

# Gamification in Educational Software Development

Achilleas Buisman & Marko van Eekelen



# Educational Software Development

- ▶ Course in IT studies
- ▶ Building software
- ▶ Real clients and products
- ▶ Learning new skills

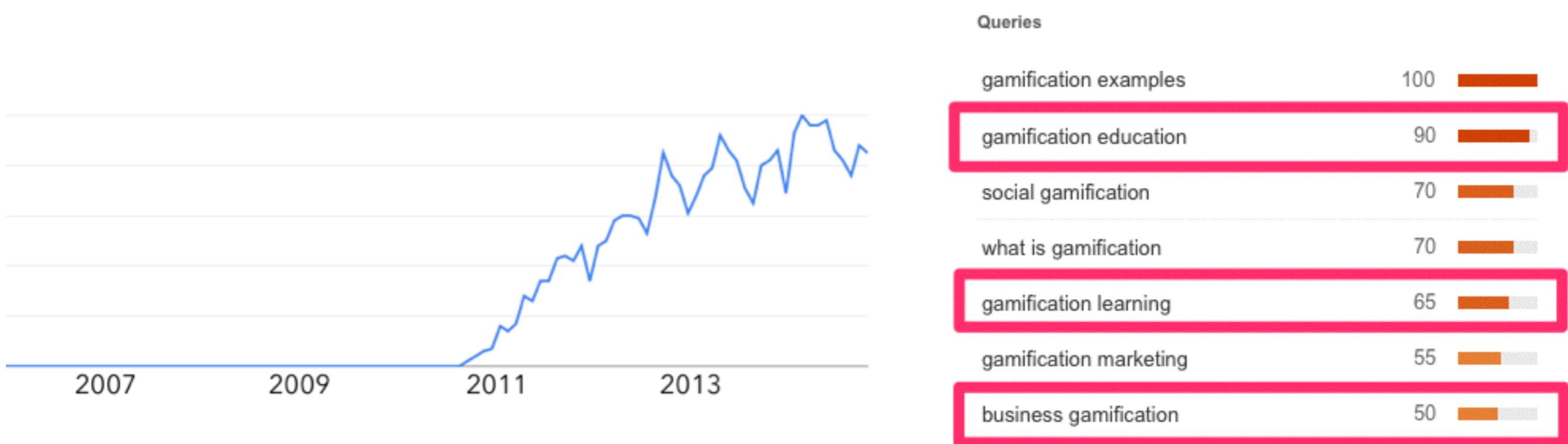
# Challenges in ESD

- ▶ Many new skills
- ▶ Limited amount of time
- ▶ Limited resources (manpower)
- ▶ Individual supervision

# Goals

- ▶ Automated supervision
- ▶ Learn through doing: Use the provided tools
- ▶ Motivate students early

# Gamification



Google search interest



Our Solutions

Our Products

Our Customers

Our Story

# Boost Community Engagement

B2B Leader Marketo Increased Active Community Users by 51%

[SEE THE CASE STUDY >](#)[SEE THE VIDEO >](#)

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Tony Adalieri

CEO

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Suite 200

Palo Alto, CA 94301

US

1,220 Points

Level 5

780 Points until Level 6



What is Badgeville? →

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**NEW TO GAMIFICATION?**  
**WE'VE GOT YOUR BACK.**

**JUST FOLLOW THE STEPS**

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The Most Interesting Revolutionizing T World

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## The Gamification of Business

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By Brian Burke

Gartner, Inc.



When designed correctly, gamification has been successful in engaging people and motivating behaviours, develop skills or solve problems. Of the features used in real games, gamification can also turn other types of activities into games.

# Gamification

*“Applying game elements to non-game contexts”*

# Gamification

*“Applying game elements to non-game contexts”*

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Massachusetts Institute of Tec... - Computer Science and...  4.81 [Follow](#)

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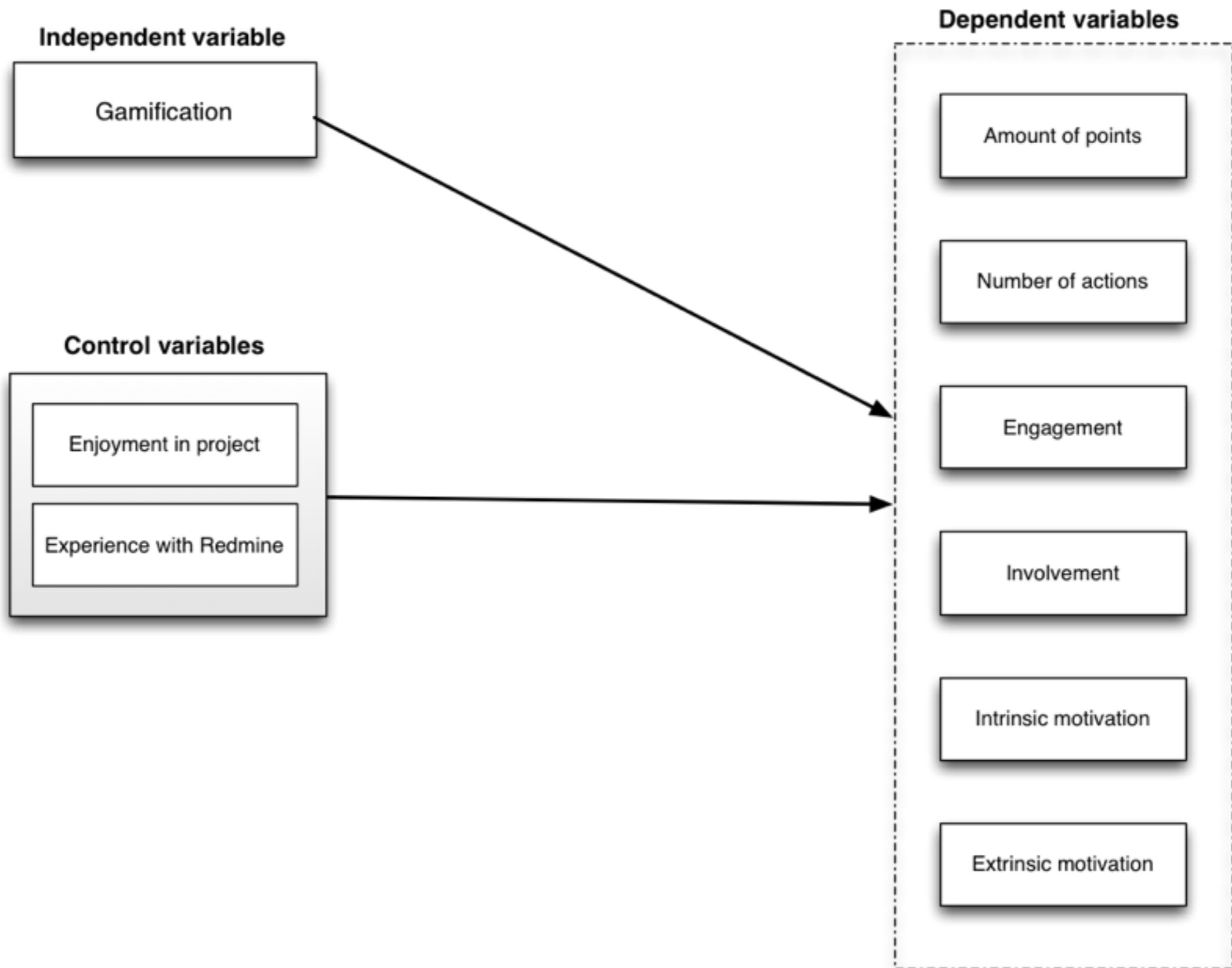
 Massachusetts Institute of Technology  
Computer Science and Artificial Intelligence Labo...  
MA, United States



# Research Question

- ▶ To what extent does gamification lead to students using ESD tools more?
- ▶ To what extent does gamification affect the engagement, involvement and motivation of students in ESD?

