SOCIAL SIMULATIONS IN COMMUNICATION STUDIES:

CREATING A SIMULATION SCENARIO OF AN ENVIRONMENTAL PROBLEM

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Introduction

Aims and scope. *This handbook has been created for educators who want to unlock and discover the potential of social simulation as an effective learning method for improving students' transversal skills in blended learning environments***.** *No doubt, universities are to prepare future professionals in compliance with Europe's agenda for new skills and jobs (European Commission, 2010). It is required that universities focus more on training students' transversal competencies and skills[1] such as being able to manage complex data, work in teams efficiently, take strategic decisions in rapidly changing situations, and cope with high levels of uncertainty and ambiguity (World Economic Forum, 2016). As the previous literature indicates, social simulations can be extremely useful tools in the educational process. Therefore it was to some extent our surprise to discover that the literature on the methodologies for educators on designing simulations and games is scarce and unsatisfying in the sense that clear and elaborate description of the step-by-step process of designing a social simulation was missing. As The Renewed EU Agenda for Higher Education (EC, 2017) highlights, universities in Europe are not fully effective in addressing students' learning needs. It is the case also in the Baltic countries. Such a mismatch is very much due to the fact that too many academic staff members in Latvia, Estonia and Lithuania receive little or almost no training in pedagogic methodologies and didactics. Pedagogic innovations depend on the opportunities open to academic staff and students allowing them to engage in transformational activity that is meaningful and useful to them.*

The structure of the handbook. *This handbook consists of two parts***:** *the theoretical part and the methodological part that is complemented by tips based on our practical experience. The theoretical part is split in five chapters: literature review of simulations (characteristics, classifications) (Chapter 1); transversal competencies and skills of a 21st century student (Chapter 2); discussion on online and blended learning approaches that include application of digital tools and VR/AR solutions (Chapter 3); conclusions on learning process through simulations (Chapter 4) and learning outcomes and their assessment (Chapter 5). The second part consists of two chapters that focus on such issues as setting the social simulation goals, development of the simulation story based on a real-life situation, choosing the simulation format, preparing hand-outs and instructions for students, distribution of roles, planning the use of online platforms, and guiding the feedback and debriefing session at the end of the simulations. In the second part of the handbook you will also find a step-by-step description on how we transferred our originally for in-person format designed simulation scenario to an online environment due to the requirements caused by the COVID-19 pandemic.*

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[1] Consistency in the use of terms is not observed in the scientific literature or in policy planning documents, both the term 'competence' and 'skills' are used to denote the same phenomena.

PART 1.
SOCIAL SIMULATIONS: WHAT ARE THEY, WHY TO BE USED AND HOW?

1. Definitions and characteristics of social simulations

Historically, simulations refer to both management/business simulations and computer simulations that are used to analyse specific systems, develop mental models in learners, or research artificial environments (Klabbers, 2009). In our case, simulation means a social-process simulation and the **complex real-world experience**, which includes the description of scenarios and the various roles with responsibilities and constraints that initiate action (Gredler, 2004). Social-process simulations are open-ended situations which can take different directions, depending on the actions and reactions of the participants (Gredler, 2004). Simulations allow "insight into any unforeseen, undesirable, and unintentional effects" (Davidsson, & Verhagen, 2017: 26) and experiencing the effects and consequences of one's decisions and actions. Social-process simulations enable participants to explore different processes **without any risk** (ibid.) and creates an environment where students **can experiment and make mistakes** (Cummings, et al., & Baur, 2015).

Simulations are widely used in several disciplines such as health care, military, business and others; however, the "thinking behind", or in other words, the ways how the simulations are designed, guided, valued depend on the particular discipline (Shaffer, 2006). Many disciplines use computer programs to simulate various scenarios or utilize mechanized artificial intelligence to simulate, for example, a flight in pilot training programs; however, as Wright-Maley (2015a) emphasises, in social sciences, the focus is not primarily on technology but on the human interaction and social phenomena.

Simulations and other interactive learning activities: some conceptual clarifications. It has to be noted that sometimes the concepts of games, simulation games, and simulations are used interchangeably; however, important differences exist among these that have consequences for the process and outcomes for the learners.

Table 1
Characteristics of different interactive learning methods (adapted from Klabbers, 2009)

Types of activities	*Learning methods*	*Specific features*
Games	Role-playing game Strategy game Action game	Assuming a character Strategic-decision making Physical challenges, coordination
Hybrid	Simulation game	Goal-oriented re-enactment of real-world processes
Simulations	Training simulation Modelling simulation	Train to maximize performance in achieving a task (e.g. psychomotor) Model processes or objects

Gredler (2004) illuminates the essential difference constructed around the presence or absence of the **competitive** aspect. Thus, **games** are competitive exercises in which the objective is to win and players must apply subject matter or other relevant knowledge in an effort to advance in the exercise and win. In contrast, **simulations** are open-ended evolving situations with many interacting variables. Instead of winning, their goal is to take a bona fide role, address the issues, threats, or problems arising in the simulation, and experience the effects of one's decisions. Simulations address multidimensional evolving problems, run from 50 min to several days, and use role descriptions including goals, constraints, background information, and responsibilities. Unlike games, in which the rules may be imaginative, the basis for a simulation is a dynamic set of relationships among several variables that reflect authentic causal or relational processes. That is, the relationships must be verifiable. Klabbers (2009) emphasize the above mentioned difference by concentrating on the **intent**. In case of the games (and also simulation games), the dominant intent of the game developers is to ensure a fun and entertaining experience for its players while for simulators the intent is to train and develop a particular set of skills.

One of the challenging aspects in the field of interactive learning activities is the conceptual confusion. Wright-Maley (2015a) notes that often the term "simulation" encompasses different pedagogical activities, including games, role-plays, theatrical performances, historical re-enactments, and others. Johnson differentiates between five types of educational activities that are often labelled mistakenly: simulations, exercises, games, role-plays and so-called ambivalents – mixtures of the previous four (Johnson, 1989). The advent of educational technology and development of platforms for web-based role-plays and strategic games adds to the confusion. Perhaps, one of the reasons here is because the term "simulation" may be used wrongly as a general word for any type of activity that is both engaging and interactive (Wright-Maley, 2014). Therefore, it is useful to outline what is understood by "simulation" in social science studies because, as Crookall (2010) has noted, "people in engineering or climate change will define simulation very differently from those working in management and cross-cultural communication" (p. 904).

Simulations and Games. While a game always ends with the final score and cheating is considered a breach of rules and not acceptable, in a simulation or role-play participants can lie, cheat, steal and still not be excluded from the activity, providing they are behaving with an intent. Unlike games, which are always competitive by nature, simulations and role-plays may also be cooperative. Sauve et al. (2007) note that a simulation is a simplified version of reality, while a game is often developed without a clear reference to a real situation. During the debriefing[2] phase, after a game, the main question is "who won?", but after a simulation the important questions often are – "how efficient you were and why?" In a simulation, unlike in a game, a conflict or competition is not necessarily present, and the participants are not aiming to win.

Still, the borderline between a simulation and a game is not clear cut, and as Johnson (1989) notes, the ambivalent concept of "simulation game" sometimes is used. One overlapping characteristic for games and simulations is the need to make

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[2] See page 32.

meaningful choices along the activity. At certain stages during a simulation or a game, the participants have to choose between several courses of action. The choices are not correct or incorrect *per se*; however, they influence the further development of the activity. Also, a simulation sometimes can bear some characteristics of a game such as award points and similar to make the activity more playful and exciting. Some previous studies (see, e.g. Männamaa, 2015), have demonstrated that mixing elements of a game and a simulation may be fruitful for teaching complex phenomena in cases when the facilitators are well aware of the theoretical models of the game and simulation design.

Simulations and Role-plays. Some words need to be said also about the potential confusion between simulations and role-plays due to the fact that in many simulations students are indeed assigned certain roles and asked to play different people, organizations or even countries. As Wright-Maley (2015a) argues, one of the main aspects that delineates simulations from role-plays is that the primary function of a simulation is to foster an understanding about dynamic systems and either interpersonal, interorganizational or interstate processes, while a role-play is primarily aimed at the recognition of various perspectives. During a role-play, students explore personal narratives of people by "temporarily adopting them as their own" (Cruz, & Murthy, 2006: 4).

The purpose of simulations. The use of simulations has several purposes (Davidsson, & Verhagen, 2017) and the most important for us are acquisition and deepening of knowledge, understanding content, skill acquisition, and engagement (Vlachopoulos, & Makri, 2017). Simulation encourages students to practice critical thinking skills (Cummings, et al., 2015), interpersonal communication, teamwork, leadership, decision-making, task prioritising and stress management (Vlachopoulos, & Makri, 2017), as well as allows experiencing the feelings, questions, and concerns associated with their particular role (Gredler, 2004). The goal for all participants is to each take a particular role, address the issues, threats, or problems that arise in the situation, and experience the effects of their decisions. The situation can take different directions, depending on the actions and reactions of the participants (ibid.). From the perspective of supporting students' readiness for ever-changing situations that they will most definitely experience at their job placements, the value of simulations lies upon ensuring the safe space where students can experiment with ambiguous problems, become aware of their reactions toward them, and have an opportunity to develop better reactions. This aspect has become of increasing importance to employers (Newman, & Hermans 2008).

Essential features of a social simulation. Figure 1 summarizes the four essential elements of a social simulation which are analysed in more detail below in this chapter: resemblance to real life, dynamism, active learner's participation, pedagogic mediation.

Figure 1.
Four characteristic elements of a social simulation (adapted from Wright-Maley, 2015a).
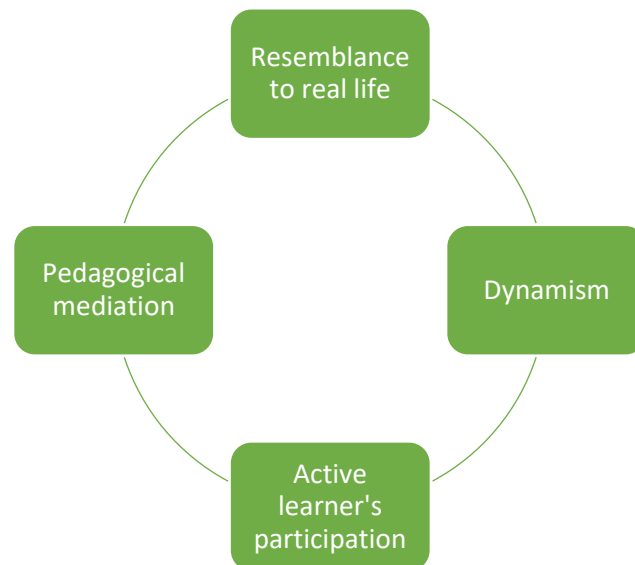
Resemblance to real life. A simulation is most often described as a pedagogical activity that reflects real life processes (Leigh, & Spindler, 2004; Martin, 2003; Swanson & Ornelas, 2001) and offers a type of controlled reality, where learners can experiment with aspects of reality that otherwise would be impossible to study. Claudet (1998) states that simulations reproduce situations, dilemmas and actors who participate in them as realistically as possible in order to provide learners with the opportunity to put into practice and to transfer their experience in a "quasi-real" situation. A simulation is a simplification or an incomplete representation of reality which, nonetheless, reproduces its essential characteristics. A simulation, in other words, is a mock-up of reality, certain elements of which having been removed in order to highlight others (Sauve et al., 2007). Thus, a simulation also bears the characteristic of fidelity which is defined as "the degree of similarity between the training situation and the operational situation which is simulated" (Hays, & Singer, 1989: 50). Fidelity can refer either to the physical characteristics of the activity such as visual, spatial, kinaesthetic, and the functional characteristics of a simulation such as the informational basis that the participants have access to, a stimulus added during the activity, options for decision making or choosing courses of action, etc. It is said that simulations are like "three-in-one": they must be rich enough with details to make the activity engaging for participants (Arnold, 1998), complex enough to remain faithful to the phenomena that are studied through simulation (Baranowski, 2006), but at the same time simple enough for participants to easily and effectively grasp the meaning from the activity (Aldrich, 2006).

Dynamism. Another attribute of simulation is its dynamism – participants are free to control and affect the situation, which means that the learners are taking active roles (Wright-Maley, 2015a), but at the same time, simulations are still pedagogically mediated. A balance should always be sought between a certain degree of chaos and order when designing and implementing a simulation - this can happen through a rule set that allows occurrence of changes during the activity, the progression of events

that is (fully or partly) determined by participants' actions and decisions, a scenario that is not strictly prescribed and leaves room for improvisation, and outcomes that are not clearly predictable, but guide to further exploration and discussion (Leigh, & Spindler, 2004). To maintain the dynamism of a simulation, unexpected challenges (sometimes also called "incidents") prepared by the facilitator may be thrown at the participants to see how they adapt to the new / modified circumstances, and how they modify previously developed strategies (Gill, 2015).

Active participation. Simulations in social sciences are most often understood as group activities, where all students participate and "act out the roles of individual system elements and then see how the behaviour of the system as a whole can emerge from these individual behaviors" (Wilensky, & Stroup, 1999: 2). Some authors (e.g. Shapira - Lishchinsky, 2014) note that cooperation is the key element in simulations because participants together decide how to solve problems, choose from a range of possible courses of action, and evaluate the group's performance at the end of the activity.

Pedagogical mediation. In this handbook, we focus only on simulations that happen in educational settings and require pedagogical mediation (opposite to, e.g., a simulation game that a student can play with his/her peers over the internet at home after school). As Wright-Maley (2015a) emphasizes, an educational simulation is not meant to be a matter of happenstance. Instead, it is designed, initiated and facilitated by a teacher with a specific learning goal in mind. A good simulation is "structured, well designed and closely supervised" (Gill, 2015: 16), and, as Gill (2015) continues, such simulation can "provide profound and exceptional learning experiences, acting as a pathway between the kind of knowledge acquired through analysis and dialogue and the wisdom gained through immersion in a process" (p.16). A lot has been written previously about the facilitating role of instructor during a simulation distinguishing between "coach", "guide", "trainer", "supervisor" (Kato, 2005). Some researchers suggest that a facilitator is doing well when participants scarcely notice his/her presence during simulation (Kriz, 2008). However, a facilitator must always remain active in the background; stay focused and aware of group dynamics and learners' decision-making processes to ensure that the facilitator can make appropriate interventions when needed. Such an approach is sometimes described as a form of "active inactivity" (Leigh, & Spindler, 2004). Gill (2015) argues that the level of facilitation "intensity" depends on many factors, and, in spite of the fact that it looks more passive than in a traditional educational setting, it is the facilitator's duty to provide support and feedback, and intervene when necessary.

