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GAME-PLAYING IN INTERDISCIPLINARY DESIGN AND PLANNING TEAMS

A ROLE-PLAY SIMULATION AS A LEARNING METHOD

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ABSTRACT

In this paper we present our experiences in setting up and fulfilling a role-play simulation in an academic context. This simulation was set up for the first time in February 2010 to teach 260 students in their final semester in the Bachelor, the bachelor 6, of the Faculty of Architecture how to work in interdisciplinary design and planning teams. Main goal was to teach them how to deal with expert targets in relation to interdisciplinary negotiations in a decision arena. Students had to optimize different expert sub solutions to come to an integral Master Plan for an outdated industrial area of 130 ha which the local municipality wants to transform into a lively urban district. In this role-playing simulation students learned that transformation of urban areas is not something for one individual to decide on (planner or designer) but needs a combined effort from mutual interdependent professionals to make a realistic and feasible plan. The dynamics of this mutual interdependency and the need for a realistic and feasible plan were the core of the final semester in the Bachelor. This exercise was repeated in September 2010 and in February 2011. For the second and third round we made some minor adjustments on the concept. We will give you insight in our practical experiences with this didactic model and combine this with scientific theories on gaming and simulation. At the end of this paper you will find some conclusions and recommendations for the use of role-play simulation as a learning method.

Keywords: Interdisciplinary design and planning, gaming, simulation.

INTRODUCTION

Some years ago the university of technology, and the faculty of architecture as part of that, decided on renewal of the curriculum. After years of preparation the execution started in the academic year 2006/2007 with the first year of the Bachelor. The execution of the new curriculum for the last year of the bachelor started in the academic year 2009/2010. Part of the student assignment for the second semester of that year was to make a masterplan for a complex urban area redevelopment with a group of students.

Urban area development in the Netherlands will be focused on the transformation of existing urban territory. For the assignment of the student groups an outdated industrial area, the Binckhorst in The Hague, was chosen as the area to focus on. That type of transformation operation is highly complicated especially because of the large number of participants with diverse interests. The students have in the bachelor 6 semester their final exam after which they are allowed to use the title Bsc. That is one of the reasons to create a learning situation in which students can get acquainted with the integral character of urban area redevelopment tasks, and in relation to that, develop solutions in the form of a spatial/functional plan which is financial feasible. Within the faculty the department of Real Estate & housing has an experience of several

years with the management game as a didactical form. Students assess these management games mostly being very efficient. For that reason this didactical form is also introduced in the bachelor 6. The result was that, after four weeks work, 28 different master plans were presented for the Binckhorst area, in the form of posters, power point presentation and supporting reports. The amount of students (260), the amount of groups (28) and the amount of participating teachers (about 30) formed an enormous logistic challenge. A challenge that peaked in the final presentation on the 12th of march 2010. On that day the plans were assessed by a jury and there was a debate with several experts.

ROLE-PLAY SIMULATION AS A LEARNING METHOD

‘Masterplangame The Binckhorst’ as a role-play simulation

This section shows you the basics of the learning method ‘game playing in interdisciplinary design and planning teams: a role-play simulation’. This didactic model is related to theories on ‘gaming’ and ‘simulation’ and is called a powerful teaching aid (De Caluwé and Stoppelenburg, 2002). A game in itself exits on players, rules, events, goals and time setting. A simulation is a representation, an imitation of some real thing, state of affairs, or process. Simulation is used in many contexts, including the modeling of natural systems or human systems in order to gain insight into their functioning.

In our didactic game we combined some concepts: “students simulate by playing roles”: each student assumes the role of an expert or character that exists in real design and planning world and simulates the way that specific expert would design or make (master)plans for the chosen urban area The Binckhorst. So we called the game ‘Masterplangame The Binckhorst’ and to be precise: the game was a role-play simulation. A role-play simulates (often simplified) reality to create a learning situation in which players can exercise (old or new) rules and customs. This role-playing game has two main functions. It has both a mirror and a window-function, which means that the students (the players in this didactic game) become aware of existing problems (mirror) in reality and gain insight about

the way to handle decision-making in a multi-actor environment (window) (De Caluwé, Geurts, Buis en Stoppelenburg, 1996).