# Conceptual Model



# Case Study



Radboud University



Redmine

# Methodology

- ▶ Experiment over 6 months
- ▶ 3 groups
- ▶ Survey: Engagement, Involvement, Motivation
- ▶ Final data set: 57 observations
- ▶ MANCOVA & post-hoc analyses

# ⌚ Your Activity Points: 1969

🏆 You are ranked 69 out of 81

September

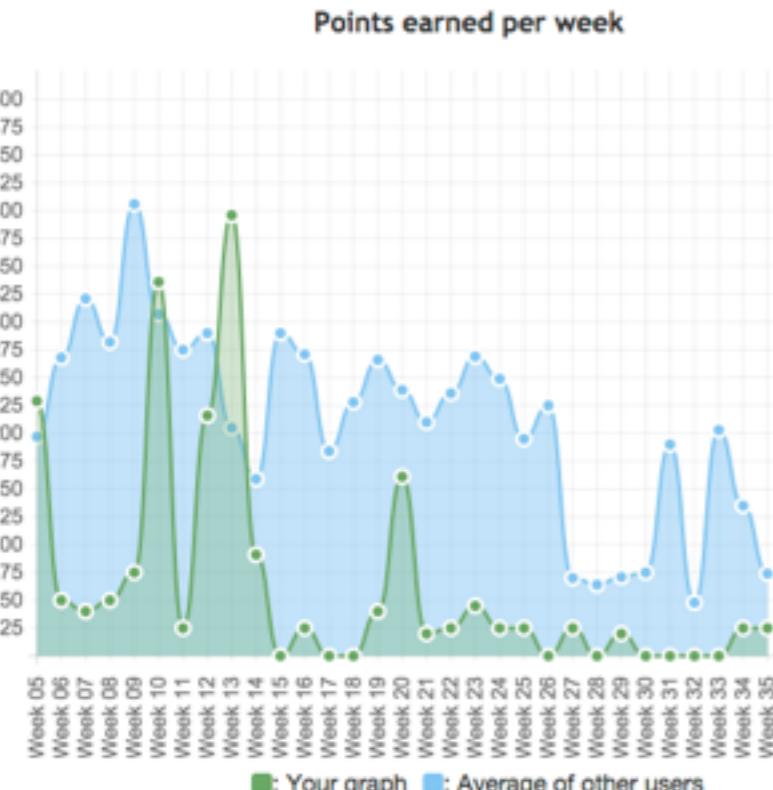
25

This Week

25

Today

25



Achilleas Buisman

My Activity Points: 1969

Today: 25

## Ranking

🏆 You: 69 / 81

- 67 : F...G (2450)
- 68 : T...K (2391)
- 69 : Achilleas Buisman (1969) ←
- 70 : E...H (1779)
- 71 : S...C (1638)
- 72 : J...V (921)

## Latest activities

01 Sep 2014

14:11 5 Viewed project issues of Directorate

14:11 20 Viewed the welcome page

31 Aug 2014

09:07 5 Viewed project issues of Directorate

09:07 20 Viewed the welcome page

22 Jul 2014

13:28 20 Viewed the welcome page

11 Jul 2014

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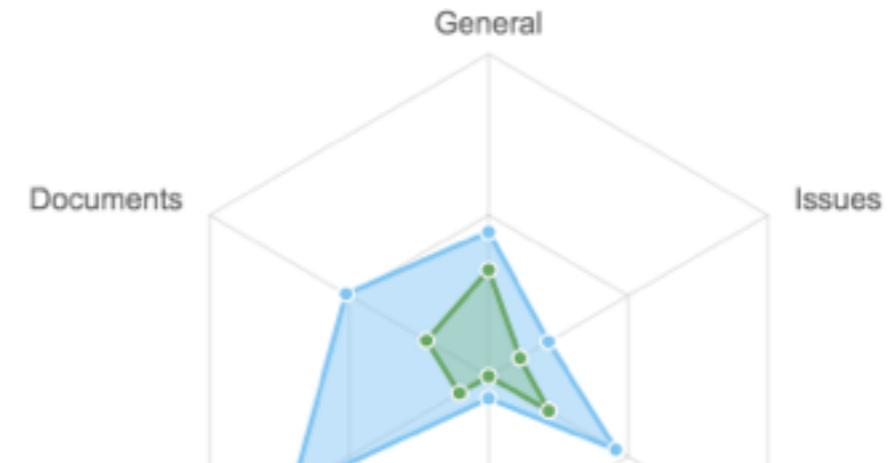
Today

25

Points earned per week



Points earned per subject



Search

Jump to a project...

Achilleas Buisman

My Activity Points: 1969

Today: 25

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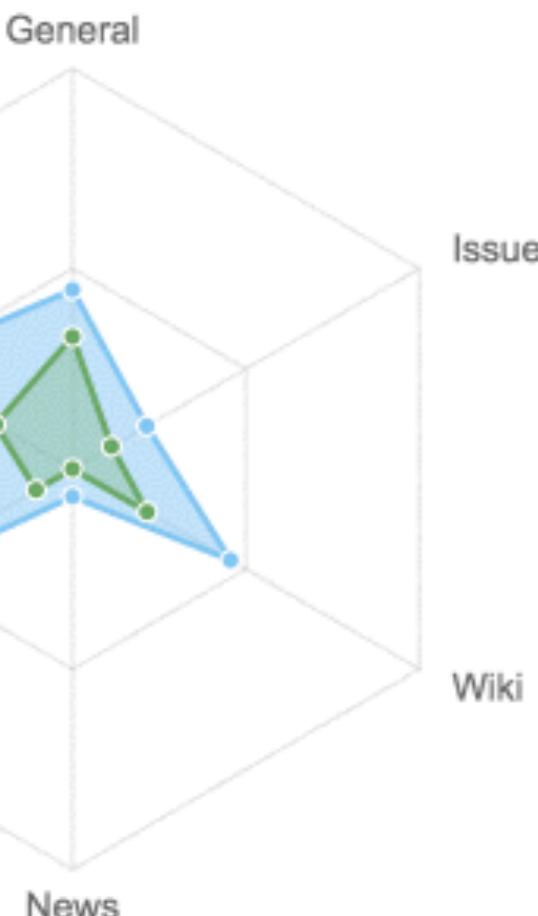
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## Latest activities

