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REPRESENTING URBAN SPACE ACCORDING TO THE FEATURES OF THE IDEAL CITY

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ABSTRACT

This study focused on high school students' representing the real and ideal urban spaces on plans and it also focused on their representing of these spaces in texts. Students worked in groups and we presented their results: the city plans created for three ideal cities. We analysed the represented geographical elements, the functions of those cities, and the difficulties that students had in perceiving and representing geographical space.

Keywords: *city functions, city plan, project-based learning, city plan for the ideal city*

INTRODUCTION

We conceived this qualitative research after noticing that students had difficulties in representing space on plans and on map sketches and in understanding the relationships between extant elements on the surface of

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the Earth (Dulamă, 2006). Moreover, we started from our concern to find practical ways to increase students' level of understanding of the geographical space and the quality of students' representations of this space (Dulamă, 2006; Mândruţ, 2003; Mândruţ, 2012). This study focuses on high school students' representing the real and ideal urban spaces on plans and focuses also on their representing of these spaces in texts. These students were working in groups. We analysed the results of three groups of high school students who presented their results during a Geography class: the city plans created for three ideal cities.

There are a series of criteria or groups of criteria according to which scientists or people in general have made a hierarchy for cities in order to be "ideal": the highest wages in the world, best life quality, best living conditions, excellent infrastructure, safe streets, high number of parks, medical services, culture, environment, and education. Our aim was not to research the criteria according to which our students planned the ideal city and not to compare the plans of their ideal cities to diverse models of ideal cities in the world. We focused mainly on making our students perceive the urban space in an integrated and prospective manner, from the standpoint of sustainable development and to form students' following competences (Dulamă, 2010a, pp. 75-76): to analyse the features of cities in general (strengths, weaknesses, opportunities, and risks); analysing a city plan (Dulamă, 2010a, p. 87-88); to elaborate a city plan (Dulamă, 2010a, pp. 77-80); to present a city plan (Dulamă, 2010a, pp. 77-80); analysing the functional areas of a city (Dulamă, 2010a, pp. 85-86);to solve problems in a creative way, and to give arguments for the proposed solutions. We proposed our students the subject of the ideal city mainly to motivate them solve the task in a creative manner in order to form the above mentioned competences.

In the context of this research, we asked a series of questions. The main question for which we tried to find the answer was: How do high school students represented urban space on a plan and in writing? From this question, other related questions emerged: Which were the geographical elements of the urban space that students represented on a plan? Which were the symbols they used? How do students place the geographical elements of the urban space? What kind of relationships do students establish between geographical elements and the functions of cities?

THEORETICAL CONSIDERATIONS

The concern for creating a city that meets all inhabitants' needs is an old one and a proof is represented by the phases in the evolution of urban planning (Filip, 2009): from pseudo-urban planning (Antiquity-1850) to the beginning of urban planning (1850-1899), the phase of urban experiments (1900-1959 – Garden City and its urban variants; City Beautiful and La Ville

Radieuse), the phase of conceptual maturation (1960-1993) and to the contemporary phase (after 1993).

The contemporary period in the evolution of urban planning is very rich in concepts (Asmervik, Simensen, 2005; Beatley, 2000; Clark, 1996; Cuthbert, 2007; Downton, 2009; Ellin, 2006; Frey, 1999; Hall, 1996, 2005; Kaufmann, 2005; LeGates, Stout, ed., 2005; Platt, 2006; Thomas, 2007; 2007 – *Leipzig Charter on Sustainable European Cities*) and may be characterised through two syntagms: *sustainable development* and *habitation quality* (Filip, 2009, p. 28). These, due to their intense use not only in scientific literature, but also in mass-media, are the ones that structure the city inhabitants' discourse about the way they imagine an ideal city. From this perspective, students are no exception.

METHOD

Research Design

At the basis of our research was the constructivist paradigm (Piaget, 1969; Doolittle, Hicks, 2003; Joiţa, 2006). In order to answer the questions asked at the beginning of our research, in order to test hypotheses, we organised an activity during which students elaborated a plan in which they represented the ideal city and they also elaborated a text about the respective plan. *The main objective* of our research was to study the results obtained by the group of students after elaborating the plans for ideal cities. *The secondary objectives* of our research were the following: 1) Analysing students' plans (representations) (identifying errors and difficulties); 2) Analysing the texts that students wrote about the city plans; 3) Identifying ways to better students' representations of the urban space and identifying future research directions.

