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# Engineer meets sociologist. Interdisciplinary team in academic and business practice

**Maja Skibińska[1], Mariusz Wieczorek[2]**

[1]Department of Landscape Art, Faculty of Horticulture, Biotechnology and Landscape Architecture, Warsaw University of Life Sciences, 159 Nowoursynowska Str., 02-787 Warsaw, Poland

[2]Institute of Sociology, Faculty of Philosophy and Sociology, University of Warsaw, 18 Karowa Street, 00-927 Warsaw, Poland

[1,2]E-mail address: skibinska_maja@wp.pl , m.wieczorek@is.uw.edu.pl

**ABSTRACT**

This article pertains to a research project carried out by an interdisciplinary team. What distinguished this project from others performed in market or academic conditions was voluntary participation of the members of the research team. This is a situation which requires constant review of the teaching habits as well as creativity and skilful use of soft competences in order to keep the team in its initial composition and give it an incentive to work. The aim of this article is to present practical aspects related to the management of interdisciplinary teams by two main researchers with different scientific background.

***Keywords*:** interdisciplinary teams, project management, qualitative research, cooperation, education, volunteering research, tutoring, academic practice

## 1. INTRODUCTION

The issue of interdisciplinary or multidisciplinary teams in the education system in Poland is very poorly represented [1], being practically absent at university level [2,3]. Studies on the subject of cooperation are primarily found in the literature concerning health care or social assistance [4,5].

The basis for writing this article was a half-year collaboration between an engineer and a sociologist in the performance of a research program implemented by a group of students representing various faculties of the University of Warsaw (sociology, cultural studies, ethnology, spatial development, political science, law, European studies), namely a student of sociology communication at the Maria Grzegorzewska University and a doctoral student of philosophy of the Erasmus program. Interdisciplinarity pertained both to the participants and the lecturers:

Engineer – educator for nine years, practitioner for twelve years, specializing in urban furniture and identity of the urban landscape.

Sociologist – teacher for four years. His professional work is a reflection of his scientific interest in the fields of medical sociology, sociology of economy and local communities.

The goal of this article is to present practical aspects related to the management of interdisciplinary teams and supplement the literature with this perspective.

## 2. INTERDISCIPLINARY TEAMS

### 2. 1. Common parts

The work of a landscape architecture designer as well as a sociologist is dominated by participation in projects. It is divided into the following stages: 1. Establishment of project assumptions. 2. Selection of the persons in charge of project implementation. 3. Detailed specification of the project together with the team: determination of the main purpose and objectives. 4. Contact with the contracting authority: negotiations, exchange of expectations and identification of the possibilities of their implementation, establishment of deadlines. 5. Possible modifications. 6. Acceptance of the project by the contracting authority. 7. Work on the project. 8. Presentation of the product to the contracting authority. 9. Possible modifications. 10. Submission of the final development or final presentation. This is where the similarities end.

### 2. 2. Work as an engineer

Teaching practice – during design classes, students of landscape architecture work on the areas identified by public institutions, develop a recomposition, modernization or new land development project. The task of the teacher is to set the scope of work, establish the main objectives and lead each team until the final execution of the project. During one semester a conceptual design of land development is developed. The classes last for two semesters. All the students attend the same classes during which they perform designs within their specialization groups. Students work in project teams (pairs, triads or quartets, depending on the specific topic of the project). At the beginning, students receive the rules prepared in cooperation with the contracting authority, which specify the scope of work, the main assumptions, awards, as well as important dates including, among others, deadline for submission of the project. During the semester, students participate in a kind of a competition since the institution which sets the topic has specific requirements and the area has its own characteristics – these requirements create similar conditions to those that await students in their commercial orders after graduation.

An important element of the course is team work. Students need to coordinate their work, share tasks as well as reach a compromise with the project work. It is extremely significant since in the life of a professional landscape architect team work is a daily routine. The contracting authority undertakes to hold an exhibition of all projects and grants awards to the authors of the best works. During the exhibition, the students present their work, which is also an important element in the work.

Professional practice – the work of a designer of landscape architecture is very similar. It consists in carrying out projects of landscape architecture objects in cooperation with a team of specialists from other industries. It is often the work of multi-person interdisciplinary teams of architects, designer specialists, sometimes sociologists, naturalists or graphic designers. The developed concept is presented to the contracting authority for his approval. On this basis, a construction project, followed by an executive project, are developed.

