Development and Implementation of Longitudinal Community Pharmacy Virtual Simulation for Student Pharmacists

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OBJECTIVES

This project followed the implementation of Newbie's Family Pharmacy, a faculty-created, community pharmacy experience for first-year student pharmacists to support long-term knowledge retention.

- Students follow a virtual community pharmacist, William Newbie, during their learning modules
- Students interact with various on-screen tasks that simulate pharmacy practice experiences
- Allows for a one-of-a-kind simulated rotation experience

Approved by the Campbell University Institutional Review Board

METHODS

The Newbie's Family Pharmacy experience was developed under the Analyze, Design, Develop, Implement, and Evaluation (ADDIE) instructional design approach.

- Module content:
  - Drug knowledge, basic disease state information, pharmacy law, pharmacy skills, counseling, and order verification
- First-year (P1) students:
  - Longitudinally across the school year
- Second-year (P2) students:
  - Within a single 7-week block
- Evaluation loosely based on Kirkpatrick's Model
- Survey followed each activity. Assessed what was learned and collect feedback on module's usefulness
- The learning experience was rated by the user on a 5-point Likert scale, from poor to excellent
- Module success and Top 100 Exam grades were analyzed by Student's t test

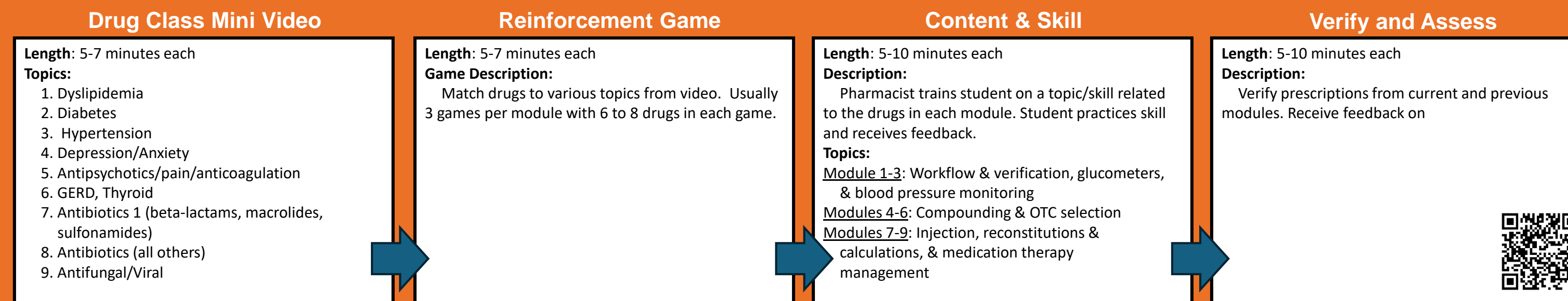**Table 1. Critical Design and Development Components**

ADDIE Phase	Critical Component
Analyze	1) Students have difficulty applying basic drug knowledge to pharmacy practice experience in first year 2) Students have trouble recalling critical information on the top prescribed drugs
Design	1) Objectives developed (apply knowledge from Top Drugs to various real-life pharmacy scenarios) 2) Should reinforce content throughout first year
Develop	1) 18-month process to develop longitudinal the experience; 9 modules 2) Utilized various resources and tools including Adobe Photoshop, Adobe Premiere, green screen
Implement	1) SCORM/xAPI files embedded in Learning Management Software 2) Required to pass by specific date, unlimited attempts
Evaluate	1) Kirkpatrick's model (KPM) of evaluation used ○ Experience surveys (KPM level 1), Completion timeline (KPM level 2), Top 100 exam (KPM level 3/4)

