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FORMING AND ASSESSING THE COMPETENCE TO ELABORATE PROPOSALS OF SPATIAL PLANNING MEASURES FOR HYDROGRAPHICAL BASINS

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Abstract: During the M.Sc. programme of *Resources and risks within the hydroatmospheric environment*, at the Faculty of Geography of Babeş-Bolyai University, in Cluj-Napoca, Romania, we aimed to form our students' competence to elaborate proposals of integrated spatial planning measures, at the course of *Integrated spatial planning of hydrographical basins*. For increasing the education quality concerning the elaboration of proposals for spatial planning measures and for developing university students' competence to elaborate such proposals at as high a level as possible, in this research we targeted the realising of five objectives. In order to achieve those objectives, we analysed the activities we had with our students. The tools we used during this research were very useful for the rigorous and systematic planning and organising of the activity and we introduced a series of novelty elements. By using those tools in this assessment type of research, we identified easily and quickly M.Sc. students' lacunae and mistakes when elaborating the proposals of integrated spatial planning measures for hydrographical basins, we categorised them and that enabled us to identify the ways to improve our future activity and students' results.

Keywords: proposals of spatial planning measures, hydrographical basin, Geography higher education, competence, assessment criterion, indicator

1. Introduction

This study had as a source our finding that Geography university students had difficulties when elaborating proposals of integrated spatial planning measures. At the Faculty of Geography of Babeş-Bolyai University, in Cluj-Napoca, Romania, we form the competence to elaborate proposals of spatial planning measures at the Bachelor's level, at the *Territorial Planning* specialisation, during three years of study, and then during Master's programmes lasting for two years of study.

During the M.Sc. programme of *Resources and risks within the hydroatmospheric environment*, at the course of *Integrated spatial planning of hydrographical basins*, in the syllabus, we mentioned that we aimed at developing our students' competences, such as: using the research principles, methods, and techniques adequate to the research aim, for identifying concrete solutions to real situations; using standard assessment criteria of the factors, processes, methods, and solutions. The general objective of the course was to get students involved into in-depth learning of the elaboration of proposals for spatial planning measures for hydrographical basins, approached as complex territorial systems, using up-to-date theories and relevant case studies. Some of the objectives characteristic of this course focused on: the strategic approach of a hydrographical basin; learning the practical ways of elaborating development strategies for hydrographical basins; analysing the critical aspects at the local and regional levels, as well as certain sustainable development strategies; using the research principles, methods, and techniques adequate to the research aim, for identifying concrete solutions to real situations; realising a case study on certain geographical processes and phenomena that pointed out students' capacity for analysis and synthesis, their originality, and appropriate use of the methodology. So that our M.Sc. students formed characteristic competences and achieved those objectives, we created the context for team work in order to have students elaborate proposals of integrated spatial planning measures for a certain hydrographical basin.

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As we cared for increasing the education quality concerning the elaboration of proposals for integrated spatial planning measures and for developing university students' competence to elaborate such proposals at as high a level as possible, in this research, we targeted the achievement of the following objectives:

1) the analysis *of the knowledge* integrated into the competence to elaborate proposals of spatial planning measures for hydrographical basins;

2) the analysis *of the procedure* to elaborate proposals of spatial planning measures for hydrographical basins;

3) the analysis *of the proposals* of spatial planning measures for hydrographical basins and students' competence level in elaborating those proposals;

4) the analysis *of students' mistakes* when elaborating proposals of spatial planning measures for the hydrographical basins and their causes;

5) the establishment *of certain ways of avoiding making mistakes* when elaborating proposals of spatial planning measures for hydrographical basins, *of improving the education process and students' results*.

In order to achieve the objectives of our research, we analysed the activities we had with our students at the course of *Integrated spatial planning of hydrographical basins* and we analysed five proposals, representing the total number realised by our M.Sc. students during that course. The respective proposals reflected the level of competence they reached at the end of the activity. In this study, we focused on the qualitative research results that were relevant landmarks for improving the educational activity at this course. The quantitative results obtained after using the assessment tool showed the M.Sc. students' competence level when finishing the elaboration of the proposals for spatial planning measures, for the respective hydrographical basins.

2. Theoretical background

We based this study, theoretically and methodologically, on the geographical literature about spatial planning in general, and about the hydrographical basins especially, as well as on the literature in the field of the sciences of education, focusing on forming and assessing competences.

