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Sabine Payr, Bernhard Jung,
Juan Martinez-Miranda, Paolo Petta

Game-Based Development of Collaboration Competences

• Freyung 6/6 • A-1010 Vienna • Austria •

• Phone: +43-1-5336112 •

• mailto:sec@ofai.at •
• http://www.ofai.at/ •

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Game-Based Development of Collaboration Competences

Sabine Payr
sabine.payr@ofai.at

Bernhard Jung
bernhard.jung@ofai.at

Juan Martínez-Miranda
juan.martinez@ofai.at

Paolo Petta
paolo.petta@ofai.at

Austrian Research Institute for Artificial Intelligence (OFAI)
Vienna, Austria

Abstract: The subject of collaboration has attracted the attention in research areas including management, organizational dynamics and education, mainly because effective collaboration dynamics are fundamental to learning, knowledge exchange, and development/innovation processes in a wide variety of contexts. Collaboration competences are emerging as key condition for productive and sustainable innovation and learning processes. The work presented in this paper is part of an international effort aimed at improving the understanding of factors inhibiting effective collaboration dynamics and at developing collaboration competences through training. An integral part of the training settings are simulation games addressing collaboration challenges at the organizational, group and interpersonal levels. This paper focuses on the design and implementation of the embodied virtual character for the interpersonal level game, its theoretical foundations and its deployment and evaluation in learning situations.

1 The Challenge of Collaboration

Effective collaboration dynamics are fundamental to learning, knowledge exchange and innovation processes in a wide variety of contexts (education, private and public sector). In spite of the attention that the subject of collaboration has attracted over the last years in fields like management (Hansen & Nohria 2004), organizational dynamics (Mayer et al. 1995, Orlikowski 1992) and education (Pea 1994), no effective traditional or computer-enhanced approaches and learning solutions exist to-date addressing the systematic development of collaboration competences from an inter-disciplinary perspective. In fact, in today's global environment, a very large number of collaboration initiatives fail to deliver the value expected (Shenkar & Yan 2002, Miles & Snow 1992, Labianca et al. 1998), as collaboration complexity is significantly increased by the diversity and the distributed nature of the people, groups, and knowledge sources, by the ICT technologies and e-Collaboration platforms used to support such distributed processes, as well as by the complexity of the knowledge integration processes involved. Effective collaboration competences are hence emerging as a key condition for productive and sustainable value creation at the individual, team, organizational, and inter-organizational level.

A European project partnership addresses the design, deployment and evaluation of immersive simulation-based learning experiences supporting the development of collaboration competencies, at the individual, group/team and organizational level. Beside a knowledge base and virtual community for research and training of collaboration, the project developed training settings and materials. Central to these are simulation game prototypes around collaboration challenges on three different levels: organizational, team/workgroup, and interpersonal. This paper addresses collaboration at the interpersonal (IP) level. It focuses on factors that determine both motivation and capability to collaborate at the individual level, their manifestations in interpersonal conversational exchanges, and the possibilities to influence them through one-on-one interactions. Players face a scenario where mission accomplishment requires them to collaborate successfully with a simulated peer, the Intermediary Agent (IA):

> Imagine to be put in charge with your consultant's team of a difficult change management mission in an organization. You will have to move to this organization and stay there during 6 months, trying your best to achieve your mission. You are confident to be able to succeed, but something is going to make it even harder: The CEO of the organization has decided that in order to minimize disruptions, you are not going to intervene directly within the organization. You will always need to interact first with an intermediary who has been put in charge of working with you and implement all the decisions you will take (meet managers at the organization, communicate and organize events, etc.). As you will realize soon, collaborating with this middle-man will make things complicated, and you will wonder what to do to increase both his motivation and capability to work with you towards the achievement of your mission.

