

PROJECT-BASED LEARNING FRAMEWORK FOR LARGE GROUPS: THE CASE STUDY OF THE SILESIAN METROPOLIS (GZM) MODEL

*ZAŁOŻENIA PROJEKTÓW W FORMULE PBL W DUŻYCH GRUPACH
PROJEKTOWYCH: PRZYPADEK MODELU STRUKTURY GZM*

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The research issue presented in the article is the application of the project-based learning (PBL) method with the participation of a group of forty-three students and two lecturers at the example of the design prepared for the Metropolitan Association of Upper Silesia and Dąbrowa Basin (MAUS / GZM) within the subject entitled City Structures.

Keywords: project-based learning, project-based framework, urban design, physical model, 3d model, 3d printing, team work design

Problemem badawczym artykułu jest wykorzystanie metody project based learning PBL przy udziale dużej grupy czterdziestu trzech studentów oraz dwóch prowadzących na przykładzie projektu wykonywanego dla Górnośląsko-Zagłębiowskiej Metropolii GZM w ramach przedmiotu Struktury miasta.

Słowa kluczowe: project based learning, uczenie się oparte na projektach, struktura oparta na projektach, urbanistyka, model fizyczny, model 3d, drukowanie 3d, projektowanie pracy zespołowej

objective → acquisition of knowledge → search for a solution → presentation

The term of Project-Based Learning is associated with *Inquiry-based learning* [which is an active form of learning based on asking forensic questions with *Problem-Based Learning*, i.e. learning by solving problems and tasks, and with *Design Thinking* which is a method of developing innovative products and services based on understanding the problems and needs of users.

Inquiry-based learning (also enquiry-based learning in British English) is a form of active learning that starts by posing questions, problems or scenarios—rather than simply presenting established facts or portraying a smooth path to knowledge.

https://en.wikipedia.org/wiki/Inquiry-based_learning (12.09.2018)

Problem-based learning (PBL) is a student-centered pedagogy in which students learn about a subject through the experience of solving an open-ended problem found in trigger material. The PBL process does not focus on problem solving with a defined solution, but it allows for the development of other desirable skills and attributes.

https://en.wikipedia.org/wiki/Problem-based_learning (12.09.2018)

Design thinking is a method for the practical, creative resolution of problems using the strategies designers use during the process of designing. Design thinking has also been developed as an approach to resolve issues outside of professional design practice, such as in business and social contexts.

https://en.wikipedia.org/wiki/Design_thinking (12.09.2018)

“The experience in urban planning education demonstrates that good results are brought about by expanding the forms of teaching outside of the classic ideas of design and by addressing actual, realistic subjects within workshops, competitions, so-called integrated projects etc.”..

“Doświadczenia z edukacji w zakresie urbanistyki pokazują, że dobre rezultaty daje rozszerzenie form nauczania poza klasyczne zajęcia projektowe i podejmowanie aktualnych, realistycznych tematów w ramach warsztatów, konkursów, tzw. projektów zintegrowanych itp.”.

Michał Stangel

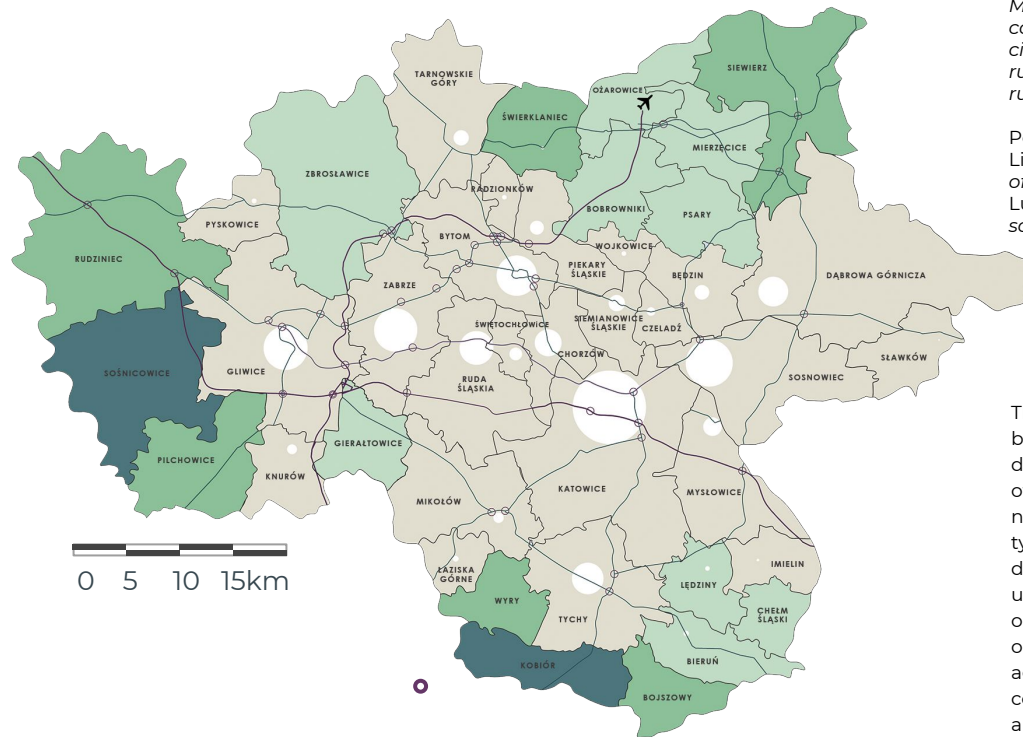
One of the reasons for undertaking the works on the project was establishment of the Metropolitan Association of Upper Silesia and Dąbrowa Basin (MAUS). The metropolis was established under the new Act on the Metropolitan Association in the Silesian Province of 9 March 2017 ^[10] It consists of 41 cities and communes from the areas of Upper Silesia and Dąbrowa Basin.

