

Creativity in teaching plant production

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Abstract

Using life-affirming values as a starting point, authors conducted action research to investigate ways of enabling pupils to experience freedom of choice, and to participate creatively in class activities, thus allowing them to begin to enjoy the subject of agriculture. The research problem was: How to encourage pupils to independently and freely express creativity in the plant production classes.

On the basis of the research problem they set two main aims: (1) to encourage the pupils' divergent thinking by using different creative techniques in teaching and (2) to increase pupil satisfaction with the possibility of participation in the planned activities. Teacher used creative techniques of Provocation, Mind Maps, Brainstorming, Five Ws and a H, Random Stimuli, and Freedom of Choice in order to achieve these pre-set aims.

This research demonstrates that the application of creative techniques is not enough to spur pupils' creativity. There are other factors that influence pupils' creativity, including the length of the lesson, the methods used in other teachers' classes, the pupils' previous experience of creative activities, as well as the teacher's competence in encouraging creativity.

Freedom to choose activities has proved to be the most inspiring for the pupils. It was only when teacher gave the pupils freedom of choice that they defined problems relevant to themselves (the construction of a compost place and the production of a spice) and found appropriate solutions for these issues.

Keywords: Action Research, Creativity, Creative Teaching, Teaching for Creativity, Creative Techniques.

1. The context of action research

This research was conducted as a result of cooperation between Vehid Ibraković, a high school teacher and Branko Bognar, a university professor assistant. Vehid Ibraković was the main researcher and Branko Bognar was his critical friend and helped him in writing this action research report. Although we cooperated in all stages of this action research project, the report was written from Vehid's point of view.

1.1. Vehid Ibraković's educational context

At the end of the 1980's, I began to teach the agricultural vocational subjects of Basics of Plant Production, Farming, Vegetable growing, and Production Materials in Agriculture in [the high school Matija Antun Reljković in Slavonski Brod](#). This also included elements of practical training. The school has about 800 to 900 regular students in thirty classroom-units, studying for different vocations in agriculture, forestry, veterinary medicine and chemistry. There are specialized classrooms for veterinary medicine and for chemistry, as well as laboratories for micro-propagation. [The school farm and school garden](#), "classrooms in the open", afford opportunities for practical training for the students.

School years have passed, and I have been searching for the free and creative teacher inside myself. To this end, I have been greatly helped, supported and advised by my fellow-teachers, and by the school pedagogue Biserka Halavanja in particular. In working with the children in school I had been trying to establish a connection between my poetic dreams and reality; although these often seemed to be quite incompatible. Sometimes I felt like a dreamer watching the future seeking new values, one of which is love for plants and life in general. I found this connection after the years of collaboration with colleagues for whom education is more than acquiring a large number of often unnecessary facts.

The action research described in this work was conducted in collaboration with high-school freshmen (1.a) who are educated as agricultural technicians. There were 17 students in this class; 7 boys and 10 girls. I teach two subjects for two periods a week: Basics of Plant Production and Cultivation of Vegetables in a Protected Area, which is an elective course.

1.2. Branko Bognar's educational context

As a school pedagogue, I started to use action research to help teachers improve their practice. In the beginning we worked within a learning community at school level only. However, as some participants were not from my school, I decided to use Moodle, a course management system, to promote a wider learning community. This became my Ph.D. action research project, which began in September 2005 after two years of preparatory activities. There were thirty three registered participants, from six primary schools and one high school, fourteen of whom conducted their own action research enquiries. Twelve participants represented their action research results at professional meetings, ten participants finished action research reports. From those ten reports, two were sent for publishing in professional journals and two reports were finished in the form of MA dissertations. The project officially finished in January 2007.

Having completed this project, we determined that action research represents an effective way in making educational changes. By listening to the project participants' opinions, I concluded that action research represents a systematic and creative activity, which presumes a philosophical consideration of educational values, creativity and a vision of new opportunities and challenges. These include an active participation in the realization of productive ideas, in data-gathering connected with processes of change, in a self-critical consideration of the results and in finding ways through which experiences arising from the research could become part of a closer or wider culture of social communities.

One of the participants of my Ph.D. project "The possibility of realizing the role of a teacher - action researcher through the electronic learning" was Vehid Ibraković. We continued our collaboration within a new project "The development of creativity in the lifelong education of teachers". The major emphasis in this project was to promote the creativity of teachers, as well as that of pupils. In other words, teacher creativity would be meaningless if student creativity is not also encouraged. Collaboration in this project happened via the Internet (<http://pedagogija.net/kreativnost>).

2. Methodology

In Croatia, action research is still not well affirmed, although in the past ten years it has been increasingly more evident in the professional literature. Many authors see action research as a form of qualitative research (Miljak, 2001; Mužić, 2004; Halmi, 2005; Sekulić Majurec, 2007). They generally agree that it represents the possibility for observation of, and improvement in educational practice:

Action research, according to us, is direct, participant, cooperative observation and changing of educational practice with intention for creating conditions, environments and atmospheres that will lead towards emancipation of all participants of the educational process. (Miljak, 2001, p.107)

I (Vehid) encountered the term "action research" for the first time during the 2005-2006 school year while participating in the project "The possibility of realizing the role of a teacher - action researcher through the electronic learning" led by Dr. Branko Bogonar (2008b). Within this project, I conducted my first action research in which I managed to encourage students to participate actively in extracurricular activity planning. Despite the fact that some changes were realized, I decided to develop this work by encouraging student creativity. Consequently, I joined a new project entitled "The development of creativity in the lifelong education of teachers".

By participating in action research projects I learned about living theory action research in which practice is "a form of real-life theorizing. As we practise, we observe what we do and reflect on it" (Whitehead & McNiff, 2006, p.32). By reading available literature about a living theory approach I realized that it is grounded on autonomously elected values:

Jack Whitehead emphasizes the value basis of action researches. Thereby, each researcher can choose which type of value is important for his or her research (moral and aesthetic, spiritual, dialog-dialectical, political and economic, etc.). Values are for him or her, the standard for assessing the quality of the resulting action research (Whitehead, 1989). At the beginning of

the process of action research, it is advisable to discuss and determine the values that are then a starting point for the participants in their educational activity. (Bognar, 2006b, p.216)

I accept McNiff and Whitehead's (2002, p.23) opinion that "it is pointless to produce abstract models of social change and expect other people to apply them to their own circumstances or locate themselves within the models." Therefore, in this research I put myself in the middle of process in which I endeavoured to overcome my living contradiction, that is a gap between life-affirming values in which I believe and my ordinary practice (McNiff & Whitehead, 2006, p.47).