2.1. On regional planning in geographical literature

In the geographical literature, scientists considered the limits of the hydrographical basins as a criterion for regionalisation and they perceived the hydrographical basins as a model that they compared to the circulatory system in the human body (Buache, 1757 apud Cocean, 2010, 5).

In the last decades, in Romania, geographers realised many studies on spatial planning and we mention the following that our students had easy access to: for the North-Western Region of Romania (Cocean, coord., 2004a), for Tăşnad micro-region (Cocean, coord., 2004b), for the peri-urban area of Bistrița (Cocean, coord., 2007; Cocean, 2010), for Mărginimea Sibiului region (Cocean, coord., 2009), for the Hârtibaciul Valley region (Cocean, coord., 2010), for the suburban area of Bistrița (Cocean Zotic, Puiu and Moldovan, 2010), and some of them were overlapping hydrographical basins: for the Tisza hydrographical basin, as a result of a successful cross-border project due to the catalyst role of the EU (Cocean and Vartanoff, coord., 2007), and for the Someş hydrographical basin (Cocean and Göncz, coord., 2012).

In Romania, a characteristic form of spatial organisation, overlapping sometimes precisely over the natural units represented by the river basins, is the "land" type unit (Cocean, 2010, 7-8; Ilovan, 2010). In the Romanian part of the Tisza hydrographical basin, during historical time, 10 such "land" type territorial units appeared (out of the total 18 in this country): Maramureş, Oaş, Lăpuş, Năsăud, Chioar, Silvania, Beiuş, Zarand, Haţeg, and the Land of the Moţi, and they were the best example for a spatial integration of both natural and human organisation (Cocean, 2010, 8). These lands have a significant role in sustainable resource exploitation and people should pay more attention to them when elaborating regional planning measures, especially because, beside the hydrographical basins, they are

examples of systemic functioning of the territory, focusing on exploiting territorial identity (regional characteristic features and regional pride) (Ilovan, 2009).

2.2. On forming and assessing competences in the literature of the Sciences of Education

Brien (1997) argues that a competence includes a sum of declarative knowledge, procedural knowledge, and attitudes that a person possesses and that are activated (transformed and integrated) when planning and performing a task characteristic to a certain field or to a certain situation. Dulamă considers that a competence is the complex capacity and the action (process) of selecting, transforming, combining, and appropriately integrating a sum of internal resources (i.e. a person's field and strategic knowledge, capacities, and skills) and of external ones, in an efficient manner, in due time, aiming at planning and performing independently a complex task or a group of certain tasks in a field, in a category of situations, that need a high number of operations and which end with a noticeable and assessable result (Dulamă, 2011, 54).

The same author presented a model for describing the knowledge integrated into a competence (declarative, procedural, and attitudinal knowledge) and the procedure (Dulamă, 2009, 247, 410; Dulamă, 2010). We used that model during our research. When assessing the competence, we took into account the assessment tools tested within previous research (Osaci-Costache, Dulamă, Alexandru and Voitovici, 2013; Osaci-Costache, Dulamă and Ilovan, 2013a; Osaci-Costache, Dulamă and Ilovan, 2013b; Dulamă and Ilovan, 2016). These analytical assessment grids for forming and developing a competence include several criteria and a list of indicators associated to each criterion.

3. Material and method

3.1. Participants and the research contents

Our study focused on analysing five proposals of spatial planning measures for certain hydrographical basins (the Vișeu – 2 students; the Talna – 3 students; the Ozana – 3 students; the Cerna – 1 student; the Bârgău – 2 students), realised during the 2015-2016 academic year by 11 students in the first year at the M.Sc. programme of *Resources and risks within the hydroatmospheric environment* at the Faculty of Geography at Babeș-Bolyai University in Cluj-Napoca. The students realised the respective proposals for spatial planning measures and developed their competence to elaborate such proposals at the course of *Integrated spatial planning of hydrographical basins*. The students involved in this study realised the courses and seminars with the same professor (the second author of this paper). Among the students that represented the analysed population (the subject variable), there were differences in what their initial education (i.e. knowledge level, competence level) was concerned, in the framework of their graduated university studies (Bachelor's level, three years – Bologna process). They graduated at the Faculty of Geography the following specialisations: Geography (1 student), Geography of Tourism (2 students), Hydrology and meteorology (8 students). These M.Sc. students had digital cartography competences and knew how to use GIS. In order to realise the research objectives, we took into account all our students who realised proposals of spatial planning measures, without creating a sample. Because of the small number of M.Sc. students and of the differences in their previous education, the statistical results of this study cannot be generalised, but they offer us relevant landmarks for increasing the efficiency of the future educational process.