ned per subject



: Average of other users

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72: J..**Late****01 Sep**

14:11

14:11

**31 Aug**

09:07

09:07

**22 Jul**

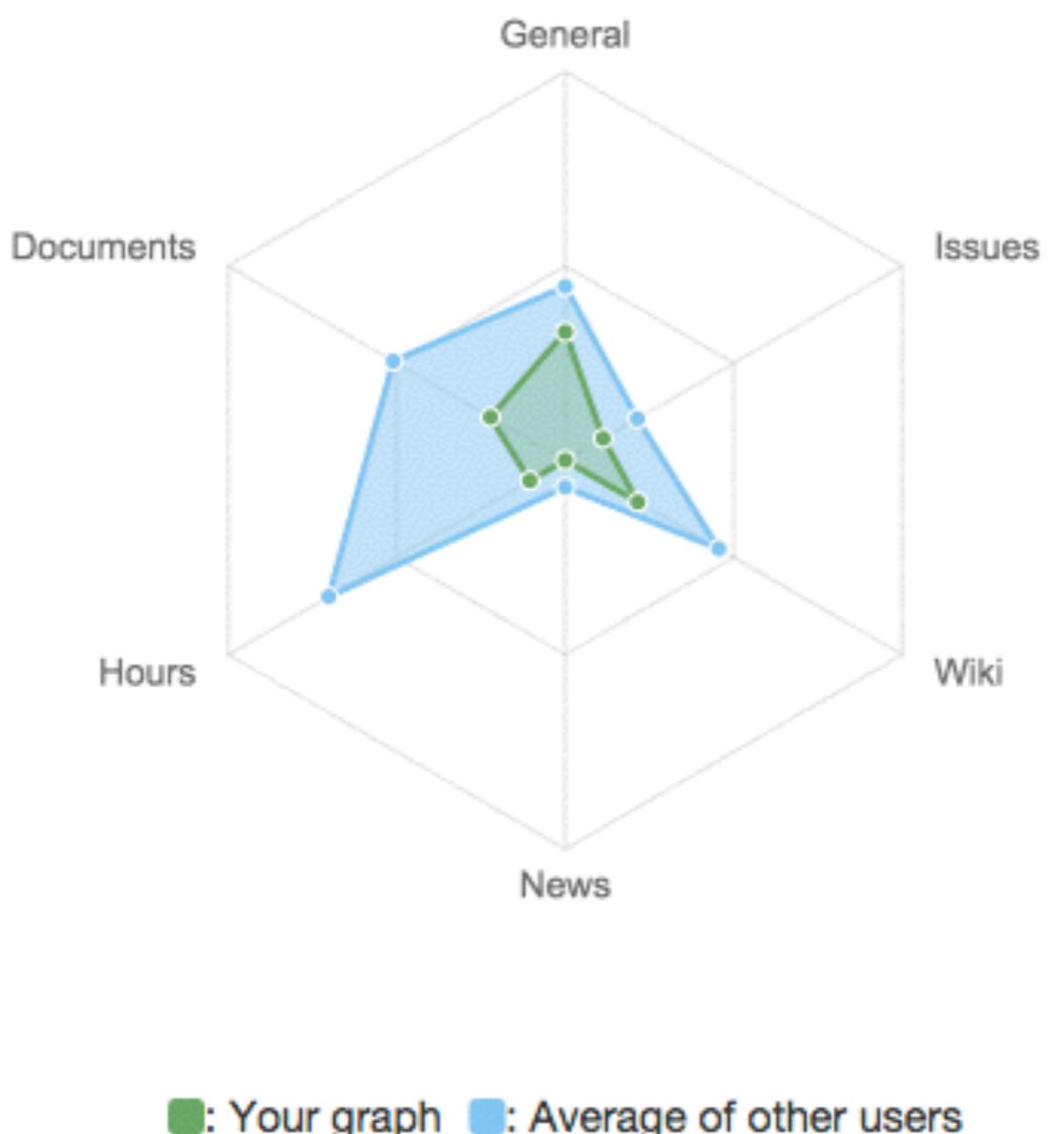
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**11 Jul**