The main objective of the classes and the starting point for further analyses was examination, by the students, of structure of the communes making up the new entity.

Jednym z powodów dla których podjęto pracę nad projektem było powstanie Metropolii GZM. Metropolia powstała na podstawie nowej Ustawy o związku metropolitalnym w województwie Śląskim z dnia 9.03.2017. Metropolię tworzy 41 miast i gmin obszaru Górnego Śląska i Zagłębia Dąbrowskiego.

Głównym celem zajęć oraz punktem wyjścia do dalszych analiz było zbadanie przez studentów struktury gmin tworzących nową jednostkę.

GZM METROPOLIS DIAGRAM

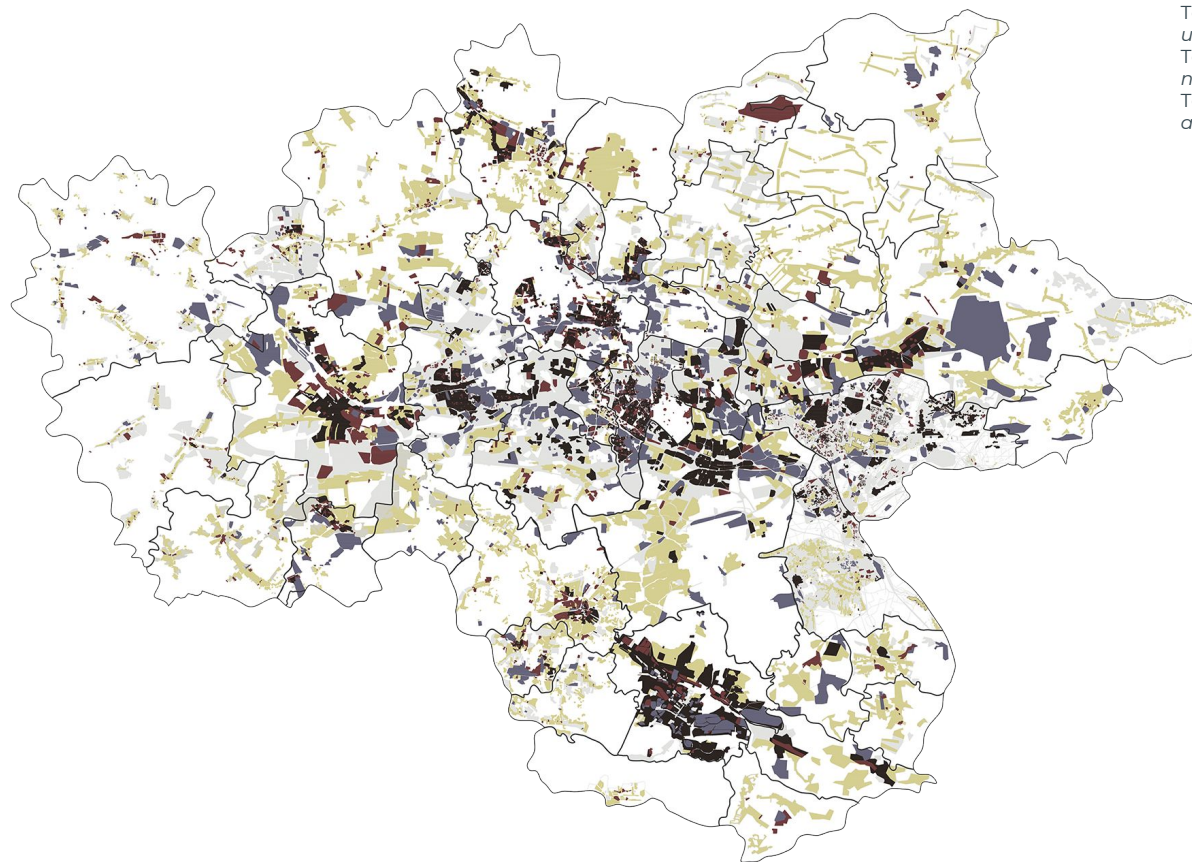


Metropolis consists of 41 communes, most of them are cities (23). The rest are: 10 rural communes, 6 rural-forestal and 2 forestal.

*Powierzchnia/ Area: 2 553m²
Liczba mieszkańców/ Number of inhabitants: 2 279 560
Ludność na km² / people per sq km. : 893*

The municipalities belonging to the GZM are difficult to compare, as each of them is different in nature. After analysis of their types, a core can be distinguished, which are urban municipalities formed on the east-west axis. The outskirts are formed by agricultural and forestry communes are the outskirts around the main urban centres.

