

A ROLE-PLAY APPROACH FOR TEACHING RESEARCH METHODOLOGY IN CONSTRUCTION MANAGEMENT

Andreas Hartmann¹, André Dorée² and Ludwig Martin³

^{1,2} *Department of Construction Management and Engineering, University of Twente, PO Box 217, 7500 AE Enschede, The Netherlands*

³ *Department of the Built Environment, Cape Peninsula University of Technology, PO Box 652, Cape Town 8000, South Africa*

Assignments for Construction Management (CM) graduate programmes often require students to carry out research on real-world problems. To prepare students for this task, many CM-programmes contain a research methodology course. However, after taking part in these courses, many students still lack the ability to define the scope of their research problem and to find an appropriate research design. To counteract this situation, a role-play approach to teach research methodology was designed in which the students take on the role of "clients" and "researchers". The role-play was embedded in two research methodology courses at the University of Twente (The Netherlands) and at the Cape Peninsula University of Technology (South Africa). In both cases the lecturers noticed that this exercise proved to be an effective instrument. Students became more aware of the complexity of construction management problems and were better able to define their research problem and design. Furthermore, it helped to put research methodology into a more realistic and pragmatic perspective.

Keywords: education, research methodology, role-play.

INTRODUCTION

Construction Management (CM) graduate programmes often require students to conduct research into real-world problems faced by the construction industry. Based on the description of a research problem and objectives, students have to study the relevant literature and gather and analyse data to understand the problem more thoroughly. Furthermore, based on this process, they are required to draw conclusions and recommend possible solutions. In order to prepare students for these tasks, many CM-programmes offer a research methodology course. The challenge of such a course is to address "rigour" on research methodology as well as "relevance" on the research issues (Vermeulen, 2007).

Despite these courses, a substantial number of students still struggled with their assignments and had difficulty in defining the "research problem" and its scope. The students often overlooked the complexity and vagueness of the related real-world problem, and lacked the sensitivity to understand the actual problem. They either

¹ a.hartmann@utwente.nl

² a.g.doree@utwente.nl

³ martinl@cput.ac.za

tended to approach these as textbook problems, or they embraced the entire problem mess without focussing on the essential aspects of a problematic situation. Usually students were unable to project themselves into the role of the problem-owner and to recognise that a researchable problem is the outcome of an interactive and intensive discourse involving problem-owner and researcher. The text books on methodology explain techniques, methods and research models, but fall short in the area of contextualisation.

Based on the authors' observations, classical educational forms of instruction (e.g. ex-cathedra teaching) have demonstrated to be ineffective in building the skills necessary to tackle the complexity and vagueness of CM problems. Here, the claim is made that research methodology courses in CM demand teaching approaches and techniques that allow students to construct new knowledge and interpersonal skills by actively engaging in practice-related, real-world situations. Without such approaches the students will struggle to contextualise CM problems in their final (thesis) projects.

In 2006, at the Department of Construction Management and Engineering at the University of Twente (The Netherlands), an 8-week research methodology course was designed with a role-play exercise as core teaching element. The role-play was structured around the course and required students to take on the roles of "researcher" and "problem-owner" in order to formulate a sound research problem and an appropriate research design. In 2007 the approach was repeated and further developed to suit a one-week intensive course at the Department of the Built Environment at the Cape Peninsula University of Technology (South Africa).

From the authors' perspectives both applications had the character of experimental case studies. This paper analyses the data the respective lecturers collected using the newly developed approach and discusses the suitability of the approach for teaching research methodology in Construction Management.

ROLE-PLAY IN EDUCATION

What is role-play?