3.2. Method

The activity to elaborate proposals of spatial planning measures for a hydrographical basin (independent variable) included the following phases:

a. Presenting the task. At the beginning of the semester, students received the task to elaborate at home, either individually, in teams or in groups, a proposal of spatial planning measures for a hydrographical basin of their choice.

b. Presenting and discussing theoretical and methodological aspects. For realising the respective proposal, we offered students, as a model, "The Development Strategy for the Someş Catchment Area" (Cocean and Göncz, coord., 2012) and for the Tisza (Cocean and Vartanoff, coord., 2007). So that students understood the environmental and community significance of realising proposals for spatial planning measures for hydrographical basins, they also read scientific papers approaching the topic (Petrişor, Toth and Chicoş, 2010; Vescan, Gligor and Fonogea, 2010; Nițoaia, Șerban, Tudose, Nacu and Rândașu-Beuran, 2016) and watched a film (*Mountain Hay Meadows*, 2012). They also studied a discourse on history and community identity (Blandiana, 2016), and they read and discussed research papers on territorial identity and its role in local and regional planning (Ilovan, 2009, 2010, 2012; Kneafesy, 2000; Raagmaa, 2002). Moreover, they studied the TICAD-SDSS (2010-2011) – a material on a software created especially to enable the decision-making process for integrated planning measures of hydrographical basins. After studying these sources and starting from them, we discussed and initiated a heuristic conversation during our seminars.

c. Explaining and discussing the way of elaborating a proposal of spatial planning measures. During seminars, we explained and discussed with our students the way of elaborating a proposal of spatial planning measures. We provided our students with the above-mentioned models and bibliographical sources. In order to form their competence to elaborate proposals of integrated spatial planning measures for hydrographical basins, students would have to possess in their knowledge base what we listed in Table 1, and, when elaborating the spatial planning measures, they should observe the procedure described in the same table according to the models in the specialty literature (Dulamă, 2009, 247, 410; 2010, 323).

Table 1. Components and the procedure of the competence to elaborate a proposal of integrated spatial planning measures for a hydrographical basin

Declarative knowledge	*Concepts*: spatial planning measures, hydrographical basin, development strategy, dysfunctions, measures, SWOT analysis, case study, diagnostic, integration, sustainable development, argument, opinion, proof, quote, bibliography, etc. *Structure of the proposal for spatial planning measures*: Analysis of the present situation; SWOT analysis; Development strategy
Attitudinal knowledge	Observing the requirements for elaborating a proposal of spatial planning measures for a hydrographical basin Elaborating the proposal of spatial planning measures for a hydrographical basin through personal/team/group effort Finishing the proposal of spatial planning measures for a hydrographical basin in a *correct, complete, and systematic manner, and in due time* Observing the copyright
Procedural knowledge	- conceiving the proposal of spatial planning measures for a hydrographical basin - identifying the appropriate information for the topic, in diverse sources - selecting information according to diverse criteria, adequate to the topic - processing information using diverse techniques and languages - elaborating a scientific text - using quotations in a text - expressing opinions about the published information in scientific papers - giving arguments for personal opinions - giving counter-arguments for certain opinions - writing the bibliography - elaborating maps using GIS - elaborating charts using Excel
Procedure	**Phase 1. Researching the literature** Step 1. Identifying the bibliographical sources appropriate to the respective hydrographical basin and for elaborating the proposal of spatial planning measures Step 2. Studying the bibliographical sources appropriate to the respective hydrographical basin and for elaborating the proposal of spatial planning measures Step 3. Extracting the relevant information to the respective hydrographical basin (maps, statistical data, etc.) and for elaborating the proposal of spatial planning measures