The IA simulation game addresses these collaboration dynamics, providing individual learners or teams of players with experiences of how difficult interpersonal collaboration with an individual (virtual) peer can be. The game is a main component of a learning experience (a workshop of up to one day) designed for facilitated groups of participants interested in extending their understanding of the collaboration dynamics in inter-personal contexts. The game supports learning about important IP collaboration dynamics and breakdowns through instrumental mission-oriented and social interactions with a virtual peer, and about communication skills in challenging mission settings; it provides intense experiences, analysed in a debriefing.

2 The IA Simulation Game

2.1 Theoretical Background

Factors that increase complexity and influence the motivation and capability of individuals to engage in productive collaboration are, for example:

- *Trust and distrust:* Trust encourages knowledge sharing by increasing the disclosure of knowledge to others and by granting others access to one's own knowledge. Distrust can be defined as a feeling that someone is dishonest and unreliable. (Nelson & Cooprider 1996, Roberts 2000).
- *Feedback* measures how direct and clear is the information that an individual receives related to the job s/he is doing (Hackman & Oldham 1976). Destructive as opposed to constructive critique can seriously damage collaborative relationships.
- *Power distance* measures the degree to which members of a society accept that power is distributed unequally in institutions (Hofstede 1980). Power distance varies in different cultures, with the risk of conflicts in intercultural collaboration.
- *Goal orientation:* Too many challenging goals can have a negative impact on collaboration (the situation is "hopeless"), while too easy goals can upset a collaboration because people are not challenged and motivated enough to work together.
- *Self-reputation and self-realization*: Self-reputation is a complex process of evaluation of self and values (Branden 1998). While a certain degree of self-reputation motivates a person to perform in and be part of a group, extremely high levels can impede individuals from collaborating. Self-realization needs represent the highest category of needs for an individual as they relate to full development of one's own personal potential and increase in competences. Again, these needs can be positive within a group context, but if they become too focused on the single person at the expense of others, they can threaten collaboration.

Out of these (and many more) concepts and factors playing a role in collaboration, trust was chosen as the main reference for the IA simulation. This choice was motivated by the dynamic nature of trust building as described by the *trust building cycle* model (Vangen & Huxham 2003). It presents a framework of nurturing activity to establish and maintain a certain level of trust in collaboration. Here, trust is closely connected to power, risk, vulnerability, expectancy, aims, and goals. Trust is built and confirmed through behaviors such as (Abrams et al. 2003): acting with discretion, being consistent between word and deed, ensuring frequent and rich communication, ensuring that decisions are fair and transparent, establishing and ensuring shared vision and language, holding people accountable for trust, creating personal connections, giving away something of value, and disclosing one's expertise and limitations. Getting started with trust-building in situations where there is no history of trust implies that the parties must be willing to take a risk. The parties also must be able to form expectations about outcomes. The more modest the outcomes expected and the lower the level of risk, the greater the chance that expectations will be met. Beside trust-building behavior, it is then also the positive outcome of collaborative initiatives that sets the trust-building loop in motion—which aligns itself well with a "small wins" strategy. (Vangen & Huxham 2003)

Trust being a reciprocal relational attitude between two persons, there are *two* trust levels to deal with, and two possibilities to map to learning goals. Players could learn to either trust the IA or the *agent* could learn to trust the players, who would have to act trustworthily to obtain the IA's collaboration. At present, we focus on explicitly modeling the dynamics of the relational attitudes of the IA towards the player, by means of a simple cognitive appraisal process that is driven by direct and indirect effects of interactions on the IA's trust level. Conversely, a dynamic choice of dialogue moves (utterances) allows players to try to probe and influence the IA's state, and to portray themselves. The assumptions about trust that inform the design of the simulation game are:

- trust increases collaborativeness
- (un)successful initiatives increase (decrease) trust
- a small wins strategy is more likely to be successful in building trust
- openness increases trust
- consistently poor performance decreases trust
- social (as opposed to mission-oriented) interaction can increase trust, if initiated in appropriate contexts.
- assigning credits/blame, responsibility, conversation style and the type of feedback also have an influence on the tendency to trust (see section 2.3)