Role-play belongs to a group of active learning techniques which incorporates epistemological assumptions of constructivism. From the constructivist perspective knowledge has no objective or absolute value. It does not exist independently of the student, but rather is created, based on the student's experience, observation, reflection, experimentation and interaction with the environment (Glaserfeld, 1995). Role-play is a teaching technique that puts students in positions they have never experienced before and allows them to interact, communicate and negotiate with others in certain roles under given circumstances (Yardley-Matwiejczuk, 1997). In doing so, they look at occurrences from different perspectives, as well as experience and understand problem situations from a different point of view. They learn something about the specific person and/or situation through imitation, observation, feedback, analysis and conceptualisation (Steinwachs and Sugar, 1990).

Role-plays are student-centred and as such can motivate students to practice various types of behavioural modes. Role-plays provide rapid feedback on students' learning and develop the students' ability to interact (Ladrousse, 1989; Ments, 1994). However, they also may be time-consuming and contain the risk of dominating the course to the point of excluding solid theory and facts (Ments, 1994).

Design issues for role-play

To effectively unfold the advantages of role-play some critical design issues need to be taken into account. These issues relate to the four main phases of a role-play, namely: preparing, briefing, running and reflecting.

Preparing

Role-plays are not stand-alone techniques. They must be embedded in the overall learning strategy of the course or curriculum and have to contribute to the course objectives (Ments, 1994). The objectives and function of role-play must be clearly defined. Role-play may be placed at the beginning of a course in order to introduce a subject. It may also be used as supplement to a topic which is being discussed. It can even be the focal point of a course through which critical aspects are studied. There are two possible constraints that should be considered when implementing role-play into a course. Firstly, the classroom should be suitable (e.g. movable furniture), and, secondly, there should be enough time available particularly for the feedback at the end (Yardley-Matwiejczuk, 1997).

Briefing

An essential part of role-play is the briefing of the actors about the situation and the characteristics of their role. For this purpose the role scenario and role description have to be scripted. The role scenario sets the background of a particular problem and the associated constraints. The role description provides the profile of the people involved (Ments, 1994). The scenario and description need to be close to the actual situation or problem, but should avoid irrelevant facts and too many conflicts. In order to create confidence, and to ease understanding and knowledge creation, briefings should be written in simple, clear language and be based on the existing experience and knowledge of the students (Livingston, 1983; Steinwachs and Sugar, 1990).

Running

There are several forms of running role-play (for an overview see Steinwachs and Sugar, 1990). Which form is chosen depends on the objectives of the role-play and the extent to which students are involved. For example, in a single role-play only a few students perform while being observed by the class, whereas in a multiple role-play groups of students are simultaneously active. An advantage of the former is that the whole group can share and discuss its observations, while the latter creates an environment where the student may feel less embarrassed and exposed (Ments, 1994). The lecturer fulfils different functions during role-play. He (or she) provides additional information if necessary, controls the time, motivates students and intervenes in case of poor performance or emotional escalation (Ments, 1994).

Reflecting

According to Yardley-Matwiejczuk (1997), the most important activity in role-plays is reflecting. During reflection students step back and discuss what happened in the role-play exercise, identifying reasons for the observed behaviour and outcomes, as well as drawing conclusions for improvements (DeNeve and Heppner, 1997; Steinwachs and Sugar, 1990). By doing so, students should be able to relate their observations to other parts of the course (Aubusson *et al.*, 1997). Thus, the links with previous and further teaching should be pointed out. Reflection can be achieved by verbally discussing questions posed, or the response can be in written form (McSharry and Jones, 2000). If possible, reflection should be placed immediately after the role-play, so that students are able to recall their behaviour and observations. Moreover,

the time needed for reflection should not be underestimated, since role-play usually produces a lot of (discussion) material (Ments, 1994).

To sum up, if CM is considered as a discipline that requires students to solve socio-technical problems by collaboratively engaging in a process of knowledge production and sense-making, the constructivist view of learning offers a fruitful, epistemological basis for designing effective research methodology courses in CM. Role-play refers to the assumptions of constructivism and, if properly designed, promises to be an effective teaching technique in CM research methodology.