DEVELOPMENT

Figure 1. Screenshots of Activities
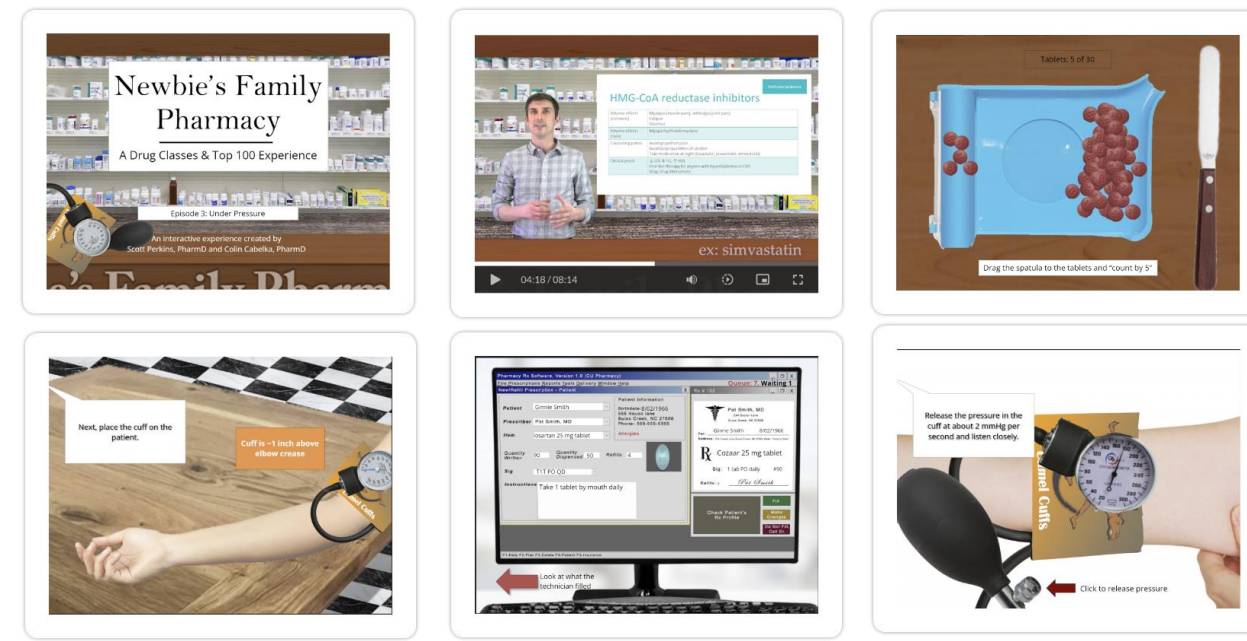
- Modules: 9 simulation modules
- Source material: Largest drug classes in *Sigler's Prescription Drug Cards*
- Length of Development: 18 months
- Tools/Resources:
  - Adobe Photoshop, Adobe Premiere, AI generated images, Articulate Storyline, Voice.ai, Pixabay assets
- Developers: 1 developer
- Games: Matching, slots, roulette, "pointing" gallery
- Verification opportunities: 88
- Number of attempts allowed: unlimited

MODULE PROGRESSION

Drug Class Mini Video
Length: 5-7 minutes each
Topics:
1. Dyslipidemia
2. Diabetes
3. Hypertension
4. Depression/Anxiety
5. Antipsychotics/pain/anticoagulation
6. GERD, Thyroid
7. Antibiotics 1 (beta-lactams, macrolides, sulfonamides)
8. Antibiotics (all others)
9. Antifungal/Viral

Reinforcement Game
Length: 5-7 minutes each
Game Description:
Match drugs to various topics from video. Usually 3 games per module with 6 to 8 drugs in each game.

Content & Skill
Length: 5-10 minutes each
Description:
Pharmacist trains student on a topic/skill related to the drugs in each module. Student practices skill and receives feedback.
Topics:
Module 1-3: Workflow & verification, glucometers, & blood pressure monitoring
Modules 4-6: Compounding & OTC selection
Modules 7-9: Injection, reconstitutions & calculations, & medication therapy management

Verify and Assess
Length: 5-10 minutes each
Description:
Verify prescriptions from current and previous modules. Receive feedback on

IMPLEMENTATION

Figure 2. Implementation Map Pharmacy Practice Skills Courses I, II, and III.