What can be simulated in social simulations? Davidsson and Verhagen (2017) firstly enumerate such human-centred systems as **human societies**, which consist of a set of persons with individual, conflicting goals and various individual behaviour in relation to the state of the individual itself, the environment, and other individuals along with a spectrum of social states (e.g. norms) as viewed by the agent. Secondly, **organizations** also can be simulated as structures of persons related to each other with the purpose to accomplish some kind of activity or task (e.g. work) where the interaction among individuals is crucial for the behaviour at the system's level. For the simulations of organizations, it is important to focus on two important aspects of interaction - who is interacting with whom (interaction topology), and the form of this interaction along with the aspects of (social) network. Finally, **economic**

systems can also be simulated. In this case, the emphasis is on them as organized structures in which the actors (individuals, groups, or enterprises) are engaging in trading goods or services on a market.

2. Transversal competencies and skills

Over at least the last decade, the education policy worldwide has been focusing on the development of transversal competencies and skills alongside with other skills such as foundation skills and specialized skills. A broad and varied definition of transversal competencies and skills and different classifications are available from a variety of sources, therefore a brief insight into findings in literature is offered below. UNESCO has defined transversal skills "as not specifically related to a particular job, task, academic discipline or area of knowledge and that can be used in a wide variety of situations and work settings" (UNESCO, 2013).

UNESCO classifies transversal skills in the following five groups:
- Critical and innovative thinking;
- Inter-personal skills (e.g. presentation and communication skills, organizational skills, teamwork, etc.);
- Intra-personal skills (e.g. self-discipline, enthusiasm, perseverance, self-motivation, etc.);
- Global citizenship (e.g. tolerance, openness, respect for diversity, intercultural understanding, etc.);
- Media and information literacy such as the ability to locate and access information, as well as to analyse and evaluate media content (UNESCO, 2013).

Recently, another group of transversal skills has been added to the initial UNESCO's list such as physical health, religious values - appreciation of healthy lifestyle, respect for religious values (Lāma, 2020). *Skola 2030*, an ambitious education reform project in Latvia, proposes the following transversal skills: critical thinking and problem solving, creativity and entrepreneurship, self-directed learning, collaboration, civic participation, and digital skills (Skola 2030). Similarly, but with slight differences, it is defined in a study by American scientists: learning how to learn, cultural awareness, creative problem solving and resilience, digital competence, multiliteracy, adaptability, and civic participation (Milakovich, & Wise, 2019).

Different stakeholders in education pay attention to transversal skills. Often the term "transferable skills" is also used, for instance, by non-governmental organisations to support schools. For example, the association "Great Schools Partnership" is working on a project to build an online system that will bring transferable skills to the centre of teaching and learning. The following are identified as transferable skills: communication, problem solving, informed thinking, self-direction, and collaboration (Great Schools Partnership).

The term "21st century competencies/skills" is also found in literature, which is essentially synonymous with the terms "transferable" and "transversal". 21st century

competencies and skills focus more on the combination of skills that are important in today's society and workforce, while transversal emphasizes skills that can be used in different situations as opposed to technical skills specific to certain professions, but it should be noted that these skills overlap. The term "soft skills", which are related to people and personal skills, is also used and may include emotional qualities, attitudes and values. After examining educational policy documents of different countries, it can be concluded that the most frequently mentioned transversal competencies and skills are **critical, innovative and reflective thinking; reasoned decision making; communication and cooperation**. It is noted that some 21st century skills are transversal not only in terms of learning but also in terms of geography, while other skills are heavily influenced by cultural contexts (e.g. communication skills and global citizenship) (Care, et al., 2018). Transversal competencies are equated to a currency that allows one to understand changes in society and participate in them as active participants, not just as passive observers (Milakovich, & Wise, 2019).

Research on transversal competencies and skills highlights two other important aspects: assessment and the use of information and communication technology. When planning formative and shared or co-assessment systems in higher education, it is essential that students acquire competencies and skills that are common to all subjects. It remains important to further analyse innovative teaching and assessment methods based on the transversality of knowledge, which is a key factor in ensuring successful social and professional development (Alcalá, et al., 2018). It is recognized that ICTs contribute to the development of transversal-horizontal and soft skills (communication, critical thinking, collaboration, etc.) and promotion of entrepreneurship (Szűcs, & Turzó, 2014). Further in the handbook, you will find chapters on the assessment of learning outcomes and the use of information technology in terms of blended learning and virtual/augmented reality).

3. Online, blended learning, incl. application of VR/AR tools

Learning, formal and informal, is possible not only in classrooms but also by distance, for a variety of reasons. People used it in the early 19th century (Pappas, 2013). Technological development enabled the distance learning process to be more operational without the use of postal services. Computers first facilitated the learning process, and then the Internet was a major milestone in development. Fee (2009) defines e-learning (online learning) as an approach to learning and - a set of learning methods using digital technologies, which enable, enhance and supplement learning.

Research has shown that online learning is not of lower quality, although there is such a stigma (Hodges, et al., 2020). Online learning includes synchronous and asynchronous learning activities. Initially, an asynchronous approach was used, which basically allows the learner to be independent, to learn at any time, place, at his/her own pace. Hrastinski (2008) emphasizes that asynchronous methods do not require participants to be online at the same time, training materials can be used at their own time, discussion forums are used for cooperation, where entries are made asynchronously (Hrastinski, 2008). Synchronous activities were developed when

video conferencing was sufficiently available. Their advantage is the more active involvement of learners, which strengthens the sense of learning community, mutual cooperation and support. The benefits identified in the research are the increasing social presence and interactivity; learners and educators emphasized the opportunity to see each other, realize audio communication and online chat, and archive lesson recordings (Martin, & Parker, 2014).

The blended learning concept has been described and explained in a very broad and varied way in recent decades. It is important to understand what blended is in each case and to what extent. The terms "blended," "hybrid," and "mixed-mode" are used interchangeably in research literature and education practice. Analysing the most commonly used definitions, Hrastinski indicates that the key concepts highlighted in them are instructions and learning experiences combination in face-to-face and online environment. In addition, the term "content delivery" is used, with at least 30% taking place online in the case of blended learning (Hrastinski, 2019). Blended learning can be considered as a natural extension of traditional classroom learning, it is like a hybrid of traditional face-to-face and online learning so that instruction occurs both in the classroom and online (Colis, & Moonen, 2001). Blended learning is associated with a hybridization concept that combines two different parts (online and face-to-face) to produce a third. The result of a successful combination is an educational environment that is highly conducive to student learning (Vaughan, 2007).

The literature describes in a variety of ways what blended learning should look like. The most common understanding stems from the community of inquiry framework, and there, blended learning is proposed as an ideal higher education experience (Garrison, 2018). Studies suggest that effective blended learning needs to be flexible and personalized, a source of support that extends the scope of traditional learning activities, while promoting lifelong learning skills and the practical uses of technology (Medina, 2018). Now technologies allow real-time synchronous interactivity that is quite close to face-to-face actions, for instance, self-paced web-based courses, electronic performance support systems (Karkazis, et al, 2019). One of the traditional models of blended learning provides a certain sequence in the learning process: initial face-to-face meeting, weekly online assessments and synchronous chat, asynchronous discussions, email, and a final face-to-face meeting with a proctored final examination (Martyn, 2003). Blended learning takes place in an environment where different teaching models and types of content transfer, learning styles are effectively integrated as a result of adopting a strategic and systematic approach to the use of technology combined with the best features of face to face interaction (Krause, 2007; cited by Griffith University, 2007).

An online platform of blended learning can be more than just a communication channel; it must focus on student interactivity and improved pedagogy, as evidenced by a student-centred approach combined with frequent online interactions and feedback. Feedback delays reduce its efficiency; only the application of technology can ensure this necessary timeliness (Spector, et al, 2016). However, more attention needs to be paid to facilitating constructive and critical online discourses if blended learning is to achieve high quality learning (Vo, et al., 2017). It is more specific to the development of transversal competencies and skills and not for exact study courses. The benefits of blended learning listed by students in previous studies are time flexibility and improved learning outcomes. Expectations about less work, inadequate

time management skills, responsibility of personal learning and technological skills are mentioned as challenges. Looking at the views of those involved in the administration of studies, the perceived benefits are enhanced teacher and student interaction, increased student engagement in learning, more flexible environment for teaching and learning, which promotes continuous improvement. Aspects that have been identified as challenges by educators are time commitment, lack of support for course redesign, need to acquire new teaching and technology skills. In turn for students, self-regulation, technological literacy and competency, students' isolation, technological sufficiency and technological complexity were indicated as challenges (Vaughan, 2007; Rasheed, et al., 2020).

Virtual reality refers to the immersion of an individual in an artificial environment usually created by computer means, which simulates complete reality for users and allows them to interact with this environment. The 3D video experience and the use of video games are not considered a virtual reality (Rizzo, & Koenig, 2017).

Five technological levels of Virtual Reality technology are highlighted:
1. physical reality - without digital information, interaction only in physical environment;
2. augmented reality - with digital information, interaction with real world;
3. augmented virtuality - physical environment is virtually augmented;
4. mixed reality - interaction with real world and the digital (virtual);
5. virtual reality - absolutely digital environment, no interactions with physical environment (Dreimane, 2020).

Augmented reality displays superimposed information and can take in a new world where the real and virtual worlds are closely linked. Virtual reality provides an immersion in an artificial scenario where the user cannot interact with the real environment, but augmented reality allows you to see the real world by deploying virtual objects or virtual information. It is important to emphasize that augmented reality does not replace the real environment, but complements and integrates it, the real objects are used as a basis to add contextual information that helps the user to deepen his/her understanding of the topic (Zaidi, et al., 2017). Augmented reality connects the real-world view with digital interactive content on a mobile or wearable device. An important activator is tracking technology, such as computer vision techniques for tracking off predefined markers or markerless images, therefore necessary to provide a mechanism for using these digital elements and experiences (See, et al., 2018).

Experience plays a key role in the learning process, and virtual reality has the potential to expand this experience. Virtual reality gives the opportunity to experience beyond the physical reality; you just have to be able to do everything you can think of regarding both: historical places and events and fantasy places and events. As a result, people can expand the boundaries of their experience and learning to anything that can be represented in a virtual environment. At present, it is close to real experience and has very few limitations (Sanchez-Cabrero, et al., 2019).

Virtual reality allows for new unique learning opportunities, but the most important thing is to find authentic learning situations where students have the opportunity to design for social impact. It is necessary to consider the alignment of context, culture, and pedagogical aims to a given learning situation (Roman, & Racek,

2019). It is recognized that virtual reality offers great opportunities for teaching at many levels, but for the time it is being an insufficiently explored field that needs to be applied urgently in classrooms, because there is a new generation of students and learners who have a very natural interest in interacting and learning in the digital environment (Wu, & Kuo, 2017). Education is one of the most important ways of using virtual reality. By exposing the student to an almost real learning content experience, it can be considered that learning is much more stable, faster and more efficient than other more traditional learning situations (Sanchez-Cabrero, et al., 2019). Research has concluded that the use of virtual reality increases students' interest and involvement in the study course, providing a sense of reality and presence. In addition, virtual reality technologies can promote the concept of equal opportunities in education because they enable people with disabilities to take an active part in the learning process (Yildirim, et al., 2018).

Regarding the role of virtual reality in facilitating learning and what are potentially the unique aspects of virtual reality space that augment the learning experience, it is stated that this learning environment has the potential to promote learning opportunities by forcing the learner to be at the forefront of the educational process, learning becomes learner-driven complex, creative and collaborative. It is important to use multi-user and synchronous interactions in order to exploit the full potential of the virtual reality learning environment. Effective learning requires both features of virtual reality - representational fidelity and learner interaction (Dreimane, 2020).

From a didactic point of view, virtual reality technologies allow teachers and students to participate in the creation of new knowledge. Virtual and augmented reality seeks to reproduce the conditions of cognitive behaviour. Therefore, it is necessary to experiment with new interaction tools, integrating new subjects into didactic models (Avellis, et al., 2014). Three theories of education have been proposed in research as a theoretical basis for the application of virtual reality in education: constructivism (in relation to creating new knowledge); autonomous learning theory (regarding self-directed learning); cognitive load theory (about the mental capabilities of the brain). These theories can facilitate the development of appropriate didactic models (Stojšic, et al., 2019) that increase the benefits of virtual reality.

Key findings on general pedagogic principles involved in facilitating learning in virtual reality are about the convergence of different pedagogical perspectives and learning strategies, in addition, learning experiences in virtual reality can achieve learning goals in all cognitive processes and dimensions of knowledge; it can be used for both to provide factual knowledge and to develop a set of different values and attitudes, as well as contextual experiences and knowledge. L. F. Dreimane (2020) emphasized that the meta-cognitive dimension is most often developed. Several studies have listed the benefits of using virtual reality in the study process: to develop the learner's critical thinking and the enhance ability to create and innovate, to improve learning outcomes, students' motivation, to influence empathy (Dreimane, 2020; Stojšic, et al., 2019).

4. Learning process through simulations

Social simulations belong to the group of teaching methods that stem from constructivism ideas in learning. Constructivism is a learner-centred approach (Argyris, 1976) where the facilitator aids students through a series of authentic tasks and thus helps the student integrate his/her existing knowledge or attitudes with other perspectives through reflection (Flavell, 1993). Constructivist approach relies on the notion that people learn more effectively when they are encouraged to discover knowledge for themselves rather than when they are instructed (Hiltz, & Turoff, 2002). Constructivist learning implies active learner's participation. Learners are invited to explore complexity of the chosen problem, go beyond single-solution responses in an evolving learning activity, and engage in dialogue with peers to help them interpret information (Windschitl, 1999). Hence, social simulations as constructivist learning methods promote knowledge construction through learners' authentic experience (Willey, & Burke, 2011). By engaging in an open-end social simulation (Gredler, 2004), learners have the opportunity to test different approaches together, try out various strategies, and experience various and unexpected outcomes, thus building a better overall understanding of the phenomena which are studied, and creating new knowledge (Hill, & Semler, 2001).

It is noted that students sometimes perceive simulation activity as something inconsistent with "serious learning" (Tufford, et al., 2018); however, the purpose of the simulation is always to distil meaning from activity (Wright-Maley, 2015b). Simulation should not be perceived or looked at as a fun episode of spending time in-between "real" studying. Among the most common conclusions about the challenges of simulations summarized by Wright-Maley (2015c) are such utterances that simulations are too time consuming and are no more effective than other learning approaches, simulations may lead to shallow learning and trivialization of complex phenomena, and simulations sometimes may risk psychological harm to students. Among the positive affordances most commonly it is mentioned that simulations may contribute to development of critical and systematic thinking, problem solving, strengthening democratic skills, deeper conceptual learning, increased engagement with specific content and topics. Additionally, it is also mentioned that through simulations students can develop a more realistic understanding of their actual knowledge level and identify knowledge gaps (Wright-Maley, 2015c). The active nature of simulations asks students to engage to adapt to circumstances within a specific context, engage flexibly, communicate, and collaborate (Kirkwood-Tucker, 2004), which are seen as important goals for 21st century learning. Gill (2015) outlines that a simulation is a potent learning activity for teaching such skills as conflict resolution, negotiation skills, because, firstly, a simulation helps to link theory with practice in an effective way, secondly, students, during the simulation activity, experience real feelings and pressures, and identify with actors in conflict even when these are considered irrational or immoral, and thirdly, in a well-designed simulation students experience a sense of personal development and their learning motivation increases.

