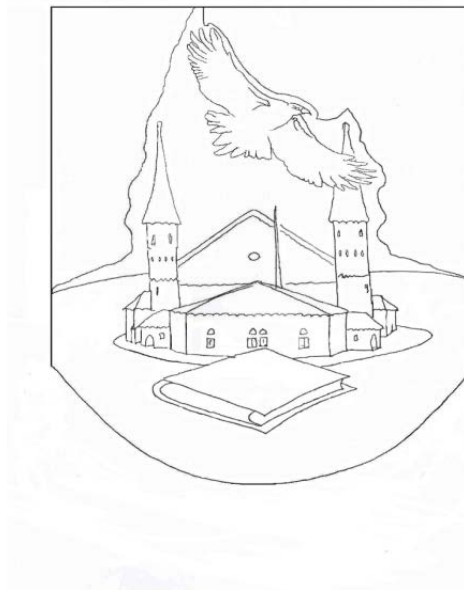


Albert Kiss

**Scientific Children's Association in
primary schools
- establishment and operation -**

Methodology



Propagating general knowledge

Micro-research

Scientific Children's
association

Talent support

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Scientific Children's Association in primary schools – establishment and
operation

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Introduction

This booklet is an abridged edition of the handbook written by the Hungarian author Albert Kiss in 2010. His book is the result of a pedagogical development carried out during the practice of talent support.

The author recommends a research-proven way for teachers and institutes of primary education to undertake the encouragement of those pupils between the age of 10 and 14 who are interested in science to subjective creation.

The book may be used as a methodological guide for preparing talents and latent future talents for a creative fulfilment of the demands made by a knowledge-based society requiring a self-confident use of information and resources, a sense of scientific problems, the ability to apply research methods and prepare subjective creations.

The stages of the creation-based development of pupils are presented in a thematic way, highlighting the interpretation of the essence, goals and challenges of Scientific Children's Association. Then the relationship between the activities of SCA and the National Curriculum is demonstrated including the role of SCA in primary education. The author describes the way of establishing SCA in order to support talents and future talents. Meanwhile, he keeps the underlying learning process in focus, the key element of which is the facilitation of learning how to create a work propagating general knowledge and how to learn the relevant research methods.

The concept of micro-research based on research methods interpretable for children is also clarified, while the essential activities of micro-research are accounted for by the author.

He acquaints the reader with the progression-based, complex competition, Scientific Children's Conference organized for pupils interested in science, the establishment of which was professionally supported by the Ministry of Education. He also places a great emphasis on the need for self-reflection in the course of working in SCA.

The aim of publishing the present version of the author's book is to call readers' attention to the Hungarian initiative introduced above with special regard to the most significant findings and achievements. The booklet is divided into chapters following the structure of the original version. The chapters contain figures and tables, descriptions are included to unfold the content of them in case it needs further explanation or when demonstration by figures and tables cannot replace textual argumentation.

1. SCIENTIFIC CHILDREN'S ASSOCIATION IN PRIMARY SCHOOLS

1.1. The essence of the pedagogy of Scientific Children's Association in primary schools

The essence of the pedagogy of Scientific Children's Association operated in primary schools can be modeled by a relation system of three key elements, with the help of which the relevant pedagogical processes can be described.¹ (ZSOLNAI J. 1996.61.p)

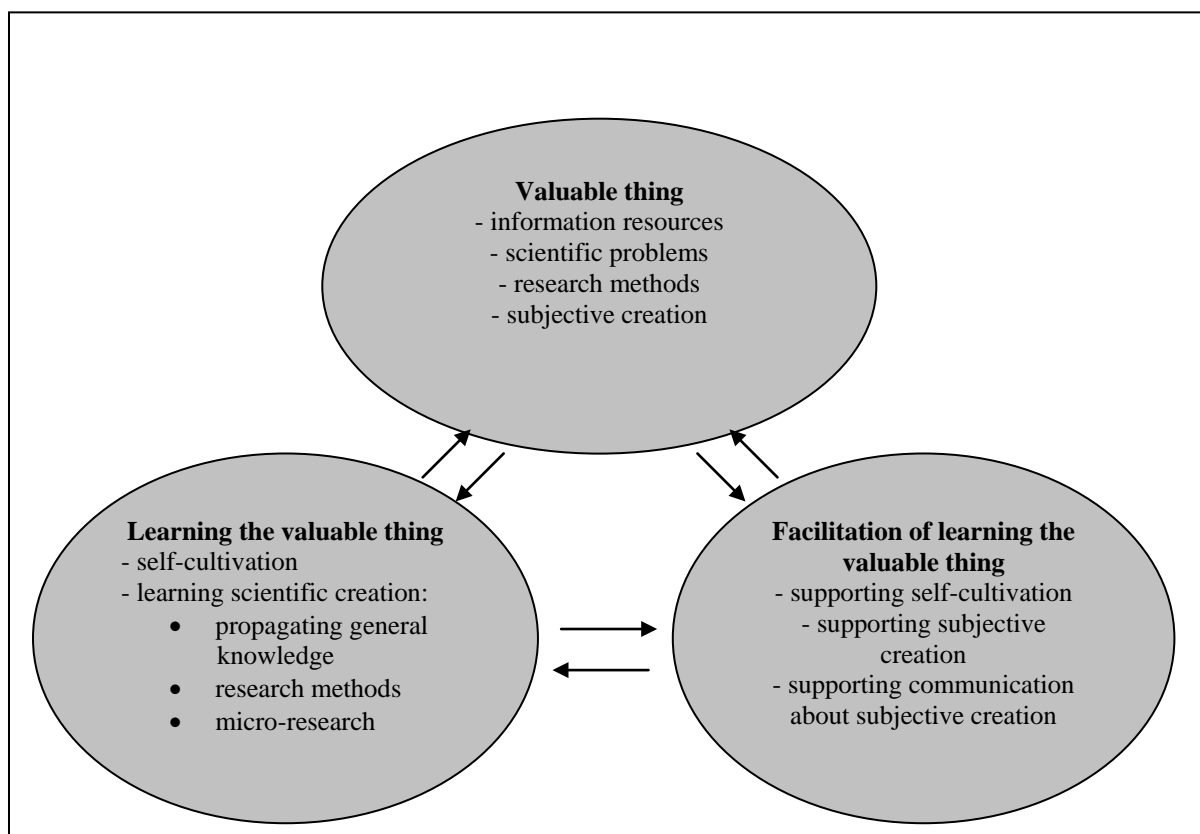


Figure 1. The essence of the pedagogy of Scientific Children's Association in primary schools