3. What was my concern?

I was often dissatisfied with the regular classes I conducted, during which the students were often apathetic or indifferent. Personally, I felt that I did not allow the students to develop their love for agriculture and the technical subjects that I taught in school. Moreover, I was aware that many students who completed this course would not be able to find the employment for which they were trained. Even if they are successful in obtaining employment, our former students quickly realize that today's workers are required to be very creative and imaginative in solving everyday business problems, since most of the production will be machine-based in the future. Consequently, I think that Dryden and Vos (2001, p.183) are right when they are concerned with the fact that "the most important 'subject' of all is not taught at most schools: how to invent your own future, how to create new ideas."

Because of this, I began to think of how I could enable students to begin to enjoy the subject of agriculture and to be creative in the plant production classes. While reading the book *Super-teaching* by Eric Jensen (2003, p.73) I came across the following comparison of traditional and modern teaching: "Old: Teacher's work is to fill the students with knowledge like an empty container. New: Teacher's job is to serve as a catalyst so that students can develop love of learning and knowledge of what the best learning is¹."

I thought it was possible to move from traditional teaching by providing the students with learning experiences in which they could express their ideas, imagination, vision and youthful enthusiasm, and could participate in independent decision-making. Accordingly, I decided to make initial video-recordings of my teaching to observe and define the problem of this new action research, (videos are available at <http://www.youtube.com/watch?v=wzSVoY-R9LQ> and <http://www.youtube.com/watch?v=wjklSeaYrb8>). These video recordings demonstrate that the students were divided into groups in which they were working on the worksheet tasks. Yet, while it was a form of cooperative teaching, the students had little opportunity to be creative. The comment of a critical friend Branko Bogнар highlights this:

Vehid, I saw the summaries of both of your lessons in Basics of Plant Production and Cultivation of Vegetables in a Protected Area and I can say that they are an excellent example of the implementation of cooperative learning ... As this is a project to encourage creativity, I wonder if there is a possibility that creativity also becomes one of the goals of your teaching. So, is

¹ B. Bogнар translation.

there a opportunity for students to produce many original ideas, to create products that would not only be the application of existing knowledge, but a step forward towards new achievements? (B. Bognar, personal correspondence, November 22, 2008)

Although I could respond to this question at the end of my new research, I supposed that an inspiring environment needed to be created, with appropriate activities organized for creativity, and that the rest would be done by students themselves. Thus, creativity is the result of students' independent activities, and not teachers teaching. Therefore, the problem of this research was: *How to encourage students to independently and freely express their creativity in the plant production classes?*

On the basis of the research problem, I set two main goals:

- to encourage of students' divergent thinking,
- to gain students' satisfaction with teaching activities².

To assess the success of the assigned goals I established the following criteria, which underline the values of love and creativity that inspire my work: (1) creative techniques are organised in classes; (2) sufficient time should be provided to realize the creative activities (two class periods in a row); (3) students are active, free, creative and satisfied with the learning process.

Established goals and criteria helped me during the realization of the action research. In fact, in having had them as a starting point I could see what I needed to change in my teaching. Thus, I developed an action research plan.

4. The Action Research Plan

Having taken Jean McNiff's (2002, p.85) recommendations as a starting point, I decided to start with small changes in my practice. Since action research is a creative process (Whitehead & McNiff, 2006b, p.26; Bognar, 2008a, p. 25) it was clear to me that I would not be able to plan everything in advance, but that I would have to constantly try to change my actions in order to be more in line with my basic values of which the most important are creativity and the freedom of choice. I put special emphasis on freedom, because without freedom there is no creativity (Rogers, 1961, pp.358-359).

Guilford, Jackson and Messick (in Isenberg and Jalongo, 1997, pp.5-6) believe that creative behaviour must meet the following criteria:

1. Creative behaviour is original; it has a low probability of occurrence.
2. Creative behaviour is appropriate and relevant.
3. Creative behaviour is fluent; it results in many new forms of content.
4. Creative behaviour is flexible; it explores the uses of non-traditional problem-solving approaches.

² The essence of this aim "is that people are more creative when they are motivated by intrinsic pleasures such as enjoyment, satisfaction, and challenge" (Feist, 1999, p.160).

In order to achieve the goals of the research problem and to meet the criteria of creative behaviour, I proposed to use the following activities:

1. *Provocation – encouraging experimentation* is a technique that encourages lateral thinking³. This technique was devised by Edward de Bono using the word “po” which is an acronym for “provocative operation”. Statement “po” is directly and deliberately provocative, and therefore stronger than all the others. For example, the assumption should be something reasonable, but provocation “po” can be consciously illogical (De Bono, p.51). He suggests that we label the provocative statements always with a “po” so that all participants know that this is a provocation.
2. *Mind Maps* represent ideas, notes, information, etc. with widespread drawings. In fact, Tony Buzan (2004, p.45) believes that our brains do not function like a computer, linearly and in a continuous sequences or series: they think radially and in an exploding manner. “A Mind Map also mirrors the activity of the brain by being organized in a radiant way, thereby triggering creative thoughts and memories more effectively” (Buzan, 2006, p.20).
3. *Brainstorming* was designed by Alex Faickney Osborne. The term “brainstorming” has almost become synonymous with creative thinking in the English speaking countries. Brainstorming is realized in a group of five to ten participants who strive to find solutions for a concrete and simple life problem. Osborne (2008, p.269) recommends avoiding making judgments during the creation of a multitude of ideas, which should be as unusual as possible. In addition, the enhancement and combination of other participants’ ideas are being promoted.
4. *The Five Ws and an H*: There are only six universal questions that we can ask each other: what?, where?, when?, why?, who?, and how?. Thus, a problem that we wish to solve can be explained if the answer to each of these six questions is given. (Treffinger, 2000, p.26)
5. The technique of *Random Stimuli* comes from the assumption that the brain is a self-organising system that can easily and successfully create a connection. Almost every by chance elected term can stimulate ideas about the topic which we are dealing with. Terms that can serve as triggers of new ideas can be randomly selected words or pictures. (Silverstein, Samuel & DeCarlo, 2009, pp.122-126)

Having completed the action research framework plan, I was aware that it would be important to continue daily planning in order to determine the most appropriate actions in achieving the set goals.