It is considered that simulations were first used in political science as a means to understand complex social processes that cannot be subjected to experimental testing or analytical evaluation. The use of social simulations was soon expanded to include the teaching of political science itself (Raymond, & Usherwood, 2013). There is still relatively little research on the pedagogical effectiveness of simulation as a

teaching method. Hence, it is necessary to demonstrate that simulations are effective and productive tools for learning, rather than simply enjoyable exercises for students. Simulation is one of the methods of collaborative learning, an important challenge for educators is to provide that the experience is both useful and enjoyable (Donelan, & Kear, 2018). Social simulations that take place in a blended format or entirely online can also be related to the concept of computer-supported collaborative learning. It has been studied (Wang, & Hong, 2018) that the collective (group) task value increases the performance of students' cooperation, as well as increases the level of cognitive quality.

The literature indicates that simulations contribute to learning in three ways: simulations improve students' motivation to learn by providing students with information in a way that increases their interest in understanding it; simulations favourably change the learning environment, replacing the passive perception of teacher-delivered content with activities that promote self-discovery and peer-learning; students observe and reflect on the consequences of their behaviour, then form abstract generalizations in an attempt to understand comprehensive principles that may relate to what they have experienced, finally, students test these generalizations against new observations (Raymond, & Usherwood, 2013). Simulation developers need to be clear about what the simulation is intended to achieve. It is necessary to first assess whether the simulation allows providing the information that is important for the students' performance. Learning outcomes can be the acquisition of knowledge, the development of skills or the socialization of groups (Raymond, & Usherwood, 2013).

A methodically developed simulation integrates three things: student participation, learning objectives and learning outcomes. It is essential that the simulation and the learning context are clearly interlinked, allowing learners, after reflection, to take full advantage of the opportunity to understand how the simulations relate to a real life task, occupation or set of experiences (Raymond, & Usherwood, 2013).

5. Learning outcomes and their assessment

Effectiveness of games and simulations can be evaluated according to the learning outcomes (Vlachopoulos, & Makri, 2017). The most frequently analysed learning outcomes are cognitive (e.g. knowledge acquisition, conceptual understanding), behavioural (e.g. social skills, teamwork, relational abilities) and affective (e.g. motivation, engagement, satisfaction) (Vlachopoulos, & Makri, 2017). During the process of evaluation of the simulation, the facilitator can focus on a variety of aspects upon their choice. For instance, the purpose, i.e. learning goals (e.g. knowledge acquisition, content understanding, skill acquisition, engagement etc.), learning content, i.e. subject discipline (e.g. social science, business and management, maths, science etc.), technical characteristics, i.e. strategies and approaches (e.g. single-multiplayer, linear – non-linear, collaborative competitive etc.), platforms, i.e. delivery modes (e.g. computer, mobile etc.), type (e.g. strategy, action, role playing etc.) (ibid.)

Assessment is essential for the full engagement of students in the learning process, it is therefore a key element in the improvement of learning and teaching practices, because it takes a considerable proportion of teaching time and student learning experiences dominate there (Anderson, et al., 2009). Feedback in the process of reflection depends on the student's ability to recall, discuss and thus analyse their actions and motivations. Assessment can be a powerful way to encourage students to reconnect simulation experiences with other areas of their learning, such as the use of reflective discussion, where students can compare their experiences with academic literature (both in substance and in procedure). It is possible to develop a broader set of feedback processes, such as post-game group discussions, a review of game materials (such as video or online caching), and observer- or peer-led debates (Raymond, & Usherwood, 2013).

Simulations are related to experiential learning, so it is recommended to associate assessment less with quantitative performance, but more with analysis, discussion and reflection. The focus should be on what choices and what decisions have been made. Reflection is a key factor for experiential learning (Kerridge, 2020). As already indicated, simulations in the educational process are related to the development of transversal competencies and skills that include a set of different, but interrelated skills and competences that are latent and therefore not directly measurable. It is recommended (Webb et al., 2018) to use theoretical models, which must first be related to specific complex and contextual and therefore possibly dynamic patterns of behaviour. For example, when evaluating the quality of collaboration in a group, it is necessary to understand what would be a good indicator - the quality of the final product, the creativity of the solution or the satisfaction of team members with the social interaction in this group. In these theoretical models, it is important to take into account various considerations (including normative ones), for example, how different models of learning activities are related to such a latent aspect as creativity; how stable these models are in relation to different types of problems or the social/cultural context of the learning situation. This is important for both formative and summative assessment: translating theoretical (and normative) considerations into an appropriate measurement model and obtaining meaningful interpretations of learners' activities, which then allow for the adaptation of learning processes. It is important to clearly and theoretically substantiate the meaning and possibilities of interpretation, using the new options to track and analyse learning activities in the digital environment (Webb et al., 2018). A study in Spanish universities showed that the use of formative assessment systems in higher education had a positive effect on the understanding of transversal competences and skills (Alcalá, et al., 2018). Well-designed formative assessment practice that reflects adaptive and dynamic teaching, is best suited for the development of 21st century skills (transversal skills) (Spector, et al, 2016; Care, et al., 2018). When designing the assessment, it is necessary to determine whether the simulation should cause positive changes in students' substantive knowledge, skills, and/or affective characteristics. Learning outcomes need to be assessed in a way that help to understand whether these goals have been achieved (Raymond, & Usherwood, 2013). Multi-component assessment can be more conducive to student learning, as further and continuous work is invested and internal feedback or reflections from the students themselves are possible (Vo, et al., 2017).

Peer assessment is essential for the assessment of learning outcomes. It is important to ensure the learner's understanding of the task to be performed and its

assessment criteria. It is the setting of criteria that is the most difficult in the obtaining of various fields of study, for example, if in exact fields checklists are an easy-to-apply technique, then it will not be suitable for the assessment of argumentation. Therefore, there is a need for clear learning objectives and a work scheme that demonstrates progress towards awareness-raising and ways to make assessment criteria available to students. These pedagogical principles are important both for peer assessment and for the learner's understanding what is required for their own learning (Webb et al., 2018).

The debriefing meeting is an important part of learning process with a formative opportunity which enables the reviewee to reflect; provides a space for the reviewer to offer supportive and constructive feedback; allows the reviewer and reviewee to discuss suggestions collaboratively (Anderson, et al., 2009; Raymond, & Usherwood, 2013).

The literature lists the following challenges for effective peer assessment: creating an environment in which learners feel confident in their assessment skills; designing, promotion and management of peer review, including timelines; managing learners' expectations (Webb et al., 2018). It is recommended that simulations be designed to include multiple checkpoints that allow students to evaluate both individual efforts and group outcomes, which could prevent unequal distribution of responsibilities (Raymond, & Usherwood, 2013).

The digital learning environment (learning management systems, blogs, wikis, etc.) allows us to extract a variety of learning data. By analysing data from different users, effective next steps can be predicted towards obtaining specific skills, such as critical thinking (Webb et al., 2018). When planning assessment in simulations, it is important to keep in mind that simulation is an unusual learning environment for students, which can be confusing for them (Raymond, & Usherwood, 2013).

Part 2.
SIMULATION "BEES VS PESTICIDES"

Part 2. Simulation "Bees vs Pesticides"

As you have already learned by reading the first part of this handbook, social simulations are a great way to make the learning process more engaging, interactive and practical. Often, when studying at university, the internship period is the first time when students can (consciously) apply their knowledge and skills in a practical way. With social simulations, learning can be more practical/applicable already in the university auditorium.

In this part of the handbook, you will find a step-by-step explanation about how we planned and conducted the social simulation "Bees vs Pesticides" that was developed during our project *Simulation Games in Strategic Communication*[3]. You will find the different versions of the scenario of the simulation as well as descriptions of organizations, class instructions, timeline and the worksheets (strategic planning guide, evaluation forms, observation forms, self-assessment forms etc.) that will be helpful in preparing and conducting social simulations in your own learning space. We have added useful tips based on our experience that will be helpful in setting the goals for the simulation, choosing a case, developing the scenario etc. You will find ideas about gamification elements to consider when planning your social simulation activity.

1. Planning and conducting a social simulation

When planning a social simulation, it is important to think through why you want to organise it, how students can benefit from it, where to implement it and what skills your students can develop, use and/or improve by participating. Our main aim was to develop a social simulation that helps students to advance their transversal skills such as negotiation, leadership, problem solving, collaboration, management of uncertainty etc., and become better communicators.

Setting the learning goals. First step in creating a simulation is defining the learning goal of the simulation: what competencies you want to develop and improve in your students. As mentioned in the first part of the handbook, simulations can be used for many different reasons. The social simulation (similarly to the solving of any real-life communicative problem) includes a complex array of different tasks to reach the end goal, thus different competencies and skills can be considered. At the same time, it is advisable not to make the goals too ambitious. We would be cautious in supporting too optimistic views on social simulations as a method for learning something totally new. From our experience we can tell that the simulation with its limited time frame does not allow students to thoroughly build any new skills, however, it works excellently as a tool that stimulates self-reflection and self-evaluation or reification of previously learned skills. Thus, it is important to carefully plan and give

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[3] See information about the project on the Vidzeme University of Applied Sciences website.

the students self-evaluation assignments before and after the simulation as well as include a collective reflection or discussion session after the simulation - from our perspective, it might be the most important part of the whole experience.

Another aspect to keep in mind is that the simulation can have different end goals depending on the study field, study programme or study course simulation is applied to: it can focus on competition with the objective to determine the winner or more open-ended simulation with the aim to find consensus. In our case, the different scenarios with different lengths allow for more consensus-oriented and competitive focus with the use of different additional elements (e.g. trading political and reputation points, attributing points for performance at different stages of the simulation). Scenarios for simulations in communication could be created based on real-life communicative situations or crises; they can have specific goals related to the study field as well.

Third, the assessment strategy is important: in the preparation stages for simulations clear factors of knowledge and skills that would be developed and implemented during simulations need to be decided - what and how learning and participation will be measured. With the competitive simulations the winner will be determined, but also more cooperative simulations can have evaluative elements constructed into the simulation (e.g. evaluation of the completion of specific tasks). For continuous evaluation and more immediate feedback one option is also having teacher observers with each team throughout the simulation.

Choosing a case. After having defined the learning goal, you will be able to choose the case for the simulation. As mentioned above, the simulations have to have enough details and complexity to be both engaging and educational (i.e. imitate real-life complexity of communicative problems), but at the same time simplified enough for the participants to quickly be able to grasp the situation and steps to be taken by their team.

It is easier to build the simulation based on real-life cases (for our project we have taken the situation from real life - it was an actual debate that occurred in Latvia regarding the ban of certain pesticides where many stakeholders were engaged in discussions) as it allows more easily to create scenarios: to search for the situation and problem to solve, to identify stakeholders and their initial stakes in the debate. However, in our experience, the simulation works better if it is abstracted enough from real-life context to deter students from utilising their existing real-life knowledge of the communicative situation that can divert them from the framework established by the simulation scenario itself. We would advise you to introduce fictional places and characters instead of using real ones, to make it easier to keep distance from contexts that could have an impact when real places, events and people are taken for the storytelling of the simulation's scenario. In our case, by choosing to make the simulation around the controversial topic of global extinction of pollinators, we added another layer to the simulation exercise by giving the students the opportunity to become more knowledgeable about this important environmental problem. However, some interesting things happened: in one of the scenario testing sessions, one group who did not belong to environmentalists' side actually tried to find pro-environmental solutions and were willing to make compromises. Students also complained that it was difficult for them to take the role that is not actual for them and to stand for their (anti-

environmental) position. After the simulation ended, they expressed satisfaction and happiness because they were able to avoid antagonistic and anti-environmental positions. Another group derived radically from their pre-agreed strategy and aims right after the first steps of the simulation. Such a great shift in the pre-planned course of action as well as a refusal to defend a position that conflicts with one's personal values are great aspects to capture and reflect on after the simulation.

Developing the scenario, distributing roles, time plan. The simulation consists of the scenario, descriptions of acting personas (organizations), situation (event) development timeline, instructions and organisation of work during simulation, supportive material - various drafts for strategy statements, worksheets and evaluation forms. These materials are important for all the stages of simulation: preparation, implementation, debriefing.

Below, in Table 2 you will find an overview of the four different simulation versions that we developed during our SimGames project. The first one we call the "basic" since it was the first one we created and tested in-person with an international group of students and university facilitators. All the other versions are derived from the "basic" scenario to suit different learning situations, the number of available participants and other requirements. As you will notice, completing the "short" scenario and "online" scenario takes considerably less time and requires less students than playing the "basic" or "advanced" scenarios. The "advanced" scenario provides some more fun and competition between the groups, as there are some gamification elements added. In "basic" and "advanced" scenarios, there are added descriptions of compromising information about each involved organization which we call "skeletons", and during the simulation the "skeletons", of course, get out of the closet at some point during the simulation.

TIP!

A social simulation is a demanding teaching method; therefore, if you have limited experience with conducting social simulations, start with the simple version to build your experience.

The scenario for the online social simulation is the one that was the most intensively tested version of our simulation during the project due to the restrictions of in-person teaching during the COVID-19 pandemic, and we propose to you some insights and tips based on this testing experience (see Ch. 2). Actually, before the pandemic, it was not our original plan to develop a scenario for the simulation for the remote mode in an online environment; however, it became a valuable learning experience for us as facilitators to reconsider and transfer the scenario online, and our students enjoyed it very much despite general screen-exhaustion.

Table 2

An overview of the simulation scenarios developed and tested during the project

Scenarios	Simulation "Bees" A Basic	Simulation "Bees" B Short	Simulation "Bees" C Short: Online	Simulation "Bees" D Advanced
Time needed	7–7.5 h	3–3.5 h	2.5–3 h	8 h
Format	Face-to-face	Face-to-face	Online	Face-to-face
Participants	Six organizations Journalists Observers	Six organizations	Six organizations	Six organizations Journalists Observers
Type of activity	- In-group discussion - Inter-group communication Special events: TV debate; Roundtable discussion	- In-group discussion - Inter-group communication Special event: Roundtable discussion	- In-group discussion - Inter-group communication Special event: Roundtable discussion	- In-group discussion - Inter-group communication Special events: TV debate; Roundtable discussion
Additional elements	The description on skeletons of the involved organizations (given only to journalists)	---	Online voting	The skeletons (for organizations and journalists); Leakage of information during the simulation
Gamification elements	---	---	---	- Reputation points - Political influence points

The first step in creating the scenario is setting the stage or point of departure for the simulation. It can include the description of the "triggering" event (either as a narrative or e.g., journalistic article) and additional background knowledge necessary for the students to make informed decisions in the course of the simulation.