GZM LAND USE PATTERN

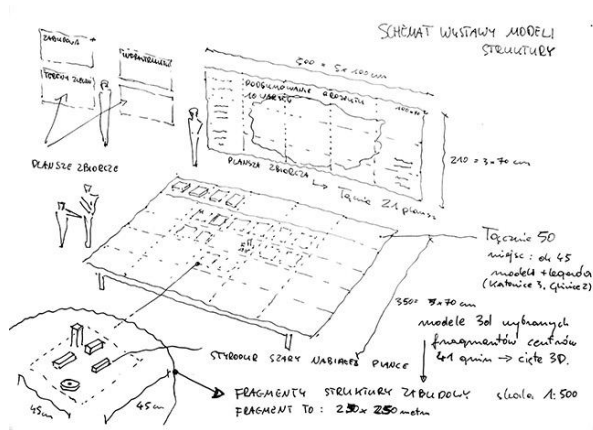


Tereny zurbanizowane/ <i>urbanized area</i>	28%
Tereny niezurbanizowane/ <i>non-urbanized area</i>	65,65%
Tereny przeznaczone do urbanizacji/ <i>areas intended for investment</i>	6,35%,



● tereny zurbanizowane ● tereny niezurbanizowane ● tereny przeznaczone do urbanizacji

ASSUMED AND EXECUTED PROJECT EVOLUTION



Evolution of the concept. Working sketch illustrating the multi-scale model developed by all participants (author: Tomasz Bradecki), visualizing the models and displays in the room (author: Agnieszka Sztabkowska, Agnieszka Janas), final version: physical model display and drawing (photograph: Alicja Kochańska)

Szkic roboczy ilustrujący wielkoskalową makietę tworzoną przez wszystkich (autor: Tomasz Bradecki), wizualizacja makiety i wystawy w pomieszczeniu (autor: Agnieszka Sztabkowska, Agnieszka Janas), prezentacja końcowa: ekspozycja makiety i plansza (fot: Alicja Kochańska)