### 2. 3. Work as a sociologist

Teaching practice – at university courses, and within the framework of additional projects organized by scientific clubs, students of sociology usually work among themselves. In both cases, the greatest emphasis is put on the acquisition and improvement of research techniques which, combined with expertise, enable graduates to find their own place on the labor market in most organizational structures of institutions and enterprises. Interdisciplinarity occurs only in the case of the work of scientific clubs – therefore, it will be the subject matter of the following section of this article.

The project work of scientific clubs is divided into two types: own projects and commercial projects carried out in consultation with an external institution. Each project is a comprehensive competence training involving researcher's workshop, cooperation according to the adopted timetable, ongoing negotiations on team's composition, finding substitutions in the case of absence, independent work and taking responsibility for the assigned tasks. It is the work on a voluntary basis which provides the opportunity to acquire experience proportional to the contribution of time, energy and motivation of the team members. Most often, a research group is composed of students of sociology, ethnography, anthropology and cultural animation, less often philosophy, law or journalism.

The emphasis in the project work is put on group work on the basis of the student – master relationship. Tasks are distributed among students divided into task groups of various nature and scope of competence, with clearly defined (exposed) position of the leader (usually an experienced student of the fourth or fifth year) who is responsible for carrying out the tasks entrusted to the group. Working within the framework of a scientific club provides one of the few opportunities for interdisciplinary collaboration in the course of study, let us add, an opportunity to cooperate in a team of people with a similar profile of human sciences.

The first phase of the work of the scientific club consists in the annual brainstorming session aimed at collection of ideas for the current academic year's research activities – interested students submit their ideas in the form of a five-minute presentation. Discussion involving all the present persons takes place and voting is conducted to select three projects for implementation. Researchers are allocated to the projects depending on their interests, which starts the second stage of work consisting in the establishment of research tools, selection of the sample, distribution of tasks with selection of the leader depending on declared competence. The works are held in groups of up to six or eight persons. In the implementation stage, regular monitoring meetings aimed at boosting motivation and

summarizing the so far activities. This is the time in which joint arguments, observations, requests and comments are collected and tasks are allocated depending on the current needs. Subsequently, the third stage of analyses is conducted. Finally, the results are published in the form of a report on the website of the scientific club, which completes the stage of project work.

Professional practice – commercial projects are carried out in a very similar way, except that the recruitment process and the motivation of the people involved is additionally supported by financial gratification (usually of symbolic nature). The second difference lies in the fact that the research tool is designed in accordance with the guidelines provided for by the contracting authority, meaning that it needs to take his needs and ideas into consideration. Negotiations are designed to give answers to the following questions: „what knowledge is to be gained?" and „on what issues should special emphasis be put?". After accepting the tool and having determined the amount of remuneration, the stage of performance commences. The project will be completed upon submission of the report and database to the contracting authority and payment of the agreed amount.

## 3. CROSSING PERSPECTIVES. JOINT WORK

Experience in the cooperation with teams of specialists in various fields in the context of project work indicates that they should have three key competencies: 1. Analytical skills allowing to describe the problem to solve together with any possible difficulties and possibilities of their crossing 2. interpersonal skills – ability to express own thoughts and emotions in a way comprehensible for other team members, also an ability to resolve conflicts 3. ability to cooperate in a group (as well as to manage the team). [1,6,7]

As an engineer and a sociologist we conducted joint research on urban benches in Warsaw. The study combined the perspective of a landscape architect and a sociologist with research and teaching work. We were invited by an organization of student volunteers to work on the project contracted by an institution outside the university (one of the departments of the city council).

We had no influence on the selection of our collaborators – we received a team of researchers to perform the task – people of all ages, from different faculties and with various scientific background. One person was a first-year student whereas two researchers were from the Erasmus program (differences in the level of the knowledge of Polish, workshop and education resulting from nationality), thereby necessitating clarification to avoid misunderstandings.

The topic which we received was a peculiar challenge for us. We had to pursue it for three hours a week in the period of twenty weeks. What is more, the students had to devote approximately thirty hours to the research.

The contracting party left us a lot of freedom of exploration, indicating significant issues requiring a more comprehensive study (various offices of the City Hall were interested in the aspects of security, aesthetics and use by the elderly).

We established an action plan and an indicative schedule for the upcoming weeks with an aim to develop a report on the Warsaw benches. We started self-ethnographic work with the students, whose objective was to identify their resources. This allowed us to divide our students into three groups according to their interests.

On the basis of the achievements of foreign researchers, we conducted an introductory lecture on the subject of benches located in urban public spaces as well as a short training on the performance of field research and individual interviews, which were the techniques to collect data constituting the basis for the analysis. We wanted to standardize the perspective so that the collected data were consistent in terms of methodology, regardless of the background of individual researchers.