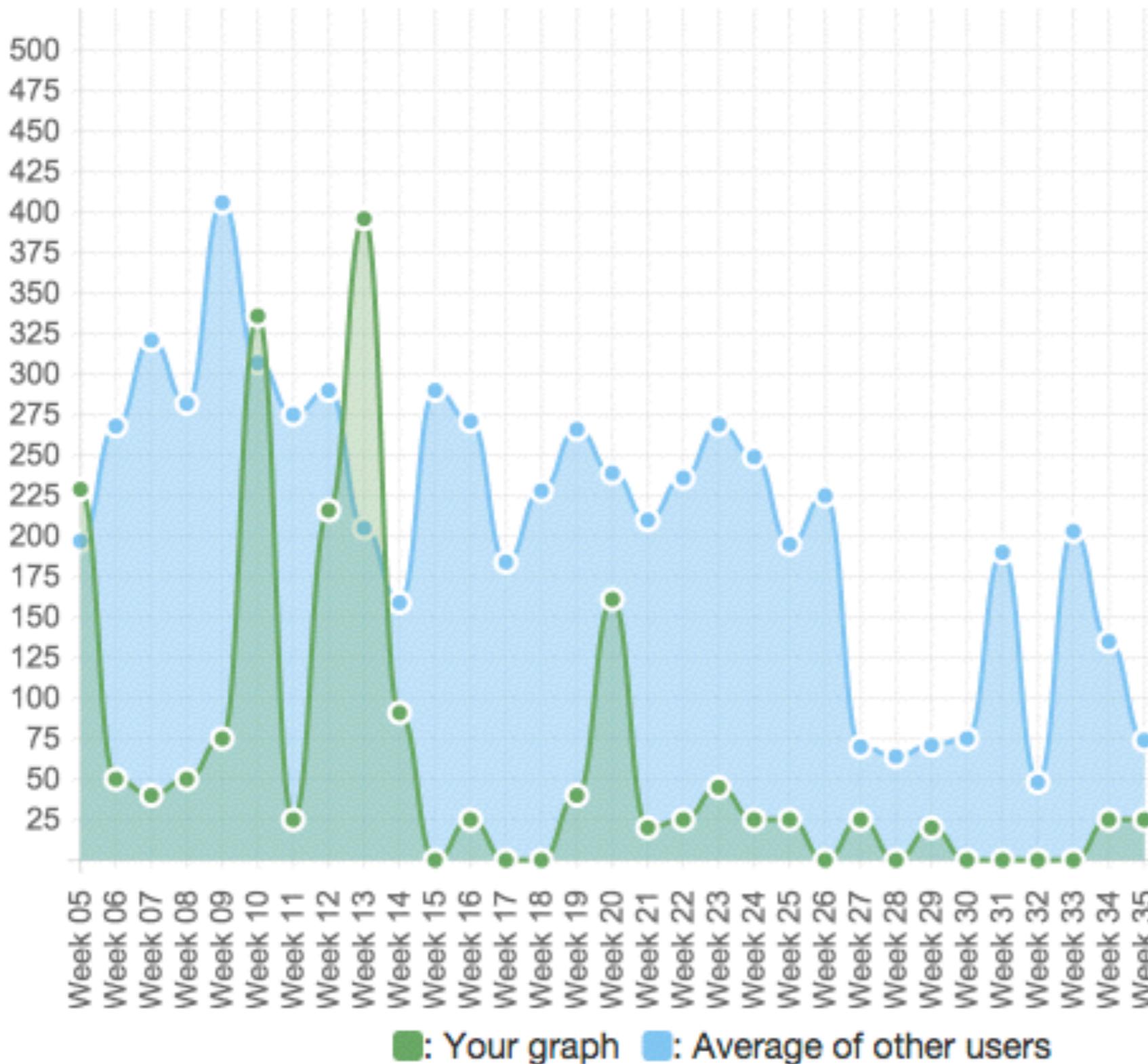
21:19

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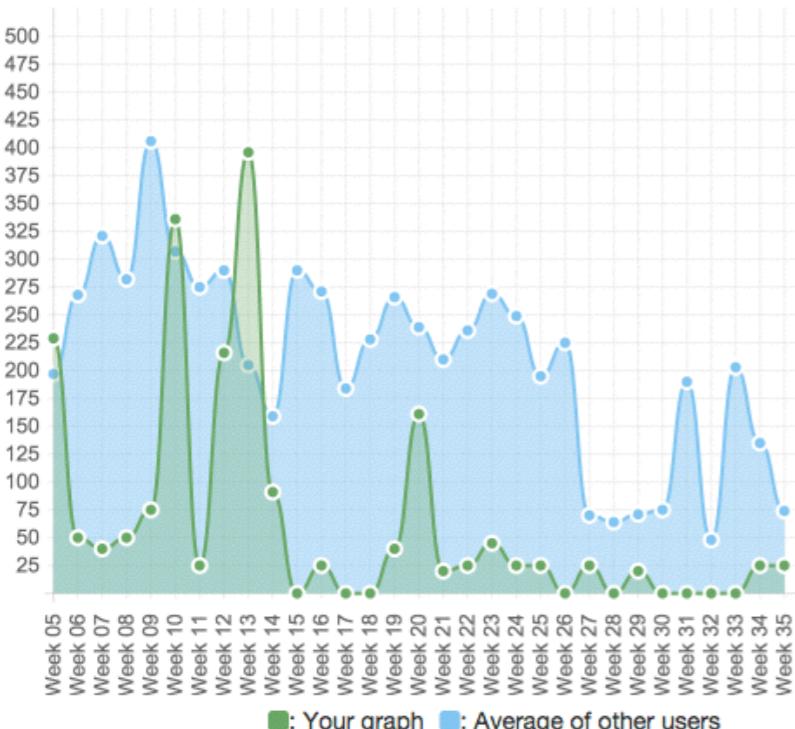
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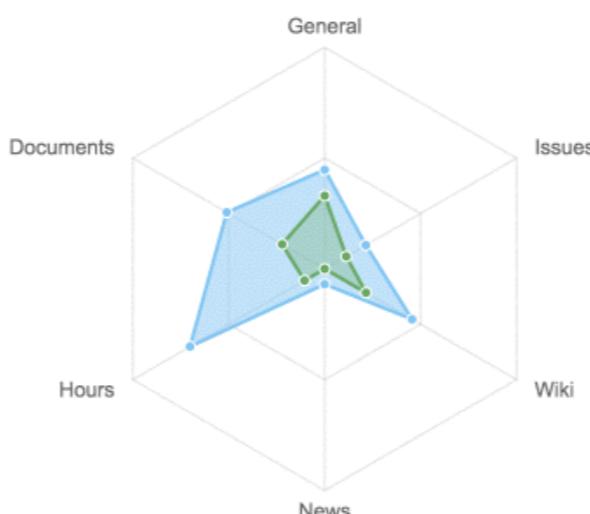
Today