Secondly, the different roles of participants have to be identified and described both for the teams who will take on the role and for other teams with different amounts of information revealed in both cases. Similarly, all extra information materials (e.g. "leaked information" distributed to different teams at certain points of the simulation) needs to be carefully planned and prepared.

Thirdly, the timeline of events has to be established: what are the activities that the teams will have to engage in, both within their teams and between the teams (joint events), together with the timeframe for each task and event and detailed worksheets with guidelines about what the students have to do within each task (e.g. distribution of roles within the team, stakeholder mapping, developing of initial strategic communication, creation of communication messages) and which outputs are expected from the students (e.g. press brief, etc.). The timeline can be developed in

two ways: either the students get all the information and timeline in the initial briefing or the tasks will be announced step-by-step during the simulation.

If the simulation includes certain stocks or points that the different teams either have at the starting point or can build up or lose with different activities, these strategies have to be carefully developed (you will find more information about that in the next subchapter about gamification elements).

Finally, for the simulation to be really effective, special attention needs to be paid to the documents facilitating the debriefing phase of the simulation, both for students to help with the reflection and self-evaluation of the experience, as well as for the organisers to get adequate feedback of the simulation exercise. In our case, we prepared the self-evaluation questionnaires that students filled in before and after the simulation as well as the guidelines for the debriefing session.

The next page will give an overview of the simulation handouts.

Table 3

An overview of the simulation handouts

Simulation "Bees" A Basic	Simulation "Bees" B Short	Simulation "Bees" C Short: Online	Simulation "Bees" D Advanced
General Problem Description: Scientific report and News article			
Description of Organizations (not confidential) Description of Organizations (for each organization)			
Class Instructions A	Class Instructions B	Class Instructions C	Class Instructions D
Timeline A	Timeline B	Timeline C	Timeline D
Strategic planning guide Tactic for negotiations			
Communication plan and messages	-	-	Communication plan and messages
The skeletons	-	-	The skeletons
Evaluation form			
Observation Form	-	-	Observation Form
Self-evaluation of competencies (optional)			
Simulation "Bees" A Basic	Simulation "Bees" B Short	Simulation "Bees" C Short: Online	Simulation "Bees" D Advanced
General Problem Description: Scientific report and the News article			
Description of Organizations (not confidential) Description of Organizations (for each organization)			
Class Instructions A	Class Instructions B	Class Instructions C	Class Instructions D
Timeline A	Timeline B	Timeline C	Timeline D
Evaluation form			
Strategic Planning Guide Tactic for negotiations			
Observation Form	---	---	Observation Form

Gamification elements. A simulation in essence is different from a game, since it is not necessary to determine the winner. However, it might be interesting and enriching to use various gamification elements in your simulation. In our case, we have added some gamification elements in the "advanced" scenario of our simulation.

Gamification elements increase excitement and competition between participants. However, making it too competitive could be counterproductive since it can divert attention from other skills and aims of the simulation. The elements chosen should support the aims of your simulation and not explicitly focus on winning or losing in some way.

As mentioned in the theoretical part of this handbook, some practitioners have found that a simulation without competitiveness might not necessarily decrease students' motivation to participate, because instead of competing, students will focus on cooperation more. Again, it is necessary to deliberate what the goals of the simulation are. It might be tempting and easy to add various elements that support competitiveness, since it is easily comprehensible and clear to students, but much more can be done to support learning and diversifying the simulation experience.

As a gamification element, several things can be used like money, power, political influence, resources, various achievement points etc. Each chosen element must have a clear purpose in the simulation and have an orderly explanation or connection how it affects the result. As mentioned before, simulations should be open-ended, so the gamification element could contribute to varying the end result of the simulation and the outcome. All gamification elements should be used in moderation not to over encumber the process, nor make it too game-like and divert attention from the simulation aspect of it all.

TIP!

Gamification elements add a lot to a simulation and increase participation and excitement. However, the gamification elements must have a purpose and you should have a clear idea about how they can contribute towards the "open-endedness" of the simulation.

While developing the simulation "Bees vs Pesticides", there were multiple elements considered. The end result of the simulation is to vote at a roundtable to ban pesticides or not to ban them. While choosing the gamification elements, each was weighed how it could influence the voting results or the process in general.

For example, in the "advanced" scenario for "Bees vs Pesticides" you can use reputation points and/or political points in the simulation. If the aim of the simulation has a communication focus, **reputation points** for groups could be used. The participants would be encouraged to plan their communication activities in the simulation in a way that would increase their reputation (in the eyes of the wider public), including, for example, trying to appeal to common societal values or "higher goods". **Political points** could be used when the simulation has a negotiation focus. The participants would need to negotiate with various partners and form coalitions to

gain as many political points (and political power) as possible. In conclusion, even though both elements would help participants to sway the voting towards ban or no ban in the end depending on their preference, the skill focus (communication skills vs negotiation skills) for the simulation is different and depends on the general aim of the simulation that the teacher has chosen.

The gamification element can also be something other than a resource of some sort. It could also be situational. For example, in the simulation "Bees vs Pesticides" in "basic" and "advanced" scenarios **"skeletons"** are used. Using the skeletons can work in different ways. If the students know another group's skeleton, will they still want to cooperate with them? Or will they leak it to the media to undermine their opponent's agenda? Actions taken can also have consequences for their own group, for example, when maliciously leaking information about their opponents, their political power may grow but their reputation will suffer.

Recruitment of students, arrangement of the groups for simulation. One thing that needs special attention before conducting the simulation is the recruitment of students. During various testing phases of "Bees vs Pesticides" it became evident that the best way to have a simulation is to integrate simulations into the subject as a part of the teaching curriculum.

Of course, it is very situational and dependent on students, their learning habits and overall learning culture, but, if the simulation is more of an "additional activity" rather than an integral part of a course or learning process, students feel less motivated to participate. While using volunteers to participate in the simulation may require additional efforts and explanatory work with students to promote the simulation, value of participation in simulation and active extra motivational activities during simulation is worth the additional effort. To have motivated and active participation from recruited students during the simulation, it is better to incorporate social simulations into the curriculum so more students can benefit from it and perceive the simulation as a part of the learning process. Participating in a simulation is time consuming, so in essence, students have to feel it is beneficial to their learning experience and worth their time.

After recruiting the students, it is also somewhat important to think about how to group your students. For example, you have to think about the group: do students already know each other or they are dropped into the groups simultaneously just right before simulation and they do not know each other. If students do not know each other, you have to provide them some more time to get acquainted with each other, and during the simulation you have to provide extra time for them to agree on communicative rules, channels and provide more time for discussions, especially if those activities are online.

The easiest way, of course, is to put students into groups randomly. This can hopefully push some of them out of their comfort zone and encourage cooperation between students who normally would not work together. However, randomizing groups leaves less opportunity to manage group dynamics and may result in over-functioning or under-functioning groups.

You certainly do not want the more dominant voices to cancel out more quiet ones during the simulation. Therefore, the best way is to divide students into groups intentionally. We suggest keeping an eye on group dynamics - this role of a facilitator is crucial for the success of simulations!

We advise to divide students into groups intentionally. For example, students with strong leadership skills should be separated into different groups or more introverted students to groups where they could better voice their opinions. Also, when groups have already been formed in the class between the students some other way (based on friendships, cliques, in advance formed groups by students etc.) and they have reached the performing phase of their formation process, it could be weighed whether to keep them together, perhaps ensuring more productive and active participation or to disrupt that workflow and foster their skill of managing uncertainty, which is also one of the transversal competencies.

There are many ways to balance the dynamics to have best performing teams overall. All the aspects mentioned in this subchapter, of course, are sometimes difficult to achieve but it is good to keep these aspects in mind.

Briefing phase, giving instructions: setting the scene. The simulation starts with a briefing phase when students are given instructions about what is going to happen. Acquainting with the scenario and with descriptions of the organizations and class instructions takes some time and effort to go through. You should plan plenty of time for briefing since it is a very important step for social simulation – if instructions are clear and students' questions answered, the rest of the simulation will go quite smoothly and stay in the flow.

The playful element of the simulation is significant, as we have already emphasized, but the students should not take participating in the simulation as a solely fun activity. It is important that students perceive the simulation as an integral part of the learning process and not some additional separate event they have to partake in. The briefing phase is a suitable moment to remind students about it!

During the briefing phase it is important to explain to the students what is expected of them and what they will do. This means also managing expectations of what the aims of the simulation are and what the learning outcomes of the simulation are.

When we tested the "basic" scenario, the simulation participants got the materials and worksheets on the day of the simulation. That means that a good portion of the simulation time was put into getting familiar with the documents, asking questions and then later starting to work.

When conducting the simulation online, we learned that it is useful to shorten this introductory phase on the day of simulation by giving students some pre-simulation activities. Before playing the online scenario, we divided students into groups and sent them some background materials (e.g. the scenario, individual

worksheets and descriptions of their organizations) with instructions a few days before the simulation. In such a way students had more time to work through the topic, acquaint themselves with their organization and come to the simulation better equipped. It saved time on the simulation day when they all gathered together online.

TIP!

If you play the online scenario, send some materials to the students beforehand. Then, on the day of the simulation, students will arrive prepared and with more specific questions and can start working on the simulation sooner.

Simulation. It is important to guide students through the simulation with precise (prepared but adjusted) instructions and sufficient information for them to be able to decide for the course of action. Asking questions if there is something unclear should be encouraged and students should have an opportunity throughout the course of simulation to ask. However, you need to be careful not to give one group more information than to another. If the question points to a potentially misunderstood element, it is best to ask everybody's attention and clarify the matter for all.

Table 4

An overview of the preparation for the simulation and the steps of the simulation

The activity	The simulation handouts (according to the scenario)
Preparation and planning	
Setting the learning goals and choosing a scenario	Facilitator's guidelines
Time planning	- Class instructions - Timelines
Recruitment of participants (students), arrangement of the groups	-

Briefing and giving instructions	- News article - Scientific report - Descriptions of organizations (not confidential) - Descriptions of organizations (separate for each organization)
Implementation of simulation	
See class instructions and timeline for each scenario: • In-group discussion • Inter-group communication • Special events	- Strategic planning guide - Tactic for negotiation - Communication plan and messages - Skeletons
De-briefing	
	- Observation form - Evaluation form - Self-assessment of competencies

Responsibilities of facilitators during the simulation typically are the following:
- giving instructions before the simulation
- keeping time and reminding time limits to participants
- answering the questions that participants have during the briefing and also during the simulation
- monitoring the course of action to see if the participants have understood their tasks
- observing to notice learning points to discuss in the briefing phase (e.g. conflicts/discrepancies in group work; strategies that are used; excellent performances; mistakes that are made). These aspects should be written down to remember and systematically address during debriefing phase.
- adjusting the course of action in simulation if necessary
- in some simulation scenarios, facilitators provide extra stimuli in the form of compromising information (we call them "skeletons"), gamification elements, or extra information.

TIP!

Each group of students is specific. Although the scenarios of the "Bees vs Pesticides"

have been tested in diverse groups and the final timelines have proved to be optimal,

there might be a need to give more time to some of the steps, to spontaneously include

some elements (like oral statements by participants), or exclude something. Be aware of that and adjust the timeline. Based on our experience, students always want more time during the discussion stages, so there is a need to set limits to the maximum extension of time and stick to it. For time tracking, in an online simulation, it is possible to use screen sharing with up-to-date information. However, do not optimize the timeline on the expenses of the debriefing session.

For a successful simulation we advise to involve at least two (or three) facilitators. It is best when each of them has a certain role and they have agreed beforehand who will be responsible for what. One, for example, can focus on instructions and answering questions; the other one on observing and time keeping. If you are doing the simulation online, it is advisable to involve one additional person ("a technical advisor") who can help with emerging technical issues.

Debriefing. For students' ability to learn from the simulation, debriefing is the most important part of the simulation. According to a constructivist and learner-centred approach, students should be able to integrate knowledge or attitudes with other perspectives through reflection, which is why there has to be a debriefing phase. Understanding and learning from the experience requires individual reflection and collective discussions.

Engaging debriefing needs to be designed well. Some reflecting and assessing should be done before the simulation and it should be repeated after the simulation. Everybody should feel involved and be given the opportunity to share emotions and experiences. A supervisor-observer's duty is to support learning by bringing out key moments from the simulation that help participants to focus on important learning points. Based on the notes from the simulation, the supervisor should ask questions first to guide students to think through the most crucial parts/elements. Supervisor's comments and teaching should ideally complement participants' self-reflection. As the aim of simulations is to develop transversal skills which are not measurable through formal evaluation, the grade should not be given. Also, grading could lead students to perform rather than reflect openly, which is the aim of the debriefing. Some feedback from other participants could also be involved.

How much is the minimum time for debriefing? It may happen that after a successful and tiresome simulation participants do not have much energy to dedicate to reflecting and analysing. Therefore, with longer scenarios or online events, debriefing is better to be organized separately at the next meeting. Some individual reflection sheets could be given to fulfil immediately afterwards while memories and emotions are still fresh.

It is advised to ask open questions. If the group is large (more than 12 people), some smaller group discussions could be arranged simultaneously to allow everybody to verbalize their experiences and be more involved.

Some questions that could be used in a debriefing discussion:

- What went well? What did not go that well? Why?
- What did you expect to happen before the simulation started? What did actually happen? Why was there a difference between what you expected to happen and what did happen? How and why did the group shift away from the initial plans and aims? Were there any wrong assumptions or expectations before the simulation? What were these and why were they there?
- When were you most frustrated? Most content? Why?
- How did the teamwork go; were there any disagreements?
- Could time pressures have been alleviated by organising the work differently?
- Was the goal always clear?
- Were the instructions always clear?

TIP!

Try to ask these questions and think of other questions, too, because participants could notice how people perceive the experience differently. Make your students think whether those differences are significant? What are the reasons behind this? Additionally, during the debriefing phase the facilitator can normalize conflicts and irritation between students if it arouses – emphasize that this is a natural part of group dynamics and co-working.

According to the comments that we gained during the debriefing sessions, students felt that they were able to embody roles that they said they would not have taken on in real life. We can assume that simulations allow students to take on unusual roles in teams, such as revealing themselves as leaders, negotiators, and so on. Overall, the simulation was a good learning activity for sensitizing students towards particular transversal competences. We cannot claim that simulation is a teaching tool that should replace all the other methods of learning and teaching, rather it works as a self-testing or reflection tool for the students where they can test out different competences and have new discoveries about themselves. Social simulation in our experience is a great activity for students to gain a better understanding of what they are already good at and what they could work on in the future.