We expected a different level of detail and accuracy of the conducted interviews due to various experience and personalities of the students. This was the result of the following assumptions: firstly, quantity is quality, which means that the more interviews are conducted, the more the researcher sees, the data is of better quality and better conclusions can be drawn therefrom. Secondly, a lot depends on the personality of the researcher – the interviews of bold and inquisitive students were much richer in information (using *thick description* according to Geertz [8]) than those performed by quiet and shy students who asked only the questions from the list of issues developed by the group, trying not to go beyond it.

We did not expect different standards in taking pictures. Upon completion of the work we came to the conclusion that one class should have been devoted to detailing the methodology of field research, namely how to take pictures in the field (the obtained pictures are often of poor quality), how to photograph benches in the context of the environment, how to read the boundaries of a given space, how to interpret what the researchers saw (impose the framework of interpretation and discuss it in detail on its own example) and finally how to develop graphic materials obtained in the course of the study so that they can be subsequently used in the final study.

The abovementioned issues concern communication between the leaders and the students. The issue of communication between the leader and the leader, that is an engineer and a sociologist, proved to be interesting as well. Establishment of uniform terms (it turned out that some concepts were interpreted differently within a given field of science) and joint extension of the vocabulary was of key importance (some concepts were unknown or unclear for the other side). Also, past experience in team work differed as specified in the preceding chapters.

The research was carried out in three teams (in groups of two, three and five students) that were selected depending on the scientific interests and the initial vision of exploratory research established by the students. A big surprise for us was the inability to work in a team, which was observed in the case of most of the participants in the research program.

Voluntary nature of the study also assumed certain flexibility of the framework and voluntary participation. Therefore, the classes were conducted in a proactive manner so as to fulfil the needs of the students and encourage them to action. Consequently, a strict project timetable was developed, which considerably hindered the work in the subsequent stages of the research (tardiness in the performance of tasks by some students and failure to meet the agreed deadlines) as well as at the stage of writing the report (failure to meet deadlines).

Voluntary participation was one of the key factors. The researchers conducting exploratory work found it important that the students came from different faculties and universities as well as that (due to the voluntary nature of participation) there were no effective penalties which could encourage the more reluctant students. In academic practice, such a penalty involves failure to award credit from a compulsory subject, whereas in professional practice, this translated into the amount of remuneration (possibility of increase or decrease in the remuneration depending on the expected contribution and / or innovation).

As far as a volunteer project conducted to the benefit of an external institution is concerned, the only way is to prevent splits in groups and counteract the loss of motivation by individual members, especially after the assessment phase forced by deadlines for submitting protocols of ratings (this system did not pertain to three students, i.e. nearly one-third of the participants who completed the project).

The most important of all the factors leading to tensions between the students and the leader were deadlines of the performed works. Reviewing the state of research, individual field inspections and the resulting performance of interviews were extremely time-consuming and difficult since they were carried out in winter (from December to January). Development of the report from the study also took more time than it had been expected, mainly because of the lack of preparation on the part of the students for such engaging and hard work during the examination period and winter holidays.

## 4. HOW TO MANAGE INTERDISCIPLINARY TEAMS

Avery [2009] and Jamali [2005] attach great importance to the impact of environmental factors on the quality of knowledge generated within an organization. Avery describes different paradigms of leadership on the basis of case studies whereas Jamali establishes guidelines which best reflect the world of dormitories and the market. These authors assume awareness of the actors – performers and trainers and their uninterrupted desire to achieve their objectives.

The project on urban benches was carried out on behalf of a public institution through the intermediary of the university. The project included both elements of the specificity of an engineering design and the voluntary nature of the activities of social science clubs. On one hand, it was a commercial project, on the other hand, we became the leaders-tutors having to present the scope of work, to develop and implement a training program and finally, as it turned out over time, to encourage people who did not possess appropriate habits to cooperate and draw fundamental conclusions therefrom. In this situation our task could be compared to development of an interdisciplinary team manual. We wish to share this knowledge at this point.

**1.** The matter which we do not control is the motivation of the project recruiter (for example, willingness to organize the subsequent edition with limited interest in the project), motivation of individual participants in the project who passed the recruitment process (sheer curiosity, a genuine passion for research, an obligation to complete practical training or elective courses, a desire to acquire a large number of ECTS points, an obligation to undertake apprenticeships required to receive the certificate of completion of the studies). Identification of the motivation of individual team members and their monitoring during the project enables better organization of work and more efficient management. Accurate assessment of the competence of the team members enables effective delegation of tasks so that each participant could see his contribution to the work of the team and the entire project and feel that it has tangible meaning. If a participant leaves the course, it is often already too late for any form of negotiation. It is also a form of natural selection of the most interested and mobilized persons to obtain the optimal composition of the research team.