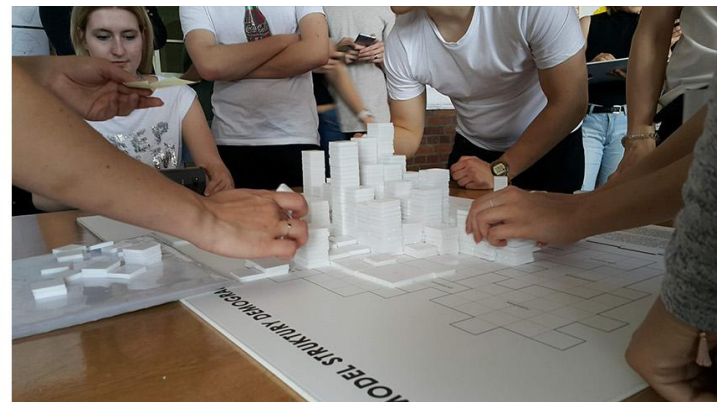
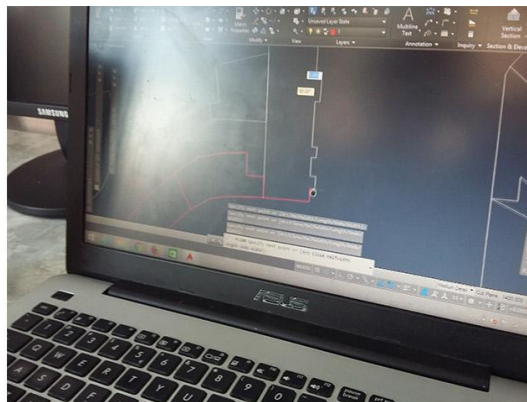
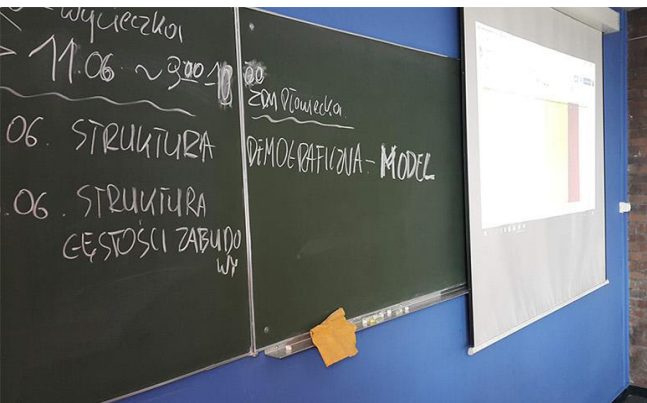
ASSUMED AND EXECUTED PROJECT - workshops



Initial arrangement of desks in the shape of a horseshoe, classic arrangement of desks (photograph: Tomasz Bradecki)

Pierwotne ustawienie ławek w podkowę , klasyczne ustawienie ławek (fot. Tomasz Bradecki)

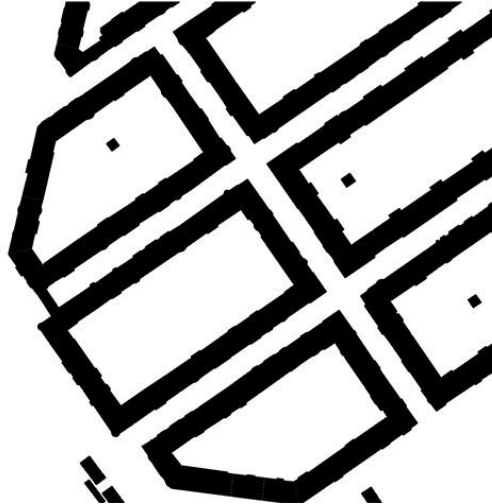
ASSUMED AND EXECUTED PROJECT - workshops



Various forms of works during classes: blackboard (photograph: Tomasz Bradecki), laptop (photograph: Aleksandra Kuśmierz), manual works (photograph: Tomasz Bradecki)

Różne formy pracy na zajęciach: tablica (fot. Tomasz Bradecki), laptop (fot. Aleksandra Kuśmierz), praca manualna (fot. Tomasz Bradecki)

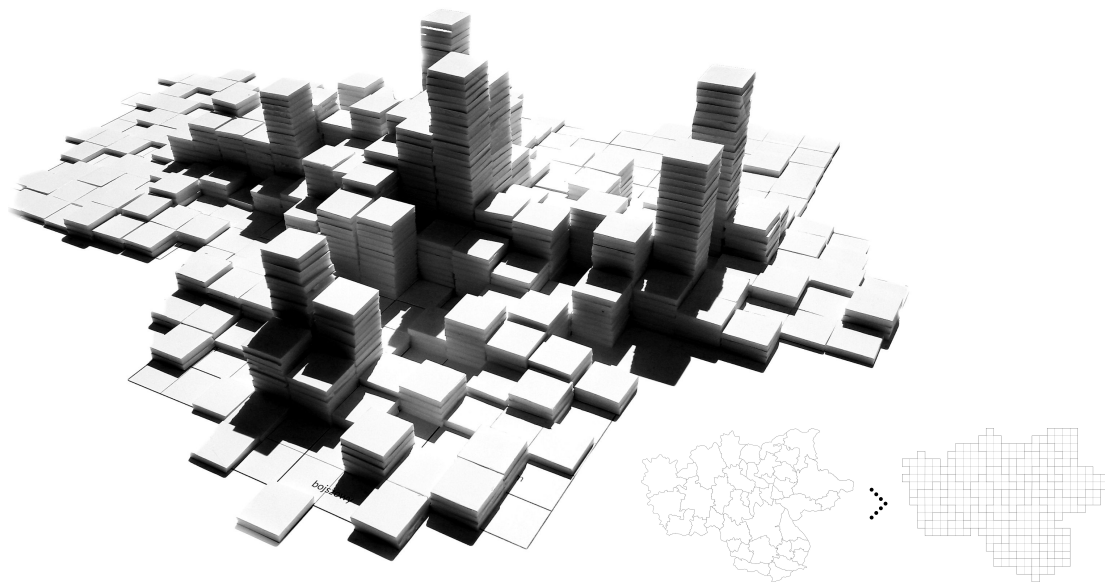
ASSUMED AND EXECUTED PROJECT - on site visit and 3d model



