GamiTRIZation – Gamification for TRIZ Education

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TRIZ – The Challenge of Learning and Teaching

learning TRIZ

creating

evaluating

analyzing

applying

understanding

remembering

cf. revised Bloom's taxonomy for learning [20]

Teaching TRIZ with games and cases

playful elements for education
promote learning situations
where students

• from various backgrounds

• are motivated to learn,

• engage in the act,

• are ensuring that learning
will occur and willing to
reflect their learning act and

• find the learning process –
not just the learning
outcome – to be satisfying.
Definition: Games and Play (acc. to K. Salen/ E. Zimmerman, 2004, p. 72/73) - and our Approach of Understanding
# How to understand Play, Games and Cases

('++' = applies fully, '+' = applies)

<table>
<thead>
<tr>
<th>Element of understanding</th>
<th>Play</th>
<th>Game</th>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proceeds according to rules limiting players</td>
<td>++</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Goal-oriented / Outcome-oriented</td>
<td>+</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>For its own sake</td>
<td>++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity, process or event (time frame)</td>
<td>+</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Commitment</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Conflict to be solved</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Task to be fulfilled</td>
<td></td>
<td></td>
<td>++</td>
</tr>
<tr>
<td>Involves decision-making / influence</td>
<td>+</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Entertaining and fun</td>
<td>++</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Artificial/Safe, outside ordinary life</td>
<td>++</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Creates special (social) groups</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperation / Connection between people</td>
<td>++</td>
<td></td>
<td>++</td>
</tr>
<tr>
<td>Competition between groups / Players</td>
<td>++</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>System of parts/Resources and tokens</td>
<td>+</td>
<td></td>
<td>++</td>
</tr>
<tr>
<td>Absorbing, energy taking</td>
<td>++</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>
## Selected (technical) Contradictions of play(-ful Situations) for Learning

<table>
<thead>
<tr>
<th>Contradiction</th>
<th>Parameter 1</th>
<th>Parameter 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Entertainment</td>
<td>Serious (learning) outcome</td>
</tr>
<tr>
<td>2</td>
<td>Enjoyment, fun</td>
<td>Engagement</td>
</tr>
<tr>
<td>3</td>
<td>For one's own sake, for it’s own sake</td>
<td>Engaged for an outcome, for an activity, for competition,…</td>
</tr>
<tr>
<td>4</td>
<td>Cooperation and connection</td>
<td>Competition</td>
</tr>
<tr>
<td>5</td>
<td>Team-building / belonging / (social) groups</td>
<td>Working for oneself / achievement / working for a task</td>
</tr>
<tr>
<td>6</td>
<td>Winning</td>
<td>Losing</td>
</tr>
<tr>
<td>7</td>
<td>Exploring / Thriving through a given (new) situation</td>
<td>Gaining influence on and control over a given situation</td>
</tr>
<tr>
<td>8</td>
<td>Nobody forcing, free will, …</td>
<td>For an outcome, for an objective, …</td>
</tr>
<tr>
<td>9</td>
<td>Freedom, anarchy, creativity,…</td>
<td>Limitation of players, rules, structure, organization, …</td>
</tr>
<tr>
<td>10</td>
<td>Rules (to break (former) rules)</td>
<td>Rising complexity</td>
</tr>
<tr>
<td>11</td>
<td>Ignorance if own knowledge will be helpful</td>
<td>Commitment</td>
</tr>
<tr>
<td>12</td>
<td>Real-life situation</td>
<td>Artificial / Story telling</td>
</tr>
<tr>
<td>13</td>
<td>…</td>
<td>…</td>
</tr>
</tbody>
</table>
Playful elements to overcome Contradictions in Learning and Teaching

2 examples:
resolved contradictions, taken from „Umbrella 5.0“ case (case for children, process oriented)

Physical Contradiction: There should be some competition between the groups so that the children are highly motivated AND there should be no competition between the groups so that the children are not frustrated in the end.
• Resolved by “separation in relation”.