2. Transferring an in-person social simulation to an online environment

Originally, we had no plan to develop a simulation scenario for an online environment, however, the COVID-19 pandemic and the following restrictions for activities in classrooms forced us to think about other possibilities to carry out simulations so we have decided to transfer one of the scenarios for the remote mode. The following part of the handbook introduces our experience and the lessons learned during the development of scenarios and the implementation of the online social simulation. The

detailed descriptions of the steps taken by us will help you to adjust any simulation scenario and prepare for conducting the simulation in a virtual environment.

Choosing the online platform for the simulation. An online simulation poses some specific requirements to the facilitators. Due to the multitude of platforms available and the rapid developments considering new functions and user interfaces, we are pointing out some major aspects that would be important to consider when choosing online platforms for the simulation. Examples from the "Bees vs Pesticides" online simulation experiences are given as illustrations.

Basic requirements for the virtual environments:
- Simulation is an interactive learning method and the **contact between participants** is important. Therefore, platforms with a video function should be preferred. It is also important to ensure that the participants have their video cameras turned on. The students should be informed of this request beforehand to be ready for that requirement.

- The platform chosen for online simulations should provide the **possibility to arrange different channels for communication between participants** as during activities participants must be able to find partners for negotiations and formulate pairs easily. To implement the "Bees and Pesticides" scenario, technical preparation should include the creation of multiple channels and breakout rooms. This is the limitation in most top-down logic-based platforms. From existing platforms, our opinion is that *wonder.me* allows this the best (but is unstable and unreliable currently); functionally good is also *Zoom* where participants can move freely and join breakout rooms by themselves. Another platform that we used in our online simulations was *MS Teams* - its advantage was the fact that both the students and facilitators were already familiar with the functionalities with this platform (e.g. that it is easy to create breakout rooms, place information in them, that students can conveniently disconnect from the main channel and return back to it). The general rule is that the better you know the functionality of the chosen platform, the easier it is for you to plan the simulation - and this requirement goes for both facilitators and participants of the simulation.

- One of the main roles of the facilitator(s) is to **moderate the simulation**. Facilitator(s) need to have a clear understanding of how the simulation should go, how it is going and what the students are doing during simulation in real time. Compared to a classroom, a virtual space poses more challenges here, especially in case of many parallel negotiations or group discussions. One of the roles of facilitators is to follow the group dynamics that presupposes the possibility to monitor the processes as well as to move between groups. Some platforms like *Zoom* or *wonder.me*, indicate the location of participants, and other platforms provide the possibility for those who have specific assigned roles to move easily between channels and groups, with some limitations to follow activities of participants.

- While choosing the platform for online simulation, do not forget about the **opportunity to broadcast messages** to all and send some reminders, for example, regarding time limits, and to invite participants back to the main room

/ general forum. Facilitators should be able to communicate with participants to make announcements or to add some extra information. The inability to get students' attention might be a problem if and when students use private/personal channels or separate platforms for negotiations or group discussions.

- Size of the group: if you are doing the simulation with a big group of students, check the limits for the options of the discussion groups.

- The last but not the least important factor for the success of online simulations is a good internet connection. Different platforms require different quality of connection (for example, for some online educational platforms the internet connection should be stable otherwise you will not be able to use video during simulations - the images could freeze, the participants could be dropped out of the teams, etc.).

─────────────────────── **TIP!** ───

If you are working with free versions of the virtual platforms, always check what the time limit for a meeting is, whether the recording is possible, can you as the host of the meeting see or attend discussion groups created by students. Always be ready for unexpected technical disruptions: the video may freeze; the sound may disappear… Extra buffer time is advisable. And one more thing - it would be valuable to test the platform for the simulation beforehand with colleagues - facilitators.

One of the main lessons that we learned from the "Bees and Pesticides" simulation was that one has to be prepared to be flexible in solving technical problems, as they would appear without any doubt. The technical problems in online environments made it challenging to monitor the simulation process and to provide detailed advice on the content of the simulation, and to identify emerging misunderstandings in interpreting the subject matter aspects of the simulation.

After having conducted the first tests of our simulation in the auditorium, we noticed that one major difference between an in-person and online format is that in the classroom the facilitator is allowed to travel from one group to another and observe their discussions, easily spotting the peculiarities of the group process. Some online platforms do not allow the host of the meeting to see and visit the chat rooms created by participants. This limits the facilitator(s) contact with the students during the simulation, and certainly, there are some drawbacks related to it - if something unexpected happens, your abilities as a facilitator to intervene might be limited. Time limits in simulations are tight (and must be in order to keep the pace), and in case of technical problems participants feel very frustrated. Facilitator(s) could prepare participants for these occasions stating already during the briefing session that this is

a natural part of the simulation and also in off-line simulations people feel that they do not have enough time – this is part of the simulation experience.

Adjusting the simulation scenario to an online environment. Virtual simulations are more monotonous and tiresome, and require more active engagement from participants compared to in-person simulations. Participants sit in front of their screens and miss the direct contact with each other. Therefore, the sessions should be shorter and more intensive than in face-to-face simulations. It is wise to cut the exercise into smaller parts: you may do the briefing in one day, then have the simulation on another day, and potentially have the debriefing session the following day. According to our experience, we suggest a 3 to 4-hour-long online session as the optimal for an online social simulation.

When preparing for an online simulation, much more attention needs to be paid to the preparation of instructions compared to an in-person simulation. You must aim for the maximum clarity of the rules in order to ensure a smooth simulation process for all the participants and the consistency of the activities carried out. In an in-person simulation, most preparatory activities, such as the presentation of the situation, introduction to the simulation rules, timeline, etc., would be usually performed in the auditorium just before the simulation. In the online version, they might be separated from the actual simulation and introduced to the participants of the simulation a day or a few days before the simulation takes place. In this way, students join the simulation being prepared: the teams are already formed, roles between team members distributed. The preparation phase could include the agreement on the team's goals, strategies, prospective actions, etc.

TIP!

For the online simulation, you might follow our approach in the formation of the teams. In the in-person simulation, the groups usually are formed randomly. When conducting the simulation online, the dynamics of the prospective teams should be considered, so the participants may be divided into teams by the facilitator(s).

* * *

The preparation phase for the online simulation is crucial! You as a facilitator have to think about the online platform, all the processes that will take place during the simulation, arrange all procedures with moderators (if you have other partners in crime), prepare clear instructions for participants of simulations and arrange the groups considering personalities of participants (of course, if and when it is possible).

The timeline of the simulation and the process organization. Below you will find an example of how we re-designed the "short" scenario to adjust it to the online environment. We aimed to keep only the essential elements in the description to provide a clear idea about the purpose of the exercise to all the participants. For example, the stage of gathering information about the interests of other teams and their positions was changed from one-to-one talks to short public presentations of teams' positions (as we have worked with communication students, we have asked
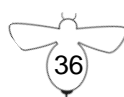
them to make a pitch presentation that could serve as a start position for further negotiations with other teams). Such changes were invented in order to provide more time and opportunities for interaction between the teams during the simulation. The allocation of time frames for each of the activities was also changed providing more time for inter-group communication during the online simulation. The final activity of the simulation was also changed to an online forum-conference allowing the participants of the simulation not only to highlight the main results of the teamwork, but also to discuss possible further actions if the simulation continued. Table 5 provides a detailed overview of how the transfer process happened for the "short" scenario to adjust it to the online environment.

Table 5
Overview of transferring to an online scenario

The original "short" scenario		The re-designed "online" simulation	
Activities	**Type of activity**	**Activities**	**Type of activity**
1. Groups read the general description, get familiar with the case.	Introduction - in the day of the simulation In-group discussion	1. Groups read the scientific report and the news article, and get familiar with the case.	Setting the groups Introduction - at least a few days in advance before the simulation (followed by independent work of the students' teams according to the instructions)
2. Groups agree on the general strategy: agree on the initial aims for each group – what are its interests, what the group wants to achieve, agree on the roles, group rules. Groups develop their initial messages.	In-group discussion	2. Groups agree on the general strategy: agree on the initial aims for each group – what are its interests, what the group wants to achieve, agree on the roles, group rules. Groups make a list of organizations and brief descriptions of what interests the other organizations have, who the potential coalition partners are. Groups develop their proposal for negotiations with other groups.	In-group discussion (before the simulation)

3. Groups gather information and map out the landscape – what interests the other organizations have, who the potential coalition partners are (the groups need to find at least one partner with matching interests).	Inter-group communication session – information gathering	3. Groups communicate their proposals for collaboration.	Online discussion (format of a briefing)
-	-	4. Groups negotiate with each other about the options, and then it depends on whether all groups can reach a consensus or alliances are formed around several options.	Inter-group communication session - coalition building (online chats in different channels)
-	-	5. Group discussion on partnership, revision of the initial tactics.	In-group discussion
4. Each group revise their communication plan and develop messages. Preparation for public announcements.	In-group discussion	-	-
5. Round of public announcements led by the facilitator. Each group has two minutes to speak.	Special event	-	-
6. Groups negotiate with each other about the options, and then it depends on whether all the groups can reach a consensus or there are several options that the groups support.	Inter–group communication session – coalition building	6. Short final negotiations with prospective partners.	Inter-group discussion (different channels online)
7. Roundtable discussion, all the options are discussed and the support for each is clarified. All the groups need to agree on a joint final solution. Journalists participate and represent the interests of the general public.	Special event	7. Presentation by the coalitions of the final results of negotiations.	Conference call (format of a press conference)

-	-	8. Discussion – reflections on the results of the simulation, team achievements.	-
8. Debriefing	Wrap–up	9. Debriefing	Wrap-up

Online simulation from the perspective of students: successes and considerations. The digital space, despite its challenges, has some learning opportunities. Although we have stated before that a simulation in an online environment may cause anxiety because of various (technological and psychological) uncertainties, there are many positive aspects to be noted. We are sure that during the simulation students gain experience to work effectively, discuss and solve problems. Students who have already had similar experiences feel much more confident and comfortable in a simulation situation. Therefore, it is likely that similar tasks, and tasks received in real life as well, may become easier to accomplish for them despite all the confusion caused by the online environment. We can say that moving to the digital space may challenge the achievement of the primary goals, but allow students to discover and develop transversal skills. Of course, it is worth emphasizing that online platforms in response to the current needs of the learning process (caused by Covid-19 pandemic that has moved all educational activities to online environment for almost one year) are over continuous improvement and they offer new tools that allow a successful implementation of remote simulations without any specific online environments designed for simulations.

Based on the analysis of the students' reflections about the simulation experience, we have made a few important takeaways that could ensure the success of the simulation.

TIP (1): proper moderation and clear communication rules during the simulation. The students' feedback indicated that during the simulation the important aspects were a clear set of communication rules (both in-group and inter-group), clarity about the negotiation process between groups and descriptions of all the stages of the simulation; the support for assigning meetings on separate online platforms, and the facilitator's availability for consultations.

TIP (2): proper and flexible time allocation. Students highlighted that the participants should not feel time pressure during the simulation as this may cause dissatisfaction and haste which could lead to confusion and chaos. Based on the feedback we received, we strongly argue that online simulations require much more time for students for communication inside the group and with other groups, compared to simulations that are in-person. For the online simulation, the time frames for each phase of the simulation should be longer, providing enough time for arrangement on digital platforms for communications, however, we think that the shortage in time should be kept.

TIP (3): preparation for the simulation. In the students' feedback (written reports and oral reflections), the preparation stage was highlighted as an important factor for the success of the whole online simulation. This part includes not only the

provision of clear descriptions of the simulation, but also different preparatory activities for the students which may include role assignment among the members of different teams, decisions about the team's strategy, etc. We suggest keeping in mind that the need for thorough preparation is a remarkable difference between an online and a traditional simulation.

Online simulation from the perspective of facilitators: successes and considerations. Because of the remote study process, both teachers and students had to adapt quickly to working in an online environment, to manage various IT opportunities and challenges that were newly integrated into the study process. Despite the careful preparation for online simulations and with previous experience during real-time face-to-face simulations, the emergence of new challenges based on IT application for simulations created uncertainty for all participants of the simulation, including the facilitators. Digital challenges that have been met during preparation for online simulations were caused by (1) shortage of experience of use of IT tools and digital platforms to moderate (develop and implement) simulations, (2) limitations of digital platforms used for remote study process for organization of in-group and out-group discussions and one-to-one negotiations on a digital platform that is not originally settled for online simulations, (3) psychological barriers related with uncertainty, lack of previous experiences and competencies for IT use for online simulations.

Below is a detailed discussion of each of these aspects:

- **Insufficient experience of use of IT tools and digital platforms** to develop and conduct social simulations was one of the factors that had an impact on the end result. The precise knowledge of scenario: what and when to do, how to manage the simulation in a virtual environment - it all requires from the simulation's facilitator not only adequate knowledge of the simulation, skills of control of the simulation process, but also self-confidence. Of course, the role of facilitators working as a team with a clear division of tasks and responsibilities among them plays an important role in this case. This helps to avoid the fears that arise during the simulation between the participants, and also creates conditions that in case of technical problems allow them to solve them.

- **Limitations of digital platforms used for remote study process**: the organization of in-group and inter-group discussions, as well as one-to-one negotiations on a digital platform that is made for traditional online education (streaming, discussions, work in breakout rooms, etc.) is impossible. The adaptation of a familiar digital learning environment resulted in less stress, but at the same time, it made us less prepared to face potential challenges. Even though we used the platform which was used in the study process and the students were informed that they should plan and decide how they are going to communicate with their colleagues, one of the most common suggestions in the debriefing phase was to prepare other channels and platforms for communication and schedule negotiations. However, such planning of simulation actions would deprive the whole process of strategy, planning, and preparation elements.

- **Psychological barriers related to uncertainty, lack of previous experiences and competencies for IT use** for online simulations. In adapting the simulation scenario, efforts were made to avoid implied challenges and to make implementation smoother in the digital environment. However, students still reported high levels of uncertainty and ambiguity. When planning and implementing the simulation, we tried to eliminate this uncertainty with the greatest possible detail of the tasks and openness to questions. Based on the experience of the implemented simulations, we suggest trying to reduce the existing uncertainty by introducing students to the fact that feeling some frustration and dealing with anxiety is part of the experience and a great opportunity to gain experience in how to cope with complex situations and uncertainty.

We can conclude that the main task in trying to meet the challenges of the simulation is to create a safe and comfortable environment for students by giving them lots of information not only about the case they are going to focus on, but also the process of simulation and the goals and benefits of such learning activities. The confusion about what and how is going to happen and the problems caused by the technical features and disruptions complicated communication among students and with facilitators.

TIP!

If students are not used to interactive learning online, they might be confused and probably also act in ways you would never anticipate. It is therefore important to try to find a way to talk to and to hear each student during and after the simulation because the communication patterns we are used to in the classroom are no longer effective or applicable in an online environment.

