Using Badges for Test Prep in a Gamified Class about Games

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Overview

1. About the course
2. About the research project
3. Methods
4. Results
5. Discussion
COMM190: Gaming and Interactive Media

- Intro and overview of digital game industries
- Topics include:
  - History of games
  - State of the industry
  - Careers in the industry
  - Legal issues
  - Negative social impact
  - Positive social impact
• Students are placed in ‘guilds’ to collaborate on projects throughout the semester

• Assessment borrows terms from gaming:
  o Experience points (XP): points for grades
  o Crafting: in-class work and homework
  o Questing: research projects
  o Bosses: quizzes and tests
  o Bonus point: extra credit

• Course initially designed and gamified by Dr. Richard Taylor
The Research Project

- Carried out by College of Comm.'s Gaming Group
- Connected to COMM190 final exam
- Badges were awarded for studying behaviors
- Designed as control/treatment experiment
  - Treatment group was allowed access to PSU badge system
  - Control group was not
  - All students were allowed access to test prep materials
- Overarching rationale: Providing badges for studying should motivate students to study more and improve their grades on final exam
The Research Project: Study Materials

- Posted to ANGEL
- Included:
  - Review session during class period
  - Assignment during review session
  - Practice quizzes (one for each topic)
  - Option to create multiple choice test questions (one for each topic)
  - Discussion forum to post and answer questions for each other
The Research Project: Badges

- Created and administered via EGC’s badge system
- Badges were awarded for:
  - Attending review session
  - Signing up for badge system
  - Completing study materials
  - Completing sets of study materials (e.g., all practice quizzes)
The Research Project: Variables

- **Study materials (20 possible)**
  - Completed any?: Yes = 80, No = 21
  - $M = 8.44$, $SD = 5.10$
  - Max. = 20, Min. = 0, Median = 11

- **Badges (26 possible)**
  - All participants ($N = 101$)
    - Completed any?: Yes = 16, No = 85
    - $M = 1.89$, $SD = 5.17$
  - Treatment ($N = 54$)
    - Completed any?: Yes = 16, No = 38
    - $M = 3.54$, $SD = 6.67$
    - Max. = 24, Min. = 0, Median = 0
The Research Project: Variables

- **Motivation**: measured on 7-point scale on final exam
  - **Intrinsic motivation**: personal motivation to learn
    - 4 items: $\alpha = .74$, $M = 4.75$, $SD = 1.01$
    - Ex.: “The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.”
  - **Extrinsic motivation**: motivated by external sources
    - 4 items: $\alpha = .75$, $M = 5.30$, $SD = 1.26$
    - Ex.: “I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.”

- Midterm grade: $M = 85.60$, $SD = 7.66$
- Final exam grade: $M = 80.24$, $SD = 9.18$
Results: Study Materials

H1: Treatment condition should study more
H2: People who engage with badge system should study more
H3: People who are motivated should study more
Results: Study materials

- All tested with linear regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition(^a)</td>
<td>-0.09</td>
<td>-0.80</td>
<td>0.425</td>
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<tr>
<td>Collected badges(^b)</td>
<td>0.36</td>
<td>3.31**</td>
<td>0.001</td>
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<tr>
<td>Int. motivation</td>
<td>-0.08</td>
<td>-0.84</td>
<td>0.406</td>
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<tr>
<td>Ext. motivation</td>
<td>0.05</td>
<td>0.48</td>
<td>0.630</td>
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</table>

Note: \(^a\) = Treatment; \(^b\) = Yes; \(R^2 = 0.12\); * \(p < .01\); ** \(p < .05\); *** \(p < .001\)
Results: Badges

H4: People who are motivated should collect more badges

- Total number of badges completed tested with linear regression
- All participants: Neither intrinsic ($\beta = -0.09, p = .407$) nor extrinsic ($\beta = 0.02, p = .834$) motivation predicted badges collected
- Treatment: Neither intrinsic ($\beta = -0.11, p = .448$) nor extrinsic ($\beta = 0.01, p = .948$) motivation predicted badges collected
Results: Final exam scores

H5: Treatment condition should score higher on the final exam
H6: People who collect badges should score higher on the final exam
H7: People who study more should score higher on the final exam
H8: Intrinsic motivation should be positively correlated with final exam score
H9: Extrinsic motivation should not correlate with final exam score
Results: Final exam scores

• All tested with linear regression

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<tr>
<th>Variable</th>
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<tbody>
<tr>
<td>Condition</td>
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<td>Total badges</td>
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<td>-1.18</td>
<td>.240</td>
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<tr>
<td>Total study materials</td>
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<td>1.33</td>
<td>.188</td>
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<tr>
<td>Int. motivation</td>
<td>-0.20</td>
<td>-1.98*</td>
<td>.051</td>
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<tr>
<td>Ext. motivation</td>
<td>-0.23</td>
<td>-2.33**</td>
<td>.022</td>
</tr>
</tbody>
</table>

Note: *a₁ = Treatment; R² = 0.11; * p < .01; ** p < .05; *** p < .001
Discussion: Collecting badges

- Students will not necessarily collect optional badges
  - 16 of 54 in treatment condition collected badges (29.6%)
- Those who do collect badges are likely to collect many badges
  - 10 of 16 collected 13 or more badges (out of 26 possible)
- Intrinsic and extrinsic motivations to learn did not predict badge collection
  - Measurement may have been problematic (more later)
  - What did motivate those who collected badges?
    - Completionism? Gaming habits? Something else?
Discussion: Study habits

- People who engaged in the badge system completed more study materials
  - Cannot establish causality – engagement was self-selected
    - Treatment condition did not increase use of study materials
    - Possible third variables?
      - Evidently not motivation
      - Completionism?
- Intrinsic and extrinsic motivations to learn did not predict study habits
  - Measurement may have been problematic (more later)
  - Again, what did motivate study habits?
Discussion: Final exam scores

- Treatment and number of badges did not improve final exam scores
  - Neither did use of study materials, which suggests study materials may not have been that helpful
    - Would badges improve scores if connected to better study materials?
- Intrinsic and extrinsic motivations predicted final exam scores in the WRONG direction
  - Problematic measurement?: Items measured during test
    - Social desirability?
  - Third variables (e.g., stress)?
Questions?

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Thanks!