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Active Teaching Methods in Education for Sustainability as Applied in Good Practices of Local Communities

Abstract. This paper is dedicated to active teaching and learning methods in education for sustainability. Active teaching methods such as case studies, simulation games, debates, and role-playing are described in a step-by-step direction. Examples of the good practices of local communities in education for sustainability are provided in the paper.

Keywords: education for sustainability, active teaching methods, student engagement, case study, simulation game, debate, role-playing, brainstorming, local communities

1. Introduction

Nowadays more and more active teaching methods are applied into higher education worldwide. While lecturing tends to be the easiest form of instruction, studies (Dale, 1969) show that students absorb the least amount of information that way (without practical application, students often fail to comprehend the depths of the study material). At the same time, using active methods turn the teaching process to an interesting and attractive activity for students. Whereas students often lose interest during lecturing, interactive teaching styles promote an atmosphere of attention and participation. Active teaching techniques involve facilitators and learners, encourage and expect learners to participate. Group work stimulates individual input. Thus, active teaching methods lead to higher

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level of understanding and result in students' ability to apply the knowledge in their everyday life, nevertheless, such teaching techniques are often perceived by students as "fun".

At the same time simply introducing activity into the classroom fails to capture an important component of active learning. Active learning means that the mind is actively engaged. Its defining characteristics are that students are dynamic participants in their learning and that they are reflecting on and monitoring both the processes and the results of their learning [Barkley 2010: 17].

Thus, active teaching methods are promoting students' engagement (Becker, 2015), as the best way to study is to play the situation, which is close to a real one. According to the Dale's "Cone of Learning", students get up to 90% of knowledge when they stimulate or model a real-life experience [Dale 1969].

2. A conceptual framework for understanding active teaching methods

There are different types of active teaching methods. Let's discuss the most popular of them:

1) The first one is **case study**.

Case study is the analyses of a real life situation, it relates the theory to a practical situation. According to Thomas (2011), "case studies are analyses of persons, events, decisions, periods, projects, policies, institutions, or other systems that are studied holistically by one or more methods" [Thomas 2011: 513]. Case study is created to analyze a real life problem that exists and to suggest solutions to these problem.

There are two different approaches to case studies:

– The Analytical Approach. This type of case study is examined in order to try and understand what has happened and why. It is not necessary to identify problems or suggest solutions;

– The Problem-Oriented Method. This type of case study is analyzed to identify the major problems that exist and to suggest solutions to these problems [How 2007].

To run the case study the major actors are to be identified for every situation. Students are to be divided into groups. Every group of students suggests its own solution to the major problems after brainstorming. As a result, they need to recommend the best solution and detail how this solution should be implemented.

2) **Simulation game** is an active teaching method.

"Simulations" are a model (or simplification) of reality or some natural systems" [Loon, Evans & Kerridge 2015: 228]. Simulation is a role-playing, which

involve people adopting roles in a mock-up of a situation [Akinsola & Anima-sahun 2007]. Simulation games allow for active learning as learners have to "do something" to acquire knowledge [Shaffer, Squire, Halverson & Gee 2005]. Decision-making in simulation games provide students with hands-on experience and opportunities to make decisions in a safe environment, and thus allowing students to experiment and learn from experience [Zantow, Knowlton & Sharp 2005].

3) Another active teaching method is **debate**.

Debate is a formal method of presenting arguments that support and oppose a given issue (Public, 2011: 5). "Debates provide a framework to help students develop more mature ways of thinking as they start to recognize the range of perspectives inherent in complex topics and internalize a view of knowledge that is dialogic, contingent, and ambiguous" (Barkley, 2010: 202).

For debate students are divided into groups and do role-playing (they act according to their roles in terms of strict time limit).