At the same time, there are some ways to prepare yourself as a facilitator for conducting social simulations online. One helpful thing is teachers' experience in participating in an in-person social simulation before testing the online version. From our experience we can say that the development of the "online" version of our simulation would not have been so successful if the organizers of the simulation had not had previous experience in implementing the simulation in-person. Having had the experience, we felt much more confident and better prepared to guess the potential challenges, spot the difficult parts of the simulation for students, and adapt the script without losing significant steps of the simulation. Another crucial aspect, in our opinion, is thorough preparation: give yourself plenty of time to thoroughly think out details of the scenario, plan the communication with students, think how you can clearly communicate the tasks to the students. Thorough preparation will allow to smoothly implement the entire simulation. Schedule the date of the simulation well in advance, then you will have plenty of time to prepare and also to send the students the necessary information well before the simulation to let them prepare.

To summarize, we want to highlight the following seven lessons learned:

(1) Clarity about the features of the simulation. It must be explicitly presented and discussed before starting the online simulation, and there must be clear, specific objectives of the simulation presented, all the operational steps must be described, so that the simulation participants can focus on the solution of the task without any uncertainty about the task itself. Compared to an in-person simulation exercise, the online version should be much clearer and more specific.

(2) Moderation. While the real-time simulation in the classroom/auditorium allows the facilitator to monitor and intervene in the process, the facilitator's role in the online simulation and his/her ability to actively intervene, or at least to monitor all the activities is limited. We strongly advise the involvement of several facilitators with clearly divided areas of responsibilities.

(3) Time. Although it was predicted that a time-consuming simulation would be frustrating, tiring, and students would not be able to keep focus, the main conclusion the students expressed after the simulation was the need for more time. Enough time is required not only for a fruitful discussion, but also for solving technical problems.

(4) Communication about the rules. If the simulation is taking place in real-time in the classroom/auditorium, the facilitator has more opportunities to present and explain the rules, follow the process and make adjustments or changes when necessary, based on the dynamics in the room. Our experience lets us conclude that it is hardly possible to change the rules in the online simulation. The main advice is that the rules of the simulation must be discussed in advance and made available to everyone prior to the beginning of the simulation.

(5) Comfortable and engaging environment for the simulation. It is especially important to create an emotionally and technologically safe environment for the simulation participants. The online simulation requires not only an active use of various IT and specific distance learning tools from the simulation participants, but it is also the facilitator's responsibility to create conditions that allow each simulation participant to engage in communication and negotiations, at the same time giving each simulation participant the opportunity to choose the appropriate intensity of participation in the simulation. Despite the fact that students were supposed to negotiate with other groups "one-to-one", there was a tendency that students wanted to negotiate in bulk to have more "courage" and "leverage". After having noticed this in the first sessions when we did the simulation in-person, when the "online" version was created, groups of negotiators were allowed, and students had their inter-group talks in bigger circles.

(6) Debriefing. Related to the previous point: it might be better to plan debriefing as a separate session, another meeting - which has to be soon enough after the simulation. Online debriefing might be more challenging because some students are not willing / do not feel comfortable to talk in a big group - prepare formats that allow them still to participate (create smaller groups for debriefing; use written notes in Miro or Jamboard etc.).

(7) **Recruitment of students.** As we have pointed out in this handbook before, it is best to integrate the simulation into the curriculum to ensure attendance. Considering how to motivate students who already suffer from screen fatigue is to decide whether to declare the participation mandatory/voluntary; give extra credits for participation etc. At the same time, in one of the partner universities, the participation in the online simulation was voluntary, and the attendance was very good. The non-compulsory nature of the social simulation seemed to add an extra layer of activeness - the participants were well engaged and interested. This was a very rewarding experience for us as facilitators!

APPENDIXES

Appendixes

Appendix 1. Digital tools

Technical specification for online simulation games

Social simulations can be quite simple with only several people participating or very complex with several groups where each group has several people in it. To transfer this sort of simulation online requires software that is easy to understand and use for first time users and has several management layers.

Before the social simulation can take place, facilitators need to discuss with the participants the tools they are going to use for communication, so that during the simulation facilitators can see and manage all groups, and also provide additional feedback from their side. It is important that every participant is using the agreed-on software because the simulation facilitators need to see each group discussion.
For holding online social simulations it would be necessary to have a desktop version and a mobile version of the application, so that the participants can follow up with updates and notifications anywhere they go.

The online conference application has to provide different layers of group administration and has to be capable of adding group facilitators. These layers would include:

Administrators – This role would allow a user to add new moderators, create groups, delete groups, and join in on all groups at any time. Delete inappropriate content. Add and remove users. This type of a user would be able to also give privileges to other user groups or specific users.

Moderators – Moderators could join all created groups, view their activity and interact with the group participants. This role could also remove users from a certain group if it were necessary and delete inappropriate content.

Silent moderators – Similar functionality as the moderator role, but when this user joined a group, other group participants would not be able to see and interact with them. This option could also just be added to the moderator role as a toggle option.

Super users – This role is similar in functionality as the regular user, but with the ability to create and delete private groups for group tasks. This role could also remove users from the groups they have created. This role would be given to each group leader.

Regular users – Regular users could join in specific groups that they are allowed. Use chat, voice chat, upload documents and use collaboration tools.

Depending on the ground rules agreed on before the simulation, an administrator has to be able to change group policies to private or public groups, so that groups can see other groups discussions or the opposite that groups are not able to see other groups internal communication.

Another separate group should be created for negotiation with the moderators and administrators. This room should have a booking feature where users and super users could schedule a time to communicate with the simulation games organizers.

The software has to provide text based, voice and also video communication functionality as well as screen share and file sharing functionality. A nice to have feature would be an online whiteboard for each group where the participants could make drawings and sketches on the go. Separate functionality for submitting an assignment is necessary. These assignments also have to be displayed in a separate tab. The privileges to view these assignments could be changed depending on the agreed terms before the simulations. Administrators could give access to other users to view these assignments.

The software should also come with notifications that could be sent by administrators and moderators. These notifications should appear on both versions of the software – desktop and mobile. This functionality would be used to deliver information to all participants at the same time.

Since most social simulation games have events that have a limited time span, it would be necessary for the software to have a countdown timer so that the administrators can set time limits for specific tasks. This timer should have a dual functionality that the administrators and moderators could switch depending on the situation. One option would be that the timer is only informative, so if the time runs out participants could still carry on working. The other options would be enforcing - when the timer runs out, all participants are automatically put back into the main group for discussions.

Currently there is no software that supports all the mentioned features above, there are some applications available that can provide the basic needs for online collaboration like *Cisco Webex*, *Microsoft Teams*, *Discord* and others.

Online conference applications suitable for social simulations

There are many different applications to make online conferences, but all of them provide the necessary functions to make a social simulation. For social simulations the administrator needs to be able to overview all groups, but groups need to have separate chat rooms where to hold discussions, as well as a public chat room.

Discord is a proprietary cross platform freeware messaging and digital distribution platform for creating communities ranging from gamers to education and businesses. *Discord* specializes in text, image, video and audio communication between users in a chat channel. (Sherr, 2019) *Discord* is a suitable tool for social simulations because users can use text chat, voice chat, video call, real time screen shares and file sharing features.

Discord software can be used to make a communication server that would be necessary for creating and holding social simulations online. The server administrator can add participants to the server and divide them in groups, so that the groups can communicate internally and create a public room where all the groups can provide their opinion on the discussion matter. *Discord* application also offers additional features which are called "bots" that can add additional functionality like countdown timers, social network monitors and others.

Webex *Teams* is a collaboration solution that keeps people and teamwork connected anytime and anywhere. With the *Webex Teams* application people can create virtual work spaces for collaboration work. (Cisco Webex Teams, 2019) This application has similar features like *Discord* and has some more features that can be useful in making a social simulation. *Webex Teams* also offers an online whiteboard option where group members can draw their ideas and also a scheduler. These features could help social simulation participants understand each other's ideas better and help plan the meetings. *Teams* application does not have a private room function, where the administrator of the simulation can assign people to specific groups. The lack of this feature can cause a situation where other group members could join the chat rooms to see what they are talking about. Depending on the simulation group size, simulation administrators might have to pay for a license (Sherr, 2019).

Microsoft Teams is a proprietary business communication platform developed by Microsoft. *Teams* primarily competes with the similar service *Slack*, offering workspace chat and videoconferencing, file storage, online whiteboard and application integration. With *MS Teams* users can easily work on the same documents online. Users can be divided into groups for separate discussions. *Teams* also provides functionality for breakout rooms where the host can break up the whole group into smaller work groups and assignments for when the participants need to submit a document (Microsoft, 2021).

Wonder is an online communications application that allows the users to choose who to talk to. Users are able to walk around a virtual stage and join group discussions. These groups can also be locked for private discussions. There is also a broadcasting option so all the users in the room can hear the presenter (Wonder, 2021).

Virtual reality headsets

Adding virtual reality to social simulations could help the participants better understand the situation that is provided. If virtual reality equipment were used in social simulations, it would be necessary that it adds to the experience rather than becomes a problem. It is important to choose a suitable virtual reality headset that is easy to use and does not interfere with the social simulation participants.

There are many different virtual reality headsets available in the market. For social simulations an optimal headset would be one that is a stand-alone solution, that provides 6 degrees of freedom and is wireless.

Oculus Quest is a stand-alone virtual reality headset that offers 6 degrees of freedom movement, room scale tracking and is capable of launching applications from

a computer. This device does not require external tracking devices and is completely wireless (Facebook Technologies, 2021).

Virtual reality applications that could be used for social simulations

VRChat is a free to play massive multiplayer online virtual reality social platform. In this platform people can interact with other people all around the world as 3D character models. This application is only available on desktop computers using a virtual reality headset or just using the computer ([VRChat Inc., 2021](#)).

VRChat has 3D spatialized audio that helps hear the conversations that are only important to the user. People can chat, collaborate, draw, sculpt and do a lot of other things with other users. With some knowledge in 3D environment development users can create their own virtual rooms and world. *VRChat* also offers full body avatars for more interesting experiences ([VRChat Inc., 2021](#)).

RecRoom is a free to play virtual reality online video game with an integrated game creation system. This game also can be used with virtual reality headsets or just a computer. In *RecRoom* users are able to enjoy games and puzzles created by other people or try creating some games and challenges themselves. This application has a similar voice and avatar interaction system as *VRChat* (Recroom, 2021).

Spatial.io is a free online virtual and augmented reality collaboration tool. Users can create their avatars just by using the computer webcams. *Spatial* application allows users to join the conference in multiple different ways, using virtual reality headsets, computers, augmented reality headsets or even smartphones (Spatial systems, 2021).

In *Spatial* users can interact with each other using voice chat and also it provides real time captions for speech (only available in the pro version). People can upload necessary word or pdf documents to be displayed to other users, show videos and even 3D models. There is also a note option where users can make notes on the go. Users that are connected from the computer can share desktop screens or applications. Spatial also has integration with *Microsoft Teams*, *Google Drive*, *OneDrive* and many other applications, for a better collaboration experience (Spatial systems, 2021). This would be the most suitable application to experiment with for social simulations, because it offers a lot of the collaboration tools as non-virtual reality applications but in virtual reality.

Appendix 2. Possibilities of Learning Analytics

Theoretical background. Learning analytics is a relatively new area in which information gathered with different analytical tools helps to improve learning and education. It combines large data sets with statistical methods and forecasting modelling to improve decision-making. Data extraction and analysis are Automated, but decision-making remains people's responsibility. There are different areas that are known to be relevant in the learning analytics, such as learning theory, sound pedagogical practices, building knowledge communities, student motivation, perseverance and motivation, and student retention (MacFayden, & Dawson, 2010; Elias, 2011).

Thus, learning analytics means obtaining various educational data, mainly from the Learning Management Systems, analysing this data in different aspects. Three main areas are distinguished in learning analytics:
1. network structures that include both social networks (actor-actor) and also actor–artefact networks;
2. processes, activities explored using methods of sequence analysis, based on action logs;
3. content using text or other artefact analysis (Hoppe, 2017).

Overall, learning analytics also includes a variety of summative and formative assessments data, allowing to analyse a student's learning history and progress.

The introduction and development of learning analytics in an educational institution is a complex activity. The literature (Knight, & Shum, 2017) identifies a number of important questions that need to be clearly answered regarding a meaningful application of learning analytics:
- what is measured: which constructs are considered as knowledge for reference to standard and evidence;
- how it is measured: linking analytical methods to particular epistemologies;
- why is this knowledge important: the applicability of the analytical question to educators and learners;
- who is the analysis for: learning analytics is able to support 1) individual student learning; 2) the work of educators and purposeful individual support for the learner; 3) education administrators for information on groups of learners;
- where is the use of the analytics: for meaningful analytics to add value;
- when do the assessment and feedback occur: applicable to the formative and/or summative character of the learning analytic; whether the feedback is just after-the-fact or does it support a further improvement and behaviour change.

The learning analytics tool should always be consistent with assessment regimes based on pedagogical practice and epistemic assumptions (Knight, & Shum, 2017). It is also necessary to emphasize the most important limiting factors for learning analytics. Firstly, in the learning analytics it is always a topical issue about data privacy

and security, ethical aspects of analytics, especially if analysis is focused on predicting the learner's success. Secondly, people tend to change their behaviour and action when they are aware that they are being observed and analysed, and that analysis has a significant impact. Thirdly, the data used by learning analytics do not cover all information on factors that influence learning, such as family or work responsibilities (Knight, & Shum, 2017; EDUCAUSE, 2020).

Learning analytics experts emphasize the need for a clear outcome, aligned with the institution's priorities, that learning analytics seeks to achieve. The clear vision needs to be regularly updated and clarified so that everything is understandable to users, so that analytics is convenient and valuable (Ferguson, & Clow, 2017).

The possibilities of learning analytics application in the social simulations directly depend on the possibilities of the Learning Management System development in the university. Only a sufficiently developed system can integrate learning analytics. Of course, the next essential condition - properly trained staff, who are familiar with pedagogical, technological and analytical issues.

Assuming that technology and properly trained staff are available, social simulations in any scenario that uses the digital environment allow for data acquisition and processing in all three of the above areas:
- network, for example, student cooperation in groups and between groups, connection with different materials;
- processes, activities, such as the number, frequency and duration of mutual communication activities;
- content, analysing written communication texts.

Of course, during a social simulation various formative assessment data are generated, such as self-assessment of one's competences and skills before and after the simulation. It can be supplemented by peer assessment during and after the process. Analysed texts can also be formed from reflections during the process, their sentiment analysis is possible.

On the text analysis, it is important to point out that so far it is mostly only available in certain major languages, so it is difficult to use in lesser-used languages, such as the Baltic countries. On the other hand, it is more difficult for students to express themselves, for example, in English if it is not their mother tongue.

Appendix 3. Simulation "Bees vs Pesticides"

GENERAL INFORMATION

Scientific Report: Benefits and Hazards of Neonicotinoids

Neonicotinoids are a group of pesticides harming pollinators. More specifically, neonicotinoids are a class of neuron–active insecticides chemically like nicotine, such as acetamiprid, clothianidin, imidacloprid, nitenpyram, nithiazine, thiacloprid and thiamethoxam. Imidacloprid is the **most widely used insecticide in the world**. They are called neonics. Imidacloprid–containing and thiamethoxam–containing AALs have been developed for the treatment of, e.g. potato planting material, sugar beet seed, spruce, pine, larch, firewood, apple, pear, cherry and plum.

