SIMULATION & GAMING
THROUGH TIMES AND ACROSS DISCIPLINES
PAST AND FUTURE HERITAGE AND PROGRESS

CONFERENCE PROGRAM

AUGUST 30TH 2019
WARSAW
Dear Conference Participants,

Welcome to Warsaw and welcome to Kozminski University. We are extremely excited about the 50th Anniversary Conference and can’t wait for you to experience our rich program. We have five conference days packed with diverse activities for you to enjoy. We will immerse ourselves 50th Anniversary celebrations that are spread throughout the whole week into more and less formal activities. Right from the beginning on Monday with the Conference Opening Celebrations until traditional ISAGA tree planting on Friday Afternoon. In between, we constantly have up to four different activities to choose in every time slot. Paper sessions, workshops, thematic sessions, poster sessions, discussion panels, exciting keynotes, and special events are among them. We have the 50th Anniversary Quiz Game, which will make us nostalgic thinking about past conferences and friends we have sadly lost in last years. I challenge you to immerse yourself in the social program that we have planned for every day with few surprises prepared for you up to our sleeve. On Thursday we have planned celebratory Gala Dinner in one of Warsaw’s most iconic and chic location, and as we will wait with excitement for celebrations and Awards, you can enjoy what Warsaw has to offer.

I want to thank the co-organizers JASAG, NASAGA, SAGANET, SAGSAGA, PTBG, ThaiSIM and The Kozminski Foundation for the continues support, promotion and effort put in this conference. We thank our generous sponsors for they support: JASAG, SAGSAGA, Kozminski University, Riva consulting&training, REVAS, and CAPSIM, without them this conference wouldn’t be possible to happen. I would also like to extend my thanks to ISAGA Executive Board who granted us this honor of organizing this special event.

ISAGA 50th Anniversary Conference is my beloved project for two years now. It would not be possible without the hard work of many dedicated people. So the success of this ISAGA conference would not have been achieved without the cooperation of the Track Chairs, Program Committee, and Organizational Committee. I want to thank them warmly. I’m grateful for their support.

I want to thank all authors who submitted their work to this year’s conference, and we eagerly wait for your presentations and facilitation. I also want to thank all the attendees of the Conference. Your support is crucial to the ISAGA Community.

I hope everyone will have an exciting, fun, fruitful, and productive conference.

On behalf of Program and Organizing Committees

Marcin

50th Anniversary ISAGA Conference

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50th Anniversary ISAGA Conference Program
Dear gaming and simulation friends!

Fifty editions of the ISAGA conference is a legacy to be proud of! It is my pleasure to welcome you to the 50th ISAGA conference. It will be a special conference this year, with plenty of opportunities to look back on our rich past, gain insights in latest developments, and to jointly discuss the future of our field and community.

Over five decades of gaming and simulation activities has not been a straight and smooth line of development. When Richard D. Duke organised the first event around a barbeque in Germany, together with Allen Feldt who recently passed away, the legend says that it was a gathering of people interested in understanding the large-scale problems of that time with the help of emerging methods like gaming and simulation that involve stakeholders and understanding of the complex systems they interact with. A dissatisfaction with analytical models was a shared driving force.

In the current day and age we face climate change, problems with inclusiveness, scarce resources like water and energy, and large scale migration due to natural disasters and violence, to just name a few of the daily headlines in the news. A systems understanding that includes stakeholders and enriches analytical approaches is more relevant than ever. It is therefore that we see that several pockets of use of games and simulations have deep impact on the decision-making processes in various countries across the globe. The success of gaming and simulation in education is paramount, and has contributed to a different view on the world for large numbers of students.

Over the decades, our field has seen several waves of popularity. The last big wave that launched when computer gaming and ‘serious’ applications started to feed into each other has splintered the gaming community into a range of specialised studies. It is positive to note that these communities are seeking each other again now that the different branches mature.

ISAGA has always been the steady community of people interested in dealing with the systems-related applications of gaming and simulation. Our joint knowledge is deep, and recent efforts to build more on the foundational theories are having an impact on both the academic rigour, as well as the societal relevance of well-executed projects.

I encourage all of us to engage in discussions during the conference about how to strengthen our field and community for the next 50 years! With a special thanks to Marcin Wardaszko and the team at Kozminsky University for arranging the event, I look forward to a great week together!

On behalf of the ISAGA Executive Board,

Sebas
Program overview

Day 1 – Monday, August 26th

08:00 – 9:00 – **Registration and Coffee.** The registration desk can be found in the building C of the Kozminski University. If you have arrived at the different building look for direction signs or ask any Conference or KU Staff.

09:00 - 9:20 - **Conference address** by Marek Zagórski the Minister of Digitalization of Poland and Prof. Dr. Witold T. Bielecki Rector of KU and in the Leon Kozminski Hall in Building C – also start of the ISAGA 50th Anniversary Quiz Game

09:20-9:45 - **Celebration opening with Cathy Greenbalt and Dick Duke** - The Leon Kozminski Hall Building C

09:45 – 10:30 - **Keynote - State of ISAGA address** - Prof. Dr. Ing. Sebastiaan Meijer, Executive Board Chair of ISAGA, The Leon Kozminski Hall Building C

10:30 – 11:00 - **Coffee break** - Building C - Atrium

11:00 – 12:30 – Morning activities consist of 4 sessions:

Paper session 1: Game Science Theory Track - Room A22

- **1.1. Playing (in) a Crisis Simulation** - What is the playful engagement in a serious simulation made of? Goutx David, Sauvagnargues Sophie, Mermet Laurent
- **1.2. Evaluation of a pilot game to change civil servants’ willingness towards open data policy making.** Kleiman Fernando, Janssen Marijn, Meijer Sebastiaan
- **1.3. The Tacit Knowledge in Games: From Validation to Debriefing.** Roungas Bill, Meijer Sebastiaan, Verbraeck, Alexander;

Paper session 2: Gaming Cultures Track - Room A140

- **2.1. Space Pirates! Business Lessons from MMO Players**; Wade, Derek W.
- **2.2. From Warsaw to Helsinki. National identity politics in Finnish and Polish educational board games in the mid-19th century;** Garda Maria Berenika, Nylund Niklas

Special activity - 50th Anniversary workshop - Room A26

Three Modern Game Classics from the Golden Age of Gaming Simulation, Willy C. Kriz & Werner Manahl

Workshop session 1 - Room A142

Bringing Systems to Life in Organizations; Reese Rebecca M.

12:30 – 13.15 - **Lunch break and opening of the posters exhibition** - Atrium Building C
13:15 – 14.45 – After lunch activities consist of 4 sessions:

**Paper session 3: Game Science Theory Track - Room A22**

3.1. Structuring game design with active learning benefits: insights from logistical skills training in managing an emergency department; Zhang Cevin, Härenstam, Karin Pukk, Nordquist Jonas, Meijer Sebastiaan

3.2. Through a Mirror Darkly – On the Obscurity of Teaching Goals in Game-Based Learning in IT Security; Köhler, Klemens, Röpke Rene, Wolf Martin R.

3.3. Educational Escape Room – what could possibly go wrong?; Mijal Michał, Cieśla Martyna, Gromadzka Monika.

**Paper session 4: S&G for Logistics and Smart Infrastructure Track – Room A26**

4.1. The new relationship between politics, administration and citizenship; Treske Eric

4.2. Mobilise Innovation (Mobinn): A playful Approach applied to the Transport and Logistics Sector; Roukouni Anastasia, Lukosch Heide, Verbraeck Alexander, Zuidwijk Rob

4.3. Agent-based Simulation for Sustainable Management of Supply Chain and Natural Resource: Basic Model; Zaima Keiko

**Workshop session 2 – Computer Lab A138**

ENTREPRENEURIAL OPPORTUNITIES: A simulation designed to train the evaluation of entrepreneurial opportunities under uncertainty; Teach Richard, Tipton, Elizabeth, Sidhu Taptej

**Workshop session 3 - Room A142**

CICERO VR - a serious game for learning public speaking skills; Wardaszko Marcin, Jakubowski Michał, Winniczuk Anna, Podgórski Blażej, Małgorzata Ćwil;

14:45 – 15:15 - Coffee break building C-Atrium

15:15 – 17:00 – Afternoon activates consists of 4 sessions:

**Paper session 5: Simulation and gaming track - Room A22**

5.1. Participatory simulations with decision-makers on coastal flooding prevention: what did they learn? Becu Nicolas, Amalric Marion, Anselme Brice, Beck Elise, Bergossi Perrine, Delay Etienne, Marilleau Nicolas, Pignon-Mussaud Cécilia, Rousseaux Frédéric

5.2. Gaming Simulation for Managing Stranded Persons and Residents around Terminal Stations after Large-Scale Earthquakes; Toyoda Yusuke, Sakai Kohej, Kanegae Hidehiko

5.3. The Design and Development of Puzzle Game for Memorization Skills; Suksri Siwat, Nimnual Ratchadawan, Pungtippimanchai Tanyaporn, Vtitamornvet Nattakit, Lertsopaphan Nitipong Lertsopaphan

**Paper session 6:Special Track: Gaming For Individual Efficacy And Performance – Room A140**

6.1. LEARNING FROM A BUSINESS SIMULATION GAME: A FACTOR-ANALYTIC STUDY; Dumblekar Vinod, Dhar, Upinder

6.2. Unpacking and Overconfidence in a Production Management Game; Nakamura Mieko
6.3. Game Creation Aimed at Reducing the Amount of Vegetable Waste at the Consumption Stage in Japan; Sato Mizuho, Mizuyama Hajime, Nakano Masaru
6.4. Authentic Learning in Complimentary Activities Special Track: Gaming For Individual Efficacy And Performance; Titton Luiz Antonio, Jakubowski Michal

Workshop session 4 - Room A26
The future of simulation games –challenges and changes; Zuern Birgit, Buntrock Sonja Marie, Huehn Christian, Treske Eric

Workshop session 5 – Computer Lab A138
Battle for Cattle; Kokel Ege, Prade Isabel, Meinhart Camillo, Schmidt Markus

17:00 – 18:00 - ISAGA General Assembly - The Leon Kozminski Hall - Building C
18:00 – 22:00 - Celebratory grill party in the name of Founding Members - KU grounds

Day 2 – Tuesday, August 27th – JASAG Day

08:00 – 09:00 – Registration and Coffee. The registration desk can be found in the building C of the Kozminski University. If you have arrived at the different building look for direction signs or ask any Conference or KU Staff.
09:00 – 09:30 - Day 2 opening remarks and celebratory transfer of hosting to JASAG - The Leon Kozminski Hall Building C
09:30 – 10:30 – Keynote - Prof. Dr. Toshiyuki Kaneda, Urban Simulation & Gaming for Planning Research and Education for Developing Countries - The Leon Kozminski Hall Building C
10:30 – 10:45 – Official opening of the Product Showroom - The Atrium Building C
10:45 – 11.15 – Coffee break - The Atrium Building C
11:15 – 12:45 – Morning activities consist of 4 sessions:

Paper session 7: Simulation and gaming track – Room A22
7.1. Little things mean a lot; Teach Richard, Szot James, Chasteen Larry
7.2. Simulation games as a framework to conduct scientific experiments – the example of prospect theory research; Ćwil Małgorzata
7.3. The funnel of game design - Proposing a new way to address a problem definition using the IDEAS approach; Freese Maria, Lukosch Heide K.

Paper session 8: Special JASAG track: Ethics of Simulation and Gaming – Room A140
8.1. Is it permissible to use obfuscation and deception in games for learning? Katsarov Johannes, Christen Markus
8.2. Two Aspects of Ethical Standard on Gaming Simulation; Deguchi Hiroshi
Thematic Session 2 – Room A142
Facilitation in the 21st century - a retrospective and prospective analysis; Leigh Elyssebeth, Tipton Elizabeth, Likhacheva Elena, De Wijs Marieke

Workshop session 6 - Room A26
SoyStory, a role-playing game to explore the complexity of the soy supply-chain; Garcia Claude, Dray Anne, Swen Bos, Nicole Ponta, Virah-Sawmy Malika

12:45 – 13:30 – Lunch break – Atrium building C
13:30 – 15:00 - After lunch activities consist of 4 sessions:
Paper session 9: Simulation and gaming track – Room A22
9.1. Interpersonal Competitiveness in a Cohesive Team: Insights from a Business Simulation Game; Dumblekar Vinod, Dhar Upinder
9.2. Teamwork Interaction, Communicative Strategies, and Self-efficacy after playing an Educational Game “Salad Bowl”; Soranastaporn Songsri, Dumblekar, Vinod, Yamchuti Nophawan, Yamchuti Urairat
9.3. Group-based learning and group composition on the provision of public goods: Incorporating agent-based simulation and gaming; Chang Shuang, Deguchi Hiroshi

Paper Session 10: The ISAGA 50th Anniversary Track – Room A26
10.1. Journeying to the role of facilitator: a personal story alongside world trends; Leigh Elyssebeth
10.2. Simulation and Games for Effective Learning Outcomes; Dhar Santosh, Dhar Upinder

Thematic Session 3 – Room A140
Persuasion game: Cross cultural comparison; ANDO KAORI, Sugiura Junkichi, Adachi Nahoko, Ohnuma Susumu, Hübner Gundula, Tam Kim-Pong

Workshop session 7 - Computer Lab A138
Blend INN and Pop-up Shop simulation games game design for soft skills development; Wardaszko Marcin, Jakubowski Michal, Anna Winniczuk, Ćwil Małgorzata;

15:00 – 15:30 – Coffe Break – Atrium building C
15:30 – 17:15 - Afternoon activates consists of 4 sessions:
Paper session 11: Simulation and gaming track - Room A22
11.1. Simulated construction of state’s intersubjective reality in computer games: A soft power tool in international relations; Lobastova Svetlana
11.2. A Development of Web-Based Training using Simulation and Gaming as a Tool for Education; Chaisanit Settachai, Meeanan Luddawan, Chomyam Chiraporn, Tra-ngansri Apichai
11.3. The Development of the 3D Role-Playing Game on PC with an Assistive System for Deuteranopia; Kiattikomol Paiboon, Nimnual Ratchadawan, Sittisanguansak Pavarisa
11.4. Developing Resilience in Cognitively Diverse Teams: A Play-Oriented Approach using LEGO Serious Play; Scheuch Ianina, Duchek Stephanie
Paper session 12: Gaming for Sustainable Development Goals – Room A140
1. Review of Haptic and Computerized (Simulation) Games on Climate Change; Gerber Andreas, Ulrich Markus, Wäger Patrick
2. Exploring trajectories of shifting-cultivation landscapes through games: the case of Assam (India); Bos Swen, Cornioley Tina, Dray Anne, Waeber Patrick, Garcia Claude

Workshop session 8 – Room A26
Tower of Babylon; Rometsch Stephan

Special activity session - Senate Hall D-200 building D
Women in simulation and gaming - networking session
Come and join our Women in Simulation and Gaming networking panel! During the event we will discuss many issues concerning the situation of women in S&G field in both academia and business. It will be a great chance to share our experiences and debate about the prospects for the future. We will have 4 main speakers during this event:
- Elyssebeth Leigh from University of Technology Sydney, Australia,
- Toshiko Kikkawa from Keiko University, Japan,
- An Coppens from Gamification Nation Ltd., Belgium,
- Heide Lukosch from Delft University of Technology, Netherlands.
Everyone is invited to take part in the networking session, share their stories and learn from the others.

20:00 – 24:00 - Meet-up at the BAZAR Pub and Restaurant Jagiellońska str. 13, 03-710 Warsaw-
Auction of the past ISAGA items and gimmicks

Day 3 – Wednesday, August 28th – WARSAW City Day

08:00 – 09:00 – Registration and Coffee. The registration desk can be found in the building C of the Kozminski University. If you have arrived at the different building look for direction signs or ask any Conference or KU Staff.

09:00 – 09:30 - Day 3 opening remarks with Tomasz Pactwa - Director of the Social Programs in Warsaw City Hall - The Leon Kozminski Hall Building C

09:30 – 10:30 – Keynote Prof. Dr. Ivo Wenzler - The good, the bad, or somewhere in between: What makes a serious game a seriously good game - The Leon Kozminski Hall Building C

10:30 – 11.00 – Coffee break - The Atrium Building C
11:00 – 12:30 – Morning activities consist of 4 sessions:

**Paper session 13: Simulation and gaming track – Room A22**

13.1. Iterative Game Design to Develop Collective Critical Infrastructure Resilience; van Laere Joeri, Ibrahim Osama, Larsson Aron, Berggren Peter, Davis Joanna

13.2. Can the Veil of Ignorance Create Consensus? A Qualitative Analysis Using the Siting for a Contaminated Waste Landfill Game; Yokoyama Miki, Ohnuma Susumu, Hirose Yukio

13.3. Study on occurrence mechanism of quality scandal in enterprises by "Sontaku", "air" and "water" theory using business game; Hiroyasu Seita, Setsuya Kurahashi

**Paper session 14: Gaming Cultures Track – Room A140**

1. Comparison of Experience of Using Business Games in University of Lodz and Kaunas University of Technology; Patasiene Irena, Pamula Anna, Patasius Martynas

2. Attitudes of the Japanese Tabletop Gamers; Matsui Hiroyuki, Kikkawa Toshiko, Sugiura Junkichi

**Workshop session 9 – Room A26**

Using of elements of entertainment games for learning purposes; Zuern Birgit, Buntrock, Sonja Marie, Huehn Christian, Treske Eric

**Workshop session 10 – Computer Lab A138**

REVAS Games – interactive game session


13:30 – 19:00 – Special activites – Warsaw and surroundis sightseeing. You can choose one of the three activities. The sightseeing trips details and list will be displayed at the registration desk on Monday from lunch time and till Tuesday 4 P.M. – please take notice that numbers of persons per trip is limited.