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Points earned per subject



■: Your graph ■: Average of other users

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11 Jul 2014

21:19 5 Viewed project issues of Directorate

21:19 20 Viewed the welcome page

# Your Activity Points: 2230

October

236

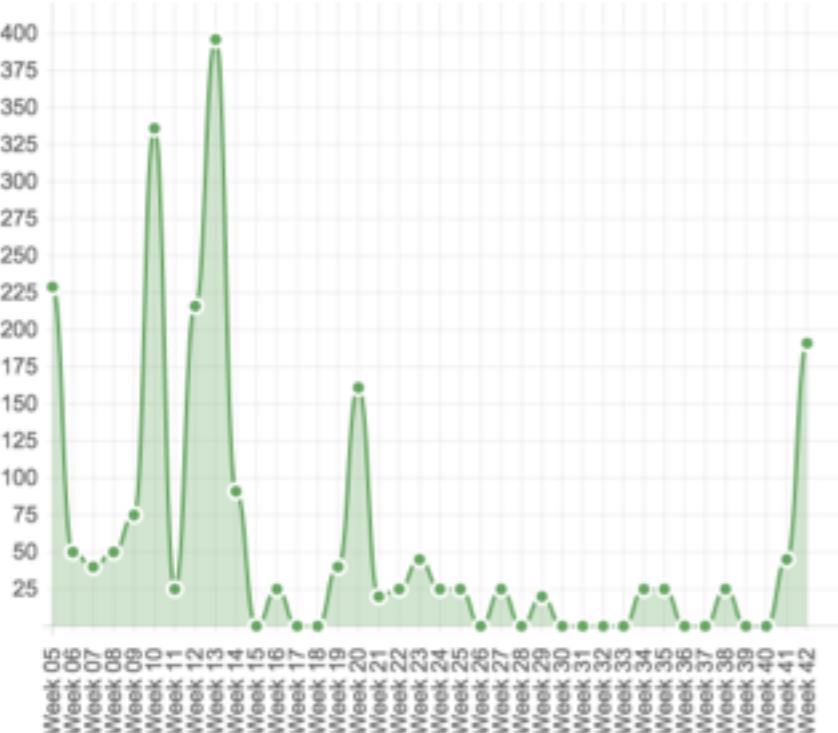
This Week

191

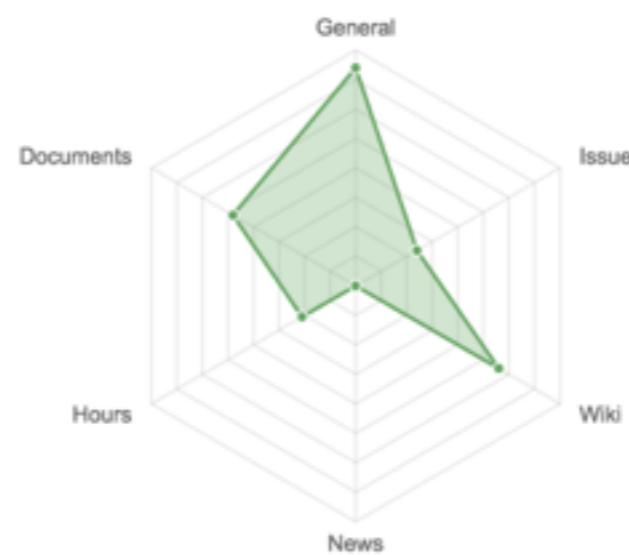
Today

0

Points earned per week



Points earned per subject



Achilleas Buisman

My Activity Points: 2230

Today: 0

## Latest activities

20 Oct 2014

20:23 60 Created wiki page Logo

20:17 10 Read wiki page: Gebruikersaccounts

20:17 12 Download a file

20:17 12 Download a file

20:17 10 Read wiki page: Wiki

20:17 10 Read wiki page: Wiki

20:18 12 Download a file

20:16 10 Read wiki page: Telephone

20:10 10 Read wiki page: Website

20:10 10 Read wiki page: Wiki

20:10 10 Read wiki page: Wiki

20:10 5 Viewed project issues of Directorate

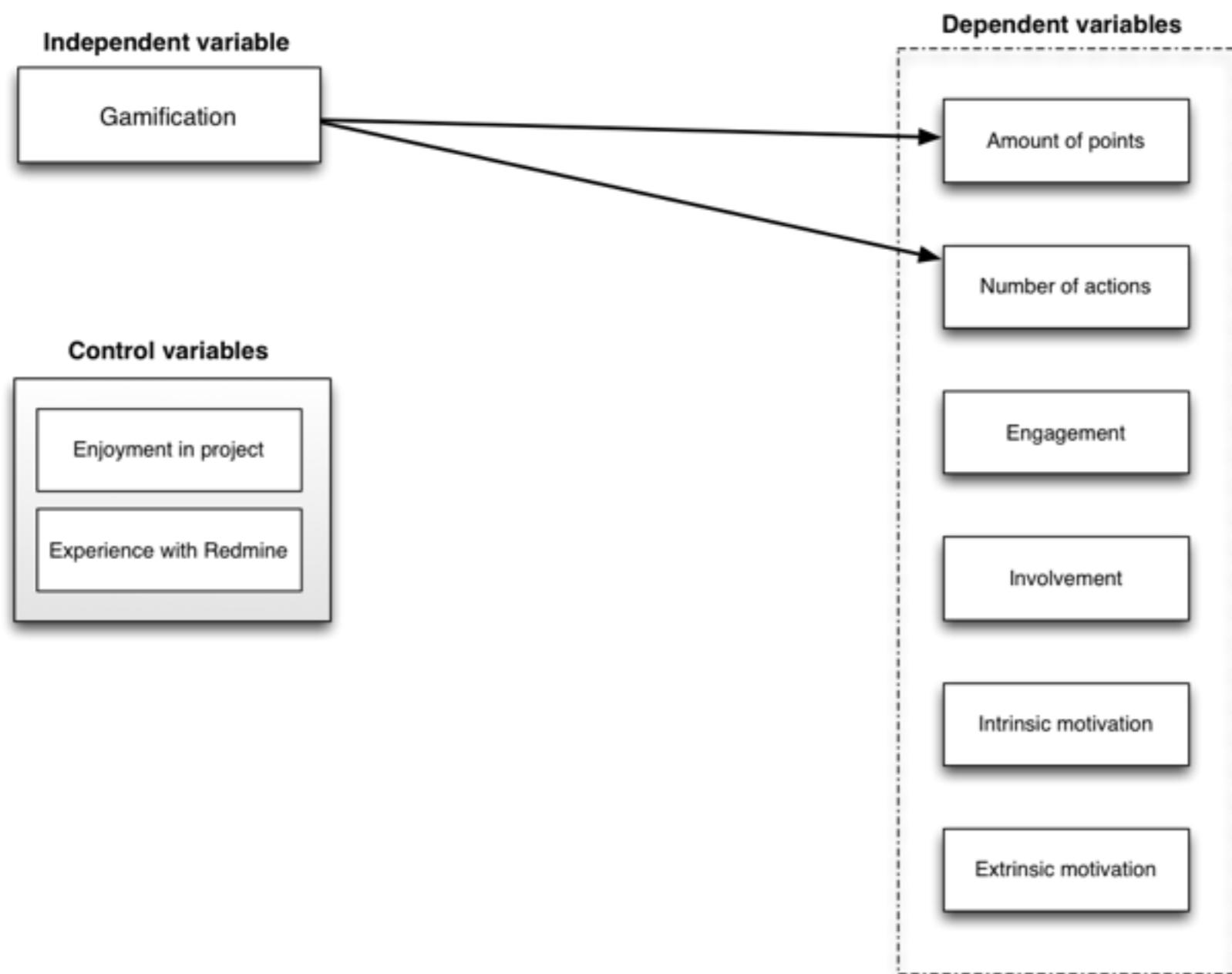
20:10 20 Viewed the welcome page

14 Oct 2014

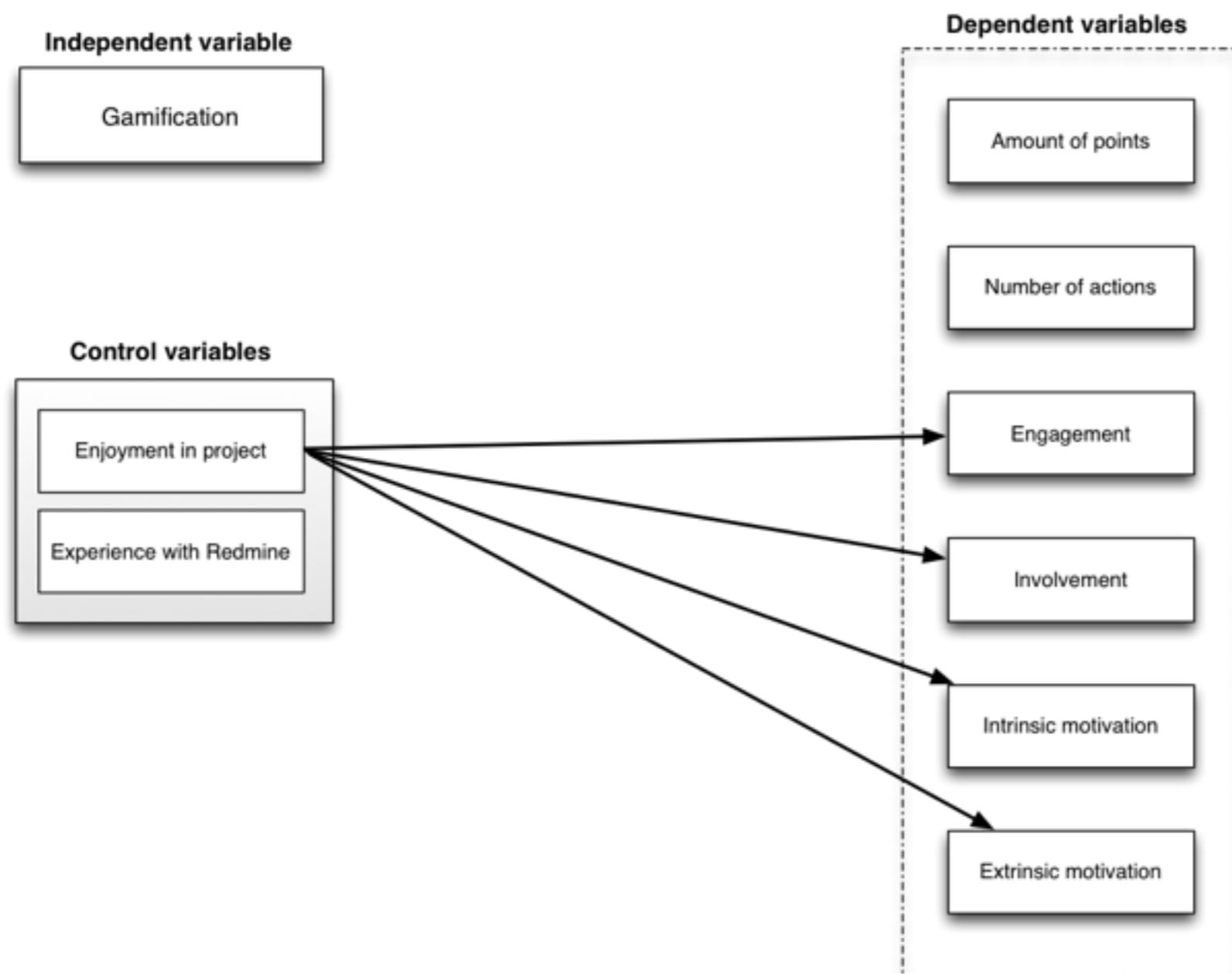
08:41 5 Viewed project issues of Directorate