Design of the facilities for the player–IA interaction and modeling of the IA's brain are informed by questions such as: Based on what does the agent decide to behave in a more or less collaborative way (what does it mean to be more or less collaborative; how is this reflected in the agent's behavior)? Which actions taken by the player will influence the agent to behave more or less collaboratively (what do current state and progress in the mission contribute to the agent's state; what context and semantics of the mission must be intelligible to the agent; what semantics of information is of relevance for the design of the user interface)?

2.2 Design Considerations and Architecture

In this section, we briefly summarize the modules of the high-level architecture (Fig. 1, cf. also Martínez-Miranda et al. 2008). The key concept of the Intermediary Agent (IA) is realized by two separate components: the Brain, which encapsulates operationalizations derived from theoretical models of collaboration dynamics (see above), and the IA's representation as a Virtual Character in the Scene of the graphical user interface. Another conceptual key ingredient is the background environment for the players' mission. This is contributed by an *underlying* simulation game which provides a believable context.

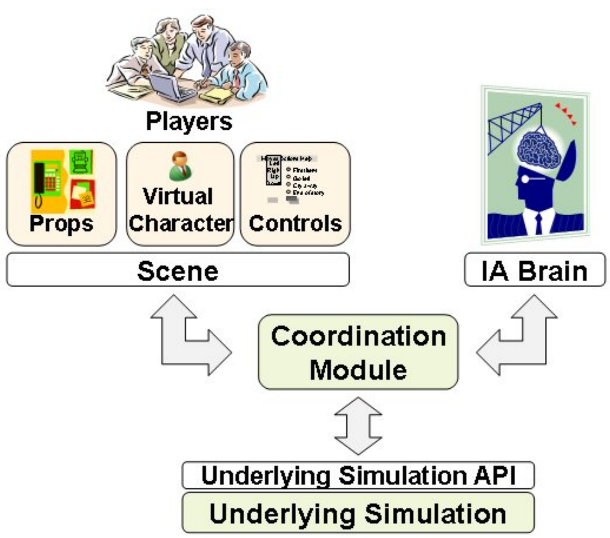

Figure 1: General architecture of the IP level game.

- *The Underlying Simulation Game:* This component (interfaced via an API providing some degree of independence from the specific game instance) provides the goal-oriented mission context for the collaboration setting. Progress with the mission in the underlying simulation is influenced by the (un)collaborative behavior of the IA, which in turn is influenced by its interactions with the players. We use a remotely hosted instance of EIS (Angehrn 2005), an organizational change management mission, wherein the IA is integrated as the defined organizational contact (see the "mission statement" in section 1). The IA takes advantage of the following features of EIS: EIS is *turn-based*, and consumes *simulated time*. This means that all changes within the simulation that are due to some external input occur one after another and take a specific amount of simulated time. EIS is *initiative-based*. Initiatives here are sometimes complex actions of the player(s), such as publishing an article in the corporate newsletter, talking to a selected member of the management, and so on. Each initiative can have pre-conditions or other requirements, and causes changes to the internal simulation state. For each initiative chosen, a textual characterization of its outcome is available. The internal state of the underlying simulation needs to be accessible to the IA to some degree, but is not directly to the player(s). This implies that the IA may possess more or different information from what it provides to the player.
- *The Scene:* The scene provides the means for the players to interact with the IA and directly with the underlying simulation game. It is run locally, and currently contains a fixed menu of (18) managerial initiatives, a dynamically adapted menu of utterances, and information displays. Players choose their next move from this menu or request the IA to suggest one. The player may ask the IA to carry out the chosen initiative, or to issue it directly, bypassing the IA and with related collaborative consequences. The choice of scripted utterances to be directed to the IA is dynamically adapted to the stage of the conversation cycle (see section 2.3). The information displays report on the current status of the underlying simulation game. The Scene also contains the virtual character (realized using the LivingActor™ technology by Cantoche), which communicates via synthesized speech and speech bubbles and portrays an expressive visual rendering of the IA's embodiment. Additionally, the players can study the evolution of the interaction with the IA through a conversation history.
- *The Intermediary Agent Brain:* The IA Brain module (see section 2.4) runs locally and encapsulates the mechanisms producing the IA's (un)collaborative behaviors. As conceptual entity, the IA Brain mediates between the player and the simulation game, issuing requests for initiatives to be implemented in the underlying simulation game and informing the player about related outcomes. This module is discussed in further detail in the following sections. The IA Brain manages the IA's interaction with the players via *branching dialogues*, building on the modeled concepts of *trust*, *trust change tendency*, and *responsibility* for chosen initiatives to generate believable behavior. A *personality profile* shapes the IA's overall pattern of behavior and informs its *emotional reactions* to events. Finally, the IA has some bounded knowledge about the effectiveness of initiatives (static broad categorizations in terms of riskiness or absolute "No-No"s, e.g., issuing directives, and limited dynamically acquired knowledge using "what-if"-enquiries issued to the underlying simulation) and personal preferences (friends and foes among the top managers), that become effective under conditions of limited/no collaborativeness.
- *The Coordination Module:* This module implements a coordination medium (Omicini et al. 2001); it is hosted remotely and realized as a web-based message-board, where other components can add and retrieve posted messages encoded in an XML-based representation.