1. Warsaw City sightseeing with the Wodka Museum

2. Warsaw City sightseeing with Warsaw Uprising Museum and Royal Castle

3. Chopin tour to Żelazowa Wola (Chopin’s birthplace) sightseeing with Live Chopin music concert

19:00 – 23:00 – Meet up in the Vodka Museum Pl. Konesera 2, in 3/4 Bar Vodka Tasting and finger food
**Day 4 – Thursday, August 29th**

08:00 – 09:00 – **Registration and Coffee.** The registration desk can be found in the building C of the Kozminski University. If you have arrived at the different building look for direction signs or ask any Conference or KU Staff.

09:00 – 09:30 - Day 4 opening remarks with **Representative of the National Centre of Research and Development Prof. dr hab. ing. Jan Duda** - The Leon Kozminski Hall Building C

09:30 – 10:30 – Keynote **An Coppens CEO of Gamification Nation** - Mastering gamification in a changing environment- The Leon Kozminski Hall Building C

10:30 – 11.00 – Coffee break - The Atrium Building C

11:00 – 12:30 – Morning activities consist of 4 sessions:

- **Paper session 15: Simulation and gaming track – Room A22**
  1. The Development of the 3D Role-Playing Game on PC with an Assistive System for Deuteranopia; Kiattikomol Paiboon, Nimnual Ratchadawan, Sittisanguanasak Pavarisa
  2. The Trust Game: The influence of Trust on Collaboration in the light of Technological Innovations; Kuijpers Anique, Lukosch Heide, Verbraeck Alexander
  3. Review of Game-Based for English Language Learning Research from S&G Interdiscipline Journal Simulation and Gaming; Nitisakunwut Panicha, Soranastaporn Songsri

- **Paper session 16: Gamification Track – Room A140**
  2. Gamification Design Strategies - summary of research project; Jakubowski Michal
  3. Make It Punk! For a critical, bottom-up, playful gamification; Thibault Mattia

- **Panel Discussion – Leon Kozminski Hall Building C**
  On the architecture of game science; Seminar continuation - Moderators Willy C. Kriz and Marcin Wardaszko
  The discussion panel will be a continuation of the scientific discourse on the future development of the simulation and gaming body of science, that was also presented in the Simulation and Gaming Journal Volume 49 Issue 3, June 2018.

- **Workshop session 11 – Room A142**
  Speed gaming : the half-day serious game building challenge!; Dray Anne, Bécu Nicolas, Salliou Nicolas /PART 1

12:30 – 13.30 – Lunch break with poster session – Atrium building C

13:00 – 14:00 - Celebratory ISAGA General Assembly with elections

14:00 – 15.30 – After lunch activities consist of 4 sessions:

- **Paper session 17: Simulation and gaming track - Room A22**
  17.1. SIMULATIONS FOR STRATEGY COURSES: DIFFICULTY VS. REALISM, ADDITIONAL FINDINGS; Chasteen Larry, Teach Richard
  17.2. Accuracy in Business Simulation; Motzev Mihail R., Pamukchieva Ophelia
17.3. Gaming as a language for public policy and program evaluation; Olejniczak Karol, Newcomer Kathryn E., Meijer Sebastiaan A.

Paper session 18: Advance in Gaming Technology Track - Room 140
18.1. Video game monetization mechanisms in triple A (AAA) video games; Ivanov Martin Penkov, Wittenzeltner Helmut, Wardaszko Marcin
18.2. Learning with Location-Based Gaming; Vuorio Jaakko, Harviainen J. Tuomas
18.3. Methodological challenges of creating a next-generation machine learning-based game engine for generating maps and vehicle behavior - Błażej Podgórski and Marcin Wardaszko

Workshop session 12 - Room A26
Pitch Your Green Idea! - Play session with the board game about sustainable entrepreneurship & concept presentation for a modular board game developer kit; Bartning Antonia

Workshop session 13 - Room A142
Speed gaming : the half-day serious game building challenge!; Dray Anne, Bécu Nicolas, Salliou Nicolas

Workshop session 14 – Computer Lab A138
MSP Challenge simulation platform – demonstration; Mayer Igor, Warmelink Harald, Keijser Xander, Santos Carlos, Boode Wilco, Gonçalves Magali

Workshop session 15 – Room A140
Training is nothing, the will is everything, the will to act - Effective methods of debriefing educational games; Janigacz Marek

Special Activity – Room A26
Serious Game Competition Interactive Session – Hosted by Jakubowski Michal
This year ISAGA will hold the first edition of Serious Game Competition. The aim of that contest is to select one outstanding production that moves forward our perception of games and simulations. We have reviewed submitted propositions and after a hard and long dispute, the very best game was chosen. Before we will announce the winner at the conference Gala you are warmly invited to join this session and try each game by yourself. Another reason to do that is the opportunity to participate in voting for Public Award of ISAGA Serious Games Competition.

20:00 – 24:00 - Gala dinner with prize ceremony and 50th Anniversary Celebrations
Bristol a Luxury Collection Hotel - Krakowskie Przedmieście 42/44, 00-325 Warsaw, Moniuszko Hall
Day 5 – Friday, August 30th

08:00 – 09:00 – Registration and Coffee. The registration desk can be found in the building C of the Kozminski University. If you have arrived at the different building look for direction signs or ask any Conference or KU Staff.

09:00 – 09:30 - Day 4 opening remarks - The Leon Kozminski Hall Building C

09:30 – 10:30 – Keynote Michal Kajetan Dabrowski CEO of DaftMobile Ltd. – The future of mobile game design - The Leon Kozminski Hall Building C

10:30 – 11.00 – Coffee break - The Atrium Building C

11:00 – 12:30 – Morning activities consist of 4 sessions:

Paper session 20: Simulation and gaming track - Room A22

20.1. Hybrid Simulation Games in Agricultural Education: Effects of a Simulation Game to educate about the new German Fertiliser Ordinance; Ivens Sven, Wiese Gerlinde, Dittert Klaus, Mußhoff Oliver, Oberle Monika

20.2. Managing Competing Values in Sustainable Urban Tourism: a Simulation-Gaming Approach; Weber-Sabil Jessika, Lalćic Lidiija, Buijtengweg Thomas, Hutchinson Kevin, Santos Carlos, Frans Melissen, Koens Ko, Mayer Igor

20.3. Impact of Competition in Energy Market on Promotion of Renewables: an Agent-Based Model Approach; Ogihara Arashi, Suzuki Kengo, Nakai Keita

Paper session 21: Simulation Gaming Applications in VR/AR Track – Room A140


21.2. Wonders of the World Simulation Program by Virtual Reality Simulation: Deechuay Naraphol, Nimnual Ratchadawan, Makasorn Panya, Permpoon Supanat

21.3. Virtual Reality Based Anatomical Vocabulary Training For Health Professionals; Nimnual Ratchadawan, Yossatorn Yossiri

Panel discussion – Leon Kozminski Hall Building C

Colliding contexts: An educationalist approach to serious gaming education; Boudewijn Dijkstra, Derek Kuipers, Ivo Wenzler

Workshop session 17 – Room A26

Simulation Game “Post-Fossil Cities” – How to Play a Fundamental Transformation in 90 Minutes?; Gerber Andreas, Ulrich Markus

12:30 – 13:30 – Lunch break – Atrium building C

13:30 – 15:00 – After lunch activities consists of 4 sessions:

Paper session 22: Simulation and gaming track - Room A22

22.1. The Design and Development of Puzzle Game for Memorization Skills; Suksri Siwat, Boonumpai Tanawatchai. Maitriwong Peerapong, Nimnual Ratchadawan
22.2. The perception of business wargaming practices among strategic and competitive intelligence professionals; Kowalik Adam

22.3. Differences between Facilitator-guided and Self-guided Debriefing on the Attitudes of University Students Toshiko Kikkawa, Willy Christian Kriz, and Junkichi Sugiura

Paper session 23: Simulation Gaming Applications in VR/AR Track – room A140


23.2. Education Meets Virtual & Augmented Reality Technology in Singapore; CAI Yiyu

Workshop session 18 – Room A119

The Sustainable Values Game (SVG): A participatory workshop; Promduangsri Pariphat, Crookall David, Promduangsri Pimnutcha

Workshop session 19 – Room A26

Business Simulation napuro – Corporate Sustainability: Topics come and go: How to keep your (business) simulation game up to date?; Ulrich Markus

15:00 – 15:30 – Tree planting Ceremony – KU grounds behind building D
15:30 – 16:00 – Conference Closing Ceremony – Leon Kozminski Hall Building C
Paper abstracts and workshops description

Monday, August 26th

Keynote: **State of ISAGA address** - Executive Board Chair of ISAGA, Prof. Dr. Ing. Sebastiaan Meijer is full professor of Health Care Logistics at KTH Royal Institute of Technology, Stockholm, Sweden and head of the department of Biomedical Engineering and Health Systems. He is also vice-dean for the School of Engineering Sciences in Chemistry, Biotechnology and Health at KTH. Meanwhile he was part-time associated with Delft University of Technology, The Netherlands. He leads GaPSlabs: a multi-disciplinary center for gaming and participatory simulation in complex systems like transport, logistics, health care, urban development and energy.

**ISAGA 50th Conference Celebrations Special activity:**

**ISAGA 50th Anniversary Quiz Game**
Willy C. Kriz, FHV University Vorarlberg, Dornbirn, Austria
willy.kriz@fhv.at
Herbert Schmidt, riva training & consulting, Aschheim, Germany
herbert.schmidt@riva-online.de

The "Riva Learning Quiz Game Software" was originally developed from 2017 for educational purposes and can be therefore classified as an example of the design science approach of gaming. The usability is continuously improved and enhanced through feedback loops with students and lecturers. The game software is used within universities and institutes for further education. Different types of media are integrated into the games that are developed with this software (e.g. texts, websites and wikis, pictures, videos etc.). It is furthermore possible to create fully gamified learning programs with alternating sequences of instruction and knowledge acquisition and with different types and sequences of question-and-answer-games and feedback.

The game features are based upon concepts of game-based learning and gamification that relate to theories of learning and performance and theories of motivation and engagement. The actual version has several options and characteristics for online learning and face-to-face education and training courses. The design elements and characteristics of the quiz game applications and options of play relate to the actual discussion of gamified and game based learning and mobile.

For the ISAGA 50th anniversary we will develop and run a special quiz game during the whole conference. The game content will relate to the rich history of ISAGA. The game has the aim of knowledge transfer about ISAGA in a humorous manner. The game will use different question-and-answer types in a real-time competition during the conference. Different types of feedback for the players (e.g. leaderboards and highscores, real-time progress displays, feedback graphs and charts etc.) will be shown during the conference. In the end the winners will receive special ISAGA related history items and we will conduct a short debriefing.
Paper session 1 – Game Science Theory Track:

1.1. Playing (in) a Crisis Simulation  What is the playful engagement in a serious simulation made of?
David Goutx, Sophie Sauvagnargues, Laurent Mermet
Institut Mines Alès
david.goutx.pro@gmail.com

Abstract
The nature and the varying levels of the engagement of participants with a crisis management exercise still cannot be described properly by the usual evaluation tools of the users’ experiences nor does the application of the concept of flow help either.
The author proposes a protocol to do a qualitative analysis of video taken during crisis management exercises, based on the premise that emotional outbursts (laughter, profanities,..) betray an excess of tension between the applied convention of pretending, by which the participants act like the simulation is a burdensome reality, and the always present knowledge that it is only a game.
This protocol is tested on two crisis management exercises played in a simulation room. It confirms the concept of ludicity - a component of the simulation, created by the participants on top of what is needed for the good progress of the simulation-, the proposal of a typology, which is used to analyze the impact on the simulation of the injection of new events and the possibility that the playfulness of the simulation is subject to entropy.

1.2. Evaluation of a pilot game to change civil servants’ willingness towards open data policy making
Fernando Kleiman (1), Marijn Janssen (1) and Sebastiaan Meijer (2)
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Abstract
The adoption of open data policy-making by governments is limited due to different types of constraints. Civil servants are reluctant to open their data to the public for many reasons. The lack of knowledge of benefits that can be produced by the release of data and the overestimation of risks and operational complexity seems to decrease their willingness to support the opening of data. The idea that a serious game intervention can change awareness of participants in different domains is already known. Yet, games are domain dependent and concepts differ per domain. A game has never been used for the emerging domain of open data in which civil servants are operating in a bureaucratic environment having a risk-averse culture and strict institutional rules. A role-playing game prototype was designed for civil servants to experience open data policy-making.
This paper analyses its first results aiming at changes of perception for the participants of the game and aims to understand the changes in behavior of civil servants that played it. For some participants, the game influenced their attitude, whereas others were not influenced. Suggesting that different approaches might be necessary for changing the attitude of different groups.

1.3. The Tacit Knowledge in Games: From Validation to Debriefing
Bill Roungas (1;2), Sebastiaan Meijer (3), and Alexander Verbraeck (1)
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2 ALBA Graduate Business School
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Abstract
Game sessions consist of three phases: briefing, gameplay, and debriefing, with the latter being considered the most important feature of games. Nevertheless, given that games are considered by many to be more of an artistic form rather than a scientific artifact, a question that rises is: Can game sessions in general and debriefing in particular be analyzed and performed in a rigorous scientific way? In other words, can they be consistently structured, given the different characteristics of games, and can clear criteria on what would constitute a successful game session and debriefing be defined? The answer to these questions is yes. Yet, it remains a challenge to extract the knowledge of experts, which resides to a large extent in the tacit knowledge spectrum. Hence, the aim of this paper is to shed some light in this tacit knowledge possessed by experts and to gain understanding on why certain practices are more prone to success than others as well as bring into the surface other practices that have remained well hidden. In order to accomplish this goal, three rounds of interviews were conducted.

Paper session 2- Gaming cultures Track

2.1. Space Pirates! Business Lessons from MMO Players
Derek W. Wade
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Abstract
What if you could organize people to double their highest-expected productivity goals, and have fun doing it? Lessons from a large, distributed, volunteer group of online video gamers offer practical 21st-century guidance for your organization. Even if you aren't a gamer. Or a space pirate.

2.2. From Warsaw to Helsinki. National identity politics in Finnish and Polish educational board games in the mid-19th century
Maria Berenika Garda (1), Nylund Niklas (2)
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Abstract
The modern states of Finland and Poland share a common history. During the 19th century, their future territories were under the rule of foreign powers, most importantly the Russian Empire, as the Grand Duchy of Finland (1809–1917) and the Congress Poland (1815–1915). The rise of national identity politics in that turbulent period has been studied in the context of various art forms. Yet it seems that not enough attention has been paid to the role of games in that process (with some notable exceptions, i.e. in Finnish: Ylänen 2017). In Polish game studies, the research on nationalism is mostly focused on the 20th century and the memory of the Second World War.

Our study is focused on a subgenre of educational board games inspired by the mechanics of the goose game, an early example of a racing game where “each player in turn throws dice and places his marker on the space bearing a number equal to the sum thrown”. It was a popular form of youth entertainment in Europe and US during the 19th century and it was adapted in many cultural contexts and reinterpreted using various themes, e.g. discovering local geography and culture.

We will concentrate on two case studies: Huvimatka Aavasaksalle and Gra z jeografii Królestwa Polskiego. We will offer a close reading of selected entries from the booklets and respective representations on the game boards. Using methods such as thematic and discourse analysis, as well as statistical overview, we would like to investigate how the given games were involved in ideological discourses and national identity politics of the era.
Special activity - 50th Anniversary workshop
Three Modern Game Classics from the Golden Age of Gaming Simulation
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This year, 2019, is a special one for us with the 50th anniversaries of both the journal Simulation & Gaming and the International Simulation and Gaming Association (ISAGA). In recent years, we started a project called the Time Capsule of Gaming. Part of this project include video interviews with the S&G and ISAGA founder’s - a generation of early pioneers and experts. One aim of this project is to preserve the rich history and deep wisdom of outstanding personalities about gaming simulation as a science, craft and art (Duke & Kriz, 2014). One of the interview questions was about recommendations for “classic” simulation games that can be recommended for current and future generations of game researchers, designers and facilitators (that is, what game artifacts they would put into a time capsule to be discovered or opened at some point).

In our workshop we want to show the results of the top ten list of games that were named by the veteran experts. Many games named were designed in a period of time that we consider to be the “golden age of gaming simulation” from 1970ies to 1980ies. We will offer to play and debrief one of three top recommended games. We will shortly introduce the three games in an overview presentation about their historic background. We will argue how and why they are still used and are continuing to be prime examples of generic games that have the power today and in future to deepen our understanding of the design principles of excellent simulation games. After play and debriefing we also will facilitate a meta-debriefing with the aim to discuss the underlying models and design principles and what lessons learned we can derive for the design, facilitation and debriefing of gaming simulation from a science of design perspective (cf. Klabbers, 1993).