The process of developing a fragment of a public space physical model (authors: Marek Grąbczewski, Małgorzata Karolak, Magdalena Wojtowicz)

Proces tworzenia fragmentu makiety przestrzeni publicznych (autorzy: :Marek Grąbczewski, Małgorzata Karolak, Magdalena Wojtowicz)

PROJECT'S OUTCOME



Analysis of the demographic structure diversification in the area of GZM was performed, this structure is complex: some areas are characterized by high population density (average 13 people / ha urban areas), while others are low (average 2 persons / ha rural areas), however the average result is 9 persons / ha, divided into squares with dim. 3km x 3km which gives a dimension of 3cm x 3cm in the scale model. For individual municipalities, the total population was analyzed, including the division into districts and data of districts, villages or the areas, included in communal statistics. The collected data was averaged for the needs of the synthetic model. The data prepared in this way was modeled in the form of real model.

PROJECT'S OUTCOME

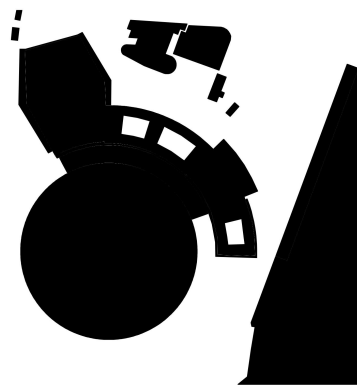


The most characteristic and representative public spaces or objects performing public functions were selected for the analysis of public spaces of the GZM. The analysis limited the scope so as to make the spaces comparable. It is assumed that fragments with a side of 250x250m will be representative. Due to the importance of some cities and the composition of the whole, it was assumed that for Katowice 4 fragments would be presented, for Gliwice, Bytom, Zabrze, Tychy 2 fragments.

PROJECT'S OUTCOME



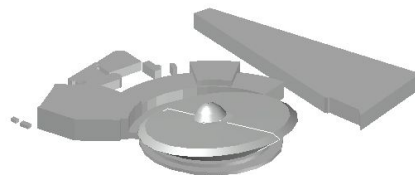
Spodek, Katowice - zdjęcie autorskie | *Spodek, Katowice - authorial picture*



schemat 2d | *2d scheme picture*

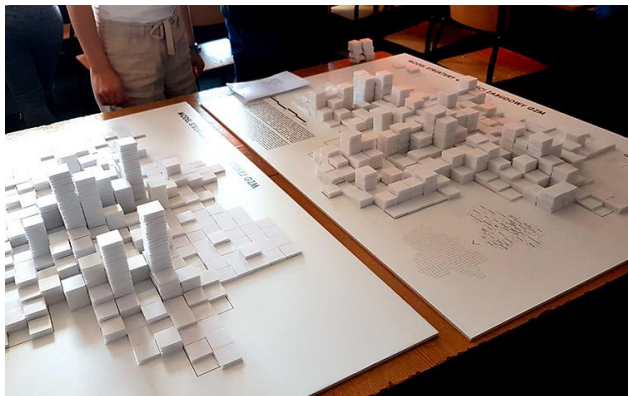


zdjęcie makiety | *physical model picture*



model komputerowy 3d | *computer 3d model picture*

ASSUMED AND EXECUTED PROJECT - preparing the exhibition and common presentation



Structural physical models (photograph: Aleksandra Kuśmierz), graphical structure model, model of fragments of public space (photograph: Alicja Kocharńska)

Makieta modelu struktury (fot. Aleksandra Kuśmierz), graficzny model struktury, makieta fragmentów struktury przestrzeni publicznych (fot. Alicja Kocharńska)