2.3 The Conversation Cycle

The behavioral repertoire of the IA is currently subdivided into two main classes: *talking* to the players and *idling/waiting* for the players to utter their next dialogue move, the two categories being connected by consistent expressiveness of the verbal and nonverbal behaviors. Conceptually, the player–IA interaction develops over *conversation cycles*, defined in terms of the initiatives issued in sequence in the underlying simulation game. A conversation cycle is structured into the following stages, defined by the different topics of interaction.

- *Introduction.* This is either some initial greeting of the peers (e.g., by the IA: *"Hello! I am Julie. I will be working with you in this mission."*), or some statement signaling that the previous cycle (analysis of the results of the initiative most recently issued) is concluded, and the next cycle has begun.

- *Asking for suggestion.* This optional stage is entered when players select an utterance asking the IA for initiatives to implement next. Depending on its current level of collaborativeness, the IA can make some good or bad proposal, or resist providing a suggestion.
- *Proposing an initiative.* The players propose the initiative to implement: this need not match any suggestions by the IA. Again, the IA can accept or resist issuing the initiative in the underlying simulation. Such resistance allows to instantiate specific sources of collaboration breakdowns (e.g., unavailability of the IA; lack of commitment; or inter-cultural differences). All of these are modeled in the IA's Brain in terms of specific thematic episodes following such hallmark resistance moves.
- *Implementing an initiative.* The IA will eventually decide to implement an initiative, issuing it in the underlying simulation. This can occur in full compliance with the players' request, can comply only partially (with some or all parameters changed), or can even be an altogether different initiative.
- *Coping with results.* After an initiative has been implemented, the IA reports (with varying degree of detail) feedback obtained about the effect achieved. Players can react with utterances reflecting their evaluation of the result (e.g., assigning credits/blame: "*Come on! How could this happen? That is really bad!*"); they may ask for more information, on which the IA may disclose information initially kept back, or issue utterances related to purely social themes, so as to influence the IA's collaboration level ("*Say, have you seen the latest news on TV?*").