Fall Block 1 (7 weeks) — 1 2 3
Fall Block 2 (7 weeks) — 4 5 6
OSCE 1 Verification/Counseling
OSCE 2 Blood Pressure Monitoring/Verification/Counseling
Spring Block 1 (7 weeks) — 7 8 9
Spring Block 2 (7 weeks)
Casino
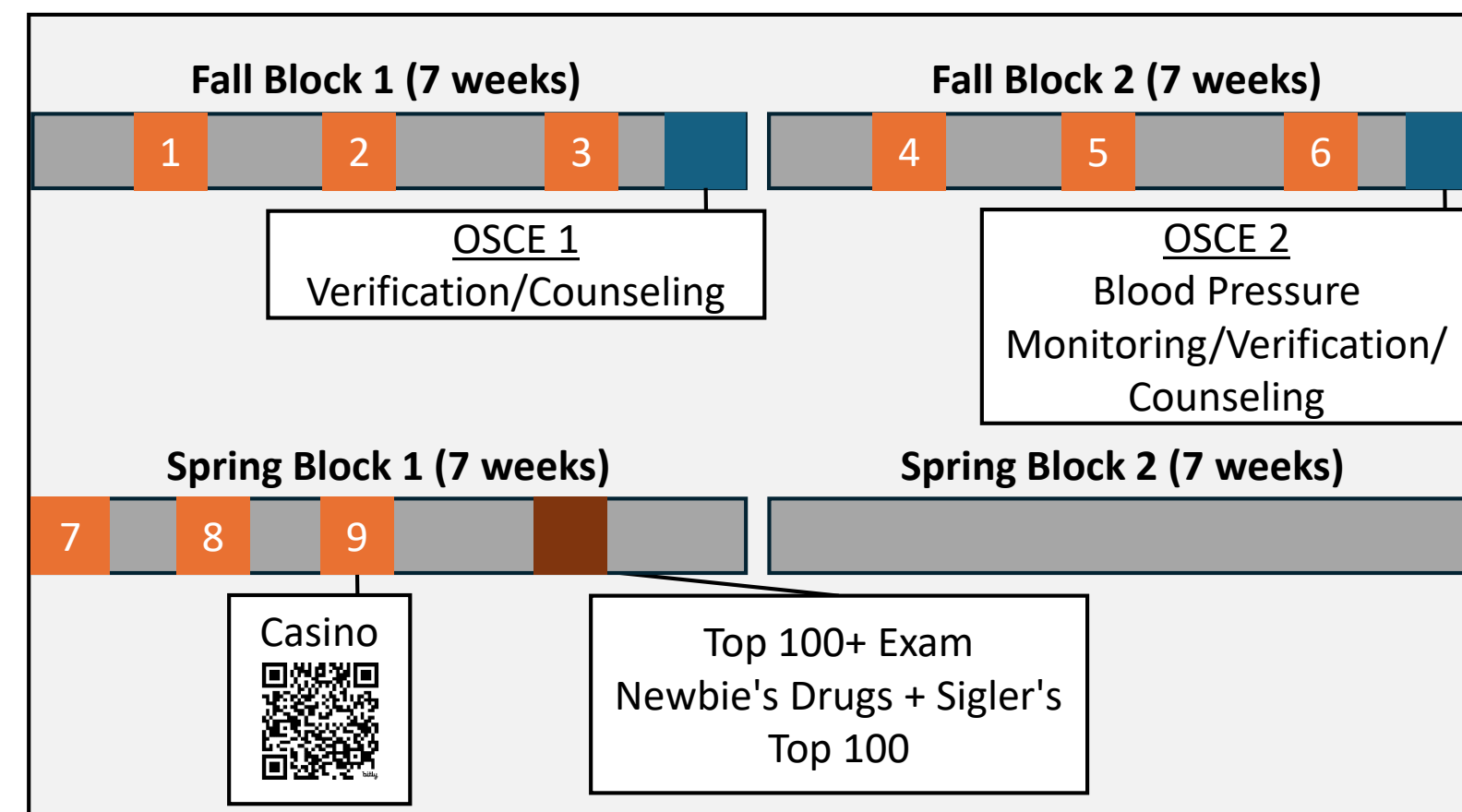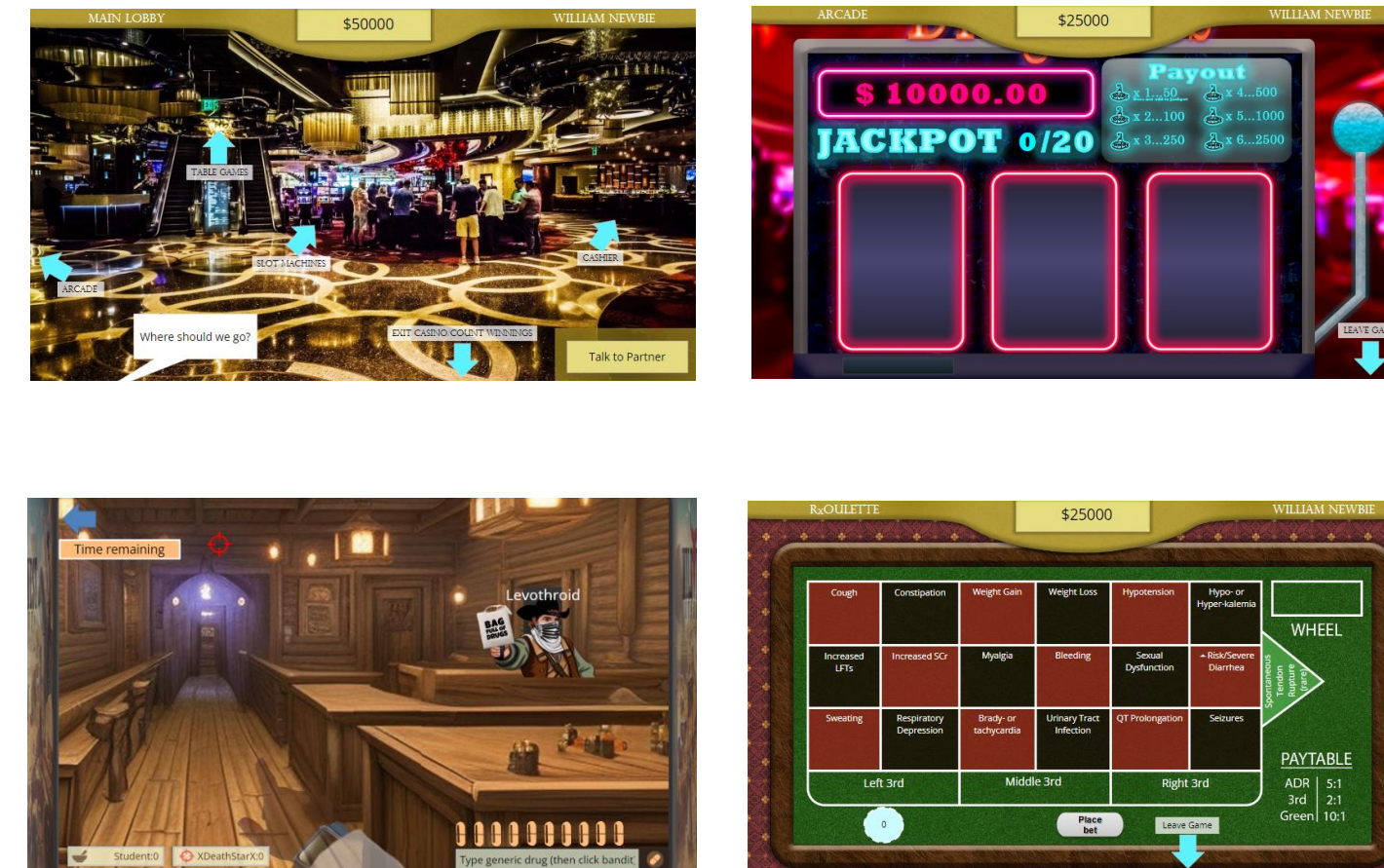Top 100+ Exam Newbie's Drugs + Sigler's Top 100