There are two main types of debates: Oxford Union style debate and Karl Popper style debate (Fig. 1 and Fig. 2). There are strict rules for both types of debates with a concrete role of each player. There can be 2 participants in each team in case of Oxford Union style debate, and 3 or 4 students in each team in case of Karl Popper style debate.
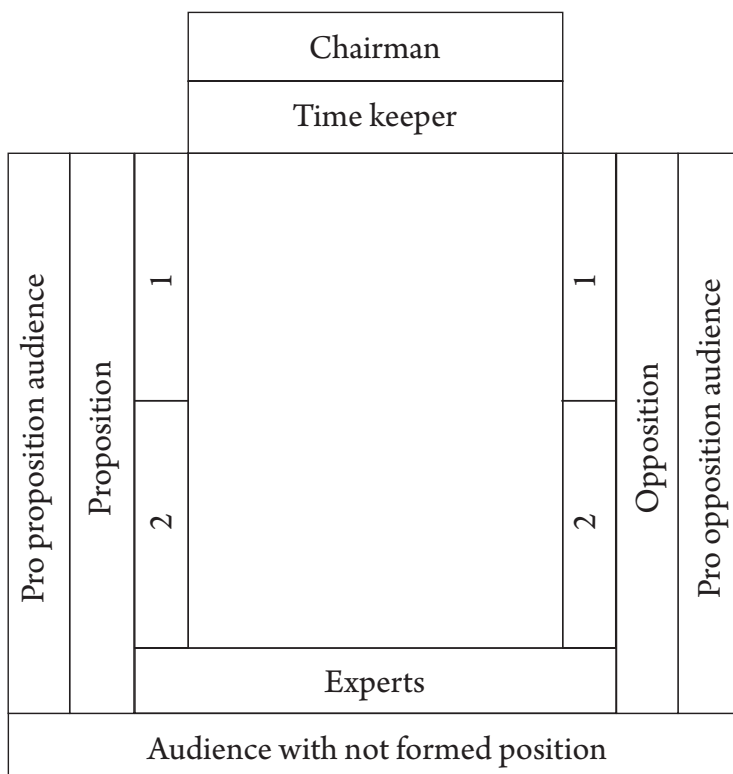

Figure 1. Oxford Union style debate

Source: own elaboration.

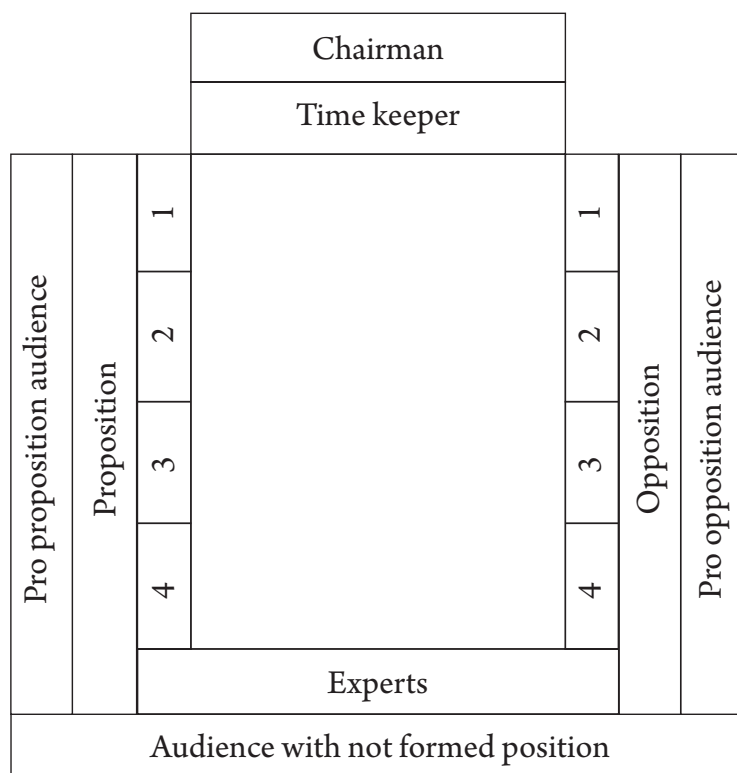|			Chairman				
			Time keeper				
Pro proposition audience	Proposition	1		1	Opposition	Pro opposition audience
		2		2		
		3		3		
		4		4		
			Experts				
			Audience with not formed position				

Figure 2. Karl Popper style debate

Source: own elaboration.

In both styles of debates there are two competitive parties: proposition (the affirmative team) and opposition (the negative team), and they have equal time to present their arguments. The proposition team gives its arguments to prove the statement, while the opposition party deny the statement giving the arguments against it.