³ Lateral thinking is the possibility of looking at things in different ways (De Bono, 2008, p.48).

5. Data Collection

Literature on action research states that data is collected to monitor and document the process of achieving change, in line with the set goals (McNiff & Whitehead, 2006, pp.131-137). During the research, I used the following data-collection techniques:

- I *photographed and video recorded* students' activities during the research. I edited videos (made shortened versions) and posted them on the Internet using the free service www.vimeo.com.
- Keeping a *research diary* is an important source of data in action research (McNiff, 1996, p.87). Like other members of the project, I published my research diary on the network forum (www.pedagogija.net/kreativnost). In addition to posting my reflections and describing the activities that occurred, I posted photographs and videos as a electronic diary, on which the other participants, especially the facilitator of my group Marica Zovko and the project leader Branko Bognar, regularly commented.
- I conducted *informal conversational interviews* (Patton, 1991, pp.281-282). During and *after lesson, and even during breaks*, I would talk to my students, spontaneously asking questions, which changed depending on the situation and on what I wanted to know.
- In order to *get the feedback on the students'* satisfaction with certain activities I used *evaluation sheets*.
- The *students' work* was also an important source of information regarding the success of the research goals realization.

I introduced the action research to the principal and to the parents of the students. Having consulted with their homeroom teacher, I outlined the goals of my research and sought permission to record and photograph the students during the action research. All the parents agreed, as did the principal.

6. The Action Research Realization Process⁴

Initially, I explained what was involved in the action research to the students. I emphasised "that they would be active participants in all the phases: in the selection of problems, in planning, in the realization of activities, in data gathering, in the evaluation of results, and even in the report writing" (research diary, January 26, 2009). The students were a bit confused at the idea of participating in the action research. I hoped that their confusion would eventually be replaced with curiosity and, once they became curious, that their imagination would generate creativity in a free classroom atmosphere.

I wanted to demonstrate that all the vocational content could be realized in a creative way. I adapted creative techniques to the basic theme of each lesson. Using one creative technique at a time, I took care that the creativity was at the centre of the teaching process and not only as an addendum. I was worried about the students' reaction. I wondered whether

⁴ The planned changes were being achieved during February, March and April 2009.

they would accept my attempt to make the lessons more creative and whether they would be willing participants.

6.1. Provocation – encouraging experimentation

I tried to explain the concept of the creative technique of Provocation to the students by mentioning examples from everyday life. My intention was to provoke the students to express unusual, diverging ideas (see <http://www.youtube.com/watch?v=OgNc42vFICA>). I introduced the technique Provocation setting using the following provocation (po): *“The Ministry of Agriculture issued a decree that abolishes ploughing and soil tillage in agriculture.”*

The students, who were divided into four groups, had to examine this provocation by trying to answer the following questions:

1. What are the possible consequences of this decision?
2. What are its advantages?
3. Under what conditions could it be a smart decision?
4. Identify the principles that support the implementation of the decision.
5. How would it function if it were to be implemented now?
6. What changes would happen in agriculture?
7. What would agricultural production look like in ten years?
8. How would these changes affect the preservation of soil fertility? (Manktelow, 2004, p.23)

Following the initial confusion caused by the provocative statement, students communicated in their groups and at the end of the lesson their spokespersons presented the groups' answers:

- Due to this decision, the soil will have “a rest” from tillage.
- The natural fertility of soil will improve. However, this will hardly work.
- The decision will reduce a yield.
- The decision would cause dismissal of workers in the factories which produce ploughs used in soil cultivation.
- Student I.B. gave the most interesting answer: “Since according to legal regulations there is no tillage, therefore sowing could be conducted in the straw.”

I wrote the following note in my research diary about the success of the realized activity: “The truth is that Provocation gives us the original starting point for creative thinking. However, the students' reactions to the provocation are still too realistic; they have not relaxed yet and have not engaged in fantasy and experimenting” (research diary, February 2, 2009). I realized that action research is a process that does not lead immediately to the expected results. It is necessary to be patient and persistent, hoping that the atmosphere of freedom and creativity would lead to the desired changes.

My critical friend Branko Bogнар wrote his comment about what he had the chance to see in the videos and read in my research diary:

I think that you applied the creative technique of Provocation well as an introduction to the topic of soil tillage. I especially liked how you explained the meaning of the word “provocation”

in a simple and humorous way. Children are not acquainted with such situations so it is normal that some felt confused. It will be interesting to follow their future reactions and to watch the changes that will happen. I am also eager to see how you will design a new theme. I think it is good to change techniques because creativity cannot tolerate repetition and boredom. If you are lacking ideas you could design a technique of your own. It is important that activities stimulate as many aspects of creativity as possible... Perhaps it could have been done in a more relaxed and humorous manner; it seems to me that you were kind of serious, which could also have an impact on the students' reaction. (B. Bognar, personal correspondence, February 10, 2009)

The students assessed this activity at the end of the lesson by completing an evaluation sheet. It consisted of several open-type questions. When asked what they thought of the organisation of the lesson, the students responded that they felt uncertain in the beginning and did not understand what it was about. However, they explained that as the lesson progressed they welcomed the opportunity to use independent thinking skills in discussing the assigned provocation and that they enjoyed a different way of learning. They also expressed their satisfaction with communicating in groups. Many of the students liked this way of learning and they said that they would prefer if other teachers also worked in this way.



Figure 1. The discussion in the circle

The observed benefits, according to the students, included opportunities for a quicker pace of learning, for creativity in learning, and for freedom in communication, behaviour, thinking and planning. The only problem identified by the students was the initial confusion caused by the provocative statement.