Experimental Group	Size	Percentage
Gamified with comparison	20	35.1%
Gamified	19	33.3%
No gamification	18	31.6%

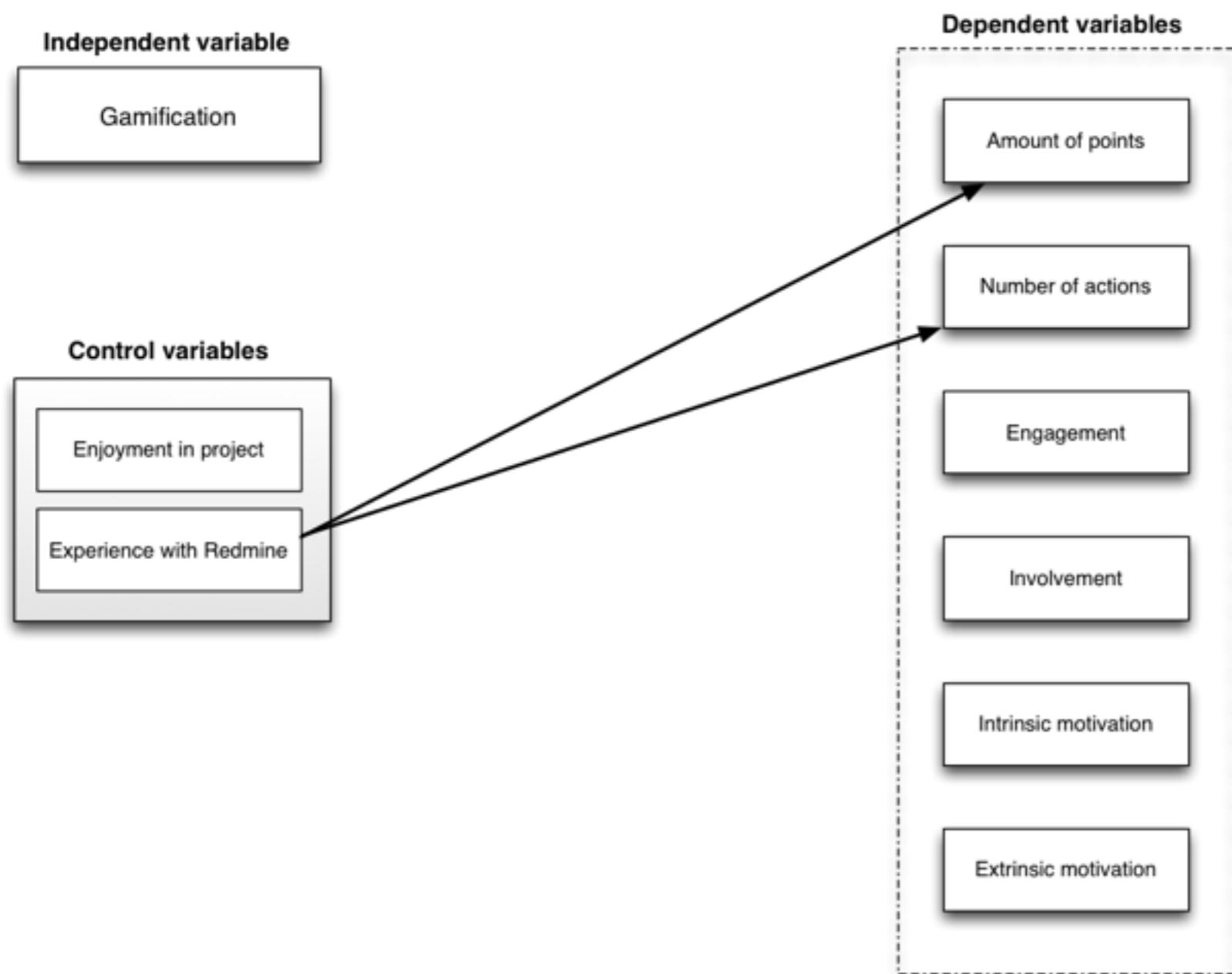
# Results



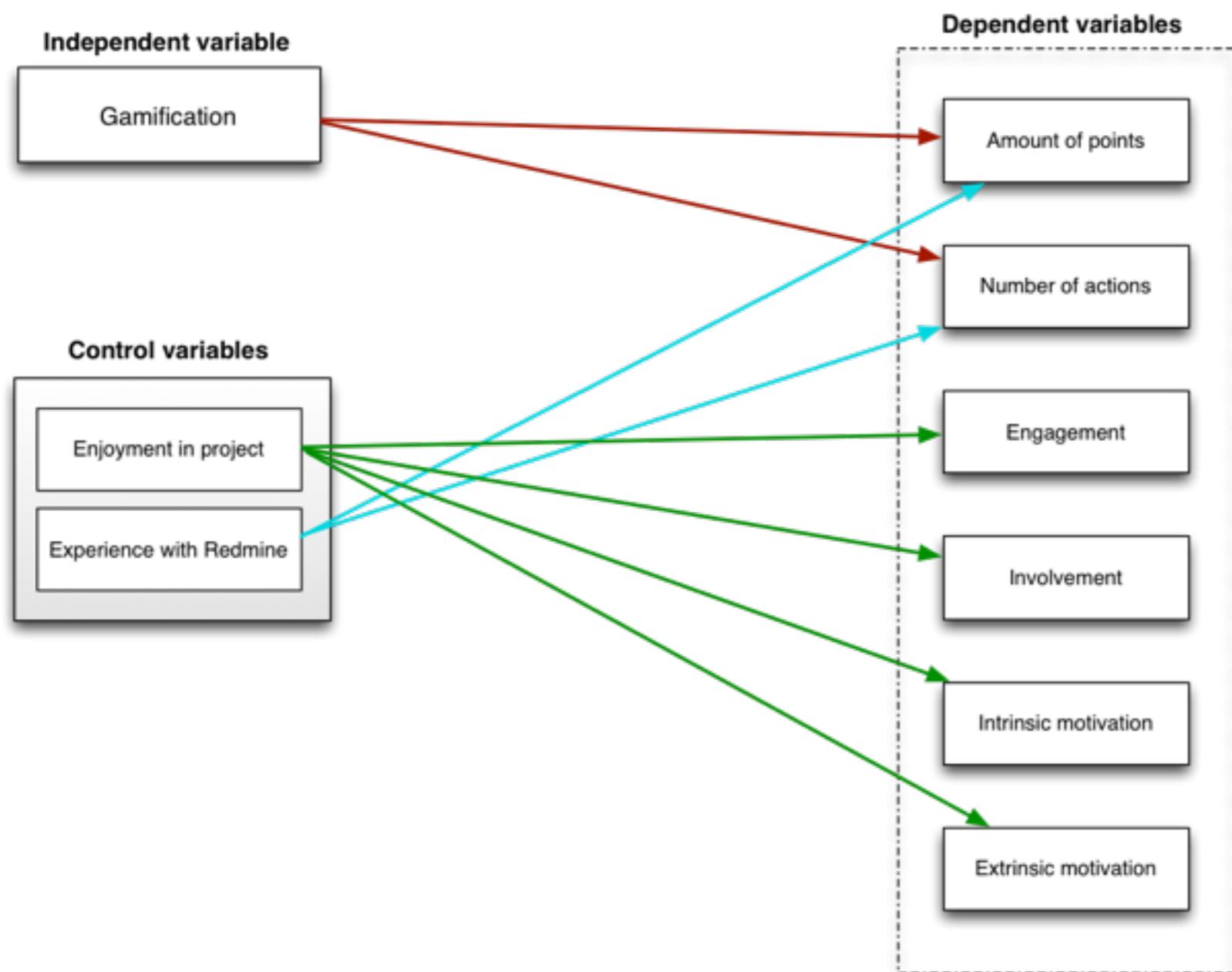
# Results



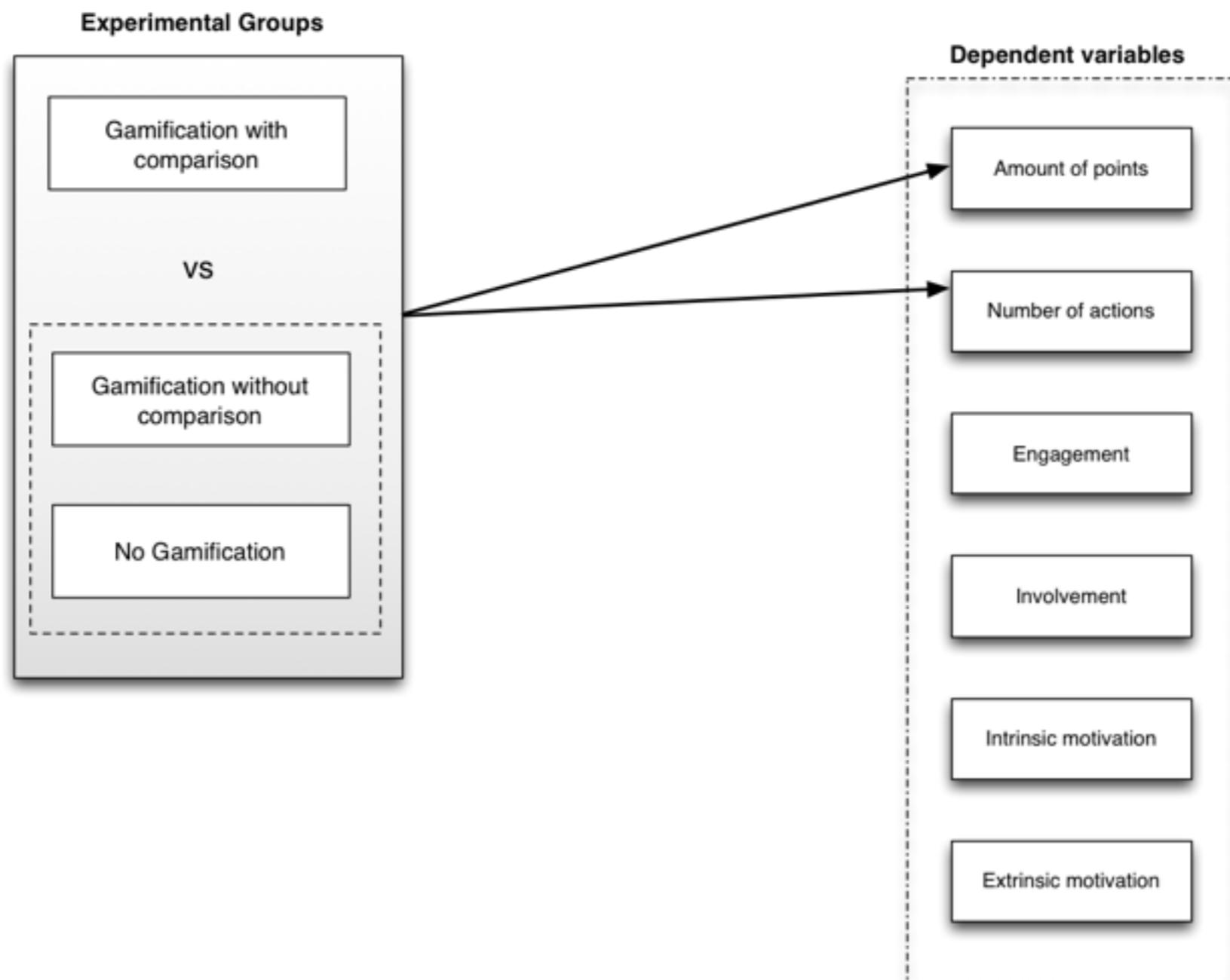
# Results



# Results



# Results



# Results

Group	Eng.	Inv.	Mot.int	Mot.ext	#Points	#Actions
Gamified with comparison	3.95	4.46	4.20	4.10	6042	962
Gamified	4.58	4.97	4.95	4.56	4079	581
No gamification	3.98	4.38	4.29	4.11	3916	546

# Results

- ▶ The gamification had significant effect on student's use of Redmine.
- ▶ Gamification with comparison feature has significantly increased the use of Redmine with students.
- ▶ Gamification without comparison has no significant effect over no-gamification.
- ▶ Enjoyment in the project has a significant effect on engagement, motivation and involvement with the company.
- ▶ Experience with Redmine has a significant effect on student's use of the tool.
- ▶ Enjoyment in the team has a significant effect on enjoyment in the project.

# Meaning

- ▶ Gamification can be used in ESD to increase the use of tools.
- ▶ Being able to compare yourself to others is needed to encourage the use of these tools.
- ▶ Experience with the tools also leads to more usage.

# Implications

- ▶ The more students like working on their projects, the more meaning and purpose they will feel in their work and the more motivated they will be.
- ▶ Extrinsic motivators by themselves are not effective tools to stimulate use of tools.

# Implications

- ▶ ESD courses will have to attract enjoyable projects.
- ▶ Engage students in choosing projects
- ▶ Measure project enjoyment

# Implications

- ▶ ESD course designers will have to make sure that students have good team working experiences
- ▶ Let students form teams
- ▶ Personality matching
- ▶ Team building exercises
- ▶ Measure team satisfaction throughout the semester

# Implications

- ▶ Train students to work with the tools used in the course at the beginning.

# Future research

- ▶ Repeat with larger/different sample
- ▶ Balancing of given points
- ▶ Measure engagement and motivation earlier
- ▶ Alternative method of measuring attitude
- ▶ Alternative sources for points

# Future research

- ▶ Applied gamification could be expanded to include other actions.

The screenshot displays the tryGit interface, which is a web-based tool for learning Git. It features a terminal window at the top and a repository viewer below it.