The debate is composed of several parts. Most of them are speeches – that is, uninterrupted presentations by a designated speaker. The remaining ones consist of cross-examination – that is, a series of questions and answers involving one speaker from each side. There is a strict time limit for each speech and questioning as well as a specific purpose for every presentation.

– The proposition speaker is expected to offer the complete argument in favor of the resolution. Later the affirmative speakers may repeat some points and expand on them.

– The two debaters are expected to face the audience (as opposed to each other). The negative (opposition) debater is expected to ask questions rather than make speeches. The affirmative (proposition) debater is expected to answer these questions; he or she should not make speeches or ask questions in return. Every speech session ends with questioning.

– Like the affirmative team in its constructive, the opposition speaker is expected to offer a complete argument against the affirmative's position.

– The proposition rebuttal (or rebuttals) must outline refutations of the negative arguments and must respond to the refutations made by the negative team (that is, the negative's objections to the affirmative case). His/her speech is reactive. In case the last proposition rebuttal talks, he/she should renew refutations that have not been addressed adequately and focus the attention of judges on the key issues in the round.

– The opposition rebuttal (or rebuttals) also must respond to the refutations made by the proposition rebuttal, and should continue to attack the affirmative case. But if he/she is the last speaker, he/she has no right to introduce new arguments as the affirmative team has no chance to respond. In that case he/she is to summarized everything mentioned by the team before [Karl 2004; Oxford 2015].

There can also be audience and there is an opportunity for the audience to join the debate. Based on the arguments the audience makes decision on its position during the debate: do students from the audience support proposition or opposition team.

When speakers finish their speeches, the judging team vote according to the quality of the evidence and arguments and the performance in the debate; and the winner is found as a result.

4) **Role-playing**.

"Role play is a creative, participatory activity that provides the structure for students to experience the emotional and intellectual responses of an assumed identity or imagined circumstance. The word role indicates that students actively apply knowledge, skills, and understanding to successfully speak and act from an assigned perspective. The term play indicates that students use their imaginations and have fun, acting out their parts in a nonthreatening environment" [Barkley 2010: 232].

"Each role-play defines a setting of characters (or roles) through which a story will be developed. What happens when the students take on their roles is uncertain. One solution might be to script the role-play in a more formal and ordered way. It is possible, for example, to specify who speaks when, and identify the ideas, arguments and information that will be conveyed in each speech" (Sutcliffe, 2002). At the same time, role-playing means students act as they imagine appropriate to a given role [Rilstone 1994]. Within such a framework the teacher maintains strong control over the focus of the role-play.

5) **Brainstorming**.

Brainstorming is a group creativity technique by which efforts are made to find a conclusion for a specific problem by gathering a list of ideas spontaneously contributed by its members [Osborn 1963].

Brainstorming is a technique in which every student's response that applies to a given topic is acceptable. Brainstorming combines a relaxed, informal approach to problem solving with lateral thinking. It encourages people to come up with thought and ideas that can, at first, seem a bit crazy. Some of these ideas can be crafted into original and creative solutions of a problem, while others can spark even more ideas. Therefore, during brainstorming sessions it is important not to evaluate ideas, people should avoid criticizing. Students need to know that they will not be required to justify or explain any answer. After a period of brainstorming (which should not be too long), time for reflection on or prioritizing of the list should be allowed. The teacher helps students to summarize main points as well as to correct any misconceptions. Brainstorming can be done individually, in pairs or small groups, or as a whole class as well as combination of these.

Brainstorming is effective for several purposes: sensitive and controversial issues that need to be explored; encouraging students who are quite and hesitant to enter into discussions; generating a large number of ideas as quickly as possible [Participatory 2004: 6-7]. It promotes critical and creative thinking and imagination.

There are several methods for brainstorming:

– Brainstorming on the board – Students call out concepts and terms related to a topic; the teacher writes them on the board and, if possible, group them into categories. This type of brainstorming works to gauge pre-existing knowledge and focus attention on the subject.