ASSUMED AND EXECUTED PROJECT TIMELINE

1	2	3	4	5	[months]	
pre-project phase	project phase				effects	
assumptions; determining the researched area and the tasks	analyses				internal presentation, drawings, one physical model	
		data collection				
			data summary			
				model development		
						execution

Diagram of the assumed course of the project over 5 months

1	2	3	4	5	[months]
<i>pre-project phase</i>	<i>project phase</i>				<i>effect</i>
<i>assumptions: determining the scope of works, the tasks and the scale</i>	<i>analyses, modification of assumptions</i>				<i>public presentation and exhibition, three physical models, a film, drawings</i>
		<i>data collection</i>			
			<i>data summary</i>		
				<i>model development</i>	
				<i>execution</i>	

Actual execution of the project over 5 months

CONCLUSIONS

GOAL	TOOL	EFFECT	EFFECT ASSESSMENT
<i>preparation of work organization in groups</i>	<i>meetings/discussions</i>	<i>effective exchange of opinions with the possibility to easily draw conclusions</i>	<i>good</i>
<i>remote communication</i>	<i>Facebook group</i>	<i>fast flow of information</i>	<i>good</i>
<i>easy exchange and sharing of data</i>	<i>Google Drive</i>	<i>orderly database</i>	<i>very good</i>
<i>preparation of joint analyses, effects</i>	<i>Google Presentation</i>	<i>final presentation</i>	<i>good</i>
<i>precision of the actual large-scale physical model</i>	<i>Cad software, 3D software, 3D cutter</i>	<i>physical model of fragments of public space</i>	<i>very good</i>
<i>schematic and logical presentation of spatial data</i>	<i>numerical data, foam</i>	<i>structural physical models</i>	<i>very good</i>
<i>combination of the effects of group work into a whole</i>	<i>Cad software</i>	<i>structural model drawings</i>	<i>very good</i>

Execution of the respective tasks, selection of tools and assessment of their effects

CONCLUSIONS

	PBL	PBL with 43 persons
number of people	about a dozen	43
lecturers	one/two	two + coordinators
division of duties	easier/equal division	impossible to assign equally
time engagement	equal for all students	depending on the duties performed
scope	limited, possible to be executed by about a dozen persons	possible to execute a larger scope with a large group
budget	adapter to the scope, low	bigger due to scale of the project
project process	classic model adapter to execution of simple projects	model adapted to execution of complex projects

Comparison of the assumptions of classic PBL and the PBL with a large number of participants

CONCLUSIONS

Working in such a big project team in a PBL model results in the following conclusions and insights.

It is necessary to maintain a precise but also flexible schedule, we we noted that almost no task was executed on time. This usually resulted from the need to coordinate the cooperation, systematize the works

The supervisory-organizational team allowed to significantly streamline the works.

Praca w tak dużym zespole projektowym w modelu PBL prowadzi do następujących wniosków i spostrzeżeń.

Konieczne jest utrzymanie precyzyjnego, ale również elastycznego harmonogramu, Zauważyliśmy, że prawie żadne zadanie nie zostało wykonane na czas. Zwykle wynikało to z potrzeby skoordynowania współpracy, usystematyzowania prac

Zespół nadzorczo-organizacyjny pozwolił znacząco usprawnić pracę.

CONCLUSIONS

The main drawbacks of executing a project in such a large group included: shortage of time, inability to perform all the tasks together during the classes, and conflicts while connecting the effects of works from the respective tasks.

Główne wady realizacji projektu w tak dużej grupie to:

niedobór czasu,

niemożność wykonywania wszystkich zadań łącznie podczas zajęć i konfliktów podczas łączenia efektów prac z poszczególnych zadań.

CONCLUSIONS

According to the authors, PBL projects for large groups of students are effective in the field of urban and spatial planning. They are capable of preparing students to professional work or to the jobs related to the given field.

Zdaniem autorów wieloosobowe projekty PBL sprawdzają się w dyscyplinie projektowania urbanistycznego i planowania przestrzennego. Mogą w znakomity sposób przygotowywać do pracy w zespole w zawodzie, lub zawodach pokrewnych związanych z daną dziedziną.

VIDEO OF THE DESIGN PROCESS AND EXHIBITION

<https://youtu.be/lvozocq6xPE>



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PRESENTATION: Patrycja Dapa, Marta Cabaj, Magdalena Opania, Wiktoria Dziadula, Mateusz Śnieżek

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