I was encouraged by the students' enjoyment of the creative activities, but I also was aware of importance of modifying the lesson to encourage their creativity. In early March, I used the provocation technique again in the unit "Fertilization of Soil" (a video record of the

lesson is available at <http://www.youtube.com/watch?v=Xi3jwB1rqr8>). I sat with the students in a circle at the beginning of the lesson (Figure 1) and we discussed provocation in everyday life. I asked some of them to recall how they felt when they were provoked in an everyday situation. I tried to emphasize the importance of removing the negative connotations from the term “provocation”. By observing the students’ responses during the lesson, and in the subsequent video, it seemed to me that I had accomplished this. Through discussion, we came to the conclusion that a provocation can be used as an incentive for finding appropriate solutions, not only as a reason for anger and strife with the person who provokes us. Subsequently, I set a new provocative problem: *“The Ministry of Agriculture issued the legal regulation that prohibits the application of mineral (artificial) fertilizers in agriculture.”*

The students worked groups, and then they presented their ideas to the class. I selected one of the responses to the proposed provocation:

- This decision will decrease the yield.
- Factories that produce mineral fertilizers would cease to work.
- This decision will accelerate the increase in ecological, organic farming.

Although I had wanted to provide the students with the opportunity to produce unusual responses, their ideas ranged within known patterns; they listed the positive and negative consequences of provocative possibilities. I discussed this with Branko Bognar:

Branko: Students had the opportunity to address the problem of what would have happened if the Ministry of Agriculture had decided to ban the use of fertilizers. It is obvious that they have recognized the advantages and disadvantages of such a decision, but it seems to me that bold and original ideas were lacking this time. I have the impression that they are still rotating in the framework of general well-known facts. In any case, they have actively discussed the problem of using chemicals in agriculture.

Vehid: I think I just have realized that students are pretty constrained in their freedom. If they did not experience freedom, then their creativity was still questionable. Therefore, Branko, you were right when you wrote in your comment *“...it seems to me that bold and original ideas were lacking this time. I have the impression that they are still rotating in the framework of general well-known facts.”* However, I am aware of even bigger aggravator. Namely, it seems that I am pretty lonely in my efforts to encourage students’ creativity. (Personal correspondence, February 24, 2009)

6.2. Mind Maps and the Five Ws and an H

I tried to use the technique Mind Maps in combination with the Five Ws and an H. The students had to systematize the content of the topic “The Soil Tillage” by drawing a mind map and by using the six universal questions who?, what?, why?, where?, when?, how? (see <http://www.youtube.com/watch?v=OQE6FVSMsyo>). At the end of the class they pasted all the mind maps on a group poster (Figure 2).

While the students were more relaxed, they were not creative in the true sense of the word. My critical friend Branko Bognar explained that that perhaps it was the way I had organised the creative technique of Mind Maps was not appropriate:

With creative techniques one should take into account the fact that they truly foster creativity, not only resemble it. Thus, creativity requires a specific problem which has no unambiguous answer, which is not the case here. In regard to the way you have designed your lessons: the students have not had a chance to express creativity, but they have only visually presented what they have learned. I personally also use Mind Maps in a similar way in my teaching, but I do not use them for stimulating creativity, but rather for the teaching content systematisation. (B. Bognar, personal correspondence, February 10, 2009)

I was grateful for his comments and I was eager to consider them while I was planning subsequent teaching activities. I was aware that I could learn from my mistakes as well as from successes (research diary, February 11, 2009).

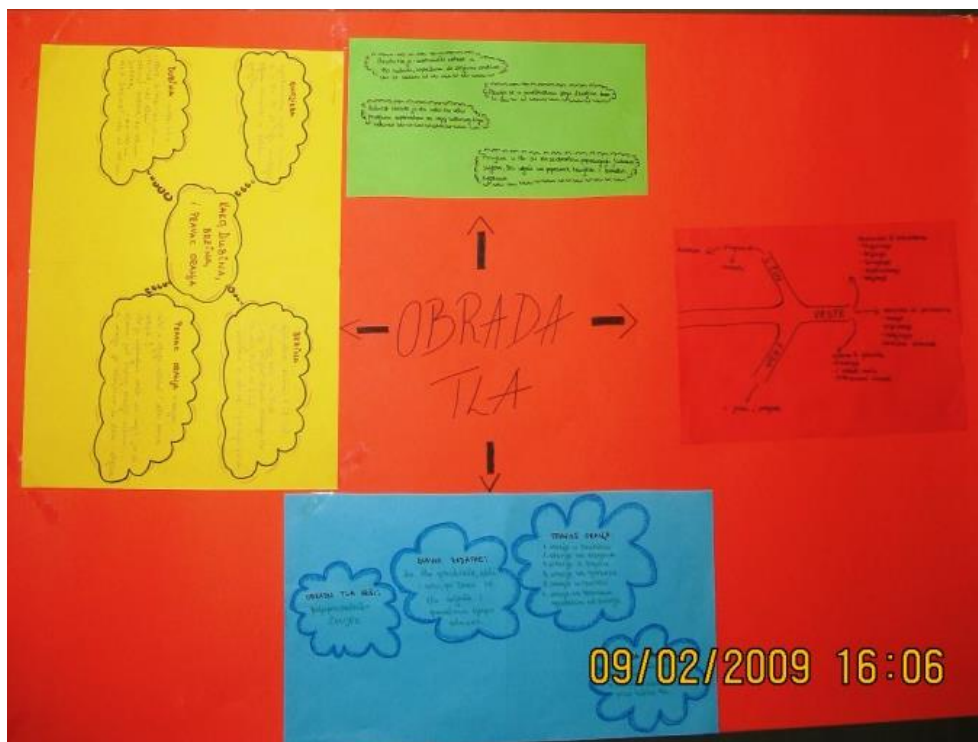


Figure 2. Mind maps

6.3. Brainstorming

My next challenge was to find a way to apply the creative technique of Brainstorming within the theme “Soil Fertilization.” I posed the following problem to students: *How can the soil be fertilized without artificial chemicals in the cultivation of tomatoes, peppers, cabbage and lettuce?* (see <http://www.youtube.com/watch?v=480DRX-C1Eg>). As in previous cases of applying creative techniques, the students continued to use previously learned information in their responses, which my critical friend Marica Zovko noted:

It is clear to see in the presentation of the lesson that students have collaborated within groups, that they are ecologically aware, and that they have a good knowledge of natural ways of fertilization. Your good and creative preparation was also quite noticeable. What I could not see were the students' ideas, their creativity when approaching the theme and the freedom of creation. Students worked in groups and wrote down what they had learned about the

topic. In a creative environment, the knowledge that we already have acquires new dimensions, and your students surely have ideas that need to be let out of the bottle. And your creativity will allow them to. Step by step, as you say. (M. Zovko, personal correspondence, February 19, 2009)

The comments of my critical friends, and the insights I gained from my observations of the video recordings helped me to understand that the application of creative techniques alone does not contribute to stimulating students' creativity. I decided to talk to the students about the problem (<http://www.youtube.com/watch?v=hWEvXuA7y78>). Student K.N. explained that this could be due to their previous educational experiences in which they had had no opportunity to demonstrate their creativity:

I think that the problem is that creativity has not been developed in us at all and that we came from a primary school where we had no opportunity to show our creativity either. And in the high school other teachers do not allow us to develop creativity. The only "creativity" is that they give us a test ... They just dictate. (Student K.N., personal communication, February 24, 2009)

6.4. Random Stimuli

To implement this technique, I asked the students to choose a small sheet of paper on which a random word or picture was printed and for which the students had to determine the properties, connecting it to the defined problem. I intended to encourage them to give creative possibilities for soil fertilization (<http://www.youtube.com/watch?v=sV32EbNljBo>). Again, they referred to previously learned material only; so creativity in its real sense was lacking again. While there were a few interesting ideas, the students' ecological awareness, rather than their creativity, was evident.

Despite the fact that I was not satisfied with the level of students' creativity, it does not mean that my teaching in general was not well organized. A comment by Irena Topalušić, a teacher from Požega, confirms this:

Vehid, I read your research diary entries for a long time last night. I read, saw and heard a lot. I enjoyed it! It is obvious that you are experienced in keeping a research diary. You use different activities. I drew on some of the ideas for today's Croatian language lesson. It would be really good if the junior-classes and secondary-school teachers had a chance to see your work. They might even change a bit. I think that students would not skip the classes if other teachers joined our project. (I. Topalušić, personal correspondence, March 6, 2009)

6.5. The pupils' evaluation of lessons

In early March, I handed out evaluation sheets to my students. They consisted of four questions which could be answered by circling the feeling faces. Additional written explanation could be added. All 17 pupils filled in the evaluation sheet.

The first question asked the students how often they had the opportunity to be creative. Most of the 13 (76%) responded that they could sometimes be creative. Two students (12%) responded that they could often be creative, and the two more indicated that they would never be creative. Nobody circled the option that they could always be creative.

In responding to the second question of how important imagination and fantasy are to them, 10 (59%) found it quite important aspect of their life. However, none of the students considered imagination to be very important. Seven students, (41%), chose the answer “so-so”, which says that imagination is of secondary value in their lives. Nobody stated that imagination had no value at all.

In the third question the students were asked to indicate how they felt during the usual plant production lesson and, in the fourth question, how they felt during the lesson in which creative techniques were used. From Figure 3, it is clear that the students felt much better when creative techniques were used.

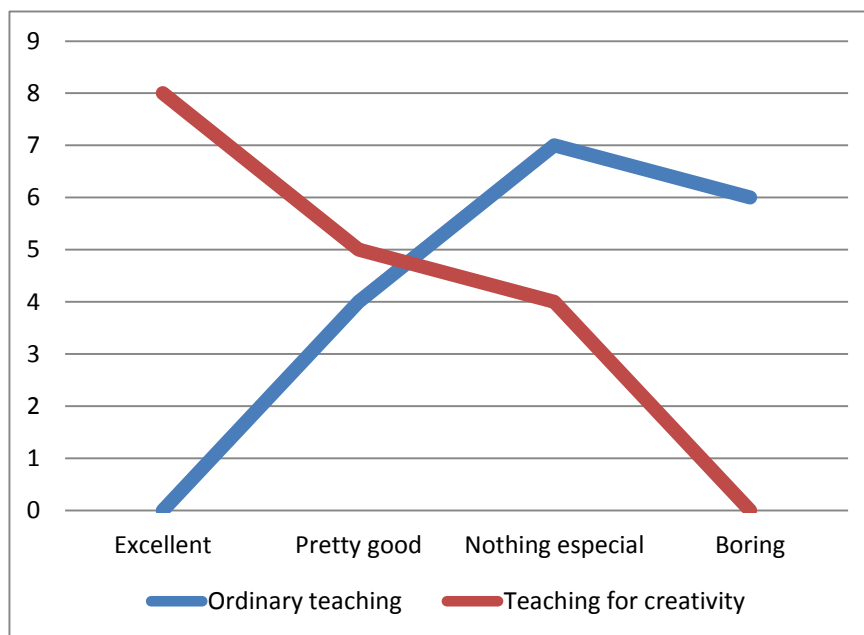


Figure 3. How the students felt during the standard lessons and lessons in which creative techniques were applied.

I talked to the students about these questions (<http://www.youtube.com/watch?v=Xe8s7R6WxTo>). A spokesperson from one of the groups responded as follows:

- Occasionally, we are creative at home but almost never at school because it is all according to the rules; so we cannot use our creativity.

- We use a lot of imagination because it helps us to accomplish the goals which we cannot accomplish in reality.
- It was boring without creative techniques in the plant production classes, every day and every hour in school looks like that.
- It feels great when we use creative activities in classes because the feelings of fantasy and freedom release; we are simply not afraid.