Figure 3. Episode 9 (Casino) Games

RESULTS

- Most frequently reported facts learned differed between P1s and P2s
  - P1s: ADRs/Counseling Points & Drug Classes
  - P2s: Verification/Pharmacy Workflow
- Trends in student satisfaction differed between groups
  - P1s: Mostly consistent satisfaction scores
  - P2s: Lower satisfaction scores that trended down
- Students who completed the casino (n = 23; 48%) spent an average of 9.9 hours to do so
- Average Top 100 scores differed between those who completed the casino (Millionaires) and those who did not (Non-millionaires) (p=0.09)
  - Millionaires: 94.1
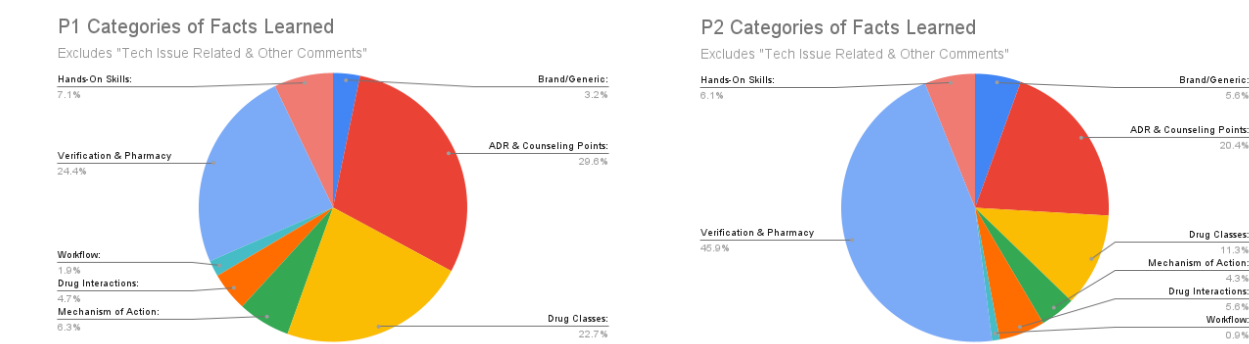 - Non-millionaires: 90.9