The hypothesis of our research was the following: students had difficulties in identifying the components of the urban space, the relationships between these components and their representation on a plan.

Place and time of research. As a teacher (Andreea Conţiu) and not as a researcher, I organised this activity in November-December 2010, during Geography classes and as homework for students at the "Alexandru Papiu Ilarian" National College in Târgu-Mureş. For Geography, in the 10th grade, students had one class per week.

Participants. 27 students got involved in our research. They were in the 10th grade, Sciences of Nature specialisation, English-intensive class. We divided students in three groups that were heterogeneous in what students' genre and level of competence in Geography were concerned, but the groups were formed of students having the same age (16-17 years old). Students accepted to use their products in this research given that they remained anonymous.

Procedure. In order to fulfil our research objectives, students got involved in a project-based learning situation undergoing several stages.

Stage 1. Discussing task and objectives with students. We told them that they were to realise a group project – the city plan for an ideal city – and that the project was due in 21 days and that they will present their project in front of their colleagues, during the Geography class. We told our students that through this activity we aimed to accomplishing a series of objectives: students were to learn how to represent urban space on a plan and to describe it in an analytical way in both a written and an oral text; students would learn to give arguments for their solutions and opinions on planning a city and on the ideal city concept; students would have to think in a creative manner to the life style and quality of the life they wanted for them. We phrased the task in the following way:

Task: Form three teams, each of them having nine students. Each team will elaborate a city plan for the ideal city, using an A1 paperboard. The project is due in 21 days. You will write a text in order to present the plan. You will present the plan in front of your colleagues, on the 8th of December 2010. You will give arguments to support that the city plan you conceived is the one for an ideal city.

Stage 2. Elaborating the plan for the ideal city. Students formed three groups. The members of each group organised their activity and distributed tasks independently. The members of the groups elaborated city plans as homework, not during Geography classes.

Stage 3. Presenting results. Groups presented their city plans in front of the classroom during a Geography class. Discussions took place after each presentation.

Collecting data. The data undergoing research were the three plans students realised, their written and oral texts associated to those plans. During the activity of data-collecting and processing the whole research team was involved (Maria Eliza Dulamă, Oana-Ramona Ilovan, Andreea Conţiu, Hadrian-V. Conţiu).

RESULTS AND DISCUSSIONS

Analysing students' city plans

We presented students' city plans in figures 1, 2 and 3. We analysed each plan starting from the criteria mentioned in table 1, not taking into account students' oral and written texts. According to those criteria, we grouped and analysed the symbols that students used for their city plans. We included the results of this analysis in Table 1.