COURSE STRUCTURE AND ROLE-PLAY DESIGN

At the University of Twente (The Netherlands) a role-play approach for teaching research methodology in CM was initially designed. This approach was further developed for and adjusted to a research methodology course at the Cape Peninsula University of Technology (South Africa).

Course structure

The main difference between the two courses is the duration (see also Table 1).

Table 1: Course structure

	University of Twente	Cape Peninsula University of Technology
Place in curriculum	First year MSc Construction Management	Last year BTech Quantity Surveying
Duration	8-week course	one-week intensive course
Number of students	32	27
Number of lecturers	3	2
Topics addressed in course	Academic skills, what is research, problem definition, literature review, research planning, qualitative research, quantitative research, data analysis	What is research, tools of research, problem definition, literature review, research planning, qualitative research, quantitative research, data analysis
Teaching elements	Two lectures per week in the first 3 weeks and one tutorial per week in the remaining 5 weeks. 1 individual assignment (role-play) 4 group assignments	Lectures with small exercises every morning. Tutorials every afternoon (role-play). 8-month individual research project following the intensive course.

The Dutch course lasted 8 weeks, whereas the South African course was presented within one week. As a consequence, the teaching elements of the Dutch course included lectures and tutorials spread over the 8 weeks and parallel assignments. Students had to work on the assignments outside of the class, whereas the results of their work were discussed in class. In the South African situation, lectures with small exercises were given every morning and supplemented by larger, in-class tutorials in the afternoon of each day, facilitated by the lecturers.

Role-play design

Although in both cases role-play had the same objectives and role-play techniques were similar, the designs differed in a number of aspects. Due to time restrictions role-play in South Africa was set up as a group exercise instead of working in pairs. Here a balance had to be found between group size and feedback time. While an approach with fewer groups provides enough time to discuss the results of role-play for each group, it entails the risk that the groups may be too large for all students to actively participate. Smaller groups and pairs allow all students to experience the different roles more intensively, but hinder a thorough discussion of the interaction of each group. Table 2 gives an overview of the design decisions made for both courses.

Experimental case studies

Both courses may be regarded as experimental case studies since they combine a treatment (role-play approach) and an in-depth investigation of the treatment. The lecturers participated actively in the course and the role-play by facilitating students' collaboration. They gave feedback on the students' results and behaviour, and intervened if problems occurred. At the same time they observed the interaction and conversations of the students, their behaviour and reactions to interventions. During both courses the lecturers made notes on what happened during role-play and discussed their observations with each other. The two indicators used for assessing the achievement of the objectives were: (1) if the communication and argumentation activities of the role-play lead to a problem definition and project design that satisfy the researcher, problem-owner and lecturer, and (2) if students recognise causes of satisfactory or unsatisfactory results of the role-play activities.

OBSERVATIONS DURING ROLE-PLAY IMPLEMENTATION

The reversal role-play in pairs in the Netherlands

Little effort to set up communication right from the start

Many students did not know each other upon entering into the role-play exercise. Although all students attended the lectures and had the chance to meet physically, the communication relating to role-play took primarily place via e-mail. The student pairs did not have more than the three contacts before the first feedback session with the lecturers. The first contact was after the problem-owner formulated a research problem and sent it to the researcher. The second took place after the researcher interpreted and rewrote the research problem and asked the problem-owner to provide more information if necessary. The third contact occurred after the problem-owner provided the information and answered the questions of the researcher, who then started formulating the problem description and research objective.

Uncritical satisfaction of problem-owner

Upon examination of the documents produced after the first two activities and presented by the researcher students, it became evident that a number of students tended to attempt to uncritically satisfy the problem-owners' request. Although the problem descriptions and information provided by the problem-owners were reformulated, most of them were replicated without challenging possible contradiction, imprecision or cloudiness. The researcher students hardly attempted to clarify issues open for different interpretations and hardly considered the constraints of the researcher's resources. Typically, the researcher saw determining the scope of the research problem as the task of the problem-owner.