The participants of the workshop will be given the choice to vote which of these three games we will actually play, debrief and discuss in detail:
• “Star Power”, originally designed by Garry Shirts, 1974
• “Hex”, originally designed by Dick Duke, 1976
• “Fish Banks Ltd”, originally designed by Dennis Meadows, 1986

Workshop session 1
Bringing Systems to Life in Organizations
Rebecca Reese
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1 Systems Workshop Summary
1.1 Learning Goals
1. Develop an appreciation for the dynamics of social and other systems all around us through several fun, experiential group activities.
2. Learn how to present these activities to groups, and effectively debrief them to spread the understanding to others.

1.2 Workshop Contents
Systems operate everywhere; inside our bodies and all around us as we interact with others. They are so pervasive that we are often unaware of them. Developing an understanding of interdependent systems can help us to anticipate long term effects of current actions, and may allow us to make decisions that lead to preferred out-comes. This can be helpful for individuals, organizations, and large systems like the global economy and ecological system. Join with others to learn basic systems thinking concepts through active games embodying systemic phenomena. Learn how to interpret simple causal loop diagrams. Deepen your understanding of how systems work through the
activities and debriefs. Then learn how and why you'll want to incorporate this kind of systems-focused activities into your practice with groups and organizations. The games and activities will include Living Loops and Group Juggle. Living Loops introduces the basic language of systems and causal loops. Group Juggle is a fun activity that demonstrates the dynamics of reinforcing and balancing loops and the transition from dominance of one behavior mode to another. Through a debrief that includes drawing causal loop diagrams, participants learn how the behavior of the system changes over time. The presentation will also include suggestions for effective debriefing of experiential activities.

Paper session 3: Game Science Theory Track

3.1. Structuring game design with active learning benefits: insights from logistical skills training in managing an emergency department

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Abstract

Competency is central to a sustainable and resilient emergency department. Decision-makers, including clinicians, managers, and developers, would benefit from meaningful simulated scenarios in which their skills are trained. Among the various types of skills, non-technical skills are prioritized because the failure to communicate, coordinate and cooperate effectively are common contributing factors to adverse events and involving patients at the 'sharp-end' of the health system. For active learning of non-technical skills, simulation and gaming have been frequently used. From the methodology point of view, there is a need to clarify these two methods in order to improve their value in training and learning. This contribution presents the reflective methodology as an option of structuring game design compared to the mainstream service system modeling. The reflective methodology starts with the underlying assumption that it is still possible to achieve gaming effectiveness, even though the baseline layer is a simulation model instead of the service system. Based on a questionnaire investigating the activation of learning of logistical skills in managing an emergency department, results are illustrative of that active learning is much improved and is moving closer to achieving intended outcomes. Analyzing results from logistical experiments in the form of a statistical summary motivates to explore the middle ground of game design and gamification further, especially when the simulation model is the steering layer in scenario generations and debriefing. This aspect might have been less supervised in the philosophy of game science, let alone the application of simulation game for human resource management in emergency department logistics.

3.2. Through a Mirror Darkly – On the Obscurity of Teaching Goals in Game-Based Learning in IT Security

Klemens Köhler (1), René Röpke (2), Martin R. Wolf (1)
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Abstract

Teachers and instructors use very specific language communicating teaching goals. The most widely used frameworks of common reference are the Bloom’s Taxonomy and the Revised Bloom’s Taxonomy. The latter provides distinction of 209 different teaching goals which are connected to methods. In Competence Developing Games (CDGs - serious
games to convey knowledge) and in IT security education, a two- or three level typology exists, reducing possible learning outcomes to awareness, training, and education. This study explores whether this much simpler framework succeeds in achieving the same range of learning outcomes. Method wise a keyword analysis was conducted. The results were threefold: 1. The words used to describe teaching goals in CDGs on IT security education do not reflect the whole range of learning outcomes. 2. The word choice is nevertheless different from common language, indicating an intentional use of language. 3. IT security CDGs use different sets of terms to describe learning outcomes, depending on whether they are awareness, training, or education games. The interpretation of the findings is that the reduction to just three types of CDGs reduces the capacity to communicate and think about learning outcomes and consequently reduces the outcomes that are intentionally achieved.

3.3. Educational Escape Room – Challenges and Obstacles
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Abstract
The purpose of this paper is to outline the designing and testing process of an educational escape room prepared by a team of international scientists participating in a research project. Its scope was to design the science-based escape room that could be used as an educational tool and support the dissemination of knowledge on the healthy lifestyle and healthy eating habits among the general population. Since games, in general, are one of the most engaging media, it was safe to assume that creating the escape room would involve participants in a way inaccessible to other teaching methods.

The project team led by the Technion University and comprised of researchers from the University of Helsinki, the University of Reading, and the University of Warsaw joined by EUFIC, developed a structured approach to the escape room design and step by step resolved issues emerging during the process. Underway we encountered several challenges that made us question some of the assumptions we had made before the procedure commenced. Our main concerns were primarily the interculturality (or language dependence) of the escape room (five countries took part in the project) and its high difficulty level. As it turned out the former did not pose any design problems while the latter – unexpectedly – behaved counterintuitively: most players taking part in our tests managed to solve all the puzzles in less than a half of the pre-planned time and the record time was less than its quarter. This phenomenon was a result of a rather ‘safe’ approach to the puzzle design since we were more focused on knowledge dissemination.

Although the entertainment value proved to be a clear asset of our escape room, it is yet to be decided whether it, in fact, supports the learning process or is just a simple distraction and offers nothing new to the table of modern teaching methods. The next step of the project is to refine the existing escape room design and venture further into the realm of educational escape rooms to try out new approaches and decide what type of content is best suited for use in such educational projects.

Paper session 4 - S&G for Logistics and Smart Infrastructure Track
4.1. The new relationship between politics, administration and citizenship
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Abstract
The social decision-making processes in Europe's democracies are on the move. Our personal choices and ways of life affect remote countries and continents. In this situation, it goes without saying that the local relationship between politics, administration and citizenship is also changing. In the municipalities, there are no major people's
parties and the municipal administrations differentiate themselves in their fields of expertise more and more. When representatives from politics, administration and citizenship exchange on topics, communication becomes tedious and often remains undecided. This requires new, comprehensive communication formats, such as games.

4.2. Mobilise Innovation (Mobinn): A playful Approach applied to the Transport and Logistics Sector
Anastasia Roukouni [1,2], Heide Lukosch [1], Alexander Verbraeck [1], Rob Zuidwijk [2]
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Abstract
Modern cities often act as incubators for innovation. A main characteristic of the innovation process is that it is a multi-actor one, relying upon a complex network of actors and activities. Within the transport and logistics sector, it is observed that while a large number of research projects develop valuable socio-technical innovations, only a small amount of those developments ends up in the field as intended. Exploring innovations in transport and logistics under an “ecosystem” perspective, this paper presents Mobinn (Mobilise Innovation), a game prototype that has been developed to act as a trigger in order to make the multiple actors involved in the complex system of transport and logistics aware of the existing challenges, as well as of the critical role that they can play in accelerating the innovation process. Utilizing a top-down approach, we developed the game using truck platooning as our demonstration case but designed it to be as flexible and easily adaptable to other innovation case studies as possible. The paper includes results of the first play-test sessions that have been organized to test and evaluate the game, as well as lessons learnt from them.

4.3. Agent-based Simulation for Sustainable Management of Supply Chain and Natural Resources: Basic Model
Keiko Zaima
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Abstract
The purpose of this study was to develop an agent-based model including both supply chain and resource management in order to investigate the effects of changing business rules and policy. In this paper, the basic model is suggested and the results from the simulation is provided. Two patterns were obtained from the simulations of the basic model. In the first pattern, resources are depleted rapidly and the economy is not sustained. In the second pattern, the resource reached a sustainable level, but society was not economically sustained. In both patterns, product waste occurred in the store, although at different levels. From these results, it is apparent that the basic model can accurately reproduce the situation in which a trade-off between the environment and the economy occurs. In this paper, two applications were discussed: scenario analysis and gaming simulation. Scenario analyses can be designed to illustrate some of the issues concerning food loss and waste in the supply chain and the relationship with waste and natural resource management. Gaming simulations can be designed for consumer education and business gaming using hybrid simulation.

Workshop session 2
ENTREPRENEURIAL OPPORTUNITIES:
A simulation designed to train the evaluation of entrepreneurial opportunities under uncertainty
Richard Teach
ABSTRACT
This non-competitive simulation creates a series of entrepreneurial opportunities which the player (or team of players) views and evaluates before deciding whether to join an inventor and form a high-tech start-up. The player initially receives a substantial amount of quantitative data as well as some qualitative data, with the possibility to request additional information. During the first round, the player describes the opportunity in a tweet of 180 characters and chooses to accept or reject the opportunity. If the opportunity is rejected, a new opportunity is presented to the player. After the first round, subsequent opportunities are compared in a tweet to the one just rejected in the previous round. Once the player rejects an opportunity, he or she may not go back and accept it later; the opportunity is lost. These tweets are retained for further analysis later. The exercise continues until the player accepts an opportunity. Once the player accepts an opportunity, he or she cannot search for better opportunities; the simulation ends.

This simulation is designed to train the player how to compare entrepreneurial opportunities and how to select the “best” opportunity from a set of opportunities on the condition that once an opportunity is passed over, it cannot be retrieved and once an opportunity is selected, no more opportunities can be researched.

Workshop session 3
CICERO VR - a serious game for learning public speaking skills;
Wardaszko Marcin, Jakubowski Michał, Winniczuk Anna, Podgórska Błażej, Małgorzata Ćwil;
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During the workshop we invite you to join us and try our newest VR simulation game CICERO. Cicero VR game is a simulation gaming tool for public speaking skills training. The game system is measuring user efforts regarding the volume and speed of speech, gesticulation and eye contact with in-game models. There are two modes of play: practice (where you can train how to speak with use of benchmark presentation) and challenge (where you can upload your presentation that pitches new product or service). Presentation in practice mode features a scenario of a yearly report submission in front of a board about a new brand in the company. We have created a fictional car-sharing service, and the user has to present all valuable data standing in a conference room in one of the downtown skyscrapers. The virtual audience varies regarding demographic representation (race, gender and age). They will also react to users performance quality. If the talk is performed with right volume, gesticulation, and maintaining the eye contact – then board avatars will act as more engaged and vice versa.
Paper session 5 - Simulation and gaming track

5.1. Participatory simulations with decision-makers on coastal flooding prevention: what did they learn?
Becu Nicolas (1), Amalric Marion (2), Anselme Brice (3), Beck Elise (4), Bergossi Perrine (1), Delay Etienne (5), Marilleau Nicolas (6), Pignon-Mussaud Cécilia (1), Rousseaux Frédéric (7)
1 CNRS, UMR LIENSs
2 University F. Rabelais de Tours, UMR CITERES
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Abstract
Marine flooding is a major issue in coastal areas and is becoming increasingly important with global changes underway. A participatory simulation tool was developed since 2015, to foster social learning with municipalities’ stakeholders, on different prevention measures, and help them build an integrated strategy at the inter-municipal level. The tool and setting of participatory work-shops, are described in a previous paper, and this contribution focuses on the results of the workshops in terms of social learning. Four workshops were con ducted with local officials (including mayors), managers and technicians in Oléron Island in France. Before the workshops, participants had a moderate opinion about “hard” coastal protection. After, one third perceived more weaknesses than strengths. During debriefing, the main topic of discussion was on the opportunity to shift from the current dominant “hard” coastal protection strategy to alternative strategies. This social learning process occurred at the same time as a policy orientation of Oléron authorities in favor of reinforcing “soft” coastal protections. Finally, all participants agree that inter-municipal level is the right scale to embrace a real integrated risk prevention strategy and to be able to operate this paradigm shift.

5.2. Gaming Simulation for Managing Stranded Persons and Residents around Terminal Stations after Large-Scale Earthquakes
Yusuke Toyoda (1), Kohei Sakai (1) and Hidehiko Kanegae (1)
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Abstract
One of the challenges in disaster response surrounding terminal stations is to manage stranded persons including commuters and tourists unable to return home by the paralysis of public transportation. Against this challenge, this study developed Disaster Management Game at Terminal Stations as a training tool for players to learn how to manage stranded persons and residents around terminal stations after large-scale earthquakes and evaluated its learning effects. Its first prototype game was played with three scenarios (without collaboration among actors; with collaboration if needed; and enabling to change some situations) in March, 2019, and revealed that players learned the importance of the collaboration among players and understood some contents of the model, suggesting some solutions to manage situations. Continuing trialing and revising is needed to show the feasibility and effectiveness of the game. The contribution of this study would be to show that Gaming Simulation could be applied for the field of disaster response around terminal stations. Moreover, changes in the game model which is embodied by players’ choice to change some situations in the game would demonstrate some educational effects for broaden players’ perspectives.
5.3. Design and Develop Multiplayer Game The Danger of Disaster by Human
Siwat Sukri, Tanyaporn Pungtippimanai, Nattakit Vititamornvet, Nitipong Lertspopaphan, Ratchadawan Nimnual
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Abstract
The emerging of the world’s industrial scale and technology exploits more and more natural resources nowadays. Overexploitation of natural resources directly affects the nature, causing the destruction of the resource and the natural disaster, which in turns happen because of human activities themselves. We propose an online multiplayer board game about the natural disaster. The game was developed using Socket.io and Node.js technology instead of Unity engine server to support network system. The graphics inside the game was designed to be 2D by Unity engine. Players are able to interact with another player at a maximum of 4 players at a time. The evaluation was done by 3 specialists, and the user satisfaction survey was done by 30 participants. The evaluation result showed that the game quality and overall user’s satisfaction were good with the averages of 4.29 and 4.34 respectively.

Paper session 6 - Special Track: Gaming For Individual Efficacy And Performance
6.1. Learning from a Business Simulation Game: A Factor-Analytic Study
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Abstract
Learning is an active self-directed experience of the individual that changes her thinking and behaviour. A simulation game offers multifaceted learning experience to its players because it produces critical thinking skills and knowledge from their interactions with others and from their reflections of their actions and outcomes. To understand what business issues could be learned in a simulation, a 20-item instrument was developed and statistically tested on post-graduate management students in a business simulation game. The analysis of their responses showed that the game provided them with deep understanding of business goals, competitiveness and collaboration, and awareness of business and selling skills. This game covered the critical subjects of the business management course. The relevance of the findings for research and application have been discussed.

6.2. Unpacking and Overconfidence in a Production Management Game
Mieko Nakamura (1)
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Abstract
People often make judgements irrationally. For example, people tend to underestimate the completion time of tasks. It is known that unpacking improves the quality of judgment. Previous research shows that unpacking tasks into a series of required steps reduced the underestimation of completion times. For this research, I prepared two different questionnaires and distributed them before game run and examined whether some informative questions, intended to improve their time management, did indeed improve the quality of estimations by participants; the results for this
were affirmative. I also distributed a common questionnaire to all participants after the game run. The post-game questionnaire assessed the attitudes of participants regarding their ability to manage the time needed for task completion and their view on whether or not the informative questions provided before the game run improved their abilities. The results of this questionnaire showed that their attitudes remained the same whether they were provided with those informative questions or not. This was consistent with the results of previous research that showed unpacking did not improve the overall quality of performance on a task, even though unpacking does improve the quality of estimations on the time needed to complete that task. To what factors do we need to pay attention when we design a game related to unpacking and overconfidence? Those who have an incorrect understanding of the situation tend to be overconfident and convincing. Those who have a correct understanding of the situation tend to be less confident and silent. An appropriate game is expected to assist those with an incorrect understanding and a sense of overconfidence to become good listeners, and support those with a correct understanding and a feeling of uncertainty to become more open and outspoken.

6.3. Game Design Aimed at Reducing the Amount of Vegetable Waste at the Consumption Stage in Japan
Mizuho Sato (1), Hajime Mizuyama (2), Masaru Nakano (1)
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Abstract
The “2030 Agenda for Sustainable Development” (the 2030 Agenda) is a set of international development goals adopted at a UN summit in September 2015, to be achieved by 2030. The 2030 Agenda sets out “Sustainable Development Goals” (SDGs) consisting of 17 goals and 169 targets that are closely linked to each other. One of the goals is “Responsible Consumption & Production,” that is, to halve food waste at the retail and consumption levels globally. Vegetables and fruits account for the most food waste. The reasons include fluctuations in production volume because of weather conditions and difficulties in freshness management. As consumers’ demand fresh produce, vegetables and fruits will remain unsold if their freshness is degraded, leading to waste. In addition, it is not possible to use the freshly purchased vegetables immediately and many disposals occur at the consumption stage. Thus, the purchase and consumption behaviors of consumers are major factors affecting food waste. Vegetables and fruits are rich in vitamins, minerals, and dietary fiber; active consumption is recommended to maintain one’s health. In this paper, a game was created to get consumers interested in the food-waste problem and to change behaviors. From the results, the relationship between consumer behavior and waste generation is evident. Additionally, it is expected that the disposal of food will be reduced not only at the distribution stage, but also at the consumption stage.