SIMULATION AS A REPRESENTATION

Imitating inter-organizational processes

In reality of design and planning processes there are circumstances we had to imitate during the role-play simulation. In this era there are some sociological phenomena’s that need to be learned about in an academic curriculum. In short (and not fully elaborated) we stated that in modern times you can see a forth going process of structural differentiation. This process will not end and gives rise to very many, different expertises and professions (based on Zijderveld: 186). For instance the character of the Master Architect in former times, who designed and managed the building and construction of Roman cathedrals on his own, exists no more. The Master Architect now needs to have several experts on his side to do his job properly. That is one of the reasons the faculty of Architecture in Delft have Master curricula and degrees in architecture, restoration, building technology, urbanism and construction and real estate management. And in every profession you can see more and more specializations and structural differentiations. The latter and the division of labor give rise to special needs of coordination. Mintzberg formulates this tendency in Structuring of Organizations (1979: 2) like this: ‘Every organized human activity - from the making of pots to the placing of a man on the moon - gives rise to two fundamental and opposing requirements: the division of labor into various tasks to be performed and the coordination of these tasks to accomplish the activity’.

These two fundamental and opposing requirements cause many structural and organizational problems, which are becoming more and more complex in design and planning practice in The Netherlands. In Dutch practice we do not have one single organization who deals with the design and planning activities. In the future this kind of complexities will not reduce; they will increase so there will be a growing need for coordination and integration in such chain-focused activities, like design and planning teams. These sociological phenomena’s

were 'translated' to the characters and expert roles in the 'MasterplangameThe Binckhorst' and are expressed in the matrix tutorials as well. In that way we imitate realistic (but simplified) inter-organisational processes so students would experience the two fundamental and opposing requirements: division of labor and the coordination and integration of human activities.

Modelling the urban area The Binckhorst In

Simulation is used in many contexts, including the modelling of natural systems in order to gain insight into their functioning. In the role-play game we want to imitate inter-organizational processes as well as we want students to simulate and practice in designing and planning an existing urban area (in interdisciplinary teams). An existing urban area in a Dutch city and of which the local municipality wants to transform the area in a lively urban district. We chose The Binckhorst in the city The Hague it is a representation of an inner city industrial area in decline. There are a lot of those areas in Dutch cities and it is an extensive future task for planners and designers to create adequate transformation alternatives for those areas. During and as a start from the role-play game a model (plan) gave insight in the today's functioning of the area. There was - in other words - a realistic but simplified representation of this outdated industrial area of 130 ha



*Figure 1 Binckhorst ,
130 ha gross 94 ha nett
63% industrial space, 23% streets, cemetery, open grounds and
harbours, 300 companies, 100 owners, 13000 working persons*

The The Hague municipality wants to transform the area because of several reasons:

The municipality of The Hague is mentioning the following bottlenecks in their vision for the future:

- the existence of marginal functions, vacancy and a low level of investment;
- the extensive use of space and environmental pollution
- a highly fragmented structure of ownership of plots and buildings
- traffic problems: shortage of parking facilities and traffic overload on the central main road of the area

Together with the strategic positioning of the area this is giving cause for a huge inner city transformation (source: Structuurvisie Den Haag 2020, Wereldstad aan Zee, Binckhorst,)

A year before the start of the management game with students, local politicians had decided and chosen for a masterplan, based on a public/private partnership. That masterplan of 2007 was aiming for a radical and full transformation of the area and realization of a high ambitious real estate program. The financial/economic crisis that surprised the world in 2008 made a reconsideration of the plans necessary. The public/private partnership collapsed and the ambitious real estate program could not be absorbed by the market. The municipality decided to establish an official working group which got the assignment to make an alternative realistic plan for the redevelopment of the Binckhorst area. That was also the situation which was simulated in the management game. Each group of 9 students stood for an official working group which had to come up with an alternative proposal for the redevelopment of the Binckhorst. The initial plans of the municipality were placed at disposal of the student groups at the start of the game.