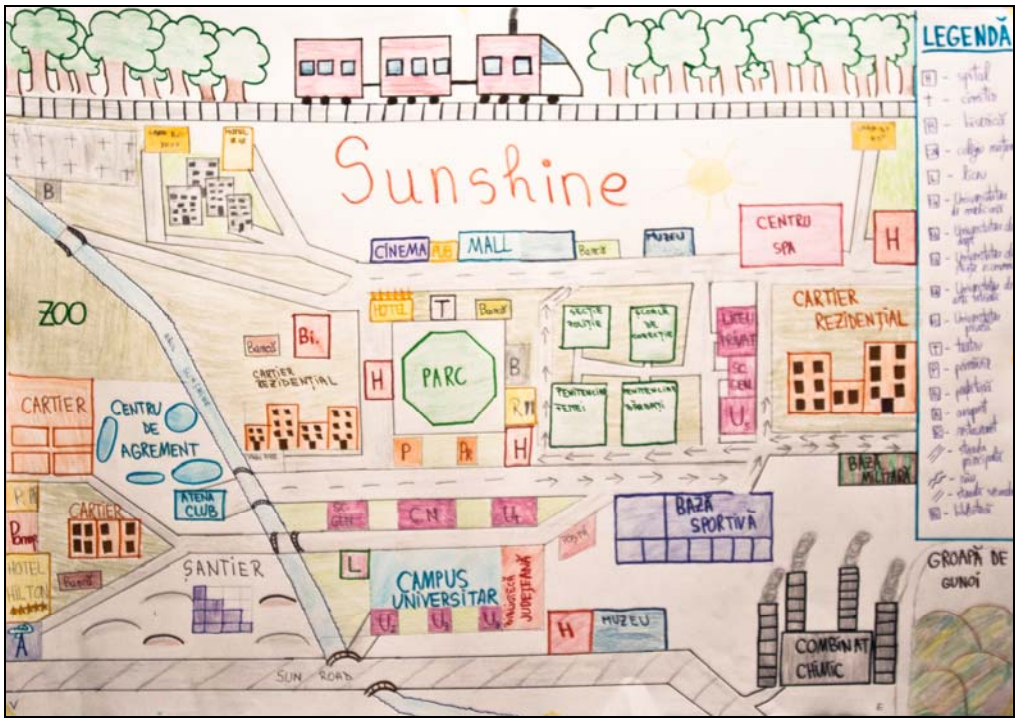

Fig. 1. Sunshine City Plan

Fig. 2. Green City Plan

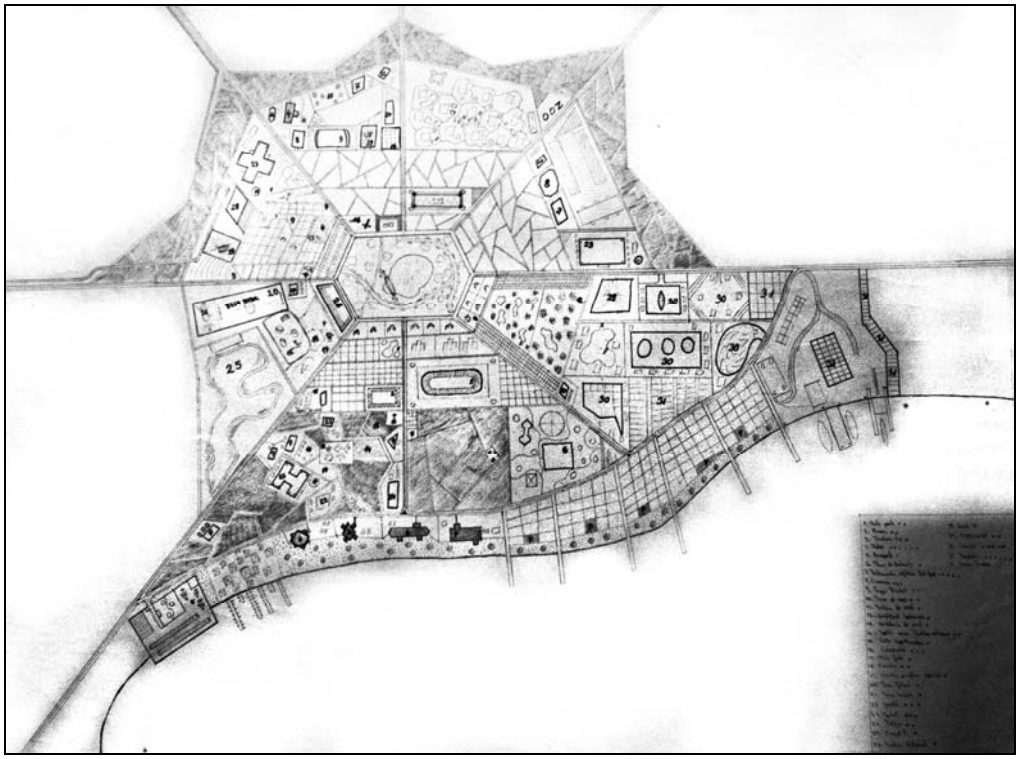

Fig. 3. Maya City Plan

Table 1. Geographical elements students represented on their city plans

Criterion	Geographical element	Sunshine	Green City	Maya
Representing buildings for dwelling	Quarters, neighbourhoods	Students represented quarters and neighbourhoods. They represented some of the buildings in a horizontal plan and others in a vertical plan drawing the windows and entrance doors of the respective buildings.	They represented three residential neighbourhoods: two new ones, a low developed one and the old city centre.	In the legend, students included no conventional sign for houses and within the plan it was not clear which were the buildings for dwelling.
Representing industrial, agricultural, financial, social and cultural	Prefecture	The prefecture lied in the city centre.	The prefecture lied in the city centre.	
	The Mayor's House	The Mayor's House lied in the city centre.	The Mayor's House lied in the city centre.	