6.4. Authentic Learning in Entrepreneurship Education
Luiz Antonio Titton (1) and Michal Jakubowski (2)
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Abstract
Entrepreneurship education has characteristics of engagement and motivation differentiated from ordinary education because it is something that refers directly to the ultimate goal of university education. Students tend to be more likely to devote themselves when the form of teaching is highly related to future professional activity. In this context, Authentic Learning stands as an additional element for the science of simulations & games. A platform is presented to demonstrate how this junction occurred in order to adapt to current models of use of internet-based
media such as social networks and learn-doing. The proposal was successfully implemented and its participation in innovation ecosystems and in the universities has grown and studies on its efficiency are in the beginning.

**Workshop session 4**

**The future of simulation games – challenges and changes**

Sonja Marie Buntrock, Christian Huehn, Birgit Zuern,
Centre of Management Simulation at the Baden-Wuerttemberg Cooperative State University of Stuttgart,
Eric Treske, intrestik, Munich

**Summary**

Participants will discuss and try to find out what kind of changes simulation games will have to face in the near future.

- Will simulation games have a future significance / impact similar to approaches like design thinking etc.?
- Which game elements are the most relevant ones in the future?
- Are there any trends? In addition, if so, which ones are considered the most important / relevant?
- Are there coming up new user groups / focus groups?
- Which themes are important?
- What will be the focus?
- How does digitalization influence the branch?

We will work in teams on different issues using some creative methods to find out what could happen i.e.:

- LEGO® Serious Play
- connection cards
- pyramid method
- silent discussion groups
- parts of the method future workshop
- Mind mapping
- Backcasting

The workshop could be a complement setting to the historical look into the past of Prof. Willy Kriz.

**Learnings**

- Get ideas of future trends
- Discussion of changes and challenges for facilitation and game development
- Get the chance to apply different methods

**Workshop session 5**

**Battle for Cattle**

Ege Kökel, Isabel Prade, Wessel Teunisse, Camillo Meinhart, and Markus Schmidt
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**Abstract**

Battle for Cattle is the world’s first science vaccine game, which is modelled after a real-world synthetic biology vaccine research project for farm animals. The game allows its players to master the same challenges as the scientists from the EC-H2020 funded project Mycosynvac, who work on the development of a mycoplasma vaccine chassis using a synthetic biology approach. In the game the player is confronted with sick farm animals and the problem of antibiotics overuse. The player experiences an increase in antibiotic resistance and learns about the importance and principle of vaccines. The player has to save the lives of cows on a farm and take control over the design of a synthetic biology vaccine. During the game, the player develops a strategy regarding when to use antibiotics, and when not. Game players also need to find out how viruses differ from bacteria, and finally how to transform a pathogen into a
vaccine chassis that can harbor several immune stimulating epitopes - surface proteins triggering the immune response - that together work as a vaccine. During the game the player goes back and forth between a farm environment and a laboratory, where the vaccines are designed. Battle for Cattle has been produced in close collaboration with scientists and game developers. It enables its players to understand the role of pathogens, antibiotics and vaccines by becoming the vaccine developer themselves.
Tuesday August 27th

Keynote - Prof. Dr. Toshiyuki Kaneda, Urban Simulation & Gaming for Planning Research and Education for Developing Countries

The issue of urbanization in developing countries is an urgent issue in the 21st century. Countries that faced this urban problematics over half a century ago see it as a challenge in establishing a social system for institutional design implementation and expert training related to this problem solving. The lecturer as an university academician has been involved in simulation and gaming researches and educations of urban problematics from the standpoint of graduate school level education over twenty years, and here provides topics on its principles, a brief history, and recent topics. Recent cases include URPG (Urban Redevelopment Project Game), a Gaming Simulation that was jointly studied with Kabul University, Afghanistan. This URPG includes the essence of rights conversion in a ‘rights conversion-type’ redevelopment project that has been known for over 1,000 cases in Japan. This has a formalization for the legislative project schemes in Mongolia and Afghanistan that Japan is working on as international cooperation.

Prof. Dr. Toshiyuki Kaneda is a Professor of Urban Planning and Urban Informatics at Department of Societal Engineering, Graduate School of Engineering, Nagoya Institute of Technology.

Paper session 7
7.1. Little Things Mean a Lot in Simulations
Teach, Richard (1); Szot, James (2); Chasteen, Larry (2)
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Abstract
All teachers using business simulations are concerned about what students learn when they participate in these games. Their questions are often: Is the business game I am using designed to teach the concepts I want it to? Are the teams balanced in terms of ability? Is the room designed correctly for little group discussions? There may also be other, simpler, and more controllable conditions to worry about that some would call, “the little things.” For example, Does the gender of the participant influence performance? Do teams with international students perform differently? Do teams that “share the load” perform differently than teams that do not try to “share the load?” Do teams that select their own leaders perform better than teams with designated leaders? Did teams that be-came good friends do better than teams that did not become good friends? This paper discusses exploratory research about the impact of some of these “little things.” This research has found that many of these “little things” have highly significant influences upon performance and should be considered when using a business simulation for experiential learning.

The authors found few differences between Males and Females nor between International students and US students enrolled in US institutions. In addition, most of the measured learning skills were highly related to the set of “little
things” that often are even not considered important when planning to use a business simulation as a experiential teaching methodology.

7.2. Simulation games as a framework to conduct scientific experiments – the example of prospect theory research
Małgorzata Ćwil (1)
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Abstract.
The main aim of this article is to examine the possibility of using simulation games as a framework to conduct scientific experiments. The main advantage of this solution is the fact that a researcher can provide the conditions that are as similar to real-life situations as possible while at the same time having control over the environment and control variables. This way of carrying out experiments aims at maximizing the ecological validity of the study. In the described research simulation game is used as a framework to verify the main hypothesis from prospect theory – one of the most prominent behavioral economic theories concerning the way people make decisions in situations involving risk. The results of the conducted experiment are described and conclusions for the future research are drawn.

7.3. The funnel of game design. Proposing a new way to address a problem definition using the IDEAS approach
Maria Freese (1) and Heide K. Lukosch (1)
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Abstract
New technologies, complex problems, interconnectedness between different actors: All these are challenges of our today’s society and characteristics of complex systems. Simulation games are a suited approach to analyze complex systems. The process of designing and developing those games for complex systems follows certain steps. One of such steps is the definition of the underlying problem. Deriving a concrete problem statement under consideration of the changing complexity of today’s society is crucial for the validation of a simulation game. Therefore, the following paper will introduce IDEAS, an approach to derive a specific problem statement as one part of the simulation game design process. In general, IDEAS consists of four steps: interviews, discussion rounds with experts, Moscow analysis and gamestorm. The approach itself as well as a case study, where this approach has been used, will be presented. Finally, we discuss the advantages and disadvantages of the approach and give recommendation for future work.

Paper session 8: Special JASAG track: Ethics of Simulation and Gaming
8.1. Is it permissible to use obfuscation and deception in games for learning?
Johannes Katsarow and Markus Christen,
University of Zurich

Abstract
Educational games and simulations can pursue persuasive goals and have been shown to arrive at attitudinal and behavioral change in learners. In some cases, educational games have only been able to arrive at such changes
through stealth approaches though, i.e., when learners aren’t aware of the educational nature/goals of a game (obfuscation/embedded approach) or are even misled about a game’s goals, presented with misleading information etc. (deception).

In educational (video) games and simulations that pursue goals related to attitudinal learning, either form of stealth approach might be of interest. For instance, Kaufman and Flanagan (2015) found that learners only improved their attitudes towards women when they weren’t aware of a game’s aim. When the aim of the game was too obvious, learners rejected to change their attitudes, and no learning effects occurred. However, when the game’s aim was embedded so well that it became invisible, learners changed their attitudes significantly. Similarly, simulations for healthcare practitioners partially use deception, e.g., when students aren’t informed that a doctor, who is participating in a simulation, is going to insist on giving a lethal dose of a drug to a patient in an emergency situation, and they don’t know that the purpose of the simulation is to raise their awareness for the need of speaking up to authorities (Calhoun et al. 2015). In line with these findings/practices, psychological research on attitudinal learning has shown that learners may change their attitudes more voluntarily, when they distracted or aroused emotionally, for instance (Martens 1998, 152ff.).

Some educational goals, e.g., combatting racial stereotypes, seem to merit the use of obfuscation or deception in games and simulations. Yet, possible critiques of manipulation, indoctrination, destruction of trust and psychological harm weigh heavily and must be taken seriously. In our paper, we will discuss the permissibility and boundaries of using stealth techniques in games for attitudinal change from an ethical perspective. Our discussion will cover diverse forms of obfuscation and deception, e.g., decision architectures that nudge people into certain directions, consider diverse pros and cons, and strategies to mitigate negative effects.

8.2. Two Aspects of Ethical Standard on Gaming Simulation
Hiroshi Deguchi
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Abstract
In this paper, we focus on the two aspects of the ethical standard not only on gaming simulation but also on a socially constructed relationship. We recognize gaming simulation as a framework for constructing artificial social relations and treated its ethical issues from two aspects. The one is the ethical standards against being embedded in the social situation where a person participates in the artificially constructed social relationship and who is not permitted to escape from the relationship. The right of withdrawal becomes the discussing issues from the aspect of ethical deviation.
The other is the second type of deviation that tries to punish or cure the person who participates in a particular social situation. The second type of deviation try to punish or cure the person who belongs to a specific minority group. We show the ethical standards against the WHO disease classification of game addiction and the medicalization of social problems. Finally, we discuss the ethical standards for participation in new virtual & artificial alternative societies.

Thematic Session 2
Facilitation in the 21st century - a retrospective and prospective analysis
Elyssebeth Leigh. Elizabeth Tipton, Marieke Marieke de Wijse-van Heeswijk, Elena Likhacheva, Natalia Isaeva

ABSTRACT
Simulations and games for learning are designed to be managed/facilitated by an expert with specialist skills and knowledge. When Dick Duke circulated his initial invitation to join a conversation about simulation, he began a
process that has generated 50 years of thoughtful analysis of the design and use of simulations. In the early years, facilitation was not as high on the agenda as it is for today’s simulation experts. As recognition of its importance has evolved more has been researched and written about it. This thematic session will review the ‘state of play’ drawing parallels between the evolving nature of the role of facilitators and the emerging complexity of learning through simulations games and play. The design team invites others interested in this vital aspect of simulation to join us in exploring what was, is, and will be in regard to successful management of simulation based learning. In the 21st century, many more people than ever before are choosing a nd using simulations in an increasingly diverse array of contexts. However, availability of resources to assist individuals to acquire and effectively apply the capabilities necessary for successful management of simulations and games for learning is not yet keeping pace with those increases in use.

Workshop session 6
SoyStory, a role-playing game to explore the complexity of the soy supply-chain
Claude Garcia, Anne Dray, Swen Bos, Nicole Ponta, Malika VirahSawmy
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Context:
Soy production has boomed over the last decades, following a surging demand worldwide. The soybean industry is ranking 2nd (after cattle production) as driver of deforestation, mainly in South America. With the new Bolsonaro government, the Brazilian Cerrado region is at major risk from soy-related landuse change. Encouraged by NGO’s campaigns, countries, consumers and downstream supply chain actors are demanding deforestation-free supply chain.

Objectives of the role-playing game:
The SoyStory game was created and used with Brazilian stakeholders to better understand the complexity of the supply chain and how this affects the agenda for deforestation-free supply chain. The game simulates how farmers’ decisions are influenced by interactions with multiple markets and traders, increasing demands for multiple commodities, infrastructures and logistics, and the effects of current governance interventions across a forest and a savanna biome (representing the Amazon and the Cerrado respectively). It explores the interactions between markets and commodities (production of cattle, corn, and soy), and how they are driving land expansion in the Cerrado and Amazon regions under different governance interventions.

SoyStory’s objectives are 4-fold:
- To model the effects of the Soy Moratorium (SM), Forest Code (FC) and Zero Conversion (ZC) on land trading, pricing, conversion and production outcomes in the Cerrado/Amazon
- To test what kind of incentives/disincentives can deal with the above-mentioned scenarios- To understand how interactions between multiple crops and multiple markets/traders drive farmers land trading, conversion and production strategies
- To model how different rates of increase in the market lead to different land trading, pricing, conversion and production outcomes

Workshop description
Participants will embody the roles of either farmers or traders. Farmers will have to manage their farm, in either the Cerrado or Amazonia-like regions, by growing corn, cattle and/or soy. They will also have the opportunity to expand their farm through deforestation. Traders will have to buy commodities from the farmers and decide where they want to sell those (Brazilian, Chinese or European markets). Markets prices will fluctuate based on the supply and demand, and scenarios like “zero-deforestation” will be tested. Each turn represents ten years in reality. The game starts in 1980 prior to the boom in Chinese soy demand, 1990 coincide with the China soy boom, 2000 is the start of the Soy Moratorium and demand for “Round Table Responsible Soy”, 2010 is the start of the demand for zero conversion soy by retailers. Policies introduced throughout the game are first Forest Code, later in the game Soy Moratorium, and finally Zero Conversion. Participants will experience, first-hand, the complexity of the issues around
Paper session 9: Simulation and gaming track

9.1. Interpersonal Competitiveness in a Cohesive Team: Insights from a Business Simulation Game
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2 Shri Vaishnav Vidyapeeth Vishwavidyalaya
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Abstract
Interpersonal competitiveness is the trait of an individual that affects her behavior and performance with respect to others in similar situations. Cohesion is the characteristic of a team that facilitates the collaborative work of its members and affects their members’ and team performance. To understand the nature of relationship of individual behavior in competitive and cohesive conditions, an instrument of statements describing such behavior was administered on 330 management graduate students at the end of their day-long business simulation game. Intrinsic motivation was the key attribute in the individual’s interpersonal competitiveness. Goal orientation was the key attribute in team cohesion, and was facilitated by discussion and assessment without prejudice or pain in an environment with focus on alignment of interests and actions. The game served as a platform with conditions and experiences that provided necessary stimuli for their competitive and cohesive behavior. Implications of this study for further research and application are discussed.

9.2. Teamwork Interaction, Communicative Strategies, and Self-efficacy after playing an Educational Game “Salad Bowl”
Soranastaporn, Songsri (1); Dumblekar, Vinod (2); Yamchuti, Nophawan (3); Yamchuti, Urairat (3)
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Abstract
Training and developing teamwork for students in this 21st century are very necessary because students will work as a team in their future career, so they will have interaction and communication either in their organizations or between organizations, in their country or aboard. Researchers, teachers, and trainers broadly use education games to train and develop teamwork performance for students especially in this era, 21st century. This is because education games engage students into learning environment and they actively participate in their learning. Students work as a team while playing and learning, so they build good sportsmanship and develop their problem-solving skills. Education games motivate students to join, so learning goals can be achieved and teachers can assess their students in more aspects than paper-based test. These aspects may be team interaction, communication strategies, and self-efficacy, rather than knowledge scores. In this study, we used a simple education game to train and develop teamwork performance, communication strategies, and self-efficacy for students. The objectives were to study teamwork interaction (5 point scales),

deforestation, the short-term and long-term impacts of their decisions, the unexpected consequences those might have (due to multiple feedback loops in the system), etc.
communicative strategies (5 point scales), and self-efficacy (6 point scales) after playing salad bowl game. The subjects of this study were all participants (174) registered at a national and an international conferences. We used two instruments: (1) questionnaires asking teamwork interaction communication strategies, and self-efficacy for collecting data and (2) the Salad bowl game for experiment. The questionnaire was verified by experts, and we used back translation technique to translate from English to Thai. The Cronbach’s alpha reliability efficiency was 0.98. Both descriptive and inferential statistics (t-test and Pearson correlation) were used for data analysis. Players rated their team interaction (M = 4.48, SD = .40), English communicative strategies: Speaking (M = 3.65, SD = .55), Listening (M = 3.73, SD = .61) and self-efficacy (M = 4.68, SD = .66) at the high level. There were statistically significant relationships between these three variables at the low and moderate level.

The results of this study suggested that players are aware of the goal of their tasks. This game encourages EFL players to communicate with foreigner players and they felt happy to play the game and to communicate in L2. When EFL players play and learn how to work as a team, they interact and communicate. Then their self-efficacy was developed.

9.3. Group-based learning and group composition on the provision of public goods: Incorporating agent-based simulation and gaming
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Abstract
Collective contribution to public goods is becoming important in modern social welfare and the understanding of its underlying mechanisms is critical to cultivate the contribution. Under the context of public service contribution and collaboration, group-based learning on improving the ability of using tools to contribute online contents and to conduct collective activities is important, yet its impact is still unclear. This work incorporates agent-based simulation and gaming to investigate the impact of group-based learning on cooperation in heterogeneous groups where individuals differ in their ability to contribute. We unfold public goods game to agent-based models incorporating a group-based learning mechanism to explore the individuals’ collaborative decision in addition to the influence from either the environment or from their past experience. A corresponding gaming session is designed and played to triangulate the simulation results, and has the potential to improve further simulation models. Simulation results suggest that small groups with competent individuals are prone to contribute more. Group-based learning is more effective in the context of contributions associated with a high cost whilst its influence is overwhelmed by other factors, such as a high responsive rate to the past experience, in those easy-to-operate contributions.