Table 2: Role-play design

Role-play phase	Design issue	University of Twente	Cape Peninsula University of Technology
Preparing	Place in course	Centrepiece. Runs parallel to lectures. Covers individual assignment	Follow-up. Follows lectures. Covers tutorials.
	Contribution to course	To practice researcher problem-owner interactions	do.
	Objectives	Building knowledge on problem definition and research design. Developing insights into the interactive researcher problem-owner relationship Raising awareness for the complexity and vagueness of construction management problems. Improving communication and argumentation skills	do. do. do. do.
Briefing	Role description	Problem-owner: person in a construction organisation who has a practical CM problem. Researcher: student who is appointed by the problem-owner to carry out research into the practical CM problem	Problem-owner: group in a construction organisation who has a practical CM problem. Researcher: student group which is appointed by the problem-owner to carry out research into the practical CM problem.
	Role scenario	Practical CM problem that needs to be researched in a 6-month project 4 activities and deliverables of the problem-owner and the researcher are described	Practical CM problem that needs to be researched in an 8-month project. 3 activities and deliverables of the problem-owner and researcher are described
Running	Technique	Reversal role-play in pairs Working in pairs: one student is researcher, another student is problem-owner (32 pairs) Each student takes on both roles	Reversal role-play in groups Working in groups: one group is researcher, another group is problem-owner (6 groups with 4-5 students) Each group takes on both roles
	Lecturers' role	Providing information on role description and scenario Giving feedback	Providing information on role description and scenario Giving feedback Intervening in group work and controlling time
Reflecting	When?	Two feedback sessions with lecturer: one after formulation of research problem, one after completion and joint reflection	Feedback sessions after each activity at the end of each tutorial
	Where?	In office of lecturers with each pair separately	In the classroom as plenary session with all groups
	How long?	Approx. 20 minutes	Approx. 45 minutes

Formulation of abstract problems

Many of the researcher students came up with relatively abstract research problems and objectives. They used ambiguous terms to describe vague problems and objectives. Taking this inclusive approach they avoided tensions and tough decisions. Examples of research objectives formulated are: "Examining information flow in projects", "Analysing relationship climate among construction firms" or "Establishing an organisation culture that strives for sustainability". Moreover, students faced difficulties in applying general concepts and guidelines (e.g. what is the problem) in a real-world situation.

Divergent interpretations of written documents

In the first feedback session held after 2 of 4 activities many of the student pairs met each other face-to-face for the first time as researchers and problem-owners. Most interestingly, after asking the problem-owner what he or she thought of the researcher's first proposal, many problem-owners stated: "Generally, I am satisfied with the researcher's work. He interpreted my problem description well. However, I have a few comments..." After giving the comments, a comprehensive discussion between problem-owner and researcher about fundamental problem issues emerged. Often the 20 minutes available were not sufficient to clarify all misunderstandings. However, the discussion revealed that most pairs held divergent perceptions of the research problem and the objective. For many students this was an unexpected and disturbing situation. The lecturers took a provocative stance, exposing the discrepancies rather than solving this for the students. The discovery of the incongruence was seen as an important learning point.

Awareness of and change in behaviour

The lecturers usually then asked both students what they thought about the reasons for their divergent interpretations. The students quickly recognised that they had not thoroughly discussed the problem and that more interaction was needed involving oral discussions. Based on the first feedback session, the students improved their communication behaviour. Most pairs made appointments for further discussion directly after the session. The second feedback session after 4 activities and the documents then handed in showed that problem and objective were now more delineated and specified and that perception differences had been reduced.