	Phase 2. Elaborating the structure of the proposal of spatial planning measures for a hydrographical basin Step 1. Elaborating the structure of the analysis for the present situation Step 2. Elaborating the structure of the SWOT analysis Step 3. Elaborating the structure of the integrated development strategy for the hydrographical basin **Phase 3. Elaborating the maps** Step 1. Establishing the list of necessary maps Step 2. Identifying the sources necessary for elaborating the maps Step 3. Establishing the methods used for realising the maps Step 4. Realising the maps using GIS **Phase 4. Elaborating the charts** Step 1. Establishing the list of necessary charts Step 2. Identifying the sources necessary for elaborating the charts Step 3. Establishing the methods used for realising the charts Step 4. Realising the charts using Excel **Phase 5. Realising the analysis of the extant situation of the hydrographical basin** Step 1. Analysing the components of the hydrographical basin, establishing their characteristic features Step 2. Identifying and presenting the relations among the components of the hydrographical basin Step 3. Identifying and presenting the dysfunctions of the hydrographical basin **Phase 5. Realising the SWOT analysis of the hydrographical basin** Step 1. Identifying and presenting the strengths of the hydrographical basin Step 2. Identifying and presenting the weaknesses of the hydrographical basin Step 3. Identifying and presenting the opportunities of the hydrographical basin Step 4. Identifying and presenting the threats of the hydrographical basin **Phase 6. Elaborating the strategy of the integrated spatial planning measures for the hydrographical basin** Step 1. Establishing and presenting the general objective Step 2. Establishing and presenting the principles Step 3. Establishing and presenting the development directions for the hydrographical basin Step 4. Establishing and presenting the measures/solutions and actions for eliminating problems/dysfunctions/weaknesses/threats of the hydrographical basin Step 5. Establishing and presenting the measures/solutions and actions for capitalising the strengths of the hydrographical basin and its opportunities **Phase 7. Writing the bibliography**

d. Performing the task. Students solved the task in several phases: they analysed the natural components; they analysed the human and human-created components; they realised a SWOT analysis and the development strategy for the hydrographical basin. They needed a PC (laptop), the programmes Microsoft Excel and GIS, and statistical data.

e) *Presenting the solved tasks and the primary assessment*. The students presented orally, during three seminars, the results for each of the three above-mentioned phases.

f) *The final assessment* included two phases: (1) professor's assessment of students' written products (their proposals for the spatial planning measures – the dependent variable) during the exam period, outside the face to face activities; (2) professor's assessment of students' oral presentation of their proposal, during the oral exam. In this study, we refer only to the assessment of the written proposals of integrated spatial planning measures for hydrographical basins.

3.3. The assessment tool

We assessed each proposal of spatial planning measures for a certain hydrographical basin using an assessment tool (Table 2). We conceived the analytical assessment tool according to the models in the

specialty literature (Dulamă, 2010, 86, 105; 2011, 106-107, 120-122). The assessment tool included elements of the contents, eight assessment criteria, and indicators (noticeable elements and descriptors) associated to each criterion. In contrast to other studies (Osaci-Costache et al., 2013; Osaci-Costache et al., 2013a; Osaci-Costache et al., 2013b; Dulamă and Ilovan, 2016), where the researchers used analytical assessment grids, in this research, we assigned from 1 to 5 points (the Likert scale) to each criterion, in order to be able to compare results. One proposal of spatial planning measures could get a maximum score of 40 points.

Table 2. Analytical assessment grid of the proposals of spatial planning measures, for a certain hydrographical basin