2.4 Brain Dynamics

The following main variables modulate the IA's behavior:

- *Responsibility* represents who took the final decision in issuing an initiative: *Shared*, when the players adopt a suggestion by the IA (and the IA implements it unchanged); *IA*, when the players' choice is altered by the IA; *Players*, when the IA issues an initiative proposed by the players it was not consulted about (or players issue an initiative directly).
- *Trust change tendency* represents the agent's tendency to alter its trust towards the player. It is influenced by the IA's evaluating the players' utterances as positive (e.g., being asked in a friendly manner), negative (offensive authoritative style), or neutral. It is also increased when players comply with an IA's suggestion, and decreased if players disregard or disagree with a suggestion.
- *Trust level* represents how much the IA currently trusts the player. It is updated after an initiative was implemented in the underlying simulation (based on the IA's rating of the outcome, and the assigned responsibility); after players' reactions in the *Coping with results* stage; and (only negatively) when the players exceed a threshold for repeated moves (e.g., insisting that the IA provide suggestions, or disclose further information).
- *Dynamic Attitude towards Collaboration (DAC)* represents the different collaborative behaviors of the IA. The values in this variable (DAC level) can be:
    - *Collaboration breakdown* where the IA does not implement any requested initiative and/or implements and suggests only initiatives with *bad consequences* in the underlying mission.
    - *Non-collaborative* where the IA does not suggest or implement the requested initiatives most of the time.
    - *Limitedly collaborative* where the IA can provide suggestions, implement the requested initiatives and provides a complete report of the initiative's effects or not with the same probability.
    - *Collaborative* where the IA provides good suggestions and implements the requested initiative most of the time.
    - *Super-collaborative* where the IA always provides good suggestions, prevents to the player of those initiatives with bad consequences and gives a complete report of the initiative's effects.

  The change from one DAC level to another (the next or the previous one) mainly depends on how the player can build a good trust relationship with the IA. This change of behavior also depends on the simulation time used: e.g. the movement from *limitedly collaborative* to *collaborative* should be easier at the beginning than at the end of the game, representing that if the player has been unable to build a good trust relationship during the first simulated months, it should be more difficult achieve it during the last simulated days. Additionally, change of the DAC level is also influenced by the previous collaborative behavior: e.g. if the IA moves from *collaborative* to *limitedly collaborative* behavior, it will be easier in the future to move from limitedly collaborative to non-collaborative than to go back up to the collaborative behavior. This represents a kind of *inertia* in the moves of the IA behaviors.