constructions	Universities	Five universities lied in the city centre. Students wrote their names in the legend, and inside the city plan, they represented them with letters and numbers: U1, U2, U3, U4, and U5.		
	Schools (secondary schools and high schools)	Students represented in the central area two secondary schools, a national college, and a private high school.	Students represented four schools, one in each neighbourhood.	Students represented three schools, two in the south-west, and one in the north, at the city margins.
	Hospitals	Students distributed four hospitals in diverse places in the city, they did not group them. They used the correct symbol: H.	Students represented five hospitals, one in each neighbourhood, and a larger hospital near the city centre.	Students represented three hospitals: one in the south-west, one in the north-west, and another one in the east.
	Museums	Students represented two museums, but they did not mention their themes.		Students represented two museums, but they did not mention their themes.
	Libraries	Students used the symbol Bi for the library. They placed the county library (not the university library) in the university campus.		
	Theatres	Students placed a theatre (the T letter) in the central area.		Students placed a National Theatre nearby the city centre and a Summer theatre in the south-west.

	Cinemas	Students placed a cinema in the central area.		Students placed three cinemas in different areas in the city.
	Churches, cathedrals	Students represented two churches (represented with letter B): one near the cemetery and one in the city centre.	Students placed a church near the bus station and the old city centre.	Students placed three cathedrals: two in the north-west of the city, one nearby the central area.
	Banks	Students placed four banks in diverse places in the city.	Students placed a bank near the city centre.	
	Mail office	Students placed a mail office in the city centre.		
	Malls, commercial centres, shops	Students placed a mall in the city centre.	Students placed the commercial centre (the mall) in the north of the city.	Students placed three supermarkets in the west. They placed two hyper-markets in opposite parts (west-east).
	Restaurants	Students represented two restaurants.		In the city (no. 7), students represented five restaurants, confectioneries, and fast foods.
	Police station	Students placed it nearby the central area.	Students placed it in the city centre.	Students placed two police stations: one in the south, near the hotels, and one in the north.
	Jails, reformatory	They placed the jail for women, that for men, and a reformato-ry nearby the central area.	Students represented a jail on an island (in a lake or sea).	
	Military basis	They placed it near the city margins.		

	Cemetery	Students represented the cemetery through a grey surface with symbols like black crosses. They placed it in the north-west.	Students placed the cemetery at the city margins.	They represented two cemeteries: one in the south-west and another one in the north of the city.
	Hotel	They represented three hotels: the 5 stars Hilton, a two stars hotel and one with no stars.		They represented six hotels. They placed four of them in the south of the city where we deduced that there was a sea with dams perpendicularly on the seashore.
	Zoos and botanical gardens	Students represented a green area for the Zoo.	The Zoo had a large area in the north-west.	Students placed the Zoo in the north and the Botanical Gardens in the city centre.
	Recreation centre, Centre for tourism	Students placed the recreation centre in a neighbourhood in the west.	Students placed the Centre for tourism in the north-east, on the shore of the lake or of the sea.	
	Spa centre	They placed it in the central area.		
	Athletic centre	They placed it in the south-east.	-	They placed a centre for training and sports near the athletic centre. They also placed a judo club near the athletic centre.
	Clubs	They placed a club named Atena in one of the neighbourhoods.		
	Stadiums, gymnasia, fields for sports			They represented three stadiums. They placed

				the athletic centre, a football field and one for basketball in the west.
	Formula 1 circuit			They placed it in the west.
	Industrial constructions (factories, plants); building sites	Through a drawing in a vertical plan, they represented a chemical factory. A building site lied in the south-west of the city.	They represented an industrial centre in the south-west of the city, at a significant distance from the city.	They grouped five factories in the east. These formed an industrial area. Five deposits lied nearby.
	Cesspool	They drew it similarly to some bushes in a vertical plan, they did not use symbols.		
Representing the transport network and the related constructions	Streets	Students represented the streets through double lines, and they coloured the space between the lines with grey. The main street had a line interrupted in the middle. On some of the streets, they drew arrows without explaining their significance in the legend.	The street network was rectangular in neighbourhoods and in the old city centre, it was irregular. The city centre had a circular street network crossed by a river and a street perpendicular on the river.	The street network was radial-concentric. Eight streets started from the central area.
	Alleys	They did not represent the alleys in the neighbourhoods.	Alleys looked messy in the amusement park and in the touristic area.	
	Bridges	Students represented four bridges over the River Sunshine.	Students did not represent bridges through symbols. They should have represented six bridges.	