6.6. Freedom of choice in the school garden

With the arrival of spring, we planned to go out in the school garden, our outdoor classroom (<http://www.youtube.com/watch?v=JsTekfuxlak>). The garden is composed of four departments (practical exercises): flowers, forest, vineyard vegetables and gardening. The gardening department is not regulated in the regular way, rather it represents a garden of biological diversity. Also, there are some creative details in the garden, such as a spiral of spices and medicinal plants (Figure 4) that are rarely found in school gardens. The students feel free and have a chance to be creative in this area (see <http://www.youtube.com/watch?v=BmWK5pwVdBw>).



Figure 4. Spiral of medicinal herbs and spices in the garden

Once out in the garden, the students were a little less tense, but they still did not completely take initiative and become creative in the true sense of the word. I remembered the advice given to me at the beginning of the research by my critical friend Branko Bognar: *"If you are lacking ideas you can design a technique of your own. It is important that these activities stimulate as many aspects of creativity as possible."* Consequently, I decided to give my students *freedom of choice* (video available at http://www.youtube.com/watch?v=08LCRg_JA-k). I suggested that they choose projects that

they themselves wanted to work on and that they develop a plan of action and try to work through it. The students then began to the initiative and launched the following interesting projects:

1. The creation of the new school product – a spice from the thyme plant;
2. The construction of the school place for compost; and
3. The inspection and remediation of the old tree-stump in the school park.

As they had freedom of choice, some students chose to remain in the classroom and learn the plant production content from textbooks.



Figure 5. Students are preparing the spice

The students who decided to design their product, the thyme spice, first developed an action plan in the classroom. Then, they went to the school library and they searched for data in the literature and on the Internet about the thyme plant. They picked thyme and left it to dry in a room with a lot of light. The following week, they collected the dried parts of the thyme leaves, which can be used as spice, and placed them in glass containers. This product was then presented to the school principal, who congratulated them on their work (a video record of the process of making the product is available at <http://www.youtube.com/watch?v=nfJmKXFNoFM>). When Banko Bogнар reviewed the video he wrote the following comment:

I think that you are completely right when you emphasize the students' freedom and needs (perhaps it is a more appropriate notion than desires) as important preconditions of creativity. However, creativity is also something which is learned and learning requires time. Therefore, it is a process rather than an event; although when creativity happens, it seems like it happened suddenly.

In order for our students to become creative, we too must show creativity. I think that your decision to design your own creative technique is an excellent example of teacher's creativity. You tried to implement the ready-made techniques for so long, and then you tried to give the teacher in yourself the freedom of choice, and then to transfer this freedom on to your student that the atmosphere has become completely inspiring, both for you and for your students. Vehid, this is the core of creative approach. I like that you gave your students the freedom of choice, which inspired their creativity ... It is nice to see that students have the freedom of choice not only because it is the best way for creativity, but also for creating a quality school that fits its students. (B. Bognar, personal correspondence, April 10, 2009)

7. Interpretation

By using different techniques to stimulate creativity, such as Provocation, Brainstorming, Mind Maps, Five Ws and an H, and Random Stimuli I had tried not only to encourage the students' divergent thinking, but I also endeavoured to achieve student satisfaction with their participation in the planned activities. Most of the creative techniques are designed to provoke and encourage original answers or solutions to posed problems (Smith, 1998, p.133; VanGundy, 2004, p.4). Therefore, my intention was to encourage students to create ideas rather than to use well-known facts regarding plant production. I had expected more imaginative responses from the students during the application of creative techniques, but I noticed their confusion and lack of original ideas, especially in the beginning. I was warned about this by my critical friends too.

7.1. Barriers to creativity

I noticed that the fragmentation of school day into periods of 45 minutes may be a limiting factor at times. In order to reduce the negative impact of time constraints, most of the activities were conducted in block two class periods. However, despite this, a bell between the two periods was still a disturbing factor because it interrupted students' activity and concentration. Although Gersick (1995, p.144) points out the positive effect of segmenting time into separate eras that could provide a team "an opportunity to look at the 'old' materials they have generated in new ways", this was not the case in my research.

In addition, I noticed that the classes that students have with other teachers before or after the creative teaching class significantly affected their creativity as they had to adapt to different teaching approaches. It caused confusion and uncertainty in the students.

The fact that the students had almost no prior experience of working in this manner posed another difficulty for me in promoting creative thinking. This is something that the students themselves emphasized in the recorded interviews (see <http://www.youtube.com/watch?v=hWEvXuA7y78>). I agree with Sternberg (in Tan, 2007) that creativity is habit:

It may sound paradoxical that creativity — a novel response — is a habit — a routine response. But creative people are creative largely not by any particular inborn trait, but rather, because of an attitude toward life: They habitually respond to problems in fresh and novel ways, rather than allowing themselves to respond mindlessly and automatically. Like any habit, creativity

can either be encouraged or discouraged. The main things that promote the habit are: (a) opportunities to engage in it; (b) encouragement when people avail themselves of these opportunities; and (c) rewards when people respond to such encouragement and think and behave creatively. You need all three. (Ibid., p.3)

According to this, we can conclude that creativity should become an integral part of the process of education for the majority of teachers, not just a few enthusiasts. This is particularly important as creativity cannot be developed without assistance from teachers, mentors, peers, intimate groups (Feldman, p.176). Woods (in Craft, 2005, p.130) explains that this can be done through a four stage development: *innovation* – the creation of something new for the pupil, *ownership of knowledge* - pupils learn for themselves and not for others, *control of learning process* - the learner is self-motivated, and *relevance* - “knowledge that is meaningful within the child’s frame of reference” (ibid.).