**Terminal Window:**

- Section title: 1.6 - Committing
- Description: Notice how Git says changes to be committed? The files listed here are in the Staging Area, and they are not in our repository yet. We could add or remove files from the stage before we store them in the repository.
- Text: To store our staged changes we run the commit command with a message describing what we've changed. Let's do that now by typing:
- Code input field: `git commit -m "Add cute octocat story"`
- Output:

```
$ git status

# On branch master
# Initial commit
# Changes to be committed:
#   (use "git rm --cached <file>..." to unstage)
#       new file:  octocat.txt

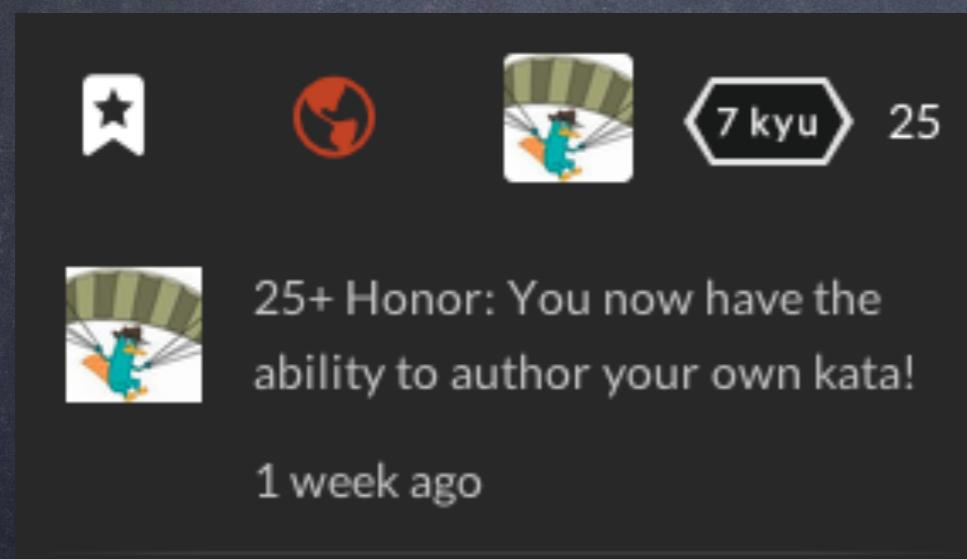
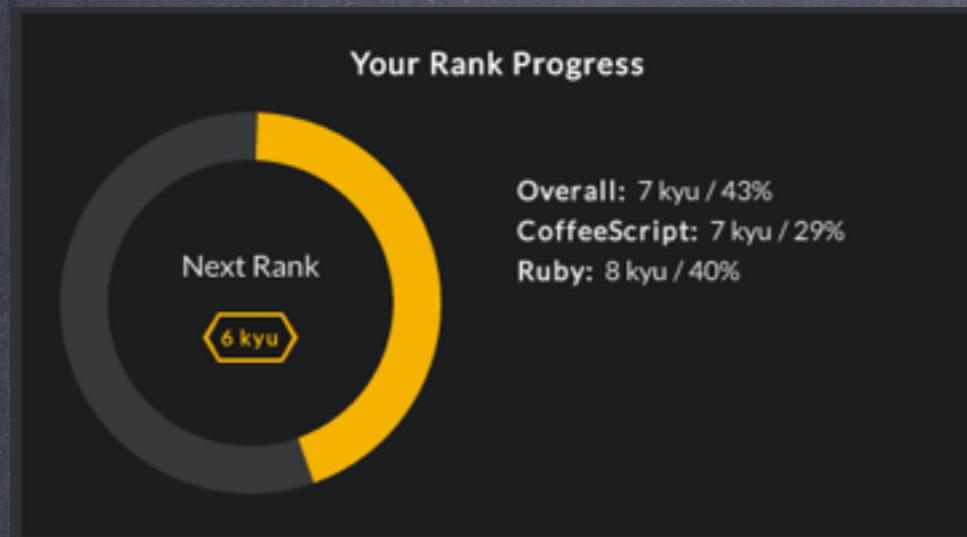
Success!
$ git commit -m "Add cute octocat story"
```

**Repository Viewer:**

- Title: My Octobox Repository
- File list: .git, octocat.txt
- Advice panel:
  - Staging Area:** A place where we can group files together before we "commit" them to Git.
  - Commit:** A "commit" is a snapshot of our repository. This way if we ever need to look back at the changes we've made (or if someone else does), we will see a nice timeline of all changes.

# Future research

- ▶ Other game elements:
  - ▶ Negative feedback vs. positive feedback
  - ▶ Badges
  - ▶ Characters
  - ▶ Avatars
  - ▶ Real-life challenges



codewars.com

mozilla Backpack mozilla

## Super Cool Badges

Coming soon: even MORE super cool badges...

### Badges 101

Issuer Details	
Name	Open Badges
URL	<a href="http://www.openbadges.org">http://www.openbadges.org</a>
Organization	Mozilla Foundation
Badge Details	
Name	Badges 101
Description	You really get badges!
Criteria	<a href="http://badges-101.openbadges.org/">http://badges-101.openbadges.org/</a>

### Web Navigator

Issuer Details	
Name	Hackasaurus
URL	<a href="http://navigator-badge.hackasaurus.org/">http://navigator-badge.hackasaurus.org/</a>
Organization	Experimental Badge Authority
Badge Details	
Name	Web Navigator
Description	Can operate a Web browser with celerity.
Criteria	<a href="http://teolness.github.io/hackasaurus-parable/navigator-badge/">http://teolness.github.io/hackasaurus-parable/navigator-badge/</a>

[openbadges.org](http://openbadges.org)

mosselman



0



41

0 / 50

41 / 150

1

Avatar

Backgrounds

Stats &amp; Achievements

Profile

## Body

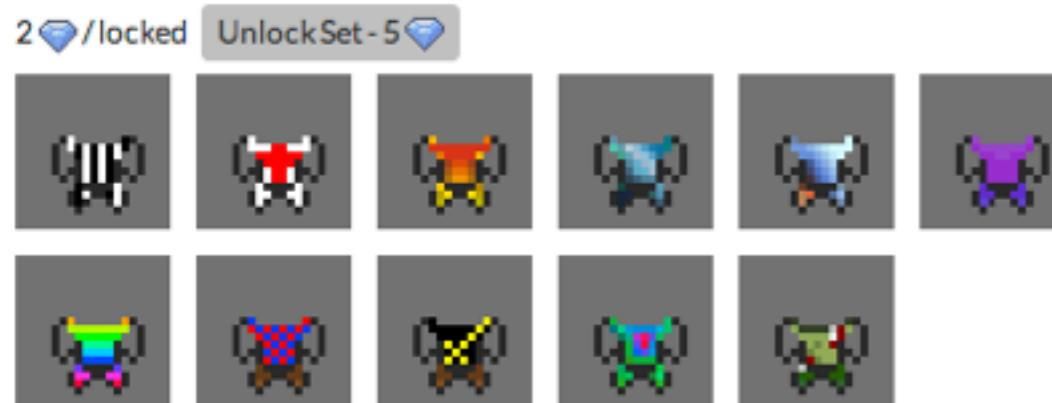
### Size

 Slim  Broad

### Shirts



### Special Shirts



## Hairstyles and Hair Colors

### Color



### Rainbow Colors

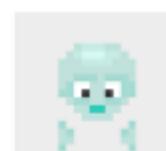
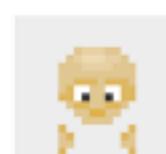
2 /locked [Unlock Set - 5](#)

### Haunted Colors

2 /locked [Unlock Set - 5](#)

## Skin

### Basic Skins



### Rainbow Skins



### Hair

### Bangs



# Non-digital gamification



# Conclusion

- ▶ Enjoyment in projects and teams is fundamental to student attitude
- ▶ ESD's challenges can be partially mitigated through gamification
- ▶ Social dynamics are a crucial element of gamification
- ▶ Questions?