2.5 Personalities and Emotions

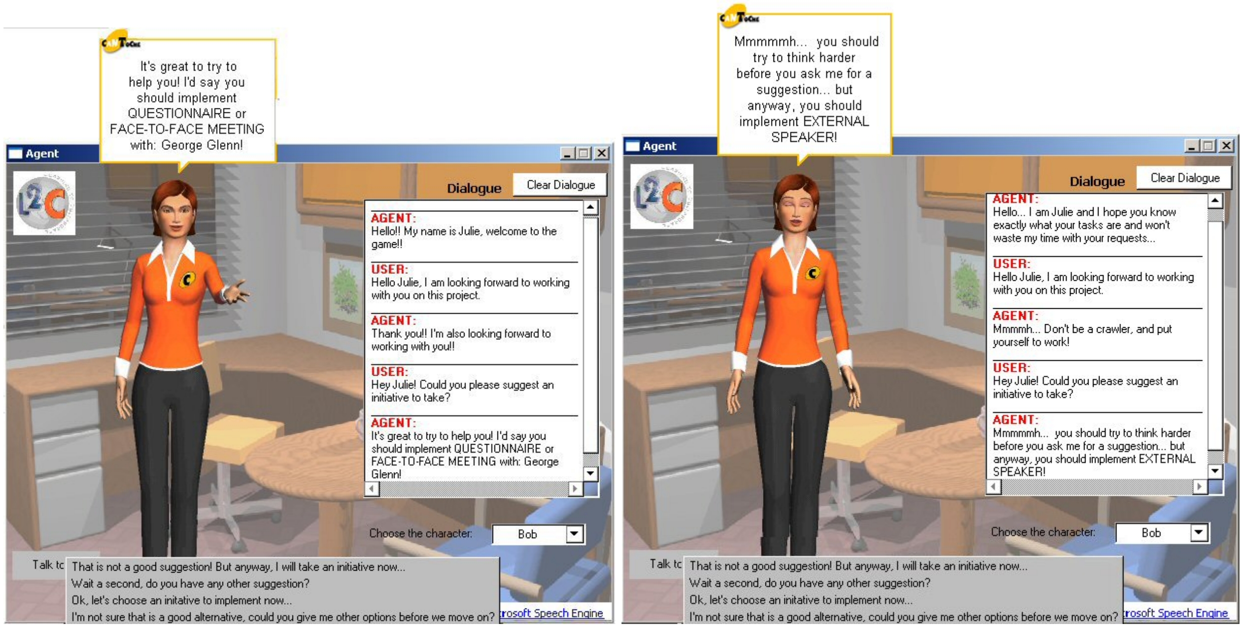

Figure 2: Recommendations from an agreeable *(left)* and a disagreeable *(right)* IA.

Without personality, the behavior of the IA would vary only with the level of trust, reflected in its demonstrated degree of collaborativeness. To improve believability (Moffat 1997, Ortony 2003), we employ personality profiles. The *agreeableness* personality trait from the *Big Five* model was selected as the first dimension to be covered, with the definition of agreeable and disagreeable profiles and related utterances and themes, because of its high impact on collaborative topics such as *cooperation* and *social harmony* (Fig. 2). Agreeableness also relates to bipolar facets such as empathy, friendliness, or helpfulness, of relevance in the social relationship between the IA and the player. This enables scenarios with an IA that is unfriendly but highly collaborative, or a friendly/empathetic IA with a low level of collaboration on the other. With these internal parameters, the reactions of the IA to salient events (including changes in trust level, and outcomes of implemented initiatives) are modeled as emotional appraisals. Resulting action tendencies are mapped to behavior parameters for expressive animation of the character in the scene, allowing to model longer-term "mood" (defined by the current trust level) with superimposed short-term positive and negative immediate reactions in a principled fashion.

3 Learning with the IA Simulation Game

3.1 Learning Objectives and Scenarios

The basic idea of the IA simulation is to provoke reflection on practice and to foster understanding of the complexity of collaboration. Learners should understand that the idea of the existence of one superior correct action in the messy, complex reality that is collaboration is incorrect. Due to its nature, actions within an instance of collaboration require the resolution of a series of issues that are situation specific. "Solutions" cannot simply be transplanted from one situation to another. The aim of the IP simulation should therefore be ideally to offer "handles for reflective practice" (cf. Schön 1987), not solutions. At the same time, and from a complementary perspective, there do exist pieces of good practice that can be employed to address and realize specific aspects of collaboration, and indeed provide the basic premises based on which subjects appraise opportunities for and threats to collaboration, as well as downright collaboration breakdowns, from their bounded perspective.

Against this background, the intermediary agent (IA) was first conceived as a “non-collaborative agent”, with actions and reactions that intentionally confuse and frustrate the player and lead to collaboration breakdowns. As typical of empathy/insight simulations, reflection and learning processes would thus be mainly motivated by negative experiences that should *force* the player to seriously confront the learning topic at hand and thereby potentially facilitate the *accommodation* of new knowledge and skills. At the same time, the simulation game itself should offer an engaging learning experience that keeps players immersed in the effort to explore the reasons for the uncollaborativeness of the IA, to try out different strategies to overcome it, and to formulate and test hypotheses about the IA’s behavior and strategies deemed promising. In other words, players should be kept from quitting the simulation game after experiencing a few confusing (re)actions of the agent. In other words, negative asymmetry (Giuseppe & Brass, 2003), meaning that the negative affect experienced from failure is likely to persist disproportionately longer than positive affect induced by success and tends to reduce motivation, should be avoided. There must be sufficient motivation to continue exploring and testing.