GAME PLAYING AS A LEARNING METHOD

In faculties of business administration, in social and psychological academies there is knowledge and experience with the didactic method of 'role-playing game'. In design-oriented faculties there is no common habit to use this specific didactic model. In the academic year (2009/2010) this didacticism was for the first time used to teach more than 260 last year bachelor students in 4.5 weeks time the

implications of interdisciplinary design and planning projects and to learn them how to deal with complexities in coordination of different expertise and with collaborative teamwork.

The words game and play refer to activities and decisions from involved players: the players play a role, they try to reach goals, they have to do some activities and tasks, they experience constraints and there must be an output (positive or negative) (De Caluwé, Geurts, Buis en Stoppelenburg, 1996).

Some theoretical notions are basic to game playing as a learning method, especially those about learning and the relationship between someone's visions and behavior. The insight that there is a big gap between what people say they (should) do and really do.

People say "yes" and do "no". Game-simulations are linking those two together: in every game-simulation there is a moment that the player has to give his ideas and goals. Besides that, there is always an element of 'doing' or 'making'. In our game every role-player gives his/her ideas about the expert sub solution for the area (documented in a sub design).

During the negotiations in our game every player has to make a decision about how he/she has to deal with conflicting sub solutions of other players. In that way game-simulation shows inconsistencies in the relation between the visions and behaviors; it is therefore a very powerful mirror to learn about visions, goals and actual behavior. To understand what is meant by the mirror-function of game-simulation, we have to listen to Kolb (1991), who presents a learning cycle in four phases. The underlying approach is that people experience 'by doing' and in doing he sees problems and challenges. Reflection on this experience guides to (new) intentions and actions. So the cycle repeats and behaviour can be changed. And through game-playing people can exercise and experiment with new ways to cope with problems and challenges (window-function).

WHEN USING A GAME-SIMULATION?

Theories on game-simulation show that game-playing is most effective in cases or situations in which people need to learn about decisions which should be taken in complex, strategic or ill structured problems. More precise: making decisions in problem solving with many variables and with (most) unknown

relationships between variables. This complexity is even more increasing when many actors are involved and ideas and wishes are conflictive.

We have to hold in mind that there is no best (one) solution in these cognitive extreme complex problems and a game-simulation cannot solve it. But a game-simulation shows players the complexity of the multi-actor decision arena and learns them to cope with it and stimulate a goal-oriented communication between players.

As we stated already: a game-simulation functions as a mirror and a window. On the one hand game-simulation shows you what and how you are doing and it gives you the possibility to reflect on your own actions and on the actions of the group. On the other hand the game-simulation gives you the possibility how (group) actions can be changed (window-function). There is a possibility as an individual as well as a group to experiment with alternatives and to learn from it.

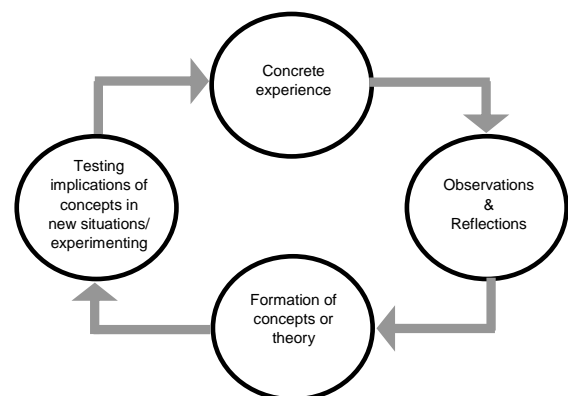


Figure 2 Kolb's learning cycle

MASTERPLAN GAME: A ROLE-PLAY SIMULATION

In the former section we mentioned the conceptual basics on 'gaming', 'simulation' and 'role-play'. In this part we will explain how we set up the 'Masterplangame The Binckhorst' as a role-play simulation. This simulation in 28 groups had to end up in planning proposals (masterplan) for The Hague municipality. Of course the 28 proposals would not be as profound as in a business situation, but as our experiences in Master-education learned:

"sometimes it is surprising how creative and nice student-proposals are, even limited by the time-setting". This time-setting is conditional to a game-simulation and it has as we call it a pressure-cooker

effect. Students, players in the game, have to have a given (short) time to produce their output. As a pressure-cooker the game provides several learning moments in which the mirror as well as the window function are most effective.