The Dutch students experienced the role-play as a valuable learning experience ($\mu=4.04$ ($\sigma=0.65$) on a scale from 1 (nothing learnt) to 5 (much learnt)). Particularly the necessity of intensive communication between researcher and problem-owner right from the beginning was a crucial lesson learnt. The feedback sessions were seen as eye-openers to the effects of communication behaviour on problem definition and research design. Some students wished they had had more feedback meetings. Students also mentioned that scrutinising their own proposal and the information provided by the problem-owner more critically was another important lesson learnt.

The reversal role-play in groups in South Africa*Intensive communication within groups*

In South Africa the lecturers randomly assigned the roles of problem-owner and researcher to groups of students. The groups started working with the role scenarios in the classroom and right from the start, an in-depth discussion about the research problem emerged in each group. The problem-owner groups tried to define the problem to be solved by the researcher group. The researcher groups tried to understand the problem obtained from the problem-owner. The working in groups expanded the original role-play by the additional aspect of getting consensus within the group before finalising the problem or proposal respectively and approaching the other group. A drawback of the group work was that some groups were faster in determining their problem than other groups. This resulted in noisy atmosphere and disturbances in the lecture venue.

Passive relationship with problem-owner

Despite intensive communication within the groups, there was little communication between groups. Students did not actively seek contact with their counterparts. Even after recognising differences in the perception of the problem, the communication

between the groups remained limited. Again, the players strictly followed the role descriptions given but did not act beyond these. They approached the other group because the role-play descriptions demanded it.

Formulation of very detailed problems

Compared to the Dutch students, the South African problem-owners came up with very detailed problems. Most problems were related to specific project contexts. Examples of problems identified were: “High water consumption on a project site” or “Skill shortage of plasterers in a project”. Despite this strong delimitation, the students also had difficulties in transferring methodological concepts into a real situation and in describing a convincing research problem and design.

Divergent interpretations of verbal information

Due to the class situation the students did not have enough time to write down elaborate descriptions of the problem and the objective. Instead, the problem and the objective were outlined orally. During the feedback sessions at the end of the group work, differences cropped up in the perception of the research problem and the objective. Students recognised that imprecise explanation and restricted communication were the potential causes. The outcome of the discussion was an additional activity called: “Redefining the problem”. For this activity, the original groups were split. One half of the researcher group joined one half of the problem-owner group in order to develop a common understanding of the problem and the objective. After this intervention both groups shared a similar understanding of the problems and objectives.

Using the same criteria as for the Dutch students (Likert type scale 1 to 5), the South African students also experienced the role-play as valuable exercise ($\mu=4.45$ ($\sigma=0.80$)).

DISCUSSION

Given the students’ deficiencies in formulating research the problem and the objective, one may argue that the role-play approach was not able to attain its objectives and thus is not suitable for teaching research methodology in CM. The opposite argument is put forward here. The intention of role-play was not to prevent students from behaving in a way they normally do. On the contrary, behaviour leading to divergent interpretations of deliverables was an essential learning outcome. In both cases role-play helped students to become aware of the complexity and vagueness of construction management problems, the importance of scope definition, and the necessity of a close interaction and communication between problem-owner and researcher to co-develop the research task. Besides raising awareness, the value of role-play is its potential to stimulate behavioural change. Both experimental case studies point to some important design issues that need to be considered in order to unfold the full potential of role-play.

Preparing

Both courses showed that students had difficulties in formulating a sound research problem and design. Of course, it cannot be expected that students should be able to develop a perfect research proposal straight away. However, students should be able to gain new knowledge by processing the experiences during role-play and linking them to some kind of frame of reference. The acquisition of basic, theoretical concepts should precede role-play in order to provide such a roadmap which students can then follow and build upon. Role-plays cannot stand alone and should be embedded in an

overall course concept involving the introduction of the main aspects of research methodology. Both cases suggest that the process of transferring theoretical concepts into a real-life situation should be supported by using a number of examples with different complexity. It should be started with examples of lower complexity which the students are familiar with. The complexity can then be gradually increased and examples can be introduced that are new to the students.