In the IA simulation, this motivation is kept up by a real possibility of improving collaboration with the IA. The simulation introduces a hypothetical “degree of collaborativeness” of the IA which is changed by interactions with the players, reflecting both positive and negative effects of their respective choices. This may appear to contradict the overall aim of the IA simulation, by seemingly introducing exactly such a simplified view of a “recipe” for collaboration that should rather be avoided: the challenge is to reconcile learning with gaming—to make the underlying model of the simulation game complex enough to keep the players in doubt, but not so complex as to spoil the gaming experience. This is achieved by covering multiple reasons for (un)collaborativeness, drawn from the multitude of underlying models. As a corollary, the original target of a “noncollaborative agent” quickly gave way to the idea of an intermediary agent with varying levels of collaborativeness. Players may thus indeed be successful in their attempts to motivate the IA to being collaborative, but should not become too sure about exactly which of their choices brought about the success in what way, and should remain aware of the limited scope (or even, to the contrary, the insufficient precision) of any partial strategy, so as to prevent them from jumping to easy conclusions and an oversimplification of the challenge.

While the simulation game deals with collaboration issues on the interpersonal level, the learning scenario has not been conceived primarily for individual players interacting with the IA, but for small teams (2 to 3 persons) working together. They have to devise a strategy beforehand and share their interpretations and decision processes. This scenario facilitates switching from a “natural”, un-reflective mode of interaction to a more analytic and explorative style where teams of learners are motivated to discuss the agent’s behaviors and their own strategies. These reflections and the involvement of the players are the starting point for the ensuing debriefing where, according to the specific learning goals and experiences of the learners, the facilitator chooses to delve more deeply into one or more collaboration topics and challenges, supported by slides and materials for further discussion and learning activities.

3.2 Evaluation: Learning from Success or from Failure?

The IA simulation has been developed to a complete prototype state, and was tested in two stages at different locations and in varying settings. We will report here on the second pilot test with 12 participants grouped into 4 teams of 3 subjects each. lthough the simulation game is designed and only makes really sense embedded in a one-day workshop, the test sessions were shorter and included only the briefing and the playing phases. The briefing explains the goals of the workshop and the game, the mission of players, and includes some technical and strategic hints. The teams were then left to play for about 60 minutes. The test sessions took place at different times, so that each team could be observed separately and their discussion recorded. Each subject filled in a questionnaire after the session, rating answers on a 7-point Likert scale. Open feedback and comments were also collected. In what follows, we will focus on the relationship between the behavior of the teams and their average ratings.

From observation and analysis of observational data we could distill three different strategies and related game outcomes:

- Collaboration breakdown (team 1): “gaming” approach, with a late attempt to change strategy
- “Trying-to-please” (teams 2 and 3): no change of strategy, no breakdown, game “stalled”
- Successful collaboration (team 4): change from “trying-to-please” to dominant strategy

Outcomes (in the underlying simulation) were bad for all teams except for team 4 who alone succeeded in using up the defined simulation time (6 months) and in achieving significant progress in the underlying mission.

The most interesting tendency in the rating of the learning experience is, however, that both the "failing" (team 1) and the "winning" team (team 4) rated their learning experience almost consistently better than the other two teams who "somehow played along" (see table 1, showing an extract of the questionnaire results). This trend carried over to the part of the questionnaire where we enquired about quality and usability of the simulation game.