As we stated before, a game-simulation as learning method works out best in complex and rather ill structured situations. And urban area development is such a situation, even more when the area to be transformed is an outdated, industrial site with a complex structure of real estate possessions. The location The Binckhorst meets all those requirements and students in our faculty should be highly challenged with respect to the content as well as to the game itself.

This sections goes on in clarifying how the game itself was set up by discussing some aspects of interest: the roles, the rules and matrix tutorials, the goals, the output and the final presentations.

ROLES

Before the game started every student got a random a specific role in one particular group of 9 students. A role that was congruent to an expert-function in the Dutch municipality and every student therefore became part of an expert-group (28 students with the same role) and a planning-group (28 groups each with 9 students). During the preparation of the role play game the question came up if the student roles should be 'congruent' with the functional roles within a public/private partnership like there initially was for the redevelopment for the Binckhorst area. Because of didactic reasons the choice was made not to imitate that specific situation. Instead of that we chose to simulate the situation of a working group consisting of specialists from different departments of the municipality. Afterwards, but still before the start of the game, this appeared to be an exact projection of the real situation chosen for after and because of the financial/economic crisis. The roles within each Group of 9 students were (see also figure 3):

1. Projectleader of the game: coordination and integration
2. Municipal urban designer
3. Municipal financial site-planner
4. Municipal site acquisition manager
5. Municipal traffic planner/designer

6. Civil servant for the environment
7. Civil servant for monuments and cultural heritage
8. Engineer spatial planning models, integral spatial feasibility
9. Engineer for urban investment models, integral financial feasibility

RULES AND MATRIX TUTORIALS

The main rule was to integrate different expert-visions in one joint masterplan. Every member of the planning-group had his/her own tasks and had to design sub solutions as part of the game.

The participating students (260 the first time) were split into groups of about 9 students. The roles within each group were assigned ad random. That is because the bachelor is a non specialized study, which forms the fundament for a later to choose specialization, by study or in practice.

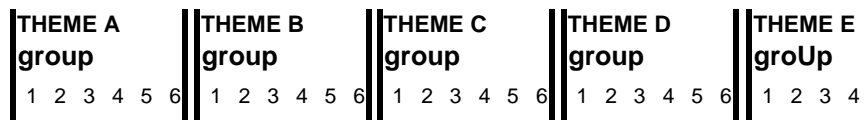
The tutorial support was arranged in a "matrix" manner. Each group had his own group tutor to support the process of tuning and integration of sub solutions, based on specific viewpoints (vertical support). Sub solutions were initially formulated taking into account the viewpoint of the different specialized roles. The necessary knowledge collection and abilities to use that knowledge was supported by role assistants or specialist teachers. (horizontal support).

GOALS AND OUTPUT

At the end of the game each planning group had to present a masterplan for the Binckhorst area. That masterplan had to be presented containing the following elements:

1. An analysis of the actual situation of the area
2. A functional real estate program positioned in the year 2030, being the final year of the execution of the transformation of the area
3. A plan for the phasing of the execution during the period 2010-2030
4. A cost benefit analysis
5. A spatial land use plan
6. A quality specification, making use of reference illustrations
7. An explanation of considerations and decisions that were essential for the content of the plan.

Group division Bsc6 masterplan game, spring 2010



roles

1. Projectleader of the game
2. Municipal urban designer
3. Municipal financial site-planner
4. Municipal site acquisition manager
5. Municipal traffic planner/designer
6. Civil servant for the environment
7. Civil servant for monuments
8. Engineer spatial planning models
9. Engineer urban investment models

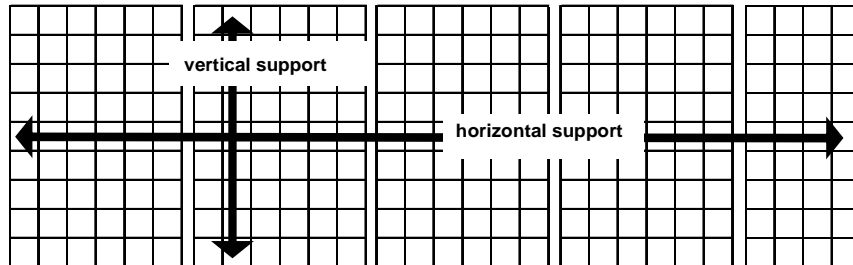


Figure 3 the matrix structure

The 28 groups had all the same assignment, to make a masterplan for the Binckhorst area. In order to create some differentiation in the masterplans five different leading brands for the area were formulated on forehand. Each brand formed an important guideline for 6 groups.