	Railways	Students used the correct symbol, but they drew only one train (in a vertical plan) a railway.	They represented no railways, although they placed a railway station.	They represented the railway station through two lines united through thin oblique lines. We deduced it was a railway because they placed it near the railway station.
	Railway station	They represented two railway stations: the Western Railway Station and the Eastern Railway Station.	Students represented a railway station.	They placed it in the in the north-west.
	Bus station		They represented a bus station.	
	Airports	They represented an airport through a symbol representing the letter A and a plane.	They represented an airport in the west.	They placed an airport in the south-west, on the seashore.
	Harbours		A harbour lied in the north-west of the city, on the shore of the lake or of the sea.	They did not mention the harbour in the legend, but we deduced from their drawings of ships and that it was in the south-east of the city.
	Subway			They drew the sign for the subway like a triangle.
Representing the hydrographical network	Rivers and rivulets	They coloured the River Sunshine with nuances of blue. They represented the river banks with winding blue lines.	They represented a river that flowed through the city centre. They did not name it.	
	Lakes	They represented four	They represented a	

		lakes in the recreation centre, but they did not include the symbol for the lake in the legend.	lake. They did not include the symbol for lake in the legend so that surface could be a sea or an ocean. They did not name it.	
Representing vegetation	Parks, green areaa	Students represented a hexagon shaped park in the city centre. They did not use a symbol, but wrote the word "Parc" inside the green surface.	The amusement park was as large as a neighbourhood was. Students placed a park in the city centre.	Students placed two national parks: one in the city centre and one in the west. They placed the amusement park in the south of the city, nearby the seaside and the four hotels. There was a park for children, two green areas and artesian fountains in the south-west.
	Trees	In the superior part of the city plan, students drew trees in a vertical plan. They did not represent the trees using symbols.	Students represented trees through two types of symbols, but they did not include the respective symbols in the legend.	
Elements of writing	Title	The title was inside the city plan, not above it.	Students did not write the title above the city plan.	Students wrote no title on the city plan.
	The North	Students did not indicate the north.	Students represented the cardinal points.	Students did not indicate the north.
The components of the legend	Title	The legend had a title.	The legend had a title.	The legend did not have a title.
	Symbols used	The legend did not include all the symbols used. Students used letters in order to specify	The legend did not include all the symbols used. They used numbers from 1 to 30 placed in a	The legend did not include all the symbols used. They used numbers from 1 to 32

		the use of buildings: B – church; Bi – library; T - theatre; R – restaurant; A – airport; U – university; L – high school; P – the Mayor's House; Pr – prefecture, etc. Students use common symbols for hospital (H), river, street, and railway. They do not present in the legend the significance of the colours they used in the city plan.	small circle in order to specify the significance of geographical elements. For instance, 9 for schools, 6 for hospitals.	placed in a small circle in order to specify the significance of the geographical elements.
	Explanation of symbols	It was correct, but in several cases, it was written with words that started with small case letter.	It was correct.	It was correct.

Table 2. Geographical elements students represented on their plans and associated to urban functions

Function		Geographical element	Sunshine	Green City	Maya
Industrial		Industrial buildings	x	x	x
		Building sites	x		
Commercial		Malls, commercial centres, shops	x	x	x
		Restaurants	x		x
		Clubs	x		
Service	residential	Quarters, buildings	x	x	x
	social	Recreation centre	x		
		Touristic centre		x	
		Spa centre	x		
		Athletic fields Centre for sports	x	-	x
		Judo club			x