Paper Session 10: The ISAGA 50th Anniversary Track
10.1. A Journey to the Role of Facilitator: Personal stories unfolding alongside world trends
Elyssebeth Leigh (1) Elizabeth Tipton (2) Marieke de Wijse-van Heeswijk (3)
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Abstract
Simulations and games for learning require expert management drawing on specialist skills and knowledge. Dick Duke’s 1969 invitation to a ‘conversation about simulation’, initiated a process that has generated 50 years of thoughtful analysis of the design and use of simulations. In the early stages, facilitation was not high on agendas for discussion or research. However, the role of the facilitator has been receiving more attention, as the importance of effective management of simulation events receives more recognition. Awareness of the complexity of human interactions, and the ways in which simulation can both replicate and unsettle them, is leading to more research and attention being paid to the role of the facilitator. Using a trajectory of personal experiences beginning in 1969, this
paper uses an auto-ethnographic approach to review our own development as facilitators of simulations and games, alongside an exploration of the broader, evolving understanding of the role, and the increasing complexity involved in ensuring facilitators contribute effectively to current learning contexts.

**10.2. Simulation and Games for Effective Learning Outcomes**
S. Dhar (1) and U. Dhar (1)
1 Shri Vaishnav Vidyapeeth Vishwavidyalaya

**Abstract**
Simulations and games are experiential exercises that transport learners to practical world. There they apply their knowledge, skills, and strategies in the execution of their assigned roles. Motivating students to change their behaviour, and maintain an interest in learning is an ongoing challenge for educators. With new developments in technology, simulation and gaming are increasingly being considered as ways to motivate students, support learning and promote positive learning behaviours. Simulation and gaming may successfully generate cognitive and affective learning outcomes which in turn may affect students’ development of critical thinking skills. DGBL presupposes that learners could benefit from joy and a sense of accomplishment during the gaming process and consequently, benefit from learning results that are more effective as compared to traditional styles of teaching. Most teachers would not take the initiative to make students play educational games within the classroom or outside of lesson time. The present study was undertaken to explore the awareness level of faculty about simulation and gaming in teaching-learning process in Higher Education Institutions in India.

**Thematic Session 3**
**Persuasion game: Cross-cultural comparison**
Kaori Ando (1), Sugiura Junkichi (2), Nahoko Adachi (3), Susumu Ohnuma4, Gundula Hübner (5,6), Kim-Pong Tam (7)
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**Abstract**
This study aims to examine the effectiveness of the “persuasion game” in changing environmental behaviors and attitudes. The study also aimed to examine the effectiveness and applicability of the persuasion game played in different cultures. The game was played by university students in Germany, Hong Kong, and Japan. The number of participants were 116 in Germany, 65 in Hong Kong and 92 in Japan. In the persuasion game, participants are divided into two groups, the persuaders and the persuadees. The persuaders try to persuade the persuadees to adopt energy-saving behaviors. They receive blue stickers when their persuasion is successful. The persuaders are tasked with obtaining as many blue stickers as possible within 10 minutes. After 10 minutes, the roles of persuaders and persuadees were changed. The results showed that the game was judged most positively in Japan, although the confidence in persuasion measured before the game was lowest there. The results indicated the persuasion game had a greater impact on those who are not used to persuading others in daily life. The intention of adopting energy-saving behavior was higher after the game was played for all three countries. Through playing the roles of persons
who promote energy-saving behavior, the participants may have changed their self-perception. These results indicated that the persuasion game can be played in different cultures with similar effects.

**Workshop session 7**

**Blend INN and Pop-up Shop simulation games game design for soft skills development**;
Wardaszko Marcin, Jakubowski Michał, Anna Winniczuk, Ćwil Małgorzata;
Kozminski University, Center for Simulation Games and Gamification
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We invite you to join this workshop session to play our newest simulation games aimed at learning soft skills – Blend-IN and Pop-Up Shop Game.

Blend-IN is a simulation game that was created in collaboration of partners from 6 different countries. Blend-IN Simulation Game main aim is to teach youth workers about intercultural communication. In this game, you can fall into the role of a youth worker and participate in conversations similar to the ones from the life of a youth worker. As you will be having meetings with people from different countries and different cultures, it is important to adjust your behavior to a certain situation. The game is divided into three main parts: preparation, conversation, and some actions that you can undertake after the conversation.

The Pop-Up Shop Game aims to develop entrepreneurial competencies among creative creators. It includes all elements of business management: from product decisions to analysis of financial reports. The player becomes the owner of a new Pop-Up Shop venue, and her goal is to achieve the best results in four different areas: financial, well-being, community, and networking. The game is created in a way that forces the player not only to think about the short-term financial result but also about his impact on the local community. Pop-Up Shop Game is a part of European Union Project "Push - Pop-Up Shop Helper" that aims to develop a unique, innovative entrepreneurial training product to help those in the creative/artistic sector to make the transition from creativity to commercialization.

Workshops take place in a computer lab, so you do not need to bring your own devices.

**Paper session 11: Simulation and gaming track**

**11.1. Simulated construction of state’s intersubjective reality in computer games: A soft power tool in international relations?**
Svetlana Lobastova
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**Abstract**
The first decade of the 21st century was marked as the new era of public diplomacy and visual culture. Contemporary international relation systems exist in a hyperreal mode. Social interaction processes on the international global level proceed in virtualized hyperreal spaces. In an emergent modality of globalized international society, each state aspires to expand its influence by the virtue of non-coercive methods utilization. Soft power, in this connection, that may be distributed by a state or non-state actor as the efficient form of social power. The hyperreal force may be
intentionally distributed within the international system via popular mass media resources and online platforms. Consequently, online gaming platforms and appropriate construction of hyperreal space in gaming intercommunication may serve an efficient means of social power. However, gaming hyperreality space has not been considered an entire soft power tool yet. This paper focuses the key comprehension of modern power concept and proposes an innovative perspective of social force that may be represented by gaming virtual reality construction.

11.2. A Development of Web-Based Training using Simulation and Gaming as a Tool for Nurse Education
Settachai Chaisanit (1) Luddawan Meeanan (1) Chiraporn Chomyam (1) and Apichai Tra-ngansri (1)
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Abstract
To accommodate the rapid changes occurring in 21st century and popularity of smart devices has increased in recent years, providing instant access to content over Internet. This study discussed the design theory and incorporation training package using game and simulation along with internet-based applications for nurse education. The aim of this study was to design and implement simulation and gaming as a tool for nurse education. The samples group of this study was 60 undergraduate students from faculty of nursing, Mahidol university, Thailand. The sample was obtained by using simple random sampling method and used 5 experts for evaluation applications. Research methods were applied to collect quantitative data using questionnaires. In this paper, we propose game and simulation as virtual reality (VR), and can display interactive objects, including images, videos, and audio. For compatibility with multiple device platforms, we developed a common file format based on extensible markup language in cooperating with HTML5 and Scalable Vector Graphics formats. The result showed that the quality of a game and simulation was at a high level in the aspect of the lesson content and multimedia. Overall, it was demonstrated that the application was useful, enjoyable, easy to use, and effectively designed for the special needs.

11.3. The Development of the 3D Role-Playing Game on PC with an Assistive System for Deuteranopia
Paiboon Kiattikomol (1), Ratchadawan Nimnual (1), Pavarisa Sittisanguansak (1)
1 King Mongkut’s University of Technology Thonburi

Abstract
The purposes of the study were 1). to design and develop the 3D roleplaying game on PC with an assistive system for green vision impaired people, 2). to assess the quality of the game created by the experts, and 3). to evaluate the satisfaction of the samples towards the game. This game was qualitatively evaluated by three experts in gaming development through a purposive sampling. Thirty participants were recruited via accidental sampling method to evaluate a satisfaction towards the game. The quality evaluation results was found to be at a satisfactory level (mean = 3.90 / SD = 0.12). The participants rated their satisfaction towards the game at the very satisfactory level (mean = 3.64 / SD. = 0.05). It can be summarized that the 3D role-playing game on PC with an assistive system for green vision impaired people is appropriate to be used for the visually impaired. The assistive system can also be applied to further develop games for the vision-impaired people. and relaxing users, which can be compared to being on a vacation.

11.4. Developing Resilience in Cognitively Diverse Teams: A Play-Oriented Approach using LEGO Serious Play
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Abstract
To meet today’s demands and maintain high performance, teams in organizations need to develop resilience capabilities. They must be able to anticipate potential threats, respond effectively to unexpected disruptions, and learn from their experience in order to become stronger than before. This paper analyzes the role of LEGO Serious Play (LSP) in developing team resilience in cognitively diverse teams. For this purpose, we conducted a qualitative study with an experimental character in the university context and compared teams with different manifestations of cognitive diversity.

Paper session 12: Gaming for Sustainable Development Goals
12.1. Review of Haptic and Computerized (Simulation) Games on Climate Change
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Abstract
Climate change imposes tremendous, complex challenges on humanity. Thoughtfully designed games can support solving them. This article presents a systematic review of climate games and updates the review conducted by Reckien and Eisenack in 2011. It provides an overview of published climate games and reveals the development of the field over the last years. A total of 119 climate games were found whereof 52 were already part of the review of 2011. The broad variety of discovered games indicates a lively community and different settings where such tools are applied. A substantial number of games addressed topics such as international climate conferences, global impacts of global decisions, and effects of individual decisions on their local environment. Other topics, however, were largely absent. They included - amongst others - the connection between climate change and health, and games that bridge local and global levels. Furthermore, the game types "video games" and "alternate reality games" were not applied frequently. Both, the absent topics and the scarcely used game types open up possibilities to develop the field. Forty-six per cent of the games listed by Reckien and Eisenack seem to have disappeared and could not be found for this review, an observation that may need further attention.

12.2. Exploring trajectories of shifting-cultivation landscapes through games: the case of Assam (India)
Swen Bos (1), Tina Cornioley (1), Anne Dray (1), Patrick Waeber (1), Claude Garcia (1,2)
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Abstract
Understanding landscape change starts with understanding what motivates farmers to transition away from one system, shifting cultivation, into another, like plantation crops. Given that they often have limited labor and money available, we explored the resource allocation strategies of the farmers of the Karbi tribe in Northeast India, a landscape of very high conservation value to the adjacent Kaziranga National Park. In the model farmers allocated labor and cash to meet household needs, while also investing in new opportunities like bamboo, rubber and tea, or the chance to improve their living standards. When given new opportunities, the farmers were eager to embrace those options where investment costs, especially monetary investments, are low.

Returns on these investments were not automatically re-invested in further long-term, more expensive and promising opportunities. Instead, most money is spend on improving the household living standards, and especially on the education of the next generation.
The game landscape changed profoundly as a result of the farmer strategies. Natural ecological succession was replaced by an improved fallow of marketable bamboo species. Plantations of tea and rubber became more prevalent as time progressed. However, old practices that ensure food security are not yet given up.

**12.3. Food-web modeling in the Maritime Spatial Planning Challenge Simulation Platform: Results from the Baltic Sea Region**

Magali Debora do Patrocínio Gonçalves (1), Jeroen Steenbeek (2), Maciej Tomczak (3), Giovanni Romagnoni (4), Rikka Dodd Puntila (5), Ville Karvinen (5), Carlos Pereira Santos (1), Xander Keijser (6), Lodewijk Abspoel (6), Harald Warmelink (1), Igor Mayer(1)

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3 Stockholm University
4 University of Oslo
5 Finnish Environment Institute (SYKE)
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**Abstract**

The MSP Challenge Simulation Platform helps planners and stakeholders understand and manage the complexity of Maritime Spatial Planning. In the interactive simulation, different data layers covering entire sea regions can be viewed to make an assessment of the current status. Planners can create scenarios for future uses of the marine space, over a period of several decades and visualize the effects in indicators and heat maps. To support the implementation of the EU MSP Directive principles of evidence-based and ecosystem-based MSP, the authors created a link between the MSP Challenge and the food-web modelling approach Ecopath with Ecosim. For each regional edition of the MSP Challenge, such as the North Sea or the Baltic Sea, a food-web model for the sea basin needs to be integrated. In this paper, the authors explain the integration of EWE into the MSP Challenge and evaluate its behaviour from historical data, a baseline scenario, and scenarios developed by planners from the region in a game session. The conclusion is that the current integration of the Baltic Sea food-web model into the platform gives ecologically realistic feedback and that this makes the players more aware of the effects of their plans on the entire ecosystem.

**Workshop session 8**

**The Tower of Babylon: A Game About Resilience**

Developed at ISAGA Summer School, Atlanta, August 2012, by:
Dirk Jan Bolderheij, Dennis Meadows, Stephan Rometsch, Simón Schwarz, Joanna Średnicka, Stanislav Vavilov

A game about sustainability to learn resilience of a system, played with blocks in different teams. Each team will plan and build a structure that best meets the goal using only the provided blocks. After "start" take up to five minutes to decide which goal and general strategy you will use to guide your design of your structure. Then take up to two minutes for construction.

Build your structure on the plate provided using only the blocks. Then I will plot the results. No communication and no trading of blocks is permitted between teams. Then a shock occurs!

Debrief and discussion:

Resilience is the ability to absorb a shock and quickly regain the ability to perform essential functions.
- If a resilient system continues to perform without pause, we say it is durable.
- If a resilient system quits performing briefly and then resumes, we say it is flexible.
- If a system is not resilient, we say it is brittle.

  • There are many possible goals when deciding how to build something new. But normally they try to maximize some concrete measure of short-term results.
  • When first they build something, normally they do not expect there will be a big shock to reduce your results.
  • There is normally a conflict between building for short-term results, versus building for long term resilience.
Wednesday August 28th, Warsaw City Day

Keynote Prof. Dr Ivo Wenzler  The good, the bad, or somewhere in between: What makes a serious game a seriously good game

Prof. Dr. Ivo Wenzler is currently holding a position of a professor of Serious Gaming at the NHL Stenden University of Applied Sciences and of a senior researcher at the Delft University of Technology. My focus for the coming year is on conducting innovative research into the design, implementation and value contribution of serious gaming, as well as on development of university level curricula with and about serious gaming.

Prior to my appointment at NHL Stenden I had a 23-year career as a Senior Principal at Accenture Strategy. Before Accenture I was the Head of Policy Analysis Group at the Radboud University in Nijmegen and Research Associate at the University of Michigan. Throughout my consulting career I have been focusing on development and implementation of change management, business modeling, workforce planning, and simulation and serious gaming approaches aimed at helping my clients deal with their business transformation challenges.

Paper session 13: Simulation and gaming track

13.1 Iterative Game Design to Develop Collective Critical Infrastructure Resilience
Joeri van Laere (1), Osama Ibrahim (2), Aron Larsson (3), Peter Berggren (4), Joanna Davis (5)
1 University of Skövde, Sweden
2 Stockholm University, Sweden
3 Mid Sweden University, Sweden
4 Linköping University, Sweden
5 Combitech AB, Sweden
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Abstract.
Resilience of interdependent infrastructures increasingly depends on collaborative responses from actors with diverse backgrounds that may not be familiar with cascade effects into areas beyond their own sector. A simulation game can enable societal actors to obtain a deeper understanding of the interdependencies between their respective infrastructures and their respective crisis responses. Following a design science approach, a simulation game has been developed that combines role-playing simulation and computer simulation. The simulation-game challenges participants to address the interaction between payment disruptions, food and fuel supply, security problems (riots, robberies) and communication challenges (preventing hoarding). The game has been played on 15 occasions with representatives from different sectors in society and the game design has been changed iteratively after each playing-session. The paper reflects on the impact of initial design choices and the effects on later modifications. Finally, it is discussed how the current version of the game serves multiple purposes: awareness raising, education of participants, model validation, identification of new mitigating actions, and development of collective critical infrastructure resilience in society.

13.2. Can the Veil of Ignorance Create Consensus? A Qualitative Analysis Using the Siting for a Contaminated Waste Landfill Game
Miki Yokoyama (1), Susumu Ohnuma (1) and Yukio Hirose (2)
Abstract.
This study aims to demonstrate the significance of the discussion under the “veil of ignorance” in building consensus about the Not In My Back Yard (NIMBY) issue. The Siting for a Contaminated Waste Landfill Game simulating conflicts related to the site selection of a contaminated waste landfill created by the accident at Fukushima nuclear power plant was developed with the veil of ignorance implemented as the prevailing social structure. The game involves two types of players: mayors, who are aware of the interests of their regions but can only engage in discussion; and citizens, who are unaware of the specific concerns of their regions (i.e., under the veil of ignorance) but are tasked with engaging in discussions and making the final decision. The transformations in the ideas of the players were examined through this game relating to building consensus. Ten games were conducted, and no unfair decisions were discerned under the veil of ignorance. A qualitative analysis of the open-ended questions revealed that a) the participants focused on fair viewpoints and avoided obsessions with regional interests after the discussion, and b) the diversity of actors and the multiple value dimensions were consistently emphasized before and after the discussion. Hence, this study succeeded in demonstrating that by participating in discussions under the veil of ignorance, the participants were able to form a shared recognition of the multiple-decision process, which the involvement of a diversity of actors and values was crucial for the formation of a consensus on the NIMBY issue.