– Brainstorming tree – While brainstorming on the board, circle the major concepts and perform sub-brainstorms on those specific words; the result will look like a tree blooming outward.
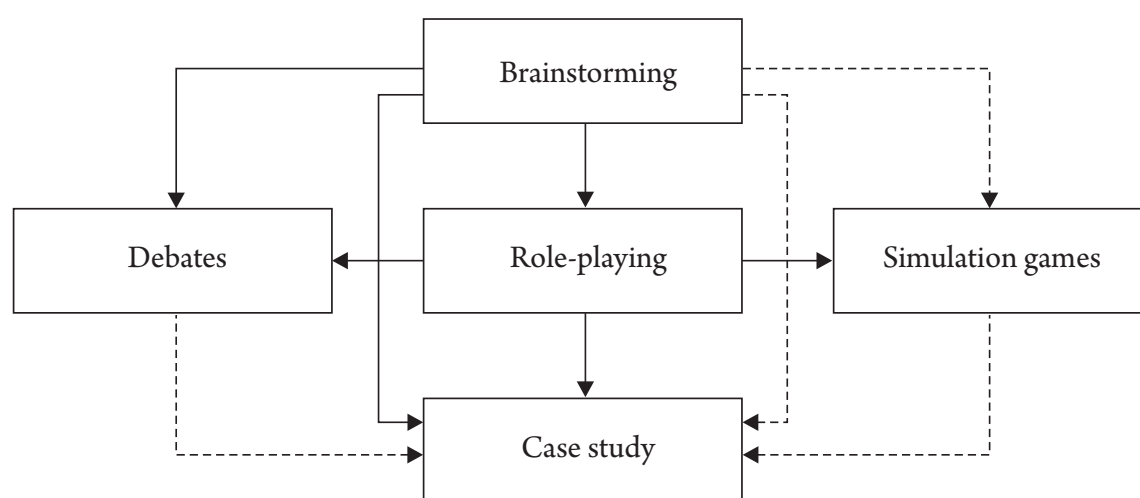

Figure 3. Types of active teaching methods

Source: own elaboration.

– Brainstorming in a circle – Group students to discuss an issue together, and then spend a few minutes looking at individual notes. One person starts a brainstorming list and passes it to the student to the right, who then adds to the list and passes it along again.

– Chalk talk – Ask students to go to multiple boards around the room to brainstorm answers to an assignment, but disallow them talking. This activity can also be done in groups [Resources: 13-14].

Some elements of one active teaching method can be a part of another active teaching method, i.e. brainstorming can be a part of debates, role-playing and case study; while role-playing can be a part of case study, debates or simulation game. Case study can be played in the form of debates. A simulated learning environment can support case based learning (Fig. 3).

3. Examples of good practices of local communities' experience in education for sustainability

There is a well-known phrase dealing with environmental issues: "Think globally. Act locally". These familiar exhortations have circulated within the slogan system of environmental education for more than four decades [Gough 2002].

One can use local experience to explain sustainable development issues to students. That is easier to understand what is happening in a nearby village than in another country or in the whole world. In case of sustainable development, that is easier to show some local practices to explain global problems to students.

Let's have a look at some good practices of local communities' experience that can be applied for explaining sustainable development principles.

3.1. Case study example

Description of the situation

Urban green spaces contribute greatly to the quality of life in cities. Green areas not only make the cities look more beautifully but they also provide a wide range of environmental, social, cultural and economic benefits to the society, starting with the assuring opportunities for recreation up to reducing the health risks.

Nevertheless, the role of urban greening increases highly, green areas started to disappear in many parts of Ukrainian cities over the recent several years. Zones of greenery in cities of Ukraine are rapidly built up with houses and supermar-

kets. Zones of greenery are green areas inside a city having a special status according to the official city plan. This is a territory, which has to be covered with trees, bushes and other greenery according to the city plan.

The city of Sumy is a typical regional center in Ukraine with population of nearly 300 000 people allocated on the East-North of the country. In the middle of 90th Sumy was a green city with lots of trees and millions of roses. Today there are much more less trees on the streets and almost no roses. Many city green areas have disappeared.