		Stadium			x
		Athletic centre			x
		Formula 1 circuit			x
	touristic	Hotels	x		x
		Zoo	x	x	x
		Botanical gardens			x
	medical	Hospitals	x	x	x
	transport and communications	Streets	x	x	x
		Alleys	x	x	x
		Bridges	x	x	-
		Railways	x	-	x
		Railway station	x	x	x
		Bus station		x	
		Airport	x	x	x
		Harbour		x	x
		Subway			x
		Mail office	x		
Administrative		Prefecture	x	x	
		Mayor’s House	x	x	
		Police	x	x	x
		Jail	x	x	
		Reformatory	x		
		Cemetery	x	x	x
		Cesspool	x		
Cultural		Universities	x		
		Schools (secondary schools and high schools)	x	x	x
		Museums	x	-	x
		Libraries	x		
		Theatres	x		x
		Cinemas	x		x
		Churches, cathedrals	x	x	x
Military		Military basis	x		
Financial		Banks	x	x	

After analysing the three city plans, we reached the following conclusions:

Sunshine City Plan was a mosaic of elements represented in two plans: a horizontal and a vertical one (the chemical factory, some of the blocks of flats, the train, and the trees) and this demonstrated that students did not understand the way in which plans and maps represented reality. The legend included common symbols (hospital, river, street, and railway) and symbols that the students created for that plan, using mainly letters and that created difficulties in reading the respective plan. On some of the buildings or places, they wrote their destination and that facilitated understanding their city plan. They coloured the buildings and the space between them, using the same colour for buildings having the same use, but they did not include the significance of the respective colours in the legend. The street network was rectangular. The title written inside the plan and the represented sun indicated that students forgot about the title and added it in the end.

Green City Plan had a central area that was circular hosting a park that occupied most of it and where students placed the Prefecture, the Mayor's House, the Police station, and a university. The city had several nuclei. The neighbourhood in the old city centre had a chaotic structure, the streets were sinuous, and the new neighbourhoods were rectangular. Between neighbourhoods students represented large green areas. Students placed the harbour, the airport, the railway station, the bus station, and the industrial centre at the city margins. They placed the commercial centre, the amusement park, and the zoo within the green area and at a long distance from the represented neighbourhoods.

Maya City Plan had a central nucleus shaped as a hexagon, probably hosting a park or a walking area. The city had a radial-concentric form. From the central area, to the margins of the city started eight main streets. The southern part seemed to border a sea or an ocean. On the shore, students placed an airport, a touristic harbour, a commercial harbour and an area with no buildings, possibly having a touristic destination where there were four hotels. The symbols in the legend did not give explanations for the residential areas and that did not create their delimitation from the green areas. Students distributed randomly within the built-up areas buildings having diverse functions. Still, we noticed that they placed factories and deposits in an industrial area.

We associated the geographical elements represented in the three plans with the city functions. In table 2, one could notice the functions of each of the three cities although we did not take into account the percentage of active population. Analysing the infrastructure for each city we noticed that *Sunshine* City had no harbour, subway, bus station, and stadium. *City Green* had no restaurants, stadium, sports fields, mail offices, subway, libraries, museums, theatres, and cinemas. In *Maya City,* there were no banks, Mayor's House, prefecture, mail offices, universities, but there were many buildings for sports.

Analysis of students' texts on the three cities

Sunshine City. From the students' text, we found out that this was a new European City, with an area of 5,000 km^2 and 500,000 inhabitants. The city, in full development, had diverse functions: service (tourism, transport), cultural, and industrial functions. The touristic function was "one of the most developed ones". The city hosted hotels for "all social classes". It also had a commercial centre hosting a cinema, a theatre, and malls. The five neighbourhoods were the following: "two residential, two for the middle class and a ghetto". According to students' perspective, the cultural function was important for the city, and that was why the city hosted two big libraries, two secondary schools, two high schools (one of them being a private one), a university campus, five universities (the Private University, the University for Theatrical Arts, the University for Economic Sciences, the Law School, the Medical Science University). The city also had three public hospitals and a private one, all of them having new medical infrastructure and highly qualified personnel. The care for the protection of the city resulted from placing industrial plants in the opposite part to the direction of wind blow.

Green City. From the text, we found out that students placed their ideal city on the shore of the Mediterranean Sea, along a river, surrounded by forests and agricultural land. They demonstrated that they understood the relationship between resources (water, forests, and soil) and the development of human settlements. The name of the city – Green City – was justified by the fact that students proposed the protection of the extant green area and the building of an industrial centre based mainly on green drainless energy (solar and wind energy).