13.3. Study on occurrence mechanism of quality scandal in enterprises by "Sontaku", "air" and "water" theory using business game
Hiroyasu Seita (1) and Setsuya Kurahashi (2)
1 University of Tsukuba Faculty of system and information Engineering Department of Risk Engineering
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2 University of Tsukuba Graduate School of Business Sciences
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Abstract.
The quality assurance falsification continues in a part of Japanese companies that have been sweeping the world with its top priority on customer first principles and quality first principles. In these cases of misrepresentation, as seen in the Akafuku case of the food fraud, there are cases in which the conjecture to a specific target worked. Until now, each company has been absolutely quality based on quality first principle, why is it so fragile and crumbling why? In this research, we use a business game based on the framework of the Giddens ‘s theory of structuring to show that "quality" is absolutely made with "sontaku" and "air" theory, which can be said as unique culture of Japan as Mr. Shichiei Yamamoto says, and furthermore that it is collapsed due to real problems.

Paper session 14: Gaming Cultures Track
14.1. Comparison of Experience of Using Business Games in University of Lodz and Kaunas University of Technology
Anna Pamula (1), Martynas Patasius (2) and Irena Patasienė (2)
1 University of Lodz
2 Kaunas University of Technology
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Abstract.
Institutional collaboration allows teachers of universities to discuss more widely and deeply about experience, culture and traditions of using different teaching methods in education of similar study programs. Teachers of University of Lodz and Kaunas University of Technology (KTU) started collaborate around ten years ago. Common annual conferences, mobility of teachers according ERASMUS program allow teachers better to understand situation and good practices in neighbor University. Both universities have experience in using business games. University of Lodz pay attention in applying Business games and simulations for seeking better results in teaching management, ERP and decision making. Kaunas University of technology has positive results in helping students better understand business processes and usefulness of using ICT in business administration. Running the same Business Game "Hard Nut" in both universities has showed similarities and differences in the field of education both universities. The main result of collaboration is possibility of applying best practices of using business games.

14.2. Current characteristics of Japanese Tabletop Game players: A preliminary study based on an online survey
Hiroyuki Matsui (1), Toshiko Kikkawa (2) and Junkichi Sugiura (2)
1 Kyoto University, Yoshida-honmachi, hmatsui@econ.kyoto-u.ac.jp
2 Keio University, tompei22@keio.jp; jsugiura@flet.keio.ac.jp

Abstract.
In this paper, we discuss the current status of Japanese tabletop game (unplugged or non-electronic games: board games, card games, role-playing games, and wargames) players based on the results of an online survey. The market for tabletop games has expanded in recent years. For example, the Game Market, which is the biggest tabletop game event in Japan, is held three times annually. It has been gaining in popularity, as evidenced by the fact that it recorded 22,000 participants in the 2018 autumn Market. One characteristic of the Game Market is that most of the exhibitors (approx. 450) are independent game designers. However, the reason for the increasing popularity of tabletop games has not been explored thus far. Therefore, we conducted a survey of 1,059 respondents, with ages ranging from 20 to 69 years old. The survey was carried out between the 22nd and 27th June in 2018. According to our results, the most active game players are in their twenties and thirties, meaning that people from the relatively younger generation could accelerate this recent trend. Men were found to be more active game players than women. In terms of attitudes toward tabletop games, younger respondents and men have more positive attitudes toward games. Those who play games frequently believe that there are connections between games and the real world.

Workshop session 9
Using of elements of entertainment games for learning purposes
Sonja Marie Buntrock, Christian Huehn and Birgit Zuern,
Centre of Management Simulation at the Baden-Wuerttemberg Cooperative State University of Stuttgart, Eric Treske, intrestik, Munich

Summary
We are planning an experience-driven workshop. It will be about playing and using “normal” board games usually used for entertainment in another meaningful way: As a learning tool. Based on the concrete experiences in the game, participants will be starting a transfer process from entertainment-driven game logic to a learning purpose. This aim, creating a playful learning environment with common means, could be reached i.e. by changing rules, selecting only a part aspect of the game and adapting it or the use of only the game material for learning purposes that are not linked to the original game idea at all. Together with participants, we want to explore new ways of using
entertainment games as tools for interactive learning experiences and get a common idea of this special transfer process. Sure, finally yet importantly, another core experience should not be forgotten: Having fun while playing is an important game element.

- Get knowledge about learning in games
- Discussion of mechanisms of games and transfer to learning purposes
- Learn to reinterpret well-known games

Workshop session 10
Business experience matching vocations and fields of study - example of a CAR GARAGE simulation
Elżbieta Szczepaniak, Revas co-founder and vice-president, business simulations trainer and coauthor, academic teacher for more than 10 years running courses on economics, management, entrepreneurship for international students, Edtech and gamification enthusiast

Aim of the workshop:
The aim of the workshop is to present how business simulations can be used for vocation and field of study related business/entrepreneurship education in schools and universities (e.g. for IT, logistics, hairdressing, mechanics students).

Programme:
Participants in groups run virtual small businesses – car garages. They will go through 3-4 first months of company’s operations in the market making realistic managerial decisions reg. the offer, HR, investments, finances etc. As they all operate in one market, they will be able to observe the influence of their decisions on the competitive environment. Participants will also have a chance to learn about simulations for other industries e.g. hospitality, logistics, hairdressing, IT.
Thursday, August 29th

Keynote An Coppens, Mastering gamification in a changing environment

An Coppens is the Chief Game Changer at Gamification Nation Ltd, which offers gamification design solutions to clients worldwide. The company won the “outstanding gamification design Agency” award at Gamification Europe in Brighton in 2017 and the Gamification Design Excellence award for non-digital gamification at GamiCon in Chicago in 2018. An is the author of several books and still aims to blog 3 times per week on the company website.

Books:
“Winning at the infinite game of learning gamification” – due out 2019

Projects she has worked on included reviewing onboarding of sales staff and their recognition, assisting managers with getting ready for new hires, website gamification, gamification of an in-house learning curriculum, membership site gamification, etc. Increasing engagement is always our key focus. Clients include Adidas, Chubb, Thomson Reuters, Qinetiq, RB, Cenlive, Millicom, YouEQ, Nightingales, EIT digital, EIT Climate-KIC, Sapp, Robeco, and a few more.

Paper session 15: Simulation and gaming track

15.1. The Development of the 3D Role-Playing Game on PC with an Assistive System for Deuteranopia
Paiboon Kiattikomo (1), Ratchadawan Nimnual(1) and Pavarisa Sittisanguansak(1)
1 King Mongkut’s University of Technology Thonburi,

Abstract
The purposes of the study were 1). to design and develop the 3D roleplaying game on PC with an assistive system for green vision impaired people, 2). to assess the quality of the game created by the experts, and 3). to evaluate the satisfaction of the samples towards the game. This game was qualitatively evaluated by three experts in gaming development through a purposive sampling. Thirty participants were recruited via accidental sampling method to evaluate a satisfaction towards the game. The quality evaluation results was found to be at a satisfactory level (mean = 3.90 / SD = 0.12). The participants rated their satisfaction towards the game at the very satisfactory level (mean = 3.64 / SD. = 0.05). It can be summarized that the 3D role-playing game on PC with an assistive system for green vision impaired people is appropriate to be used for the visually impaired. The assistive system can also be applied to further develop games for the vision-impaired people. and relaxing users, which can be compared to being on a vacation.

15.2. The Trust Game: The influence of Trust on Collaboration in the light of Technological Innovations
Anique Kuijpers (1), Heide Lukosch (1) and Alexander Verbraeck (1)
1 Faculty of Technology Policy and Management, Delft University of Technology
a.g.j.kuijpers@tudelft.nl
Abstract
Adopting innovations is key for organizations to compete in a complex system, such as the transportation system. In a complex system where social (e.g. organizations) and technical (e.g. information systems) interact with each other, collaboration can be challenging. One of the barriers identified that hampers collaboration is trust. To understand the influence of trust on collaboration, enabled by technological innovations, simulation games in our perspective are a suitable method for our study. First, we introduce the results of a literature study that was carried out to identify related work regarding trust and simulation games. Subsequently, a case from the transport sector is defined to serve as a basis for the trust game. To conclude, we illustrate our simulation gaming approach and discuss the first initial results of a playtest session with the Trust Game.

15.3. A Review of Game-Based Research for English Language Learning in S&G Interdisciplinary Journal
Panicha Nitisakunwut (1) and Songsri Soranastaporn (1)
1 Mahidol University, Nakhon Pathom Province
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Abstract
Many experimental studies on game-based learning have resulted in constructive learners’ learning outcomes, especially simulation and gaming for English language learning. However, there has been disagreement on the outcome of game-based learning. This leads to the necessity to conduct a systematic review on simulation and gaming studies to provide comprehensive analysis regarding to their effectiveness and implementation. This article carries out a review of literature research in terms of identifying research evidence about the positive impacts of games for language as a means to address the best practices and guidance for the implementation of game-based for language education. This article reviews and describes relevant simulation and game-based learning (GBL) studies published in S&G Interdiscipline journals from 2000 to 2019. Set keywords “gam*” related to simulation and gaming or game-based learning”, and language related words for example “literacy”, “ESL”, “EFL”, “listening”, speaking”, “writing” were used to search for articles on the database. 561 studies were found. Only 14 studies met the set inclusion criteria. The findings suggest that simulation-based gaming and debriefing would be beneficial for English language teaching, especially composition and literacy classrooms even though these studies are subject to limitations.

Paper session 16: Gamification Track
16.1. Resolving Migrant Issues in Thailand Using the Framework of ‘Simulation Game – Project PAL’
Ryoju Hamada (1), Nanako Iwasa (2), Tomomi Kaneko (3) and Masahiro Hiji (4)
1 Thammasat University,
2 Hokkaido University,
3 Hokkaido University of Science, Junior College
4 Tohoku University,
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Abstract
The authors researched to make new gaming by using the ‘Project PAL’ framework to let students learn migrant or refugee issue in Thailand. Many people are staying in Thailand for many reasons, we have to find a way to colive, but students have few opportunities to consider this kind of story as their problem. The PAL gaming has the power to recognize such social issues and to consider proactively. The authors compiled two versions of the game to find a solution of migrant/refugee both from Cambodia and Myanmar. By comparing the results of questionnaires conducted before and after the gaming, those games worked well, that tells us ‘Learning by Gaming’ is effective. Throughout the process, the authors grew up senior project students to create, to conduct, and to analyze the
migrant or refugee problem both in Japanese University and Thai University. Most of them accepted the experience positively. This fact shows us the possibility that ‘Learn by developing and facilitating gaming’ provides an excellent opportunity of learning.

16.2. Gamification Design Strategies - summary of research project
Michał Jakubowski
Kozminski University, Center for Simulation Games and Gamification
mjakubowski@kozminski.edu.pl

Abstract
In the paper Author will describe outcomes of his interviews with focus on how certain game elements are chosen and compiled into working gamification systems. Most popular elements which can be found in current gamified platforms and literature reviews are leaderboards, points, badges and levels. It seems that designers are using it over and over again as it would be the only possibility when one thinks about boosting engagement. What is the reason that designers won’t take advantage of other combinations of game design elements? How they are guiding the creative process of game design construction in gamification design process? Following poster will try to deliver answers basing on data gathered during the research.

16.3. Make It Punk! For a critical, bottom-up, playful gamification
Mattia Thibault,
University of Tampere
mattia.thibault@tuni.fi

Abstract
This paper criticizes the mainstream established understanding of gamification and argues for a punk bottom-up, playful alternative.

Workshop session 11 – PART 1
Speed gaming : the half-day serious game building challenge!
Anne Dray (1), Nicolas Bécu (2), Nicolas Salliou (3)
1 ForDev Group, ETH Zürich
2 UMR 7266, CNRS
3 PLUS, ETH Zürich,

For over 20 years the COMpanion MODelling community (or ComMod) developed a method to build serious games together with stakeholders facing complex issues about natural resource management and a wide diversity of wicked problems. The methodology was fine-tuned by years of practice and teaching of the method to students, researchers and practitioners. In this workshop, we propose to participants to follow this methodology and build a serious game in half a day! It is a challenge, but we’re looking forward to make it happen with you. We will facilitate this process step by step, from the understanding of a case-study to the game design itself. Doing so, you’ll experience the companion modelling community approach to serious game development.

Objectives:
The objective of the workshop is to explore the Companion modelling methodology from case-study to the construction of a playable serious game. Doing so, participant will learn how we (1) set a leading problematic (2) co-design a conceptual model of the issue and (3) translate such conceptual model into game components and rules.

Workshop flow:
Total time = 3h30:
• Introduction: welcoming word (5’). Little theatre play to introduce to all participants the general context of the case study (10’)
• Forming groups. One ComMod member is a facilitator for each group. Groups are lead to separated working space. (10 min)
• Case study discovery (Reading handout (5’) and Q&A with facilitator if needed (20’ in total) – Agreeing on a common problematic for the game (20’)
• Conceptualization (45h)
• Game design (1h15)
• End of session – debriefing on the experience (20’)

Number of participants: 20 (three groups of 6-7 participants)
Outcome for participants:
• Get an overview of the companion modelling tools, methods and facilitation.
• A playable serious game (further crash test session can be imagined with participants if they’re willing to push the experience further)
• The pleasure to be participant in an amazing challenge!

Paper session 17: Simulation and gaming track
17.1. SIMULATIONS FOR STRATEGY COURSES: DIFFICULTY VS. REALISM, ADDITIONAL FINDINGS
Larry Chasteen (1) and Richard Teach (2)
1 University of Texas at Dallas, Richardson, Texas, chasteen@utdallas.edu
2 Georgia Institute of Technology, Richard.teach@scheller.gatech.edu

Abstract
Simulations are an essential part of strategy courses - they facilitate the transfer of knowledge, skills, and ability by providing “learning-by-doing” opportunities to the students. Simulations have become an accepted part of strategy classes both at the undergraduate and graduate levels. To be explored is the impact of difficulty versus realism in simulation. Professors using simulations believe anecdotally what the literature on simulation has suggested for decades: that the simulation should be as realistic as possible, but not too complicated that students lose interest and give up. However, detailed measurements are lacking. Previous investigations have shown that this is a complex issue – sometimes simple simulations lead to good results, but sometimes they do not. There are many influencing factors. This paper is an extension of a previous paper and uses a recent dataset on undergraduate students collected at a US university in an exploratory study to continue to evaluate the relationship between difficulty, realism, and results focusing on the difference between graduate and undergraduate students. It was found that in general graduate students were more focused on realism whereas undergraduate students were more focused on getting good results

17.2. Accuracy in Business Simulations
Mihail Motzev (1) and Ophelia Pamukchieva (2)
1 Walla Walla University,
2 University of National and World Economy,

Abstract
The present paper provides some insights into accuracy in simulations and the opportunities to increase it in a very cost-effective way using Statistical Learning Networks. Learning is minimal if the simulation model is not accurate and the predictions made by students are not close enough to the real-life business. The results so far show significant
achievements in minimizing the prediction errors, shortening the design time, and reducing the cost and the efforts in simulation models development.

17.3. Gaming as a language for public policy and program evaluation
Karol Olejniczak (1), Kathryn E. Newcomer (2), Sebastiaan A. Meijer (3)
1 Institute of Social Sciences, SWPS University of Social Sciences and Humanities
2 The Trachtenberg School of Public Policy and Public Administration, George Washington University
3 KTH Royal Institute of Technology,

Abstract
The classic work of Richard D. Duke (1974) portrayed gaming as the future’s language of communication, highlighting its value for applied social science and collaborative problem-solving. The article builds on this foundational work and explores promising applications of serious games for advancing evaluation practice. Evaluation has been a well-established and central practice of public policy. However, it has been facing challenges of communicating useful evidence to decision-makers, stakeholders, and society. We claim that serious games could be employed by evaluators in their work to become more relevant and impactful in shaping the craft of public policy. We provide a framework that takes into account two crucial aspects of evaluation inquiry - its function and the nature of the policy issue. We describe and illustrate with exemplars of successfully implemented games four different areas in which games can be useful: testing retention, teaching knowable, crash-testing mechanisms, and exploring policy issues. We conclude that games are useful to promote learning about and among stakeholders and to collect valuable intelligence about the operations of programs and policies.