Elements of the contents	**Criteria**	**Indicators**	**No. of points**
a) Analysis of the present situation	C1 Analysis of the hydrographical basin components	I 1 – Presenting the characteristic features of each component within the hydrographical basin I 2 – Systematic and logical presentation of the hydrographical basin components I 3 – Presenting the components on the basis of the bibliography (at least two sources for each component), quoted in the text I 4 – Representing on maps the characteristic features of hydrographical basin components I 5 – Representing on charts the characteristic features of hydrographical basin components	1-5
	C2 Analysis of the dysfunctions	I 6 – Presenting the dysfunctions of the hydrographical basin	1-5
	C3 Systemic approach of the hydrographical basin	I 7 – Presenting the hydrographical basin as a whole I 8 – Presenting the relationships among the hydrographical basin components	1-5
b) Diagnostic analysis (SWOT)	C4 Analysis of the strengths and weaknesses	I 9 – Presenting the strengths of the hydrographical basin I 10 – Presenting the weaknesses of the hydrographical basin	1-5
	C5 Analysis of the opportunities and threats	I 11 – Presenting the opportunities of the hydrographical basin I 12 – Presenting the threats of the hydrographical basin	1-5
c) Development strategy of the hydrographical basin	C6 Objectives, principles, development directions	I 13 – Presenting the general objective I 14 – Presenting the principles I 15 – Presenting the development directions for the hydrographical basin	1-5
	C7 Measures and activities	I 16 – Presenting the measures/solutions and actions for eliminating problems/dysfunctions/weaknesses/threats of the hydrographical basin I 17 – Presenting the measures/solutions and actions for capitalising the strengths of the hydrographical basin and its opportunities	1-5
d) Writing the scientific paper	C8 Structure, methodology, aesthetics	I 18 – Observing the structure of a scientific paper (title, introduction, theoretical background, methodology, results, discussions, conclusions, and bibliography) I 19 – Observing the requirements of a scientific paper (quoting sources, scientific language, writing bibliography) I 20 – Aesthetics of the paper	1-5

4. Findings

In Table 3, we presented the scores obtained by the students' proposals of integrated spatial planning measures for hydrographical basins. The maximum score a proposal could get was 40 points. After their assessment according to each criterion, C5 got the lowest average score (1.8 points). For the other criteria, the average scores for the five proposals were between 2.6 and 3.

We correlated to scores with three competence levels: inferior level – below 2.5 points, average level – 2.6-4 points, and superior level – above 4 points. On the basis of this assessment, we may say that students have the average competence level for elaborating proposals of integrated spatial planning measures for hydrographical basins, both at the level of criteria (with the exception of C5) and for the entire proposal.

Table 3. The scores obtained by the students' proposals

of integrated spatial planning measures for hydrographical basins

Criterion	**Score (points)**	**Obtained score (points)**					**Average score (points)**
		Proposal 1	Proposal 2	Proposal 3	Proposal 4	Proposal 5	
C1 Analysis of the hydrographical basin components	1-5	1	3	4	4	3	3
C2 Analysis of the dysfunctions	1-5	1	3	3	3	3	2.6
C3 Systemic approach of the hydrographical basin	1-5	1	2	4	3	3	2.6
C4 Analysis of the strengths and weaknesses	1-5	2	3	4	3	3	3
C5 Analysis of the opportunities and threats	1-5	2	2	3	1	1	1.8
C6 Objectives, principles, development directions	1-5	1	4	3	1	4	2.6
C7 Measures and activities	1-5	1	4	3	1	4	2.6
C8 Structure, methodology, aesthetics	1-5	2	3	4	3	3	3
Total score	**40**	**11**	**24**	**28**	**19**	**24**	**2.65**

5. Discussions

5.1. Analysing the knowledge integrated into the competence to elaborate proposals of spatial planning measures for hydrographical basins

In Table 1, we gave details about the knowledge that students should have possessed and used for elaborating proposals of spatial planning measures for hydrographical basins. Identifying that knowledge was important because during the entire course and seminar activities we got students involved into diverse activities where they achieved and used that knowledge. We underline that, except the knowledge we mentioned in the table, our students used also knowledge from their previous knowledge base, and that our description was not exhaustive.

We point out the fact that, in order to elaborate proposals of integrated spatial planning measures for hydrographical basins, a person needs a series of transversal competences and of those characteristic of

geography, and we included the most important ones in the structure of that competence: the competence to research the literature in the field; the competence to elaborate the structure of a proposal for spatial planning measures; the competence to realise maps using GIS; the competence to realise charts using Excel; the competence to elaborate a scientific text; the competence to realise a SWOT analysis; the competence to analyse the present situation of the territory; the competence to realise a development strategy for a territory; the competence to write a scientific study. We think that this model of describing the competence of elaborating integrated spatial planning measures for hydrographical basins allows for the planning and organising of certain learning activities, of forming and developing the competence and of creating certain tools that may determine an increase in the efficiency of professor's and students' activity. These tools are necessary and useful in the assessment phase of the competence.