Nowadays the problem of air pollution is the urgent one in the city as Sumy is a city of chemical industry. There are four main factories-pollutants of air in the city. Air pollution influences negatively upon the health of people living in the city. The role of urban green areas in regulating the quality of city air is crucial. System of greening determines the quality of urban environment. Green areas contribute to the improvement of microclimate and sanitary conditions. They decrease air pollution from chemicals, slow wind speed, act as a trap for dust, reduce the power of sound waves, create a natural landscape in the city, etc.

But despite high air pollution in the city, the quantity of new urban greenery decreased over the recent several years in Sumy region (Table 1).

Table 1. Urban greening

Activities	2007	2008	2009	2010	2011
Quantity of new greenery, ha	4,8	7,4	7,5	2,4	2,8
Landscape reconstruction on vegetation, ha	4,3	4,5	4,4	3,8	1,6
Caring for plants, ha	1853	1858	1859	1911	2110

Source: *Dopovid pro stan...* 2012.

Problem statement

There is an attempt to destruct a zone of greenery in one of the city regions (where the urban green space per person is much less than the norm), and to construct a supermarket on that place.

The problem that happened in Sumy is not a unique one. A similar situation occurs in many other cities in Ukraine [Kostyuchenko & Petrushenko 2012: 217, 222-224].

Step-by-step directions

1.1. The teacher describes the situation and states the problem. If students need any additional information to make solution, the teacher also provides the stu-

dents with the information or explains were it can be found. The teacher also gives instructions at this stage.

Instructions:

1. The interests of different actors in the situation described differ a lot. Among the local authority deputies, there are fractions interested in personal gain from the situation when a zone of greenery is built up with a supermarket. Decision-making person, who is responsible for the control, is future owner of a supermarket that has to be constructed on that territory. These deputies also control several local radios and newspapers.

2. When a zone of greenery disappears, people living nearby the former zone of greenery are the first who face the problem. Many regions of the city are far distance from the city parks. For many people it takes a lot of time to get to the parks. That is why they visit the city parks rarely. They use green areas nearby there houses as recreation zones.

3. People that live nearby zones of greenery, which are under construction, are effected by the problem most of all. They used zones of greenery as places for rest. They also enjoyed a wonderful view from the windows of their flats. People living in the region of the city, where a zone of greenery (which is under construction) is allocated, also benefited from this area as they used it as a recreation zone. People living in other regions of the city (far from the zone of greenery) understand that the same situation can happen to their region.

1.2. Students are divided into groups according to the number of actors involved into the question.

The main actors of the situation are the next ones:
  – people living nearby a zone of greenery, which is under construction,
  – people living in the region of the city, where a zone of greenery (which is under construction) is allocated,
  – people living in other regions of the city, far from a zone of greenery,
  – local NGOs,
  – media,
  – local authorities,
  – national and international ecological organizations.

1.3. Using the information available and according to the role the group plays, students start brainstorming.

1.4. When students are ready with solutions, each group presents its own results and tries to convince the competitors.

1.5. After presenting individual results and getting the conflict of interests, students are to interact between groups to come to one common solution. It can happen that the teacher's help will be needed at this stage.

1.6. The teacher gives general comments to the case study.

3.2. Simulation game example

The project "Community based approach to local development" is funded by the European Union and is co-financed and implemented by UNDP with the support of Ukrainian government.1 The aim of the project is to stimulate sustainable social and economic development by facilitating initiatives of community members and authorities in prioritization and solution of local level problems. The community members have to self-organize themselves in order to establish formal community organizations, to design and to implement micro projects with organizational and financial support from the UNDP and the local authorities. The project provides small grants (in average 150000 UAH) to community organizations to implement their priorities on a self-help basis and within the framework of public-private partnership. Whereby each partner shares a portion of the development cost. The established mechanism is that half of the budget must be financed with contributions of local community members (not less than 5%), local authorities, the private sector, while UNDP will contribute up to remaining half of the cost. The community takes responsibility to maintain the resulting output and reap benefit from it on a sustained basis with support from the local authorities. The mechanism of financing can be considered as one of important mechanisms, which could motivate the community members to self-organization, initiative work and fruitful cooperation with the authorities. The project is one of the most large-scales projects of economic cooperation and social mobilization of the rural community members in the history of Ukrainian independence [Grazhevska, Petrushenko & Kostyuchenko 2013: 35].