Paper session 18: Advance in Gaming Technology Track
18.1. Video game monetization mechanisms in triple A (AAA) video games
Martin Ivanov (1), Helmut Wittenzellner (1) and Marcin Wardaszko (2)
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2 Kozminsky University
wardaszko@kozminski.edu.pl

Abstract
The process of video game monetization has existed ever since video games became a consumer product. It underwent multiple stages throughout the years until it reached a mature state in the economy of today. Monetization in video games is a highly relevant and controversial subject as it has caused a negative out-cry in consumers. This is due to frequent exploitation on a moral and ethical level focused on identifying psychological weak points in consumers and using them to achieve a financial advantage. On the other hand, the revenue boost that has been provided with these advanced marketing strategies cannot be denied as they generate billions of USD for the major players on the video game market annually and con-tribute to the massive growth of the video game market of today. Furthermore, since the topic’s complexity has only been increasing parallel to the economic importance of this marketing sub-process, it is becoming one of the most important segments of a video game’s business model. The en masse implementation of various in-game currencies enabling consumers to purchase so-called “in-game unlockables” has begun. These currencies, such as credits, tokens or plain virtual money, are highly differentiated and usually unique per game, with the common denominator between them being the way of acquisition – by paying with actual money. Their implementation has generated undisputable increase in revenue for companies in the game industry as currently hundreds of millions of US dollars are being generated by purchases made with in-game currencies.
18.2. Learning with Location-Based Gaming
Jaakko Vuorio (1) and Tuomas J. Harviainen (1)
1 Tampere University
jaakko.vuorio@gmail.com

Abstract
Along with popular location-based game Pokémon GO and advancements with mobile technology, location-based gaming has drawn interest in education. Schools may well pose a feasible context for the further mainstream use of location-based games aimed for educational purposes. We present conceptual work with location-based gaming in education and mobile learning literature together with in-use examples of location-based games to highlight the ongoing tendency in schools to adopt these games for pedagogic activities. Implications are provided for further research, practice and game design.

18.3. Methodological challenges of creating a next-generation machine learning-based game engine for generating maps and vehicle behavior
Błażej Podgórski1 and Marcin Wardaszko1
1 Kozminski University, Warsaw, Poland
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Abstract
The article presents conceptual work in the area of technological challenges for the construction of a next-generation racing game engine. The team creating the game decided to implement the project based on the Unreal solution. The main innovation of the product is to be: realism of driving experience and the use of machine learning elements to improve work under the engine. In terms of realism, the team will make real measurements using race vehicle telemetry devices. The Machine Learning component is intended for two purposes as a map detainting element and for setting the parameters of physics of objects in the game. The paper aims to present the ideal project idea to the critical analysis and thus improve the concept.

Workshop session 12
Pitch Your Green Idea! Play session with the board game about sustainable entrepreneurship & concept presentation for a modular board game developer kit
Antonia Bartning (1)
1 University for Sustainable Development

Abstract
The workshop at ISAGA is about a recently finalized management board game and the plans for further development in the field of sustainable serious games. “Pitch Your Green Idea!” is an entertaining management board game about sustainable entrepreneurship. It contains a combination of creative tasks, problem-solving tasks, quiz and strategic decisions. During the game the players create solutions for social or environmental issues, such as water pollution and plastic waste and they must convince the other players about their ideas. During the workshop, at first the participants play a shortened version of „Pitch Your Green Idea!“ and discuss the game and it’s modularity as well as sustainability in the analogue game industry. Afterwards the author presents an
upcoming research and development project for a modular board game developer kit that shall help people to develop serious board games, fast and easy, in the field of sustainability education.

**Workshop session 13 – PART 2**

**Speed gaming: the half-day serious game building challenge!**

Anne Dray (1), Nicolas Bécu (2), Nicolas Salliou (3)
1 ForDev Group, ETH Zürich
2 UMR 7266, CNRS
3 PLUS, ETH Zürich,

Continuation of the session please see the description of Workshop session 11 – PART 1

**Open sandbox activity - session 19: Simulation and gaming track**

This is an open sandbox session for conference participants to accommodate. If you have an existing idea for a discussion, research topic you want to explore or discuss, please let us know in the first two days of the conference and we will be happy to make it possible. For more details contact Marcin Wardaszko.

**Workshop session 14**

**Play-demonstration session of the Maritime Spatial Planning (MSP) Challenge Simulation Platform**

Igor Mayer [1], Harald Warmelink [1], Xander Keijser [2], Carlos Santos [1], Wilco Boode [1], Magali Gonçalves [1]
1 Breda University of Applied Sciences,
2 Rijkswaterstaat,
i.s.mayer@hotmail.com

**Abstract**

The MSP simulation platform (www.mspchallenge.info) helps planners and stakeholders understand and manage the complexity of Maritime Spatial Planning (MSP). In this workshop, we’ll present the design and use of the platform, followed by a hands-on play-demonstration on a number of laptops. We’ll reflect with the audience on the strengths and limitations of the platform and the role of games and VR/AR in planning support.

**Workshop session 15**

**Training is nothing, the will is everything, the will to act - Effective methods of debriefing educational games**

Marek Janigacz (1)
1 ERDAD
marek.janigacz@erdad.pl

**Abstract**

Educational games are a very effective tool only when the facilitator conducts a good debriefing but this is hard to achieve. The debriefing can be carried out in many different ways, however, which one to choose depends on the type of game and the way it is run. This workshop will focus on the connection between facilitation and the debriefing. Each participant will have the opportunity to play one of three copyright educational games. After the games there will be a simultaneous debriefing of each of the games according to the chosen model.
Friday, August 30th

Keynote Michał Kajetan Dabrowski, The future of mobile game design

Michał Dąbrowski – Chief Executive Officer, DaftMobile
Software engineer with rich experience in both iOS app and game development. As a co-founder of DaftMobile he is responsible for the company's direction, innovation, product quality, sales and monetization of mobile games, as well as building relationships with distribution partners. He is a graduate of the Faculty of Mathematics and Information Science at Warsaw University of Technology. DaftMobile under his leadership delivered many successful applications and mobile games, like Finger Hero, Idle Chef, Daft Lander and more.

Paper session 20: Simulation and gaming track

20.1. Hybrid Simulation Games in Agricultural Education: Effects of a Simulation Game to educate about the new German Fertiliser Ordinance
Sven Ivens (1), Gerlinde Wiese (2), Klaus Dittert (3), Oliver Mußhoff (4), Monika Oberle (1)
1 Georg-August-Universität Göttingen, Institut of Political Science
2 Georg-August-Universität Göttingen, Department of Agriculture Economics and Rural Development
3 Georg-August-Universität Göttingen, Department of Crop Sciences
4 Georg-August-Universität Göttingen, Department of Agriculture Economics and Rural Development
Sven.Ivens@uni-goettingen.de

Abstract
Background. Following repeat warnings of the European Commission regarding the high nitrate concentration in German waters and a negative ruling of European Court of Justice, Germany implemented a new fertiliser law, ordinance and balance demands with stricter nitrate values in 2016. The new fertilising ordinance affected the agriculture regions of the federal state of Lower Saxony in Germany particularly hard which could lead to high job losses in the life---stock farming industry if farmers do not adapt and follow new ways to produce agriculture products and comply with the new regulations. Therefore, a digital/analogue hybrid simulation game was developed to educate farmers and residents about the new fertiliser ordinance.

Aim. The aim of the simulation game is to educate residents and farmers in affected regions about the new fertiliser ordinance, to help enhance the understanding of different positions and to develop new ideas on how to comply with the fertiliser ordinance. The aim of the study is to research the effect of the simulation on subjective knowledge, internal efficacy and attitude about/towards the new fertilising laws. It also investigates participants’ evaluation of the simulation game.
Method. 90 participants from two games were provided with written pre- and post- questionnaires with mostly closed and some open questions. The results were analysed with descriptive statistics, multiple regression analyses as well as mean value comparisons, including t-tests and Cohen’s d values.

Results. The simulation game increases participants’ subjective knowledge and internal efficacy and has no effect on their attitude towards the new fertilising laws. It slightly decreases their interest in agriculture politics. The participants stated that they understand the difficulty and necessity of finding compromises in the field of agriculture politics and around 50% of the residents who took part in the simulation also attended other workshops at a later point to find solutions for implementing the new fertiliser ordinance in their regions.

20.2. Managing Competing Values in Sustainable Urban Tourism: a Simulation-Gaming Approach
Jessika Weber-Sabil (1), Lidija Lalicić (2), Thomas Buijtenweg (1), Kevin Hutchinson (1), Carlos Santos (1), Melissen Frans (1), Ko Koen (1), Igor Mayer (1)
1 Breda University of Applied Sciences
weber.j@buas.nl

Abstract
Tourism is an important economic sector that has a significant impact on sustainability indicators, such as GHG emissions and cohesion. Local policy makers are increasingly challenged to manage the urban tourism system at large. As part of a EU funded project, the authors have conceptualized sustainable urban tourism as the ‘management of competing values’ represented in a conceptual model of ecology, visitability, livability, equity, economic growth and smart citizenship. A simulation game was designed and implemented to improve social learning about these competing values. The game was played in six European cities, with around 15 local policy-makers and stakeholders in each session. The players indicated a high level of satisfaction with the game and social learning. In order to understand to what extent the game is able to validate and communicate the competing values model, the start and end states of the tourism values of the cities, as logged in the game’s dashboard, were analyzed in a comparative manner. The analysis shows significant differences in how cities manage sustainable tourism, with marked differences in ecology and smart citizenship. The differences in tourism issues and policy making styles demonstrate the value of a simulation approach to support future planning processes.

20.3. Impact of Competition in Energy Market on Promotion of Renewables: an Agent-Based Model Approach
Arashi Ogihara (1), Kengo Suzuki (2), Keita Nakai (1)
1 Department of Risk Engineering, University of Tsukuba
2 Division of Engineering Mechanics and Energy, Faculty of Engineering, Information and Systems, University of Tsukuba
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Abstract
This study developed the agent-based model (ABM) in which agents play the multiplayer game "Energy Transition" instead of human players. The theme of "Energy Transition" is the energy transition from fossil fuels to renewables in a deregulated energy market. The purpose of this study is to clarify the impact of price competition on the promotion of renewables in the energy market. Two types of contrastive agents are designed for the model. One is a competitive agent who are aggressive in expanding the market share to make profits. The other is a non-competitive agent who are more eager to invest in renewables for long-term profits than to compete with others for short-term profits. Two types of simulations are performed. In the simulation-1, the total number of agents is fixed and the ratio of two types of agents is changed. In the simulation-2, the ratio of two types of agents is fixed, and the aggressiveness of competitive agents is changed. The results show that the total usage of renewable energy and total
profit in the market becomes smaller as the number of competitive agents increases. Further, more aggressive agents make the competition stronger and largely decrease the usage of renewables.

**Paper session 21: Simulation Gaming Applications in VR/AR Track**

**21.1. The Development of the Virtual Reality for Stress Treatment**

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**Abstract**

Virtual Reality (VR) has been integrated and played an important role in human life. This phenomenon inspires the current study to apply VR to develop stress treatment technology. The purposes are 1). to develop VR technology for alleviating stress, 2). to examine a quality of VR technology created by experts in technological media, and 3). to investigate satisfaction of samples towards the created VR technology. The VR creation consists of three realistic scenes, built for users who want to be relaxed. The scenes are a spa shop, a park, and a sea. Aromatherapeutic scents and therapeutic music are used to further trigger relaxing sensations. Scenic exploration can be proceeded through a walking remote control. A VR google, moreover, is worn to generate 360 degree vision. The evaluative results of VR technology for stress treatment from three experts revealed that the overall quality is at a good level (mean = 4.32 / SD = 0.18). The satisfactory results from fifteen participants were reported to be at a satisfying level (mean = 3.96 / SD = 0.08). In summary, the VR technology for stress treatment is appropriate to be used for alleviating stress and relaxing users, which can be compared to being on a vacation.

**21.2. Wonders of the World Simulation Program by Virtual Reality**

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**Abstract**

Wonders of the World Simulation Program by Virtual Reality was created to design and build up four 3D tourist destination models, namely, Eiffel Tower, Petra, Great Pyramid of Giza, and Stonehenge. Unreal Engine 4 was used to simulate these locations and their surroundings in order to help tourists select a destination for their vacation. Twenty samples were recruited to participate in this study, based on a voluntary basis. The results demonstrated that the participants were very satisfied with the appropriateness of the models in the scenes (mean = 4.6 / SD = 0.50). The simple operating system was highly rated among the experts (mean = 4.5 / SD = 0.75). The atmospheric features, sound effects, and simulated scenes of these four Wonders, in general, provided users novel experiences and realistic feelings.

**Workshop session 17**

**Simulation Game “Post-Fossil Cities” – How to Play a Fundamental Transformation in 90 Minutes?**

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**Background:** To successfully implement Agenda 2030 and the climate protection targets of the Paris Agreement, a massive conversion of urban space infrastructure is needed. This implies, among other things, a fundamental transformation of our current oil-based societies into societies that essentially function without fossil energy carriers.
This transformation poses tremendous challenges to humanity, and appropriate tools are highly needed to cope with them.

In the "Post-Fossil Cities" project, a simulation game to identify and experience potential transformation paths towards post-fossil cities is currently being developed. The project is funded by the Swiss National Research Programme “Sustainable Economy” (NRP 73) and lasts for 3.5 years. The project team, with researchers and practitioners from five institutions, including two doctoral and one postdoctoral researchers, currently designs the simulation game in collaboration with experts and stakeholders. In a later project phase, the tool will be applied and tested with decision makers and other relevant stakeholders.

**Workshop**: The workshop starts with a brief introduction to the topic of the post-fossil city and a short presentation of the transdisciplinary research project. Next, we will present the following game design challenges that we face, but are representative to many other game development situations:

- **Time**: How to pack a fundamental 80-years-transformation into an effective simulation game that can be played in an “executive-friendly” slot of two hours (ca. 90 minutes game play)? Which are helpful design concepts in such a case?
- **Learning**: How to design helpful metaphors, participant interactions, and lucid (visual) representations to foster systemic insights, and to ensure the transfer to the everyday (business) situations of the participants?
- **Open vs. closed game**: How to enable lively interactions between players and a computer-based accounting system? How to combine computational power with an open, user-centered simulation?

The participants will then have the opportunity to get a hands-on experience of a prototype of our simulation game. The workshop will conclude with a discussion of the game experience, and the selected game design challenges above.

As an output of the workshop, the presenters expect to generate a variety of strategies to solve the game design challenges above and hope to foster a discussion that continues beyond the workshop.

**Paper session 22: Simulation and gaming track**

**22.1. The Design and Development of Puzzle Game for Memorization Skills**
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**Abstract**
The objectives of this project were to 1) design and development of puzzle game and 2) train the player for memorization skills. The game was 2-dimensional graphic which was developed by using Unity3D Game Engine. “The key” is a kind of puzzle games that is always fun and training player’s memorization skills. “The key” is a single player game and uses memorization skills for play this game. The quality of the game which was evaluated by three experts is at a good level (mean = 4.13). The user’s satisfaction toward the puzzles game which was given by 30 users is in a good level (mean = 4.15). This project has shown that The Design and Development of Puzzle Game for Memorization Skills is successful and possible to play for entertainment.

**22.2. The perception of business wargaming practices among strategic and competitive intelligence professionals.**
Adam Kowalik
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Abstract

The main aim of this research was to investigate the perception of business wargaming practices. The survey was run with the members of a leading professional association. According to the survey results the primary function of business wargames is improving decision-making. Business wargames are typically conducted less than once a year, they are conducted no matter of overall economic situation and are conducted proactively rather than reactively. Methods used to conduct business wargames are typically qualitative. Managers of various levels attend business wargames more often than staff. Business wargames are typically handled internally and this effort is lead by units dealing with strategy & analysis or market & competitive intelligence. Critical success factors related to running business wargames shared by the respondents are also presented.

22.3. Differences between Facilitator-guided and Self-guided Debriefing on the Attitudes of University Students

Toshiko Kikkawa (1), Willy Christian Kriz (2), and Junkichi Sugiura (1)

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Abstract

In this study, we investigated the effects of debriefing on 196 Japanese University students as part of an international collaboration between Austria and Japan. Based on the results of our previous studies (Kikkawa et al. (2018), Kriz et al. (2018) and Kikkawa et al. (in Press)), we showed that debriefing can bolster learning from the perspective of attitude changes and performance in games. However, there were weaknesses to previous studies in the sense that there were no facilitators to conduct the debriefings. In the experiments, all types of debriefing were carried out by students, i.e. self-guided. However, debriefing is usually conducted by a facilitator and carried out in a group. To address this weakness, we introduced facilitator-guided debriefing for the experimental conditions. Therefore, there were two experimental conditions: facilitator-guided debriefing and self-guided debriefing. After debriefing, groups of four participants played the Highway Planning game, which deals with co-operation and conflict. According to the results, the participants under facilitator-guided debriefing conditions showed more cooperative attitudes than did those under self-guided debriefing conditions, while participants in the self-guided debriefing group showed more competitive attitudes.

Paper session 23: Simulation Gaming Applications in VR/AR Track

23.1. Framework and evaluation of live video streaming as a virtual reality gaming technology: a study of function and performance

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Abstract

Live video streaming of outdoor and built environment could be a source of scenarios generation for training games, especially when scenarios are on real-time dynamics of the environment. Such so-called live virtual reality (LVR) is, among other things, one of the most recent gaming technologies. There is an increasing need for effective solutions that can be utilized to process videos in attempts to gain desirable result, as the requirement of video quality is becoming higher and higher. The issue at the core of real-time transcoding is to control the right combination of transmission bitrate and resolution. This work aims to develop a prototypical workflow for dewarping videos from fisheye camera to the cloud and re-stream it to a client. This prototype is used for testing combinations of bitrate and resolution in various living scenarios of indoor, outdoor and street traffic environments. The study of
performance is enabled by KTH students who supply feedbacks about quality of experience. Comments of observers prove the promising use of LVR in training and education games. The results reveal that the combination of bitrate 3.5-4.5 Mbps and resolution 720p is best suited for transmission in order to avoid noticeable lagging.