I think that I had not prepared adequately to use creative techniques in my lessons. In the first 90 seconds of the video recording of my lesson (<http://www.youtube.com/watch?v=OgNc42vFICA>) one can hear how seriously I explained Provocation to my students. My critical friend Branko Bogнар suggested that I should do something less tense and that I add some humour. His suggestion was in accordance with various Western studies⁵ (Fry & Allen, 1996; Craft, 2000, p.13; Roেকেlein, 2002, p.234) which point out a strong relationship between humour and creativity. As Urban (2007, p.177) explains: “Humour provides both distance and closeness towards a subject. It allows and displays a more-perspective consideration in the presence of an emotional competent”. I believe Branko Bogнар was correct and that my insecurity and apprehension at the beginning of the research may have affected the students. However, the best way to become more confident in facilitating the creative development of students was to change my practice, although I was not completely sure it would be successful. While I was dealing with this risky process I appreciated the meaning of McNiff and Whitehead’s words:

Action researchers constantly stand on the edge. The next moment is unknown. They commit to the risk of creating a new future. This is a different mental set from traditional assumptions that knowledge is given. Action researchers anticipate new problematics. Concrete answers do not pre-exist but are created by real people, in negotiation with others. This can be destabilizing for people who are used to being told what to do. Instead of beginning with a hypothesis, which they aim to accept or reject, action researchers start with an idea and follow it where it leads them. (McNiff & Whitehead, 2006, p.31)

Moreover, I did not apply some of the creative techniques in an adequate manner. This was quite evident when the mind maps were employed; the students used them for the systematization of the educational content, and not for the creation of their original ideas. As well as that, I had not taken enough care to encourage all important aspect of creativity fluency, flexibility, originality, and elaboration through comments and questions:

For example, asking “How many ways can you think of to...?” encourages fluency. “What are some different kinds of ideas?” or “So far, all our ideas involve food. Try to think of ideas that

⁵ According Rudowicz (2004, pp.65-66) humour – so prevalent in the Western concepts of creativity – is either invisible or perceived as having very little to do with creativity in the Chinese implicit concepts regarding creativity and the characteristics of a creative person.

solve the problem in a different way” encourages flexibility. Comments such as “Try to think of something no one else will think of” are designed to elicit originality, whereas “How can we build on this idea?” encourages elaboration. (Starko, 2005, p.191)

A school culture which does not fully appreciate creativity, along with personal disorientation at the beginning of research in the application of certain creative techniques, were considerable obstacles. However, it seemed to me that the problem could be in the very techniques that are supposed to stimulate creativity. These techniques are focused on creating original ideas. Yet, creativity according to Beghetto (2007) cannot be reduced to originality, because it represents a combination of originality and suitability. This means that creativity involves the creation of unusual, new, original, but also suitable solutions to the existing social problems. It was only when I gave the students freedom of choice that they defined problems which were relevant to them (place for compost arrangement and production of spices), and which prompted them to find appropriate solutions. I realized that Starko (2005, p.196) is right when he claims that “there is no one correct way to brainstorm, nor is there a single technique that guarantees positive results.” Therefore, it is questionable that someone could *teach for creativity* by using well known techniques. It seems that *teaching for creativity* can only be done through *creative teaching* (Jeffrey & Craft, 2004, p.78).

7.2. Changes in Practice

By listening to my inner voice⁶ I tried to become a teacher with a vision of a school that encourages both creativity in teaching and learning, and a love of agriculture. Those values were a starting point in my educational commitment to encourage students’ divergent thinking and to increase their satisfaction with the teaching activities. I noticed changes both in myself and in the students during the action research enquiry that were in addition to the expected aims. In analyzing the data and in writing this report, I came to understand that action research represents a systematic process of observation, description, planning, action, reflection, evaluation, and modification, but I also realized that it does not need to be conducted in a sequential or necessarily rational way (McNiff & Whitehead, 2002, p.56). As these authors explain: “It is possible to begin at one place and end up somewhere entirely unexpected” (ibid). This has happened in this enquiry. As well as the noted improvement in the students’ divergent thinking and their satisfaction with teaching activities, I noticed some additional changes, which are in accordance with my values of love and creativity. These are as follows:

Improvement of divergent thinking: I gave the students a chance to develop unusual and original solutions. One student proposed to sow plants in straw, while another proposed to make a solar powered vacuum cleaner to collect plant parasites. It is interesting that the student who proposed making vacuum cleaner did not come up with this idea in class, but rather it came to her mind at home and she presented it one week later in a subsequent

⁶ The listening to one's “inner voice” is one of four categories of personal creativity characteristics. It “includes traits that involve a personal understanding of who you are, a vision of where you want to go, and a commitment to do whatever it takes to get there” (Treffinger, Young, Selby & Shepardson, 2002, p.IX).

lesson. This demonstrates how creative techniques can stimulate students to be creative outside of the teaching process. This is consistent with Guilford's (1968) view of the creative process which he divided into four steps: preparation, incubation, the moment of inspiration that leads to solutions, and finally the period of evaluation or verification. The student did not immediately arrive at this original idea; rather it emerged after a certain time (the incubation period) had elapsed. However, the problem posed during the lesson and the possibility of addressing it within the framework of the creative technique of "provocation", (the preparation period) contributed to her unconscious problem solving.

In any case, the basic features of divergent opinion according to Isenberg and Jalongo (1997, p.11) were manifested during this research: *generative* - I was constantly stimulating ideas, *research-oriented* – together we have searched for many possible ways to develop inspiring solutions, *the unpredictable* - we have based our actions on intuition, and in some cases creative techniques led to the excellent students' response.

Students' satisfaction with participation in the planned activities: During the action research I made it possible for students to feel a sense of *psychological safety* and *psychological freedom* (Rogers, 1961, pp.357-359). I encouraged them to take risks. My creativity and the students' creativity complemented, supported and encouraged each other. There was no competition and no reward. All of this ensured the release of the creative potential.

The students very quickly felt that the action research we conducted together was something new and challenging, which encouraged them to participate actively, but at the same time it caused feelings of confusion and uncertainty. As we proceeded, the initial confusion and uncertainty disappeared and transformed into freedom and creativity.

I think it is important that students participate in educational activities without a sense of fear, as fear is the primary emotional obstacle to creativity (Davis, 1999, p.169; Craft, 2000, p. 145; Seaward, 2009, p.287). The students' experience of freedom in this study resulted in their satisfaction with the classes (Figure 3).