Figure 4. Categories of Facts Learned
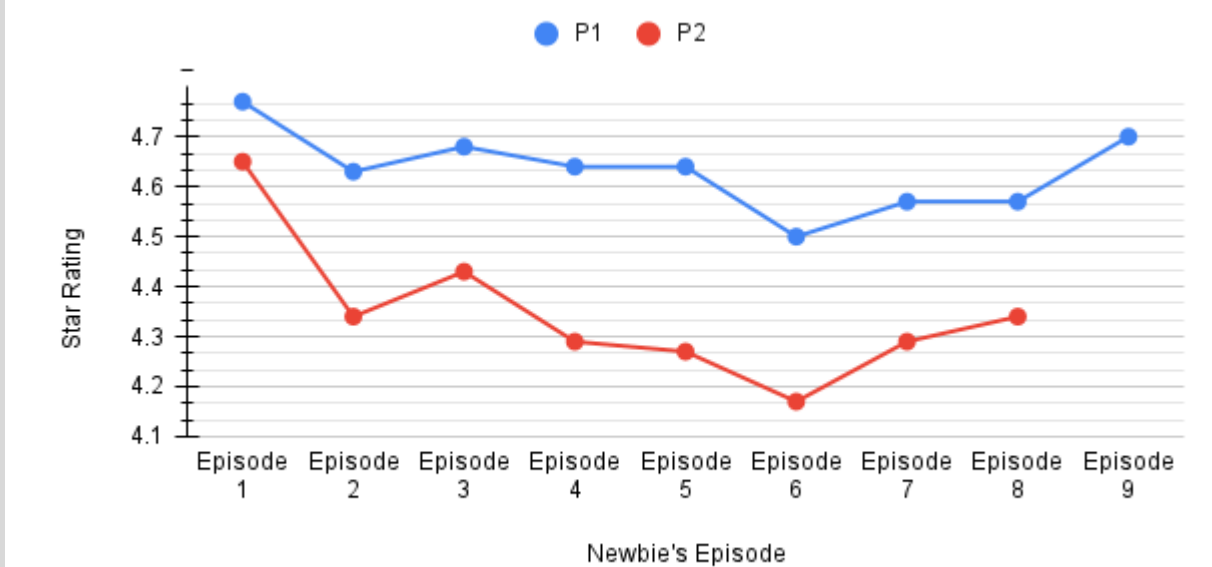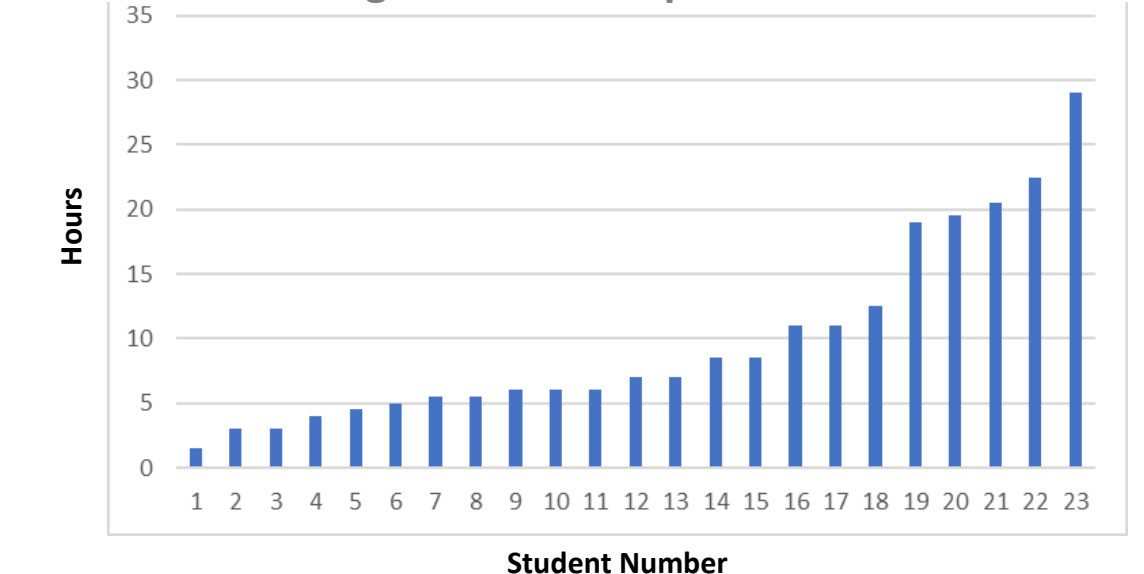

Figure 5. Average Student Satisfaction

Figure 6. Hours Spent in Casino

CONCLUSIONS

- Simulated experiences were highly regarded by both P1 and P2 students.
- Course-relevant, highly interactive simulation may help achieve consistent longitudinal student satisfaction
- Engaging learning games may improve student performance on high-stakes exams.