5.2. Analysing the procedure of elaborating the proposals of spatial planning measures for hydrographical basins

In Table 1, we systemised in a chronological order, observing certain phases and steps, according to the model created by Dulamă (2010, 323), the procedure that a person had to undergo when elaborating the proposal of integrated spatial planning measures for a hydrographical basin. This description was useful when we planned and organised the activity because we made sure that we observed the procedure in the described order, without omitting any sequences. Because the activities took place during a large time scale and in diverse places, starting from the models in the specialty literature (Dulamă, 2009, p. 247, p. 410; 2010, p. 323), we described the procedure using infinitive verbs (e.g. "Analysing"), not the imperative verbs (i.e. "Analyse!") that are more adequate when taking part at algorithmic processes.

We point out that the activity for forming this competence was fragmented in reality in a series of formal activities (courses and seminars) and in activities realised by our students during several weeks, at home or at the library, individually, in teams or in groups. During the activities together with their professor, the students discussed the contents of the recommended bibliographical sources and received answers to their questions (professor's answers had both theoretical and practical contents). The fact that the number of students was small was an advantage, because all of them had the opportunity to express their ideas, to ask questions, and to receive appropriate and on the spot feedback.

5.3. Analysing the students' proposals of spatial planning measures for hydrographical basins, their mistakes when elaborating them and the causes of those mistakes

a) Analysis of the present situation. The students had the freedom to create a structure for the analysis of the hydrographical basin components (C1), taking into account the studied bibliographical resources and the features of the hydrographical basin. They presented the realised analyses during two activities. During the first activity, they presented (1) the natural factors, the environmental situation and the management of natural risks: the natural factors (geology of the area; landforms; hydrographical network and water resources; climate; bio-geographical factors, and soil); the natural resources (resources of the soil and underground resources; touristic resources and objectives; other resources); environmental situation/ quality of the environmental factors (water/air/soil quality; waste management); water resource management (surface water bodies; underground water bodies); natural risks management (protection works against floods; landslide areas, etc.). During the second activity, students presented (2) the human factors and risk management: demography (number of inhabitants; population's distribution; age groups; demographical prognosis); the settlement network (settlement structure; settlement size according to the number of inhabitants); economic development; land use; plant cultivation; animal breeding; transport and technical infrastructure (transport infrastructure; electrical energy distribution, natural gas distribution; telecommunication; wastewater management and cleaning).

We underline that for no hydrographical basin did the students present all the above-mentioned issues and they had some difficulties in ordering and presenting those components in a logical manner, when pointing out their characteristic features, and when analysing dysfunctions (C2). They made some

mistakes when writing the value of certain indicators (e.g. declivity, the depth of relief fragmentation), when representing on maps the surface of the hydrographical basins, when numbering figures, when quoting the bibliographical sources in the text and in the bibliographical list, when using specialty terms (e.g. the term basin had a different meaning than the term hydrographical basin). The most difficult issue for the students was to approach the hydrographical basin as a system (C3). These difficulties and the mistakes they made correlated with the fact that most of the students (8 of them) graduated at the Bachelor's level the Hydrology-Meteorology specialisation and they still did not have all the knowledge basis characteristic of Geography and necessary for realising such an analysis at a high level of competence.

b) The diagnostic (SWOT) analysis. The analyses of the strengths and weaknesses (C4) were long, but without being exhaustive and without consistent argumentations. We identified serious difficulties and many mistakes when analysing opportunities and threats (C5). For instance, in some cases, students considered to be opportunities the features that in fact were the strengths of the hydrographical basin (e.g. "homogenous ethnic structure"; "diversity of landforms"; "industrial areas that allow for development and modernising"; "preserved traditions transmitted from one generation to the next"). They presented as threats features that should have been considered weaknesses because they were from the inside, not from the outside of the hydrographical basin (e.g. "unemployment rate increase for young graduates"; "uncontrolled forest cutting"; "slightly decreasing forest surface"; "loss of territorial identity, especially in the rural area, by giving up traditions, customs, etc."; "locals' uncontrolled waste dumping in the river area"; "poaching, unsustainable exploitation of resources"). They rarely placed the opportunities (e.g. "access to the Danube and to the E70") in the strengths category. In one case, students considered an environmental component both opportunity and threat (e.g. "aggressive population towards the environment"), but, in fact, that was a weakness if that feature was characteristic of the local population, and it was a threat if it characterised the population from the outside of the hydrographical basin.