Starting from a small medieval borough, students proposed developing the sectors of economy equally. In order to ensure the development of the touristic function of the city, students conceived a neighbourhood on the seaside. In the beginning, they proposed accommodating tourists in the locals' houses and, in a second development phase, they targeted the building of a complex centre for tourism. In order to ensure the industrial and commercial functions, students proposed the development of an industrial centre and of a neighbourhood with cheap housing in the south-western part of the city. The old neighbourhood (no. 18) hosted the commercial function and that neighbourhood also had agricultural and cultural functions. Then, students also included on the plan other four neighbourhoods having the following functions: administrative, commercial, industrial, touristic, agricultural, transport, and cultural (a university complex in the city centre). They mentioned that all neighbourhoods had their own schools, hospitals, and other buildings for services. They underlined the importance of the airport and of the harbour for commercial exchanges and for tourism (e.g. pleasure cruise boats sailing on the river). Students mentioned that there was a plan for placing the geographical elements of the urban area: they placed the commercial centre in the northern-central part of the city at approximately equal distance to the harbour, airport, and the industrial area; they transferred

the administrative function to the present central area of the city; they built industrial objectives in the south-west, in the opposite direction to the main direction of the wind, in order to avoid pollution. Students considered that Green City was the model for the ideal city and that in the future their plan would accommodate everybody's needs.

Maya City was created in 1580 by conquistadors. This city was situated in Central America, as a harbour at the Caribbean Sea. It developed after 1850 due to coffee cultivation on the plantations around the city, and today due to the cultivation of rubber trees. Two industries developed: the coffee processing industry and the rubber processing industry. The city exports coffee, latex, and rubber. Nowadays, the city enlarges its space through deforestation and draining of swamps. The central park had 4 km^2 and had a significant role for recreation. In the northern neighbourhood, students placed the Mayor's House, prefecture, a national theatre, and old houses dating back to 1650. The city had five residential neighbourhoods and an office complex lying in the south of the city. The city offered many spaces for recreation: an amusement park, two stadiums, a botanical garden, a zoo – one of the biggest in the world and also a starting point for safari in the jungle nearby. There was also a sports centre with facilities that allowed practicing many sports. Students mentioned that the city would be the host of the 2016 Olympics.

We noticed that students had difficulties in identifying the components of the urban space and in understanding the complexity of urban phenomena. Even if they had the task to conceive an ideal city, they did not answer to all inhabitants' needs. They did not solve problems related to: supplying water, electrical energy, natural gas, waste transportation and storage, ensuring jobs, urban transport, etc. Students had difficulties in representing geographical elements on the city plan: they used numbers and letters instead of conventional symbols; they combined representations in a horizontal plan with those in a vertical one; they used symbols they did not include in the legend; they did not give explanations in the legend for the colours they used; no graphical or numerical scale.

Identifying ways of making students' representations of the urban space better. Identifying future research directions

Starting from the above-mentioned conclusions we considered that future research could aim at the following: studying students' results (city plans) realised according to established criteria and let students know them (Dulamă, 2011; Mândruţ, Ardelean, 2012; Mândruţ, Catană, Mândruţ, 2012); studying students' results (city plans) relating them to detailed tasks and check lists (Dulamă, 2012, p. 373-378). Students should look for answers to the following questions: Which are the areas where we can place residential and industrial objectives? Where can people build streets, highways, railways, and subways? Which are the types of individual and public transport that people may use? Where can people place and arrange parks? What kinds of energy sources should people use? Where from may people find sources of water and natural gas? What should the city do with its waste?

In order to increase students' competence level in representing geographical space (Dulamă, 2010c), we recommend that those in charge optimise the Geography curriculum and school textbooks by means of including certain contents elements that have a practical dimension, not only a theoretical one (Dulamă, 2010b). Even though teachers want to organise learning activities in which their students develop skills and competences characteristic to Geography, because of the features of the present curriculum, focusing mainly on the informative dimension of Geography (*Programa şcolară de geografie pentru clasa a X-a [Geography Curriculum for the 10th Grade]*), the time resource is insufficient for teachers to focus also on the practical dimension of Geography.

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