Neonicotinoids **were registered in the EU for plant protection** purposes, since legislative risk assessment concluded that the risks from their use are acceptable. However, scientific evidence was emerging that **neonicotinoids are more hazardous than thought**. Their use has been linked in a range of studies to **adverse ecological effects, including honey–bee colony collapse disorder (CCD)** and **loss of birds** due to a reduction in insect populations; as well as **current mass extinction of insects** – some countries have lost up to 75% of their insects – some scientists link to neonics.

In 2013, the European Union and a few non–EU countries **restricted the use of certain neonicotinoids**, applying the precautionary principle, and intensified research on effects of neonicotinoids on pollinators. However, exemptions from the ban were allowed with special permits that several countries made use of.

In 2018, new evidence was available – studies by the European Food Safety Authority (EFSA) confirmed the **unacceptable risk to bees related to outdoor use** (also use of coated seeds). Therefore, the European Commission elaborated **a proposal for a legal act to ban the three main neonicotinoids** (clothianidin, imidacloprid and thiamethoxam) **for all outdoor uses**.

In 2018, the European Commission elaborated a proposal for a legal act to ban neonicotinoids for outdoor use. Neonicotinoids are a group of pesticides harming pollinators. The Committee of Member States had to vote for it, and each country needed to arrive with its position. Initially the Lugovian position opposing the ban received heavy criticism from environmental NGOs and some farmers (beekeepers, small scale and organic farmers). To discuss the Lugovian position (support ban or not), the Committee of the Lugovian Parliament on EU Deals calls up for the meeting, and each side has a chance to tell their opinion.

In the previous negotiations, the opposition to ban neonics (traders, farmers) used a lot of false arguments and pseudoscience such as that there were special circumstances in Lugovia, so research in other countries is not right for us. However,

since 2013, when discussions on a ban of neonics began, neither the Ministry of Agriculture nor the pesticide dealers themselves had conducted any research to understand how neonics impact bees in Lugovia. There is also no reason to believe that the conditions in Lugovia, compared to neighbouring countries, are that different – we are in the same geographic area, and research in these countries is showing high risks from neonic to bees.

It is also known that **neonicotinoids are important plant protection agents** in case of rape, potato, fruit and vegetable growing as well as in plant breeding. Thus, the ban has a **negative impact on agriculture and food production** with a negative impact on crop yields and quality. The ban could **increase the use of alternative pesticides** with potential negative impacts on the environment. Most of the available alternatives have shorter exposure times, so the treatment should be repeated several times during a season, increasing the risk to the environment. In the EU, active substances are approved for a limited period, and a review of many active substances is now underway, which may also lead to **the withdrawal of certain alternatives to neonicotinoids** from the market. Lack of plant protection agents **increases the use of unregistered agents and the risks of illicit agents**.

Lugovia Will Decide on the Ban of Controversial Bee-Killing Pesticides

LugoviaNewsOnline.lg

The European Commission is forcing the Lugovian government to take a decision over the ban of pesticide group neonicotinoids that has demonstrated harming pollinators like honeybees. However, a research report published last week by the Lugovian Academy of Science fails to give a conclusive answer about the threat of neonicotinoids and the impact of the potential ban.

The decision to ban widely used pesticides neonicotinoids (or neonics) has sparked heated debates all over the world. At stake, there are environmental concerns and the survival of honeybees from one side, and the lack of good alternatives for protecting crops and raising prices for food on the other.

Some European governments have banned the pesticide, but the Lugovian government has avoided taking a position on this matter so far. The requirement by the European Commission sent today leaves the government no choice.

The prime minister of Lugovia Anna Tugo admits that this is a difficult decision that inevitably will harm some people and put important economic sectors at risk. "We are obviously very proud of Lugovian clean environment and high-quality honey production, but agriculture also has great importance for us, being among our major export articles," she explained.

Prime minister Tugo emphasizes the importance of hearing and considering every position in this matter: "The decision would not happen behind closed doors, I am convinced that it requires a broad-based debate. We need to listen to everybody before taking any action."

The government so far has failed to get a clear instruction from the Lugovian scientists due to the lack of consensus about the need and the impact of the ban.

The leading researcher of the Academy of Science, professor Adam Hiri in the telephone interview with LugoviaNewsOnline.lg avoided a definitive answer whether banning would be the best option for the country. "We have, obviously, evidence about the negative impact of neonics to the bees, but there are other factors as well," he stated.

Apparently, agricultural experts do not agree with zoologists and ecologists to formulate a common position in the report commissioned by the government. "The effects are multi-dimensional. The report concludes that there are some controversial results, as well as the negative impact on economy and agriculture," explained the professor.

In order to discuss the position to support the ban or not, the government has called up for a meeting where each interest group will have a chance to express their opinion and come to a joint conclusion.

As reported previously, neonicotinoids are used as pesticides on farms and in urban landscapes. They are absorbed by plants and become transferred to bees and other pollinators. Research has demonstrated that neonicotinoids change the behaviour of bees and are one cause for their death.

In recent years, the evidence about negative effects has been growing so that several countries have banned the pesticides. Neonicotinoids developed in the 1990s are less toxic than previously used pesticides and are used in over 120 countries. Neonics have 140 different crop uses.

GENERAL DESCRIPTION OF ORGANIZATIONS
(Not confidential to participants)

Ministry of Agriculture
It is believed that the proposal to ban neonics would have a negative impact on agriculture and food production in Lugovia with a negative impact on crop yields and quality. To enable farmers to grow their products, the use of alternative pesticides will be enhanced and thus be released into the environment, with potential negative impacts on the environment. For several neonicotinoid applications, alternatives are not available.

Ministry of Environmental Protection
Most of the available alternatives to neonicotinoids have shorter exposure times, so the treatment should be repeated several times during a season, increasing the risk to the environment. In the EU, active substances are approved for a limited period, and a review of many active substances is now underway, which may also lead to the withdrawal of certain alternatives to neonicotinoids from the market. Lack of PPPs increases the use of unregistered PPPs and the risks of illicit PPPs.

Beekeepers Association
Use of neonics threatens the beekeeping business. The number of bee colonies is growing thanks to the development of the sector and subsidies. Perhaps the number of bee colonies would grow even faster, and owners would be more profitable if bees were not exposed to neonics. Yearly sampling and testing of honey has shown that neonics can be found in Lugovian honey and this cumulatively is dangerous for humans to consume.

Big Farmers Association
The BFA argues that in the case of an additional ban on the use of neonicotinoids, Lugovia will lose money every year for the cultivation of several agricultural crops and plants: EUR 15 295 000 for rape, potatoes (for chips, food, seeds), excluding starch potatoes EUR 4 255 530, for fruit trees (apples, pears, cherries, plums) EUR 4 829 080, for carrots EUR 1 232 900, for cabbage EUR 1 913 970, for coniferous plants EUR 7 700 000. Arguments: There are no alternatives available for several PPPs. In recent years, the focus in agriculture was related to the number of big farms increased, small decreased, and the number of jobs decreased as pesticide intensive agriculture saves on workforce expenses; this is how big farmers maximize their profits.

Traders of Pesticides
Traders of Pesticides continuously fund extensive research on the use of neonics. Neonicotinoids are important plant protection agents for Lugovian rape, potato, fruit, and vegetable growers as well as for plant breeders. Traders argue that there are no other practical alternatives to pest control for these neonicotinoid applications.

Organic Farmers
Unfortunately, conventional agriculture largely relies on pesticides, and their consumption in Lugovia is growing. But organic farms can grow their products without neonics and other pesticides. So, why others cannot? Organic farmers do not need help from conventional farmers to kill pests, they have their own methods and tools for controlling pests without chemicals. Organic farming creates more jobs for local

people. On the other hand, high workforce expenses make the produce more expensive, which with current living costs in Lugovia could make food less affordable to a large part of the population.
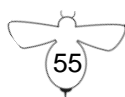
CLASS INSTRUCTIONS
(Basic scenario)

Who:
1. Facilitators, simulation management team
2. Seven groups of participants
3. Seven observers

1. The participants will be divided into **seven teams** representing groups that are involved in the bee and pesticides conflict: Beekeepers Association, Organic Farmers, Big Farmers Association, Traders of Pesticides, Journalists (representing general public), Ministry of Agriculture, Ministry of Environmental Protection and Regional Development.

Observers, one for each team, who during the simulation serve as the eyes and ears of the participants during the process and as discussion leaders after it is completed, may also be appointed.

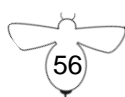The whole process is overviewed by the **simulation management team**.

2. For this learning experience to be of greatest benefit, you should try to behave as you believe the group that you are representing would usually behave, not as you think they should behave.

3. Do not add any "facts". As in real life situations, there are things which you will not know. The facts which you do have are sufficient to successfully conclude the negotiations.

4. You will first **meet as a team** to decide on your objectives, plan your strategy for the exercise and decide the roles your team members will play. Before a team may begin negotiations, they should complete the "General strategy" provided. The observers may request a copy as a prerequisite to beginning negotiations. While you **negotiate with other teams,** it is your task to seek to establish **coalitions** with other groups. Each group prepares a public statement about their position and presents them during a **press conference**. After the press conference, groups have time to revise their statements. The simulation ends with **a roundtable discussion**, where all the groups need to agree on a joint final solution.

5. During the first **in–group discussion**, the groups discuss their attitude and the importance of the following aspects (0–5): Food quality and safety; Innovation, R&D (alternative pesticides); Environmental goals (bee preservation); Food security (availability of reasonably priced food); Economy (industry profit and state budget, job market); Biodiversity. Groups also decide which aspects they can be a bit flexible about, and where their "red lines" are. Based on the importance of the various criteria, groups can formulate their positions and work around them, trying to find coalitions.

6. All **negotiations** or other contacts between teams must be accomplished by one representative of one team talking with one representative of another. It need not always be the same person, as long as the one–on–one relationship occurs.

Representatives of more than two teams may meet so long as no more than one member of any team is present at such a meeting.

7. In case any questions arise related to the simulation exercise, the groups must report it to the simulation management team.

CLASS INSTRUCTIONS
(Short (face-to-face) and Online scenario)

Who:
1. Facilitators, simulation management team
2. Six groups of participants

1. The participants will be divided into **six teams** representing groups that are involved in the bees and pesticides conflict: Beekeepers Association, Organic Farmers, Big Farmers Association, Traders of Pesticides, Ministry of Agriculture, Ministry of Environmental Protection and Regional Development.

The whole process is overviewed by the **simulation management team**.

2. For this learning experience to be of greatest benefit, you should try to behave as you believe the group that you are representing would usually behave, not as you think they should behave.
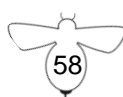
3. Do not add any "facts". As in real life situations, there are things which you will not know. The facts which you do have are sufficient to successfully conclude the negotiations.

4. You will first **meet as a team** to decide on your objectives, plan your strategy for the exercise and decide the roles your team members will play. Before a team may begin negotiations, they should complete the "General strategy" provided. The observers may request a copy as a prerequisite to beginning negotiations. While you **negotiate with other teams,** it is your task to seek to establish **coalitions** with other groups. Each group prepares a public statement about their position and presents them during the round of Public Announcements. After the announcements have been made, groups have time to revise their statements. The simulation ends with **a roundtable discussion**, where all the groups need to agree on a joint final solution.

5. During the first **in–group discussion**, the groups discuss their attitude and the importance of the following aspects (0–5): Food quality and safety; Innovation, R&D (alternative pesticides); Environmental goals (bee preservation); Food security (availability of reasonably priced food); Economy (industry profit and state budget, job market); Biodiversity. Groups also decide which aspects they can be a bit flexible about, and where their "red lines" are. Based on the importance of the various criteria, groups can formulate their positions and work around them, trying to find coalitions.

6. All **negotiations** or other contacts between teams must be accomplished by one representative of one team talking with one representative of another. It need not always be the same person, as long as the one–on–one relationship occurs. Representatives of more than two teams may meet so long as no more than one member of any team is present at such a meeting.

7. In case any questions arise related to the simulation exercise, the groups must report it to the simulation management team.

CLASS INSTRUCTIONS
(Advanced scenario)

Who:
1. Facilitators, simulation management team
2. Seven groups of participants
3. Seven observers

1. The participants will be divided into **seven teams** representing groups that are involved in the bee and pesticides conflict: Beekeepers Association, Organic Farmers, Big Farmers Association, Traders of Pesticides, Journalists (representing general public), Ministry of Agriculture, Ministry of Environmental Protection and Regional Development.

Observers, one for each team, that during the simulation serve as the eyes and ears of the participants during the process and as discussion leaders after it is completed, may also be appointed.

The whole process is overviewed by the **simulation management team**.
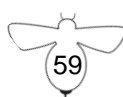
2. For this learning experience to be of greatest benefit, you should try to behave as you believe the group that you are representing would usually behave, not as you think they should behave.

3. Do not add any "facts". As in real life situations, there are things which you will not know. The facts which you do have are sufficient to successfully conclude the negotiations.

4. You will first **meet as a team** to decide on your objectives, plan your strategy for the exercise and decide the roles your team members will play. Before a team may begin negotiations, they should complete the "General strategy" provided. The observers may request a copy as a prerequisite to beginning negotiations. While you **negotiate with other teams,** it is your task to seek to establish **coalitions** with other groups. Each group prepares a public statement about their position and presents them during a **press conference**. After the press conference, groups have time to revise their statements. The simulation ends with **a roundtable discussion**, where all the groups need to agree on a joint final solution.

5. During the first **in–group discussion**, the groups discuss their attitude and the importance of the following aspects (0–5): Food quality and safety; Innovation, R&D (alternative pesticides); Environmental goals (bee preservation); Food security (availability of reasonably priced food); Economy (industry profit and state budget, job market); Biodiversity. Groups also decide which aspects they can be a bit flexible about, and where their "red lines" are. Based on the importance of the various criteria, groups can formulate their positions and work around them, trying to find coalitions.

6. All **negotiations** or other contacts between teams must be accomplished by one representative of one team talking with one representative of another. It need not always be the same person, as long as the one–on–one relationship occurs.

Representatives of more than two teams may meet so long as no more than one member of any team is present at such a meeting.

7. Each group has a certain level of **political influence points** at the beginning. The initial amount of political influence points is given by the simulation management team at the beginning of the simulation. To get more political influence points during the simulation, coalitions with other groups could be developed. For each established coalition, the groups receive one additional point of political influence. Before forming a coalition, the coalition partners agree on how they will cooperate.