	Team 1	Team 2	Team 3	Team 4
Based on your experience, to what extent did the simulation improve your knowledge/understanding of (1 = not improved, 7 = greatly improved)				
the process of collaborative goal setting at the interpersonal level?	4.00	2.00	2.67	5.00
the importance of trust for successful collaboration among individuals?	5.00	2.30	1.30	4.50
typical sources of collaboration breakdowns at the interpersonal level?	6.00	2.00	2.67	3.50
the consequences of uncollaborative behavior?	6.00	2.00	1.30	3.50
the relevance of feedback?	6.00	1.00	1.30	4.00
how to avoid resistance or deal with resistance constructively?	4.50	1.00	2.30	3.50
Based on your experience, to what extent did the simulation improve your attitude related to				
critical reflection with regard to situational and interpersonal communication conditions?	4.00	2.00	2.67	4.00
openness towards others' emotions and awareness of others' reactions?	4.00	2.00	2.00	4.50
trust in other individuals' ability, benevolence, and integrity?	4.00	1.67	2.00	4.00
good-natured collaboration among individuals?	4.00	2.00	1.67	4.00
Rate the realism of the collaboration scenario, mission and challenges encountered in the simulation (1 = not at all, 7 = highly)				
the different tactics available to manage interpersonal collaborations?	4.50	3.00	3.67	5.30
the collaboration scenario presented within the simulation?	5.00	3.00	4.00	5.00
Was the simulation experience complex and challenging enough?	6.00	3.67	4.00	5.67
Was the simulation experience engaging enough?	3.50	2.67	3.67	5.67

Table 1: Average rating of learning experience and usability by teams

The preliminary resume of these results is that both "learning from failure" and "learning from success" are viable strategies for simulation games, although the lessons learned are necessarily different ones. Ratings of the failing team tend to be a little more positive than those of the winning team. But a single case does not allow to conclude that failure is in principle a better "teacher" than success. Both clear success and clear failure are preferable to uneventful game sessions with no clear outcome. Both teams with such outcomes chose a strategy ("trying to please" the intermediary agent with small talk and through following its advice) and stuck to it, while both winning/failing teams were motivated by their problems to change their strategies.

The capability to reflect on the chosen strategy and to change it may be more decisive for satisfying learning experience than the actual outcome. There are, in principle, two ways to monitor learners' strategy: one is to build a "meta-level" into the game. The other, which we chose here, is to foresee the facilitator's intervention. Facilitators are also important when it comes to translating the teams' immediate and diverging game experiences to concepts and issues to be dealt with in the debriefing session, and to follow up the game experience with face-to-face learning activities. The initial design decision to develop the simulation games together with the workshop setting in which they are to be used thus turns out to be beneficial in more ways than foreseen.

To the question: What is better, learning from success or learning from failure? we can answer at this state of our knowledge: both are good; but to learn from failure, we have to make sure that learners fail for the right reasons, i.e. reasons that are intrinsic to the simulation and consistent with the learning objectives, in other words: failure must be "strategic". The effectiveness of learning from failure must not be taken as a license to design confusing simulation games which only frustrate and demotivate learners; on the contrary: it is as hard to design for strategic failure as it is to design for strategic success.

4 Outlook

Even the prototype now available has been judged by learners, facilitators and experts as an engaging and effective starting point for learning to collaborate. Further evaluation, especially in full-blown workshop scenarios, and feedback from facilitators will be useful to deepen our understanding of the pedagogical issues and will lead to improvements both in the pedagogical materials and guidelines and in the game design.

At the moment, the range of events and conversational exchanges with the IA is limited, barely enough to keep the players interested and motivated for 60 minutes. We have good hopes to be able to extend and modify the IA in the near future, and to carry over the model into different areas of application (namely, learning about interpersonal communication in crisis situations). Improvement of the simulation game involves

- enriching and/or varying the personality model, taking other dimensions of the Big Five into account, e.g. the neuroticism dimension,
- varying and tuning the model underlying the dynamics fo the game (currently based on trust building and responsibility)
- broadening and diversifying the dialogue repertoire of the agent, together with more fine-grained ways of handling scripted dialogues, and
- introducing more variety in the plot, through events both motivated by the interaction and external/unforeseen (but believable),
- and, through workshop experiences and feedback, improving pedagogical materials both for facilitators and for learners.

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