Systematic Planning: I had not been paying enough attention to the quality of systematic planning of my teaching. This changed during the action research. I learned how to systematically prepare for classes, ensuring freedom and creativity in the teaching process and for the students. The possibility of publishing my plans on the forum was also a stimulus for systematic planning. The fact that these could be read, and critiqued, by my critical friends also contributed to my detailed and systematic planning. Branko Bognar's comment posted on the forum testifies to the claim that my planning was improved:

Vehid, I have read your current research diary records which are a perfect example of a quality research approach. Each activity is systematically planned and prepared. After that a research record follows, which briefly, but informatively, described what happened during lessons, as well as includes your reflective comments. I have noticed huge progress in comparison with your research diary in the previous project. (B.Bognar, personal correspondence, April 9, 2009)

Although this research was realized in a different educational context I agree with Joubert (2001, p.26) when she claims that the National Curriculum is too full and it needs to be reduced: "There is not enough space in the curriculum to give teachers the freedom to be creative, to experiment and to allow children to experiment." A similar problem exists in

Croatian circumstances. But it seems that an even bigger problem lies in the lack of teacher competencies and courage to teach in creative ways. While the official curriculum did not pose too much of a difficulty when I decided to give my students more space to experiment and to be creative, I am not sure that I would have dared to move outside traditional teaching approach without the support I got within the project.

Self-criticism and learning: Action research has made me aware of the importance of my critical friends. It was not always easy to deal with critical comments, but the feedback was always constructive and my willingness to accept it has contributed to my personal learning and creativity. In fact, I think that without the critical comments of my friends I would have found it very difficult to finish my research and to make the required changes in my practice. However, I also found ways of overcoming problems in my action research in line with the needs and abilities of students, and in line with my values. I found, as Downing (1997, p.75) claims, that

...teacher⁷ support and encouragement to continue creative work is better for students' growth than specific suggestion of how to improve it. It is important that students focus on the inner rewards of doing the project, and not merely on how to win the teacher's or classmates' approval.

Communication and learning: During the project I met new colleagues with whom I cooperated and communicated in different ways, including face-to-face encounters with critical friends, in the learning community, and on the Internet (<http://pedagogija.net/kreativnost>). Intensive communication on the Internet has allowed me to learn how to use modern computer technology but, more importantly, it has encouraged me to pursue my enquiry:

Yes, your challenge is to make progress in the students' view of things. You are not like other "traditional" teachers who immediately impose clear game rules, offering ready-made solutions. Creativity is obstructed by those teachers from the very beginning. As soon as I read your research diary records, they reminded me of de Saint-Exupery's (1995, p.11) thoughts in *The Little Prince* who as a child, as well as adult showed his drawings to the grown-ups and in that way tested their understanding. He actually tested the power of their imagination:



Drawing No. 1

Drawing No. 2

Whenever I met one who seemed reasonably clear-sighted to me, I showed them my drawing No 1, which I had kept, as an experiment. I wanted to find out whether he or she truly understood. But the answer was always: 'It is a hat.' So I gave up mentioning boa constrictors or primeval forests or stars. I would bring myself down to his or her level and talk about bridge, golf, politics and neckties. And the grown-up would be very pleased to have met such a sensible person.

⁷ Certainly, in my case it was relation action researcher – critical friends, not students – teacher.

I consider that you will succeed to release the fantasy and imagination of your students and that they will be able to see an elephant in the boa constrictor. When you succeed in that, tell them the story about “boa constrictors or jungle or stars.” You will improve divergent thinking and your students will be satisfied. (M. Gavran, personal correspondence, February 2, 2009)

My sense of satisfaction: In overcoming the problems and crises integral to the process of change and learning, I felt more and more satisfied with the achieved successes, particularly because of personal learning. The new friendships that I made with the participants of the project contributed to this feeling of satisfaction.

Confidence: Before this project I had felt a certain insecurity that is often the result of non-systematic preparation for classes, something that has significantly changed in, and as result of, this project. By engaging in self-evaluation and by collaborating with critical friends I have become aware of the various options for improving my practice to achieve desired changes. I understand that being aware of problems can initiate the process of change. New learning has made me more secure. And, when I came to realize that other teachers encountered similar difficulties, I became more self-confident and willing to engage in open discussion to find appropriate solutions. I agree with West (1997, p.19) when he emphasizes importance of a supportive and challenging work environment in promoting confidence in creativity:

Climates encouraging interaction, individual autonomy and production of new ideas appear to generate creative achievement in both educational and work organizations. Where climates are characterized by distrust, lack of communication, limited individual autonomy and unclear goals, innovation is more likely to be inhibited. (Ibid.)

8. Opening new perspectives

During this project I was in true partnership with my students, and they were active participants who expressed and created their idea of freedom of choice. I have helped, encouraged, coordinated, advised, taught and led, but the students were free to make their own decisions. Consequently, they have become happy, joyful and optimistic. The usual obstacles to learning, including the fear of failure, unpleasantness and the belief that learning is “hard work”, have been removed. This positive interaction was made possible by the cooperation, trust, support, and persistence of all the participants of this research.

In order to reduce the gap between theory and practice it is important that we, teachers, become not only the conductors of other people’s ideas, but also creators of our own professional approaches. Through this action research I have grasped that students’ creativity is encouraged by teaching practices that are based on the promotion of freedom of choice and allowing students to become more independent and active in their learning. All this leads to students’ self-actualization, pleasure and the creation of love for one’s future profession.

Although we live today in a democratic society; common opinion may have changed, but not common practice. Despite the drastic changes in intellectual and general opinion in the last decade, freedom of choice in school classrooms remained either at the same level as it was in the last millennium, or it has prejudiciously deteriorated. The atmosphere in classrooms is

often more depressing than inspiring. However, the tide is turning, although it is still far from the necessary and essential flood that the people's freedom is ensured the light future. (Research diary, April 6, 2009.)

Finally, I would agree with Seitz and Hallwachs (1997, pp. 97) that we must not “stop at the imagination... We must not be taken back to the real world through imagination. We must use imagination to change this world, and to change ourselves, it is our task.” This research represents an attempt to change my personal practice, which is not complete because I intend to continue using imagination and freedom in order to change myself, my practice and to encourage students to use their freedom and creativity in creating a better and more human world.

During the next school year I intend to conduct a new round of action research with the same students. It will be focused on the projects that the students themselves design, that are relevant to them and to the wider social context. It will be interesting to see whether the creative techniques will be adequate for finding creative (original and appropriate) solutions for the students' own questions.

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