c) The development strategy of the hydrographical basin. Starting from the competences characteristic to the fields of hydrology and meteorology that the M.Sc. students possessed, for them it was difficult to conceive an integrated development strategy and not only one that focused on water management. The fact that, in general, they considered water as the main and dominant component, not only a common element in the hydrographical basin, that influenced them in orienting the strategy to establishing certain objectives, principles, and development directions (C6), measures and activities (C7) that focused on water management and capitalisation and they did not conceive so much strategies that aimed at an integrated development of the hydrographical basin. This fact proved that for students it was very hard to undergo a change of vision upon territorial development due to the activities of one course.

d) Writing the scientific paper. So that the M.Sc. students formed their competences to write a scientific paper, we asked them to adopt a structure characteristic of such papers, and they observed this requirement. They presented a part of the analysed research methods. They did not present all the methods they used, although that was a requirement. It is possible that they could not name all of those methods. Taking into account the aesthetics of their papers, we noticed the trend to elaborate long papers, some of the students cared little about the aesthetics of the text on the page, about numbering and naming figures, and about spacing.

The causes that determined students' lacunae and mistakes in the five proposals appeared because of the educational process they had got involved into (e.g. no written course material especially for students or a students' guide for the elaboration of proposals for spatial planning measures, for hydrographical basins), or because of the students' way of working (they did not take or rarely took notes during discussions; they did not clarify for themselves the meaning of certain geographical terms; they did not select rigorously the information starting from criteria).

5.4. Analysing students' competence level in elaborating proposals of integrated spatial planning measures for hydrographical basins

When establishing the three competence levels and the limits between them, we took into account the grading system of the Romanian schools where students could be awarded grades from 1 to 10 and they could pass with the minimum grade of 5. We considered that the threshold between the inferior and the average levels of competence was represented by the score of 2.5, which was half of the maximum score. The fact that, according to many criteria, the students' competence level was close to the threshold indicated that those students had to make more effort in order to develop the researched competence.

5.5. Establishing ways of preventing students from making mistakes when elaborating proposals of integrated spatial planning measures for hydrographical basins, and of improving the educational process and students' results

After the assessment of the five proposals of integrated spatial planning measures for hydrographical basins, of students' lacunae, mistakes and of their causes, we considered that we could improve the educational process and the students' results through the following measures: (a) imposing a detailed structure of the proposal of integrated spatial planning measures for hydrographical basins; (b) offering a model of such a proposal that was strictly correlated with all the assessment criteria; (c) offering a guide for realising such a proposal; (d) focusing, during the course and seminar activities, on the issues that caused the highest number of mistakes; (e) before realising those proposals, discussing with the students the assessment grid that we used; (f) students' use of a check list.

6. Conclusions

We reached the following conclusions:

a) The tools we used during this research (giving details about the knowledge integrated into the competence structure of elaborating proposals of integrated spatial planning measures for hydrographical basins; structuring the procedure in phases and steps; the analytical assessment grid) were very useful for the rigorous and systematic planning and organising of the activity.

b) In the specialty literature, researchers associated those tools to the reproductive type of competences (Osaci-Costache et al., 2013; Osaci-Costache et al., 2013a; Osaci-Costache et al., 2013b; Dulamă and Ilovan, 2016). In this paper, we associated the tools to a productive type of competence that needed the use of certain heuristic strategies and its activities, because students' competence formation and development took place during a long period (i.e. weeks, and even months).

c) Another novelty element was the analytical assessment grid that included criteria and indicators and which was different from other grids in the specialty literature (Dulamă, 2009, 247, 410; 2010, 323) because we associated a Likert scale. In contrast to other assessment grids, the use of the Likert scale enabled us to compute the average values of the degree for the achievement of each criterion and also it enabled us to make comparisons between the diverse achievement degrees according to each criterion.

d) One more novelty element was our vision on the thresholds between the competence levels. Although we used the five-point Likert scale, in order to simplify assessment, we used three competence levels (inferior, average, and superior). We established the threshold between the inferior and average levels at the half of this scale (2.5), and we considered it the minimum acceptable level.

e) By using those tools in this assessment type of research, we identified easily and quickly M.Sc. students' lacunae and mistakes when elaborating the proposals of integrated spatial planning measures for hydrographical basins, we categorised them, and that enabled us to identify the ways to improve our future activity and students' results.

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