8. Each group, at the beginning of simulation, has **reputation points**, except for journalists. Journalists are the group that has the right to decide about the increase or decrease of reputation of all other groups. Journalists have points at the beginning that they can give to other groups after the press conference. Journalists must develop criteria for giving the points to other groups.

9. In case any questions arise related to the simulation exercise, the groups must report it to the simulation management team.

TIMELINE (Basic)

Activities	Type of activity	The result	Suggested time (min)
1. Groups read the general description, get familiar with the case.	Introduction		45
2.Groups agree on general strategy: agree on initial aims for each group – what its interests are, what the group wants to achieve, agree on the roles, group rules. Groups develop their initial messages.	In–group discussion	General strategy sheet	60
3.Groups gather information and map out the landscape – what interests do the other organizations have, who are the potential coalition partners (groups need to find at least one partner with matching interests).	Inter–group communication session – information gathering	Stakeholder map	75
4.Each group revise their communication plan (target audience, develop messages according to the aims and needs of specific audiences). Get ready for the TV discussion. Journalists prepare the TV discussion: prepare the opening statement describing the problem, decide about the order of speakers, and formulate questions.	In–group discussion	Communication plans, messages	45
5.TV discussion based on the refined communication messages and led by Journalists. Also, the representatives of the ministry participate.	Special event	Observers and groups assess the performance of each group	45
6.Groups negotiate with each other about the options, and then it depends whether all groups can reach a consensus or there are several options that groups support.	Inter–group communication session – coalition building	Revised strategy Debate strategy (statement and supporting arguments)	75
7.Roundtable discussion, all the options are discussed and the support for each is considered. All the groups need to agree on a joint final solution. Journalists participate and represent the interests of general public. The discussion is moderated by the facilitator.	Special event	Observers	45
8.Individual reflections and debriefing.	Wrap–up	Observers, facilitators and groups assess the performance of each group	60

TIMELINE (Short)

Activities	Type of activity	The result	Suggested time (min)
1.Groups read the scientific report and/or the news article, get familiar with the case.	Introduction		25 or At least one day before simulation
2.Groups agree on general strategy: agree on initial aims for each group – what its interests are, what the group wants to achieve, agree on the roles, group rules. Groups develop their initial messages.	In–group discussion	General strategy sheet	25
3.Groups gather information and map out the landscape – make a list of organizations and brief descriptions on what interests the other organizations have, who the potential coalition partners are.	Inter–group communication session – information gathering	---	20
4.Each group decide about the strategy for coalition building and formulate their messages.	In–group discussion	Strategy and messages	20
5.Groups negotiate with each other about the options, and then it depends whether all groups can reach a consensus or alliances are formed around several options.	Inter–group communication session – coalition building	Revised strategy	20
6.Groups prepare their messages for the roundtable discussion and decide on their debate strategy	In–group discussion	Revised messages Debate strategy (statement and supporting arguments)	10
7.Roundtable discussion, all the options are discussed and the support for each is considered. All the groups need to agree on a joint final solution. The discussion is moderated by the facilitator.	Special event		30
8.Individual reflections.		Evaluation form	15
9.Debriefing.	Wrap–up	Facilitators and groups assess the performance of each group	30

TIMELINE (Online)

Activities	Type of activity	The result	Suggested time (min)
1.Groups read the scientific report and the news article, get familiar with the case.	Introduction	Filled form about competencies and skills (before the simulation)	At least one day before simulation
2.Groups agree on general strategy: agree on initial aims for each group what its interests are, what the group wants to achieve, agree on the roles, group rules. Groups make a list of organizations and brief descriptions on what interests the other organizations have, who the potential coalition partners are.	In-group discussion	General strategy sheet, proposal for collaboration	Before online simulation
3.Groups develop their proposal for negotiations for other groups. Groups communicate their proposals for collaboration.	Online discussion (format of press conference)	Call for collaboration	25-30
4.Groups negotiate with each other about the options, and then it depends whether all groups can reach a consensus or alliances are formed around several options.	Inter-group communication session - coalition building (online chats in different channels)	Share ideas, search for common position	35-45
5.Group discussion on partnership, revision of initial tactics.	In-group discussion	Revised strategy, (extended) proposals for other partners	15
6.Final discussion - negotiations with strategic partners.	Inter-group discussion (online chats in different channels)	Final proposals	15
7.Final event. A representative of each coalition shall present the agreement reached. All the groups need to agree on a joint final	Online discussion	General agreement of all coalitions	15

solution. Representatives briefly present how they would communicate information to stakeholders about the coalitions formed and the decisions taken.	64		
8.Debriefing.	Wrap-up		15
9.Individual reflections of participants.		Filled evaluation form and short reflection on simulation, filled form about competencues and skills (after the simulation)	15

TIMELINE (Advanced)

Activities	Type of activity	The result	Suggested time (min)
1.Groups read the general description, get familiar with the case. Journalists have information about skeletons.	Introduction		30
2.Groups agree on general strategy: agree on initial aims for each group – what its interests are, what the group wants to achieve, agree on the roles, group rules. Groups develop their initial messages. Short presentations after each discussion.	In–group discussion	General strategy sheet	60
3.Presentation of group's initial position. Journalists collect information about the groups and do the initial distribution of the reputation points.	Special event	Public presentation of group's initial position (with a visual material - a poster/slide)	20
4.Groups map out the landscape – what interests the other organizations have, who the potential coalition partners are (groups need to find at least one partner with matching interests or/and necessary political influence).	Inter–group communication session – information gathering	Stakeholder map	60
5.Each group revise their communication plan (target audience, develop messages according to aims and needs of specific audiences). Get ready for the TV discussion. Leakage of skeletons (optional) Journalists: Prepare the TV discussion: prepare the opening statement describing the problem, decide about the order of speakers, and formulate questions. If they decide so, prepare to introduce the skeletons during the TV debate.	In–group discussion	Communication plans, messages	45
6.TV debate based on the refined communication messages and led by Journalists.	Special event	Observers and groups assess the performance of each group	45

<u>Journalists</u> do the second distribution of the reputation points.			
7.Groups negotiate with each other about the options, and then it depends whether all groups can reach a consensus or there are several options that groups support. Leakage of skeletons (optional)	Inter–group communication session – coalition building	Revised strategy Debate strategy (statement and supporting arguments)	60
8.Roundtable discussion, all the options are discussed and the support for each is captured. All the groups need to agree on a joint final solution. Journalists participate and represent the interests of general public. The discussion is moderated by the facilitator. <u>Journalists</u> do the final distribution of the reputation points.	Special event	Observers	45
9.Individual reflections and debriefing.	Wrap–up	Observers, facilitators and groups assess the performance of each group	120 (can be split in two parts)

FACILITATOR'S GUIDELINES

Preparation and planning

Setting the learning goals and choosing a scenario
The first step in implementing a social simulation is defining the learning goal and considering the circumstances/conditions (timeframe, competences, level of studies, number of participants, etc.). The scenarios differ in length, the number of groups and in other aspects.

Time planning
The times given in the timelines of the simulation scenarios are recommended, they can be adjusted according to the specifics of the situation. We strongly recommend not shortening the debriefing phase: allow your students to reflect and share their experience! However, it is possible to split the debriefing session in two parts and organize one part immediately after the simulation and the second part the next day.
In our experience, it is best not to plan breaks during the simulation but go with the flow instead and let the groups retire occasionally. Make sure that there are refreshments provided/available to students for the "basic" and "advanced" scenarios.

Arrangement of the groups for simulation
It is important to think about how to group your students: to take into consideration whether the students already know each other, or they are divided into groups randomly right before the simulation. If students do not know each other beforehand, you must provide them some more time to get acquainted with each other, and during the simulation they need some extra time for them to agree on communicative rules, channels and provide more time for discussions, especially if those activities are online. We advise dividing students into groups considering their personalities. For example, students with strong leadership skills should be separated into different groups or more introverted students to groups where they could better voice their opinions.

Briefing phase and giving instructions
The simulation starts with a briefing phase when students are given instructions about what is going to happen. Acquainting oneself with the scenario and with descriptions of the organizations and class instructions takes some time and effort. You should plan plenty of time for the briefing since it is a very important step for social simulation – if instructions are clear and students' questions are answered, the rest of the simulation will go quite smoothly and stay in flow. During the briefing phase it is important to explain to the students what is expected of them and what they will have to do. This means also managing expectations of what are the aims of the simulation and what are the learning outcomes of the simulation.

For the "basic" and "advanced" scenario, the simulation participants get the materials and worksheets on the day of the simulation. That means that a good portion of the simulation time must be put into getting familiar with the documents and asking questions. For the "short" and "online" scenario, the introductory phase has been shortened on the day of simulation by giving students some pre-simulation activities. In that case, students are divided into groups and get some background materials (e.g. the scenario, individual worksheets, and descriptions of their organizations) with

instructions a few days before the simulation. In such a way students have more time to work through the topic, acquaint themselves with their organization and come to the simulation better equipped.

Implementation of simulation

It is important to guide students through the simulation with precise (prepared but adjusted) instructions and sufficient information for them to be able to decide for the course of action. Asking questions if there is something unclear should be encouraged, and students should have an opportunity throughout the course of simulation to ask. However, you need to be careful not to give one group more information than to another. If the question points to a potentially misunderstood element, it is best to ask everybody's attention and clarify the matter for all. For a successful simulation we advise to involve at least two (or three) facilitators. It is best when each of them has a certain role and they have agreed beforehand who will be responsible for what. One, for example, can focus on instructions and answering questions; the other one on observing and time keeping. If you are doing the simulation online, it is advisable to involve one additional person ("a technical advisor") who can help with emerging technical issues.

Roles of facilitators during the simulation typically are the following:
- giving instructions before the simulation
- keeping time and reminding time limits to participants
- answering the questions that participants have during the briefing and during the simulation
- monitoring the course of action to see if the participants have understood their tasks
- observing to notice learning points to discuss in the debriefing phase (e.g. conflicts/discrepancies in group work; strategies that are used; excellent performances; mistakes that are made). These aspects should be written down to remember and systematically addressed during the debriefing phase.
- adjusting the course of action in simulation if necessary
- in some simulation scenarios, facilitators provide extra stimuli in the form of compromising information (we call them "skeletons"), gamification elements, or extra information.

Role of observers
If there are enough students or participants, the facilitator can appoint observers. Each organization (group) has its own observer. The task of the observers during the whole simulation is to observe the work of the groups and make notes on leadership, situation analysis, interests, strategic planning, negotiation, etc. In the simulation materials you will find an observation form.

Inter-group and in-group discussions
The facilitator can act in two ways: either by being very present in all steps of the simulation (e.g., following the group discussions, monitoring the intergroup negotiations, etc.) or letting the students find their own way and not interfering too much. The second approach means that there could be more time needed for group discussions and also inter-group negotiations, and also in the debriefing session more time should be reserved for student reflections on their experience. The time limits set

for different steps of the simulation may increase the stress level for students, and this is an important aspect that should be touched upon during the debriefing.

Reputation and political influence points

Reputation and political influence points are included only in the "advanced" scenario. If the aim of the simulation has a **communication focus**, **reputation points** for groups can be used. The participants are encouraged to plan their communication activities in the simulation in a way that would increase their reputation (in the eyes of the wider public), including, for example, trying to appeal to common societal values or "higher goods". Journalists are the group that has the right to decide about the increase of reputation of all other groups - the timeline indicates the steps during the simulation when this can be done (presentation of groups' initial position, TV debate, and roundtable discussion). We suggest that journalists have 12 points at the beginning that they can give to other groups. Journalists must develop criteria for giving the points to other groups. It is possible for the journalists to decide to not give any reputation points during the simulation as well.

Political (influence) points can be used when the simulation has a **negotiation focus**. The participants need to negotiate with various partners and form coalitions to gain as many political points (and political power) as possible. Each group has a certain level of **political influence (points)** at the beginning. The ministries could have more political influence points, the civil society organizations - fewer (the facilitator can decide this during the preparation phase). To get more political influence points during the simulation, coalitions with other groups must be developed. For each established coalition, the groups receive one additional point of political influence. Before forming a coalition, the coalition partners agree on how they cooperate and announce it to the facilitators.

Both the reputation and the political influence points can be used in one simulation simultaneously if this suits the learning goals.

Skeletons

In the "basic" and "advanced" scenarios **skeletons** are used. Skeletons are compromising information either about a member of the group or the organization. In the "basic" scenario only the journalists know the skeletons of the groups from the very beginning, and it is up to journalists to decide what they do with the secrets of the groups. In the "advanced" scenario the compromising information can be leaked at various steps during the simulation to some selected groups based on the facilitator's decision. However, it would be advisable that no group has compromising information about all the other groups.

Special events

Special events are: 1) presentation of the group's initial position (advanced scenario), 2) TV debate, and 3) roundtable discussion. It is the duty of the facilitator to prepare the events and brief the groups about the rules and course of the events (e.g. the sequence of the speakers, time limits for each presenter, etc.). Journalists must prepare their questions for the TV debate beforehand. It must also be decided during the preparation phase who will moderate the roundtable discussion.

Debriefing

One of the main principles for carrying out a successful debriefing session is to make sure that every student feels involved and is given the opportunity to share emotions and experiences. Based on the choice of the scenario, the facilitator must plan the sequence for the reflections (e.g. when the observers share their impressions, when the facilitator introduces his/her conclusions, etc.). Based on the notes from the simulation, the supervisor should ask questions first to guide students to think through the most crucial parts/elements. If the group is large (more than 12 people), some smaller parallel group discussions could be arranged to allow everybody to verbalize their experiences and be more involved.

It may happen that after a successful and tiresome simulation participants do not have much energy to dedicate to reflecting and analysing. Therefore, with longer scenarios or online events, debriefing is better to be organized separately at the next meeting. Some individual reflection sheets could be given to fulfil immediately afterwards when the memories and emotions are still fresh.

It is advised to ask open questions during debriefing. Some examples for the questions:
- What went well during the simulation? What did not go that well? Why?
- Describe your main gains obtained from the participation in this simulation. What did you dislike / were not happy about during and after the simulation? Why?
- What skills that you have you could use? What new skills did you test?
- What did you expect to happen before the simulation started? What did happen? Why was there a difference between what you expected to happen and what did? How and why did the group shift away from the initial plans and aims? Were there any wrong assumptions or expectations before the simulation? What were these and why were they there?
- When were you most frustrated? Why?
- How did the teamwork go, were there any disagreements?
- How well did the set roles work? Did you make changes in the work process?
- How well did you guess the interests/objectives of the other groups? Based on what information did you make the assumptions?
- Could time pressures have been alleviated by organising the group's work differently?
- Was the goal of the activity always clear?
- Were the instructions always clear? What improvements would you suggest to the organisers of the simulation? What is the rationale behind your suggestions?

THE REST OF THE SIMULATION MATERIALS, WORKSHEETS, HANDOUTS AND VIDEOS CAN BE FOUND AT

https://va.lv/lv/simulation-games-simgames-handbook-and-scenarios

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