Step-by-step directions

2.1. Students are divided into several groups (minimum – three, maximum – six):

1. One group acts as representatives from UNDP "Community based approach to local development".

2. Another group acts as representatives of local authorities.

3. The rest of groups act as community members. There can be one or several communities involved (according to the number of students playing the game and according to the number of groups). The more groups act as communities the more the competition is (as it is predicted that only one community will benefit out of the project and will get the funding).

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[1] http://cba.org.ua/en [30.11.2015].

2.2. The teacher explains the task:

1. Communities need to write proposals helping to solve the most urgent local problem to apply for small grants from UNDP "Community based approach to local development". They also need to complete all the documents required by the project.

2. UNDP representatives choose the best application for granting as well as help the communities with the documentation procedure.

3. Local authorities vote for the best application according to the strategy of local territory development.

Thus, every group of students has its own role and tasks, and needs to interact.

The group of UNDP representatives runs traineeship for community members to teach them to create formal community organization, which is obligatory to apply for the project. They also help community members with documentation, explaining what types of documents are needed. For that purpose students study documents available on the official website of the project.

The groups of community members vote for the most urgent local problems and decide which one has to be solved the first. They create a formal community organization, write a proposal and learn to interact with local authorities.

Local authorities' group checks if the proposal by the community matches the strategy of local territory development, if the question the community tries to solve is urgent. The group also creates local regulations.

2.3. The game needs lots of time and can run several classes. Students need time to prepare (to read the documents, to think the problems over, to analyze the ideas). Students also need to interact both within the groups and between the groups.

2.4. Students present their results.

2.5. The teacher can judge and give some general comments.

3.3. Debates examples

Possible topics / statements for debates on sustainable development issues:

1. Refusal of nuclear energy is the path to sustainable development.

2. Globalization processes promote sustainable development of society.

3. To implement the concept of sustainable development the humanity must start to regulate fertility.

4. Shale gas extraction is an effective way to energy independence of Ukraine.

5. The pros and cons of introducing harsh penalties for non-compliance of sustainable development standards.

6. The pros and cons of decentralization.

Step-by-step directions

3.1. The teacher announces the question/statement for debate, and he or she acts as a Chairman during the debate.

3.2. Students are divided into two groups of four peoples (two teams) and act according to their roles in terms of strict time limit. Sometimes there can also be more than two debating groups. Then there are several rounds of debate in one session.

3.3. There are also judges/experts who will define the winner at the end of debate. Often invited teachers act as judges. But it can also be an additional group of students who will be responsible for that role.

3.4. There is also one more person responsible for time keeping.

3.5. When debate is finished each judge/expert expresses his or her view on every team, indicates positive points in discussion, and makes assessment.

3.6. The Chairman announces the winner of debate and gives general comments to all the participants.

4. Conclusion

There is a broad support for active teaching/learning methods analyzed in the paper. Such methods help to engage students for learning, and make the learning process more interesting and more close to real-life problems. Examples from local communities' experience can be especially useful for education for sustainability. However, active teaching methods are not the cure for all educational problems. And the question needs additional investigation in frames of different specialties and peculiarities of different fields of study.

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Aktywne metody nauczania w edukacji dla zrównoważonego rozwoju na przykładzie dobrych praktyk stosowanych w lokalnych społecznościach

Streszczenie. Artykuł jest poświęcony wykorzystaniu aktywnych metod nauczania/uczenia się w ramach edukacji dla zrównoważonego rozwoju. Metody aktywne, takie jak: jak studium przypadku, gry symulacyjne, debaty czy ćwiczenia z podziałem na role, opisano krok po kroku w postaci szczegółowych wytycznych. Podano również przykłady dobrych praktyk w zakresie edukowania na rzecz zrównoważonego rozwoju, zaczerpnięte z życia lokalnych społeczności.

Słowa kluczowe: edukacja dla zrównoważonego rozwoju, aktywne metody nauczania, zaangażowanie studenta, studium przypadku, gra symulacyjna, debata, ćwiczenia z podziałem na role, burza mózgów, społeczności lokalne