Implementation model for the gamification of business processes
- a study from the field of material handling -

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Agenda

1. Gamification in our understanding
2. Implementation Model (*GameLog Model*)
3. Case Study
4. Lessons Learned
5. Discussion
Gamification

Why are people playing board, computer or smartphone games? (Intrinsic Motivation)

- Fun
- Escape from reality
- Games foster – in contrast to many everyday activities – the 3 psychological needs for competence, autonomy and relatedness [Rig-2011]

Gamification is the process of making activities more game-like by using game elements in non-game contexts to profit from motivation mechanisms behind gaming.
Gamification vs. Serious Gaming

Gamification

- non-gaming context
  - game-elements

Serious Gaming

- model of the non-gaming context
  - game-elements
- non-gaming context

modelling (simplification, abstraction)
The GameLog Model

Problem description

Goal definition
Superior goals
Goals on behavioral level

Analysis of basic conditions

Game mechanics selection

Game elements selection

Realization
Game framework development
Technology selection
Implementation

Analysis and Exploration

Evaluation and Reflection

Design and Realization

Re-Design (CIP)
Problem description and goal definition

A description of the problem, including the addressed Key Performance Indicators (KPI) and their improvement

Manual Order Picking:

- monotonous and repetitive work contexts
- no structured training for new staff
- no or rarely self determined work processes
- rarely stimulating tasks

→ High turnover rates
→ low motivation of order pickers
→ Decreasing performance of order pickers

KPIs:
Performance (error rate, average time per pick, amount of picks)
Motivation (fulfillment of the needs of competence, autonomy and relatedness)
Analysis of basic conditions

*Detailed analysis of the basic conditions (The execution of the work process mustn’t be changed)*
Game mechanics selection

Selection of the game mechanics that trigger the defined goals

-motivation
  - result transparency
  - feedback

-competence
  - autonomy
  - team-competition
  - (social) relatedness
  - collaboration

-performance
  - individualization
  - character development
  - freedom of choice

-character development

- Decrease of errors
- Increase of speed
- More picks per time unit
Game elements selection

Selection of the game elements that trigger the chosen game mechanics

- Individualization
- Freedom of Choice
- FUN
- Result Transparency
- FUN
- Avatar
- Points
- Badges
- Highscore-list
- Team-Competition
- Feedback
- Performance Graph
- Collaboration
- Narrative
- FUN
- Character development
Realization

*Development and Implementation of the gamification application*
Evaluation and Reflection

*Evaluation of the gamification application based on the defined KPIs as an input for a potential re-design (games must evolve)*

**Sample**
- Students from 2 universities in Munich (LMU and TUM)
- N = 103
  - ♀ = 25 (24.3%); ♂ = 78 (75.7%)
  - Average age = 24.65 years

**Conditions**
- Random allocation to one of the two groups (gamification group, control group)
- 10 min. training / 20 min. working

**Statistical analysis**
- multivariate analysis of covariance (MANCOVA)
- Covariate: team-/shift-size

**Reliability (motivation)**
- competence, 4 Items, Chronbachs α = .72
- autonomy, 3 Items, Chronbachs α = .81
- relatedness, 3 Items, Chronbachs α = .86
Evaluation and Reflection

Evaluation of the gamification application based on the defined KPIs as an input for a potential re-design (games must evolve)

Motivation (descriptive)
Evaluation and Reflection

*Evaluation of the gamification application based on the defined KPIs as an input for a potential re-design (games must evolve)*

**Performance (descriptive)**

![Bar chart showing performance comparison between gamification group and control group.](image)

- **Number of Picks / 20 Min.**
  - Gamification group: 62.43
  - Control group: 46.82

- **Number of Errors / 20 Min.**
  - Gamification group: 9.63
  - Control group: 14.76

 gamification group
control group
Lessons learned

The GameLog Model works to develop and implement a gamification application into an operative work context.

The Self Determination Theory [Rya-2000] is a promising approach to understand and foster motivation through gamification among employees.
Lessons learned

„No matter what your job is, you can always try to make it more interesting…“
Thank you for your attention!
Vielen Dank für Ihre Aufmerksamkeit!
ご清聴ありがとうございました
Je vous remercie de votre attention!
Gracias por su atención!
感谢您的关注
Grazie per la vostra attenzione!
Благодарю вас за внимание!
Dank u voor uw aandacht!
Tack för er uppmanksamhet!
σας ευχαριστώ για την προσοχή σας!
İlginiz için teşekkür ederim!
Děkuji vám za pozornost!
관심에 감사드립니다
Takk for oppmerksomheten!
Dziękuję za uwagę!
Tak for din opmærksomhed!
Obrigado por sua atenção!
References

[Det-2011]

[Rig-2011]

[Rya-2000]

[Wer-2012]
Appendix
## Evaluation and Reflection

### Evaluation of the gamification application based on the defined KPIs as an input for a potential redesign (games must evolve)

<table>
<thead>
<tr>
<th></th>
<th>EG (Gamification) M (SD)</th>
<th>KG M (SD)</th>
<th>F(1,100)</th>
<th>p</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence</td>
<td>4.81 (1.40)</td>
<td>4.11 (1.13)</td>
<td>F(1,100) = 13.23, p &lt; .05, η² = .08</td>
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<tr>
<td>Autonomy</td>
<td>4.03 (1.49)</td>
<td>3.64 (1.58)</td>
<td>F(1,100) = 9.10, p &lt; .05, η² = .04</td>
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<td>Relatedness</td>
<td>3.31 (1.47)</td>
<td>1.93 (.99)</td>
<td>F(1,100) = 27.85, p &lt; .05, η² = .22</td>
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<td>Intrinsic motivation</td>
<td>4.96 (1.16)</td>
<td>3.71 (1.42)</td>
<td>F(1,100) = 20.48, p &lt; .05, η² = .17</td>
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<td>Quantitative performance</td>
<td>62.44 (15.92)</td>
<td>46.82 (18.92)</td>
<td>F(1,100) = 72.50, p &lt; .05, η² = .42</td>
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<td>Qualitative performance</td>
<td>.94 (.07)</td>
<td>.87 (.14)</td>
<td>F(1,100) = 21.98, p &lt; .05, η² = .18</td>
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</table>
Gamification Prototype Setting

Experimental group

- Game elements
  - Avatar
  - Profile development
  - Story
  - Points
  - Badges
  - (Team)Leaderboards
  - Performance graphs