23.1. Education Meets Virtual & Augmented Reality Technology in Singapore
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Abstract
ISAGA is going to celebrate 50th anniversary in Poland. Ten years have passed since the ISAGA 2009 which was co-chaired by myself. The 40th version of ISAGA annual meeting had a theme “Learn to Game, Game to Learn” with a good number of papers, workshops, games and posters presented at the conference. A book entitled “Interactive & Digital Media for Virtual Learning Environments” [1] was published with selected works presented.

Workshop session 18
The Sustainable Values Game (SVG):
A participatory workshop
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Abstract
The Sustainable Values Game (SVG) was developed in Costa Rica to provide local stakeholders with a structure for discussing and clarifying sustainable values and ethics related to issues such as environmental protection, geoethics and agriculture. The game was used as a prelude and context setter to a much larger, agent-based, participatory simulation (ContaMiCuenca) run with local stakeholders on specific aspects of sustainable agriculture in the North West of Costa Rica. The SVG was also presented at the European Geosciences Union (EGU) conference in Vienna in April 2018. In this session, we will invite you to play a simplified and general version of the game.

During this two-hour workshop, we will do four things:
  o Short introduction (about 10m);
  o Play a simplified version of the game (about 40m);
  o Debrief the game (about 30m);
  o Generate ideas about how delegates would improve the game and adapt it to their specific situations (about 20);
  o Debrief the session (about 20).

For this workshop, the game will be able to accommodate from six to 15 participants; we invite all workshop participants to play and debrief. The workshop will be of interest to people involved in one way or another with sustainability, the Sustainable Development Goals (SDGs), sustainable agriculture, ethical issues in managing natural resources and related areas

Workshop session 19
Business Simulation napuro – Corporate Sustainability: Topics come and go: How to keep your (business) simulation game up to date?
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Extended abstract

Background: The business simulation napuro conveys a dynamic, holistic view of corporate sustainability. In the simulation, competing companies produce and sell cleaning robots in highly competitive markets with typical challenges. They deal with setting up a coherent sustainability strategy. They are, for instance, confronted with increasing prices and limited availability of crucial resources. Suddenly they find themselves under critical observation of NGOs due to child labour in their suppliers’ production facilities. Or companies recognize new opportunities arising from innovations, new business models, and current social trends. This is the basis of napuro.

Since the introduction of napuro in 2011, the field of corporate sustainability and CSR (Corporate Social Responsibility) has developed rapidly, and new topics such as digitization, data responsibility (CDR) or resilience came up. This workshop will address the question of how business simulations can be designed so that they can be continuously updated at a reasonable cost of time and resources.

Characteristics of napuro: Duration ½–2 days; 8-24 participants; qualitative model without computer support; target audience: executives and employees in service and production companies, public administrations, non-profit organisations, universities (Bachelor, Master and MBA level).

Workshop:
Participants of this workshop will – after a short introduction - participate in a demonstration run of the business simulation napuro. They will get an impression of the simulation game and the practical implication of the underlying model, the UCS model of corporate sustainability. In addition, the latest updates integrated in napuro and, in particular, the design criteria that ensure simple and continuous updating of simulation games will be dealt with in the demonstration run and in the subsequent discussion. There will be room for discussion of the relevant design principles applied, and further issues of interest.

Poster Submissions

TeaCoSt: A Serious Game for Analyzing Communication Strategies Taken by a Problem-Solving Team
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Abstract

This work proposes a serious game, named TeaCoSt (Team Communication Strategy), for analyzing communication strategies taken by a team of individuals solving a problem collaboratively, and reports the results of smallscale pilot experiments. In the game, three players address a problematic situation as a team where the state of a system of concern is gradually drifting away from its ideal condition. They are expected to bring the state back into the acceptable region set around its ideal condition by taking appropriate measures one by one under the pressure of time. Each player is familiar with only a different part of the system and is provided with only a limited knowledge on the possible measures. Thus, the performance of the team will depend on their communication strategies for utilizing the pieces of knowledge dispersed among them. An ultimate goal of this work is to capture the strategies in two different layers; namely, information processing layer and social interaction layer.

Effects of Simulation-based Learning in the Context of Management Education
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Abstract  
Proposal of a Poster presentation of the PhD research project ‘Effects of Simulation-based Learning in the Context of Management Education’. The project focuses on both learning outcomes as well as individual and collaborative aspects within a problem-based learning environment in management education. Two well established team-based digital business simulation games (TOPSIM® easyManagement and TOPSIM® General Management) played with first-year- and third-year-students of the faculty of business of the Baden-Wuerttemberg Cooperative State University, Stuttgart will be analyzed. The two business simulations are related in their respective game logics but different in their grade of complexity. Data will be collected in a four groups test design in each cohort (each sample consisting of two experimental and control groups). The study is a cooperative PhD-project between the University of Mannheim, area of Economic and Business Education – Workplace Learning, Prof. Dr. Andreas Rausch (supervisor) and the Baden-Wuerttemberg Cooperative State University, Centre for Management Simulation, Prof. Dr. Friedrich Trautwein (co-supervisor).

cSIMINSOC as a tool for the study of group phenomena  
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Abstract  
SIMINSOC is a simulated society game, known for provoking group-level reality. This is true even for its computer-based version (cSIMINSOC), where each player individually participates in the game through a networked computer. The players communicate and bargain with other players, without actually meeting each other. Just as in the original game, cSIMINSOC is based on a number of rules about gaining food, employment, political parties, travels, etc. The players have to survive for seven game years while pursuing their own goals such as wealth, power, and popularity. Compared to the original, the computer-based version is characterized by its thorough record of communication and transactions among the players. We will demonstrate how this game contributes to the study of group and intergroup phenomena.

Geranium: A multi-factorial simulation to reflect on several scales the energy performance of a neighbourhood.  
Berry Anaïs (1), Becu Nicolas (1), Papoulias Nikolaos (1), Long Nathalie (1), Vye Didier (1)  
1 CNRS La Rochelle University

Abstract  
In the context of National Urban Renewal Programs, local public actors carry out many projects aimed to answer various objectives: reducing energy consumption, improving the living environment, promoting eco-mobility and encouraging social diversity. Several local public actors are concerned (socials proprietors, builders and local authorities) and bring their expertise, their recommendations, their opinions. However, these different actors may lack times, means or methods to work together. The “Geranium” participatory simulation show an integrated vision of an urban renewable projects with structural, climatic and social parameters. The computer model developed makes it possible to simulate the energy consumption of household at the scale of a district for which an Urban Renewable Project is engaged. The simulation aims to get stakeholders to think about an urban renovation in its entirety by showing the various levers of action at different economic and temporal scales of an urban renovation.
project. In order to show the evolution and support of a district in time with the conciliation to be made between the issues of energy consumption and those related to social mix while adapting to climate change.

**Peace by piece**

Agata Dziewulsk (1), Anna M. Ostrowska (1) and Igor Widawski (2)

1 University of Warsaw, Centre for Europe
2 IGGAMES

**Extended Abstract**

Mali - one of the largest countries in West Africa is plunging into chaos. The Berber Tuareg people, who have ruled the Sahara for thousands of years, are falling apart into two opposing groups. Some want their own secular state (Azawad), others want to maintain their own Islamic domination of the desert. At the same time, the Malian Army is making a coup in the capital and taking over power. A corrupt president is fleeing the country. The international jihadist forces are pulling their weight into a conflict-ridden region. They want to monopolize a weak state - introduce caliphate and Sharia law.

Under the desert there are huge reserves of oil, uranium, gold and rare metal ores. The desert is crossed with trade routes: arms, drugs, diamonds, metal ores, slaves, refugees... Most of them lead to Europe. Genocide, destruction, kidnapping. Everyone fights everyone. Nothing is certain. Nothing is predictable. The game's at stake.

How to stop the calamity? How to make Mali work?

‘Peace by piece’ – a simulation game of war, peace and everything in between – is a result of a thorough academic research and seasoned board game designing. For several years now, it has been a concern of academics that creating literature on post-conflict peace-building does not influence the change in the attitude of international decision-makers. Since early 1990s. there has been no successful peace-building mission accomplished in the world and neither doing in the classic way nor repeating the same practices over and over again can change the result. In itself, academic research becomes more and more repetitive. In order to find a way to stabilize fragile states and areas in conflicts there need to be new approaches found to investigation and implementation.

Strategic gaming is a groundbreaker – a combination of theoretical framework and exercise in simulation. ‘Peace by piece’ simulates conflicts in Mali – a state considered one of the hardest to stabilize because of the complexity and multilevel character of affinities between the factions. It reflects the motivations of the fighting parties and gives a set of tools to the international forces to act. Nothing is predefined – a sandbox construction of the game lets the players create new realm and provide international decision-makers with new solutions to be tested in reality. It is a game. It is a research tool. It is an educational aid for students of an academic course on ‘Strategic gaming in post-conflict peace-building’. While students receive a thorough theoretical framework before entering the game, ‘Peace by piece’ can be played as a solo practice as well.

- Is peace possible?
- How to reconcile fighting factions?
- Are general elections welcome?
- Will a constitution stabilize the country?
- How to manage jihad?
- Who gets the share in metal ores profits?

Provide answers – create world. Play ‘Peace by piece’

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**A comparative study of the behavior and evaluation of analog and digital community currency: Research using gaming simulation**

Masayuki Yoshida (1) and Shigeto Kobayashi (2)

1. Joetsu University of Education,
Policies with a clue: opportunities for just and effective wildlife conservation

Nicole Ponta (1), Tina Cornioley (1), Anne Dray (1), Patrick Waeber (1), Nathalie van Vliet (2) and Claude Garcia (1,3)
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Abstract
In the tropical Anthropocene, local communities are relying more and more on cash economy and industrialized products 1,2. At the same time, cultural identities and indigenous rights over land and political autonomy are increasingly acknowledged 3. In this emerging globalized society, local people still hunt and trade wildlife in order to meet their livelihood requirements 4,5. Their dependency on forest combined with external pressures forces them to find a delicate balance, with overhunting and poverty the two extremes they need to avoid. Fortress conservation alienating local resource users has been the prevailing narrative but tend not to be effective when institutions are weak, contributing to the criminalization of hunting practices and their canalization towards hidden avenues 6,7.

Designing effective and socially just conservation initiatives should be guided by a deeper understanding of people’s strategies, their drivers and their adaptive capabilities in the face of uncertain futures. To uncover hunting strategies in the Colombian Amazon and their evolution under the current socio-economic changes, we co-designed a role-playing game together with the local indigenous hunters. The game explores hunters’ behavior under different policy interventions, while eliciting individual and collective values, attitudes and ambitions. Do hunters give up hunting when given the opportunity of an alternative income and protein source? Do institutional changes affect their livelihoods? Our results show that providing alternatives would reduce but not eradicate hunting effort while legalizing trade could lead to overhunting except when market rules and competition come into place.

When it comes to coupled human-nature systems, the best way forward to produce just and resilient conservation strategies might be triggering an adaptive process of experiential learning and scenario exploration. It is about identifying the strings that pull the system and adjusting our strategies whatever direction we take 8,9. The use of games as “boundary objects” helps us eliciting the plurality of those strategies, their drivers and how outside change affect them.

An Educational Digital Game that Helps in the Acquisition of Object-Oriented Concept for Learners of Computer Programming

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Abstract
Generally, the object-oriented concept is known as one of the typical concepts of design for modern computer programming. Programs based on this concept have certain characteristics such as high reusability, an easy change of specification, and maintenance operation after developing them. Acquiring good knowledge of this concept is necessary for many developers because it reduces man-day or man-hour in software developments. However, the object-oriented concept is difficult to understand by written documents only, i.e., textbooks. Moreover, the concept of class has elements such as inheritance and polymorphism, which make it more difficult for beginners. Therefore, we believe that introducing the concept of gamification into its learning can easily ensure the acquisition of knowledge regarding class. In this study, we developed a digital game that enabled players to easily acquire knowledge regarding class based on this idea. This game is based on the world of role-playing game (RPG), which is
a popular type of game for young generations that helps in understanding the object-oriented concept [1]. A player plays this game to acquire as many assets as possible by designing, creating, and selling weapons. We adopted a metaphor of roleplaying game to class, which includes class as a weapon, fields as an offensive power and hit point, and methods as an attack to the enemy and the chant of healing magic. Moreover, we planned to maintain and improve the player’s learning motivation by targeting to develop more assets. “Code Spells” [2] was previously studied with the intention of using the digital game herein to acquire programming-related concepts. This study deals with the method of describing basic programming language. Furthermore, it was differentiated from the object-oriented concept, which has more advanced programming content. Our game is particularly designed for undergraduates who specialize in information engineering. We expect it to be a helpful tool to the students who already have the basic knowledge of programming and can understand the concept of the class in object-oriented programming.

Appearing and Disappearing of CLUG – Ideas, Suggestions, Research and Reconstruction
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Extended abstract
The poster will display first results of our reconstruction project, regarding the CLUG game from Allan G. Feldt (1972a). Allan Feldt (4/20/1932 - 2/27/2019) who died in February this year is probably best known for his development of one of the earliest simulation games on urban growth and development, CLUG, the “Community Land Use Game” (originally “Cornell Land Use Game”, 1965). Allen worked with Gaming Simulation for over 50 years (e.g. Feldt, 1995, 2014a; Moses & Feldt, 1973). His main interest and profession was in urban development and urban planning. He designed several games as tool for communication and teaching. Allen worked for some years close with Richard D. Duke (Feldt, 2014b). In 1970 Allan Feldt, Richard Duke and Hans Hansen organized the first conference of ISAGA – the International Simulation and Gaming Association (in Bad Godesberg, Germany) and established this international Association (e.g. Feldt, 1972b).

With support of ISAGA and SAGSAGA there is now a reconstruction of his famous CLUG game underway (Feldt, 1965; Feldt, 1972a; Dandekar & Feldt, 1984). As part of Willy Kriz “Time Capsule of Gaming” project we intend to:

• reconstruct and provide a playable artifact of the CLUG 1972 version
• explore the origin of the game in the 1960ies and to research its emergence from predecessor games that inspired the development of CLUG
• give a full ancestry of games that are connected with CLUG – forerunner games, different CLUG versions and revisions over a time span of more than three decades and modern games that are built upon the concept and generic model of CLUG
• provide a list of CLUG resources and research, including a commented list of references

CLUG can be seen as a “modern classic” of gaming simulation. CLUG inspired generations of game designers and led to many other games in various scientific disciplines, areas of application and even well-known modern entertainment video-computer games like SIMCITY. Although the fist CLUG versions were already designed, tested and used in the 1960ies we take the 1972 version as a blueprint for our reconstruction. The 1972 version has reached a high degree of maturity and was also widely used and taken as starting point for own CLUG-based games by other important veterans of ISAGA, e.g. Richard D. Duke and his mentor Richard Meier. In the 1970ies they worked together in several gaming projects at the University of Michigan faculty of Urban and Regional Planning. In addition we have digitalized old dia-slides and movies from this time period regarding CLUG from Dick Duke’s archive. We will show parts of the material together with the poster at the 2019 ISAGA conference.

In the poster we will show a genealogical tree of CLUG versions, predecessors and successors. We will argue why and how this game is still useful as a prime example of the process of abstraction within game design. CLUG is a best
practice case to show and understand how to build a generalized model and generic game for planning and education. This makes CLUG still interesting today and several ideas and suggestions for future generations of game designers can be deduced.

TOWARDS SUSTAINABLE INDUSTRIAL PARKS: GAMING WITH SIMBIOTIC RELATIONS
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Abstract
Circular Economy is about decoupling economic growth from consumption of finite resources, a potential way to substitute the current “take-make-dispose” economic system. Industry, as part of this system, should transform or retrofit the traditional industrial parks into eco-industrial ones including, among others, symbiotic relations. Many problems on functioning and coordination of productive processes could arise if the investigation of the case study is not developed in deep. Gaming/simulation treated with the same precision and understanding as traditional forms of communication can solve this problem, representing a fundamental exercise on applying circular economy strategies into real cases.

The objective of this work is to develop, apply and validate a methodology towards sustainable industrial parks, using the circular economy focus, where the Integrated Pollution Prevention and Control, Waste Management Hierarchy and Industrial Ecology sights are integrated. Material and Energy Flow Analysis is used to identify Improvable Flows of the case study, and Best Available Techniques are selected from an elaborated inventory, to treat those improvable flows by retrofitting and building the “improved” scenarios. Simulation and gaming were used to understand the behaviour of the case study and to compare and determine the most sustainable scenario, considering circular economy factors. The case study is a small industrial park located in Galicia (NW Spain) and eleven alternative scenarios are proposed, modelled and simulated.

The results confirm the validity of the methodology obtaining an optimal scenario from the sustainable point of view. Pathways of the industrial processes and material use are improved, industrial output is dematerialised, and loop-closing is created, as objectives of the industrial ecology to contribute to the circular economy model. Simulation and gaming have played a fundamental role in the development of the methodology and the analysis of the scenarios.