The brands were:

- A. Binckhorst preserves the historic grown industrial characteristics
- B. Binckhorst the place for offices with international status
- C. Binckhorst for the innovative and young entrepreneur
- D. Binckhorst the new urban centre for the region
- E. Binckhorst the example of sustainable redevelopment

Four weeks after the beginning of the role-playing game all student groups had to present their plan in the form of a poster and a final presentation (power point). Every group had to report their own decision-making process also. During the last session the students-presentations were followed by a plenary debate which politicians and scientists of the faculty (3.4).

FINAL PRESENTATION

The overwhelming amount of plans were assessed by four different juries of experts. They handed out prices for the most creative (1), the most realistic

(2) masterplan, for the most appealing poster (3) and for the most efficient group process. (4)

The groups that had won the prices 1 and 2 got the opportunity to present their results followed by a debate with the jury, in which the dean of the faculty, the alderman of The Hague, and some faculty professors were participating. The debates were tempting and lively. The atmosphere during that final session was glamorous but also scientifically inspiring.

CONCLUSIONS AND RECOMMENDATIONS

Before was stated that the curriculum was renewed in content and in didactic form and structure. In this case that was based on the assumption that this form would result in a high learning effect. That effect is realized according to the opinion of teachers as well as students. There were also some critical comments which illustrate the fact that implementing a new didactic concept on the scale of the whole faculty especially in the starting phase is confronted with some opposition. Hereafter an explanation on some important themes of the didactic concept of the management game.

Logistics, information, communication, coordination

Because of the big amount of students which is participating a very strict logistic planning, making use of detailed regulations, is needed. These conditions have to be taken into account

consequently to 'keep all the frogs in the barrow'. This in academic environment rather unusual teaching method demands for a disciplined attitude of all the teachers involved, saying and communicating exactly the same message. Because the teachers came from different specialized backgrounds - with each their own jargon - there was some confusion every now and then.

Not everything can be prepared on forehand. It is sensible to be prepared for unexpected problems and have in mind that creative improvised measures always are needed somewhere along the line. For example what to do if certain student group members step out, become ill or for quit some other reason. How to react within the group based on a quick and adequate group decision.

During the masterplan game there was a small coordination group of teachers that came up with solutions more or less immediately after showing up of any problem. That appeared to be of major importance to keep the process in the groups going.

Student evaluation

Student evaluations showed a positive experience by the students. Nearly 90% of the students responding on the evaluation assessed the game with a positive qualification. More than half of the participating students assessed the game as educational, about 30% said it was fascinating and inspiring and only a little more than 10% qualified it as boring.

The degree of difficulty was according to the students somewhat above average. From complementary comments of the students it appears that students not always fully understood the learning targets of the role play and especially the meaning of the 'vertical' and 'horizontal' support. A solid instruction of all the teachers who are involved in this game need to be attended frequently on the learning targets of this game, in order to understand the potential friction between the vertical integration target and the horizontal expert target.

Specific positive aspects of the game mentioned by students are:

- Learn how to work together in a complex group
- Game represents a realistic scenario

- To deliver a fantastic product within the timespan of four weeks
- An intensive team project with a lot of new learning moments
- The integration of different topics.

Jury judgement and assessment

Within the faculty of Architecture all design assignments end in a student presentation. Because of the big amount of groups, it was not chosen to spent two days on the plenary presentation of the results of all groups.

It was taken into consideration only to assess the group results based on the group reports. However the 'experimental' character of the game as a didactic model deserved a more inaugurate way of passing the finish. Therefore the final session was organized with all students, a lot of teachers and professors, the dean of the faculty and a presentation of the municipality of The Hague with the aldermen responsible for the Binckhorst area and civil servants of his department.

We look back with satisfaction to a successfully new didactic form in a design and planning faculty.

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