Enhancing Digital Heritage Archives Through Gamified Annotations

By
Mr. Job King’ori Maina

Supervisor
Associate Professor Hussein Suleman
1. Introduction

Objective
Investigate how we can enhance digital heritage archives using annotations and gamification.

And how they impact the user’s engagement with the digital heritage archive.
1.1 Introduction: Annotation

An annotation is metadata (e.g. a comment, explanation, presentational markup) attached/superimposed to text, image, or other data.

Figure 1: Example of annotation layered over content
1.2 Introduction: Gamification

Use of game design elements in non-gaming contexts to motivate users, increase user-activity and user-retention

Figure 2: Leaderboard, badges and challenges as user incentives
2. Problem Statement

Digital heritage archives have **focused on the collection of information:**

- Content is often fixed, presented as showcase
- Built for preservation purposes
- Largely the work of professionals in a particular domain

Gamified annotations could be the middle ground:

- Experts collect and present in a heritage archive
- Annotations as the user’s core activity
- Gamification as the incentive for the user to participate
2.1 Motivating Case Study - genius.com

The Great Gatsby (Chapter III)
F. Scott Fitzgerald

There was music from my neighbor’s house through the summer nights. In his blue gardens men and girls came and went like moths among the whisperings and the champagne and the stars. At high tide in the afternoon I watched his guests diving from the tower of his raft, or taking the sun on the hot sand of his beach while his two motor-boats slit the waters of the Sound, drawing aquaplanes over cataracts of foam. On week-ends his Rolls-Royce became an omnibus, bearing parties to and from the city between nine in the morning and long past midnight, while his station wagon scampered like a brisk yellow bug to meet all trains. And on Mondays eight servants, including an extra gardener, toiled all day with mops and scrubbing-brushes and hammers and garden-shears, repairing the ravages of the night before.

Every Friday five crates of oranges and lemons arrived from a fruiterer in New York — every Monday these same oranges and lemons left his back door in a pyramid of pulpless halves. There

Furthermore, moths are particularly significant because they are tragic creatures; they move toward light for a sense of security, only to find that the light source is actually a harbinger of death. Comparing Gatsby’s guests to moths implies that they are attracted to the brightness of the party’s extravagance.

Figure 3: User have uploaded and annotated other content apart from rap lyrics (poetry, movie scripts, speeches, literature etc.)
2.2 Motivating Case Study - genius.com

Figure 4: Users receive IQ points for their contributions and peer endorsements
3. Research Questions

Are gamified annotations an effective tool to increase the number and quality of annotations submitted to a digital heritage archive?

– Are gamified annotations an appropriate approach for digital heritage archives?

– Does the gamification of annotations improve the number and the quality of annotations submitted in digital heritage archives?
4. Annotated Bleek & Lloyd

Implement gamified annotations on an already existing digital heritage archive.

Figure 5: The Digital Bleek and Lloyd archive
4.1. System Design

Annotation Engine
- JSON REST API
- Requests from client via AJAX over HTTP

Enhanced Digital Archive
- Original Bleek & Lloyd Archive (Khoisan heritage)
- Static website (no database)
- Client-side JavaScript to provide annotation functionality

Figure 6: Component Systems
4.1.1 Annotation Widgets

Figure 7: Image annotation

Figure 8: Text annotation
4.1.2 Gamification Elements

Figure 9: Annotated Bleek & Lloyd with a leaderboard
5. Methodology: Experimental Prototype

The core research method was centered on an experimental prototype.

Implement gamified annotations on the archive.

- Two modes of operation
- Ability for the user to create persistent annotations
- Gamification added as a feature that can be turned on or off
- Test the system with actual users
5.1. Methodology: Usability Evaluation

- System Usability Testing
  - Based of U.S.E Questionnaire by A.M. Lund
  - Tested for:
    - Usability
    - Ease of Use
    - Satisfaction
    - Ease of Learning
  - 11 participants to provide an expert evaluation
  - Positive feedback (used to improve system where necessary)
5.2. Methodology: Final Experiment

- User’s rank according to points scored
  - 16 annotating participants (out of 61 registered users)
  - Majority of the 16 were gamified (62.50%)
  - First half dominated by gamified users (6 out of 8)
  - Second half dominated by un-gamified users (4 out of 8)
5.3. Methodology: Final Experiment

• Relevance of annotating content to subject matter

  – 117 image annotations, 150 text annotations (267 total)
  – Categorized into relevant and feedback groups
  – 108 of the 117 (96.3%) image annotations were considered relevant
  – Only 16 of 150 (12.5%) text annotations were considered relevant

<table>
<thead>
<tr>
<th>Category</th>
<th>Text</th>
<th>Images</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gamified</td>
<td>Un-gamified</td>
</tr>
<tr>
<td>Feedback</td>
<td>86 (64.2%)</td>
<td>48 (35.8%)</td>
</tr>
<tr>
<td>Relevant</td>
<td>14 (87.5%)</td>
<td>2 (12.5%)</td>
</tr>
</tbody>
</table>
5.4. Methodology: Final Experiment

• System Survey
  – 20 survey responses
  – Investigate motivation for viewing, revisit, contribute & share
  – Used 7 different characteristics of the gamified annotation system
  – In each instance user response was positive and consistent
  – Users prefer viewing annotations from other users and not only their own (possible future work)
6. Conclusion

A successful annotation system, particularly for digital heritage archives, could go a long way to provide rich metadata for younger generations to make use of and learn more about heritage objects.

Gamified annotations could improve viewership, sharing, learning and conversation around digital heritage content.

Thank you.