongoing technological **support to instructors** in adopting the 'in house' designed and developed S+GMLAs within the teaching and learning environment of their specific and interdisciplinary courses.
  - 3.3 Collaboration between the Innovation team at the FSJ and the CTL and ITS teams in providing diversified scaffolding strategies and ongoing technological **support to students** in adopting the 'in house' designed and developed S+GMLAs as new tools to support their ways of learning in across interdisciplinary areas.
- 4. Evaluation of the impact of the use of simulation and gamified mobile learning app**
  - 4.1 Student and teacher responses to questionnaires, diary entries, focus groups, and interviews will be used to evaluate whether the use of S+GMLAs contribute to the adoption of innovative and inclusive methodological approaches on the part of the instructors to better reach their students' ways of learning and influence their level of engagement and motivation across interdisciplinary areas.
  - 4.2 The logs of student interactions with the apps provide an automated form of student activity observation that will be used to evaluate whether the use of S+GMLAs contribute in providing diversified ways of learning and engaging learning experiences and environment for all students across interdisciplinary at the Faculty Saint-Jean (FSJ). Analysis methods for log files will include basic descriptive and inferential statistical methods (e.g., t-test, ANOVA). These analyses will also include techniques from learning analytics and educational datamining that will be used to determine student interaction patterns (using something similar to process mining), types of students (clustering), or changes in student behaviour over time (temporal analytics). The specific methods will be chosen later based on the nature of the tasks the S+GMLAs require students to do and the learning objectives they are meant to support.

5. **Promoting sustainability and transferability of innovative and inclusive ways of teaching and learning with the use S+GMLAs across faculties**
  - 5.1 To provide professional development in collaboration with CTL for instructors to promote the adoption of innovative and inclusive ways of teaching and learning with the use of S+GMLAs, across interdisciplinary areas
  - 5.2 To develop online support such as online tutorials in both French and English about the use S+GMLAs across interdisciplinary faculties at U of A.

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