Briefing

Students tend to search for guidelines to help them master the complex situation given. In both cases the students strictly followed the role scenario and description provided. They asked for a one-method-fits-all research model, and struggle with the literature that suggests various approaches. The challenge is to find the right extent of briefing in terms of information provided. Without a sufficient or clear description of activities students may struggle with the role-play requirements and become frustrated. On the other hand, detailed guidelines on the role-play process restrict the students' learning, since they do not decide and choose activities and behaviour by themselves and thus rather unconsciously experience the effects of their activities on the role-play results (e.g. little communication).

Running

The reversal role-play used can be applied to different course structures. Working in groups has the advantage of additional discussions within the research and problem-owner groups. A disadvantage is that not all students participate equally in role-play and disruptions can occur. An intensive course better allows lecturers to support the students during the interaction. However, there might be less time for reflection at the end. Here, a good time control is needed. Process and outcomes of role-play cannot be predicted and precisely planned. Students progress differently in their learning. The South African course showed that there should be enough flexibility designed into the course in order to adjust the role-play by, for instance, adding additional activities or feedback sessions.

Reflecting

In both cases reflection after each role-play activity was crucial to allow for student learning. During this reflection students become aware of strengths and weaknesses of their activities and their behaviour in the different roles. This not only leads to understanding how problem-owners and researchers affect each other, but also leads to a change in activities and behaviour. For example, students made appointments with each other following the first feedback session in the Dutch course. In the South African course an additional activity combining researcher and problem-owner groups was an outcome of reflection. Although students often expect the lecturer to give the "correct" answers to their questions, the lecturer should only facilitate the discussion between researcher and problem-owner and should redirect questions to both players for discussion.

CONCLUSIONS

Based on two experimental case studies, role-play proved to be an effective technique for teaching research methodology in construction management. It puts research methodology into a more realistic and pragmatic perspective and helps students to experience and understand the complexity and vagueness of construction management problems. The books and other resources provide a good base for the methods and instruments to secure rigour in the research approach. Role-play creates a more

realistic research environment where students are confronted with the problem-owner and the issue of relevance. As such, students gain valuable skills and knowledge for setting up projects and communicating on rigour as well as relevance. However, to be effective, role-play should be linked with other elements of a course, guided by a balanced role scenario and description, embedded in a flexible course design and offer sufficient reflection time after each activity.

REFERENCES

- Alkin, M C and Christie, Ch A (2002) The use of role-play in teaching evaluation. *American Journal of Education*. **23**(2), 209-218.
- Aubusson, P, Fogwill, St, Barr, R and Perkovic, L (1997) What happens when students do simulation-role-play in science?. *Research in Science and Education*. **27**(4), 565-579.
- DeNeve, K M and Heppner, M J (1997) Role play simulations: the assessment of active learning technique and comparison with traditional lectures. *Innovative Higher Education*. **21**(3), 231-245.
- Glaserfeld, E van (1995) A constructivist approach to teaching. *In: L.Steffe and J.Gale (eds.) Constructivism in education*. New Jersey: Lawrence Erlbaum Associates, Inc.
- Ladousse, G P (1987) *Role-play*. Oxford: Oxford University Press.
- Livingstone, C (1983) *Role play in language learning*. Harlow: Longman.
- McSharry, G and Jones, S (2000) Role-play in science teaching and learning. *School Science Review*. **82**, 73-82.
- Mentz, M van (1994) *The effective use of role-play*. London: Kogan Page.
- Steinwachs, B and Sugar, St (1990) Get results from simulation and role play. *In: M.R.Callahan (ed.) Info-line: practical guidelines for training and development professionals*. Issue 412, Alexandria: American Society for Training and Development.
- Vermeulen, F (2007) *I shall not remain insignificant: adding a second loop to matter more; Academy of management journal*. **50**(4), 754-761.
- Yardley-Matwiejczuk, K M (1997) *Role play: theory and practice*. London: Sage Publication.