**2.** Verification of habits is indispensable. Various groups of students mean different students with different research background. If no attention is paid to the adjustment of the workshops to take the expected form, then work of low quality may be obtained. This does not result from reluctance of the participants, but it is caused by their workshop deficiencies, especially when they gained their first professional experience on our course.

**3.** The position of the leader of each of the selected groups (selected spontaneously or by the coordinator / lecturer) is of great importance. The effectiveness and quality of team work depend largely on its individual elements, on whether and how the team members are able to combine their knowledge, expertise and points of view to achieve the aim. The leader does not need to know everything, instead, he should possess the attributes allowing him to improve communication in the group, to draw ideas, opinions and views, both constructive and emotionally painful / difficult, and finally to see and resolve conflicts. [9,10] An ideal situation will take place when leader is able to talk to each team member behaving inappropriately and show such person the correct path of constructive team work. At the beginning, the quality of this cooperation will certainly be different from the expectations drawn from our research units and work with the teams.

**4.** The quality of interpersonal relations is fundamental. Talking openly about the existing problems, the ability to work in a group or to cooperate with a specialist from another field, and overcoming reluctance are of great importance. Cooperation and collaboration need to lead to the establishment of ties between individual team members, which will later translate into its identity and coherence (this often manifests itself in the proposal to give a nickname to the group in order to emphasize the addressed subject, and to distinguish the group from other teams), as well as into thinking about our joint action and objective.

**5.** The work of the coordinator of such group mainly consists in listening, valuing and skilful distribution of tasks between different team members so that the knowledge and experience of others may be utilized in a most effective manner (create synergies).

**6.** The problem of competition within an interdisciplinary team is best solved by stating that we all deal with one subject. Therefore, let's use a multitude of perspectives to enrich the gathered data, instead of wasting it on combating opposing approaches and positions. In the case of our study, all of us, individually and jointly, had to deal with the fact that it was a project at the interface of sociology and engineering, that we had to conduct interviews regardless of our personalities and past experience, and treat the project as an opportunity for development and investment in ourselves, a chance to open up to others, and not an obstacle which we are not willing to overcome.

**7.** We identified a very difficult situation of having one member (out of ten) with no professional competence. This person did not know the specificity of university work as well as had no experience in collecting data and carrying out research. This is of course a problem of deficient recruitment process with which lecturers are faced in the subsequent stage of the project. Recruitment of such persons to advanced practical projects for external institutions is not recommended.

**8.** Proactive actions, adaptive approach to all stages of the work, starting from the establishment of the research problem and the scope of work, and ending on the formulation of conclusions, are of utmost importance. Quick responsiveness to the expectations and needs of all team members may effectively prevent problems. At the same time, it is very important

to define specific framework of action and establish the schedule of work indicating relevant deadlines.

Confrontation of own experience with the knowledge conveyed by the authors of course books and articles on the management of interdisciplinary groups allowed us to draw two general conclusions. First of all, there is no one typical way to achieve success, but there are suggestions on how to perform the task and at the same time prevent disintegration of the project, taking the most important environmental factors into account. Secondly, interdisciplinary team work in addition to a multitude of perspectives, synergies and innovation entails a lot of unknowns that are unique as the people who make up the team. In our view, the key to success is discussion at every stage of a project and gradual yet systematic verification of owns habits.

## 5. SUMMARY

The guarantor of harmonious cooperation in such an environment is individual team members' motivation – if the project is not obligatory and the leader has a handful of carrots, whose potential is evaluated differently, but he lacks sticks to enforce debts. In this situation, creativity and skilful operation of soft competences are necessary to keep the team in the initial composition. Proactive actions and responsiveness to the current needs of the groups within clearly formulated schedules and clearly defined purpose are also important. The most significant element is the feedback, both vertical and horizontal. This allows the content and form to be adjusted in such a way so as to be understood by all the members.

A good leader of the project can be compared to a professional salesman – a person who is able to examine the needs of the customer and offer him a product that best fulfils his requirements. Moreover, he is able to carry out complementary sale by entering into negotiations with the customer, which will reveal his new needs and free resources to be allocated to the products offered by the merchant. Most of all, he builds his relationship upon reliable information and trust.

In the case of research work in question, the salesman – client relationship is represented by the students and the tutor (horizontally and vertically), whereas the product – a synergic group effort resulting in a report crowning the contact between different perspectives under an engineering and a social umbrella.

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