Technical Contradiction: IF the students are grouped, THEN it’s possible to create a competitive structure, BUT the grouping requires a lot of time (because the children do not know each other and sometimes are shy).
• Resolved by “preliminary action”.
Playing TRIZ – The Call for Chapters in 2017

TRIZ-Games and -Simulations –
A Compendium for playful Learning and
Teaching Structured Innovation

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Background
The Theory of Inventive Problem Solving (TRIZ) has gained a high reputation for systematic problem analysis, problem solving and system forecasting. Its approach is unique - based on the analysis of a vast number of patents in the past - and so is its reputation by professionals in research, industry, and consulting; they regard it as the best systematic tool available today to deploy inventive creativity and boost innovation.

The deployment of inventive creativity and stimulation of a pleasant learning environment is more probable, where there is space – for fun, coincidence, activity and bringing and knowledge to new combinations and connections with others. These aspects are covered by good games. In order to more widely spread and deepen the knowledge of TRIZ, to attract more people to learn and practice TRIZ, and to trigger ideas on how it can be further developed, the approach of using games is suggested. The editors therefore invite potential authors to share their recommended games and write them in a compendium type of book published by Synnovating by fall 2018.

A game is a structured form of play to act in and solve an artificial conflict - seen here as an educational, training or development tool to be depicted by the authors' contributions. To highlight the manual character of each contribution, the goal of the game (core theme/application field), challenge, type of interaction, number of participants (number of players), estimated duration and required material or equipment and/or layout elements, as well as preparation instructions and rules are to be provided. Achievable competences / skills for the players and additional hints for the game leader(s) will complete the description. To ensure the traceability of the game, sources and/or further reading should be given.
<table>
<thead>
<tr>
<th>Criteria for successful Games</th>
</tr>
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<tbody>
<tr>
<td>Chance to win</td>
</tr>
<tr>
<td>Surprise</td>
</tr>
<tr>
<td>Timing</td>
</tr>
<tr>
<td>Consistency and Quality of Materials</td>
</tr>
<tr>
<td>Influence</td>
</tr>
<tr>
<td>Target Group</td>
</tr>
<tr>
<td>Excitement</td>
</tr>
<tr>
<td>Easy Start</td>
</tr>
<tr>
<td>Rule (Complexity)</td>
</tr>
</tbody>
</table>

cf. Kramer, W. [27]
Playing TRIZ – Games for Learning and Teaching Inventiveness (Vol. 1)

- The Sticky Tape Game –
  A ludic interaction (not only) for Smart-Little-People (model) in TRIZ
  Claudia Hentschel

- The wast(e)riz Game –
  Lean experts playfully learn TRIZ
  Christian M. Thurnes, Frank Zeihsel

- LOBIM Board Game –
  Bionic Innovation based on TRIZ
  Nick Eckert

- TRIZmeta –
  A Game Of Rules For Breaking Rules
  Darrell Mann, Cara Faulkner

- The 40 Inventive Principles, Simplified & Gamified –
  How Inspiration Cards Help You Teach & Create
  Anja-Karina Pahl

- The Innovation Map –
  Making TRIZ make sense in Schools and Make Money for Corporates
  Anja-Karina Pahl

- TRIZ Puzzle Z –
  A Mobile Puzzle Game for Learning 40 Inventive Principles of Problem Solving
  Wee Hoe Tan, Ahmad Zamzuri Mohamad Ali, Keng Kiat Cheong
Playing TRIZ – **Cases** for Learning and Teaching Inventiveness (Vol. 1)

- Titanic TRIZ – A universal Case Study  
  *Ellen Domb*

- The Broken Table Case – How to use natural resources  
  *Oliver Mayer*

- "Failure is not an option" – Apollo 13 case study  
  *Structured Innovation  
  Thomas Nagel, Henryk Stöckert, Nina Defounga*

- The Rollercoaster Case – Demonstrating TRIZ tools on a fast Example  
  *Oliver Mayer*

- Umbrella 5.0 by children – A TRIZ competition without losers  
  *Christian M. Thurnes*

- Comparative TRIZ workshop – Learn which TRIZ problem solving tools give better results to a given problem  
  *Robert Adunka, Christoph Dobruskin*
Outlook – More GamiTRIZation to come: Be part of it!

Call for paper: Playing TRIZ (Vol. 2)
To share your games, simulations and cases:
• contact the authors of this paper = editors of this book
• or find the call e.g. on www.gamiTRIZation.com
Thank you, Merci, Danke schön, ...

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sources

Questions