In Scientific Children's Association we consider information resource centers, scientific problems, scientific research methods and subjective creations to be valuable, therefore learning and the facilitation of learning are built on these key elements.² (KISS A. 2009.18.p)

¹ Zsolnai, József: Bevezetés a pedagógiai gondolkodásba. (An introduction to the pedagogical way of thinking.) Nemzeti Tankönyvkiadó, Budapest, 1996.61p

² Kiss, Albert: Tudományos diákkör az általános iskolákban- Zalabér szerepe az első tíz évben. (Scientific Children's Association in primary schools - The role of Zalabér during the first ten years.) Pannon Egyetem ÉKP Országos Központja, Pápa, 2009. 18.p

1.2. Goals of the establishment of Scientific Children's Association:

- Institutes of primary education undertaking the activities of Scientific Children's Association are to offer pupils the opportunity to prepare subjective creations managing pedagogical processes in which the facilitation of using information resource centers and research methods as well as the interpretation of scientific problems are realized, based on the abilities of children between the age of 10 and 14.
- Pupils involved in the work of Scientific Children's Association are supposed to learn the responsible way of self cultivation, the use of information resource centers, the digital and printed forms of propagating general knowledge, the application of research methods they are capable of understanding, the examination of interpreted scientific problems in their micro-environment and how to prepare and communicate about a subjective creation.
- Teachers coaching pupils to be involved in Scientific Children's Association are to support the subjective creation of future talents, including the facilitation of presenting the process of creation and the discussion related to it.
- Teachers interested in research have to be able to transmit their experience and knowledge gained from their participation in Scientific Children's Association to their colleagues and teachers working in other institutes.³ (KISS A. 2003. 81. p)

³ Kiss Albert: Tudományos diákkör 10-14 éves tanulók számára – kézikönyv a felkészítő pedagógusoknak (kézirat) (Scientific Children' Association for pupils between the age of 10 and 14 – A handbook for tutors.) (script) 2003.81p

The changes in the points of view of teachers facing the challenges of involvement in Scientific Children's Association can be summarized related to the parallel between repetition- and creation-based learning.

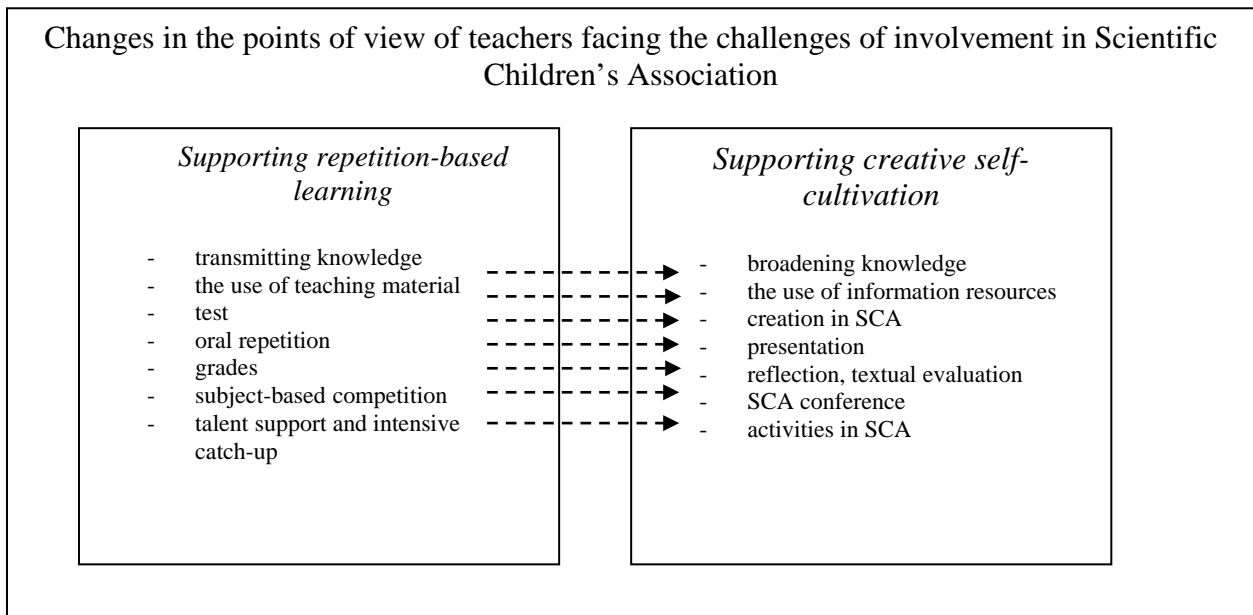


Figure 2. Changes in the points of view of teachers facing the challenges of involvement in SCA.

2. ACTIVITIES IN SCIENTIFIC CHILDREN'S ASSOCIATION RELATED TO THE NATIONAL CURRICULA

Based on the results of our empirical research, we have created the model of the relation between the activities in SCA and the National Curriculum.

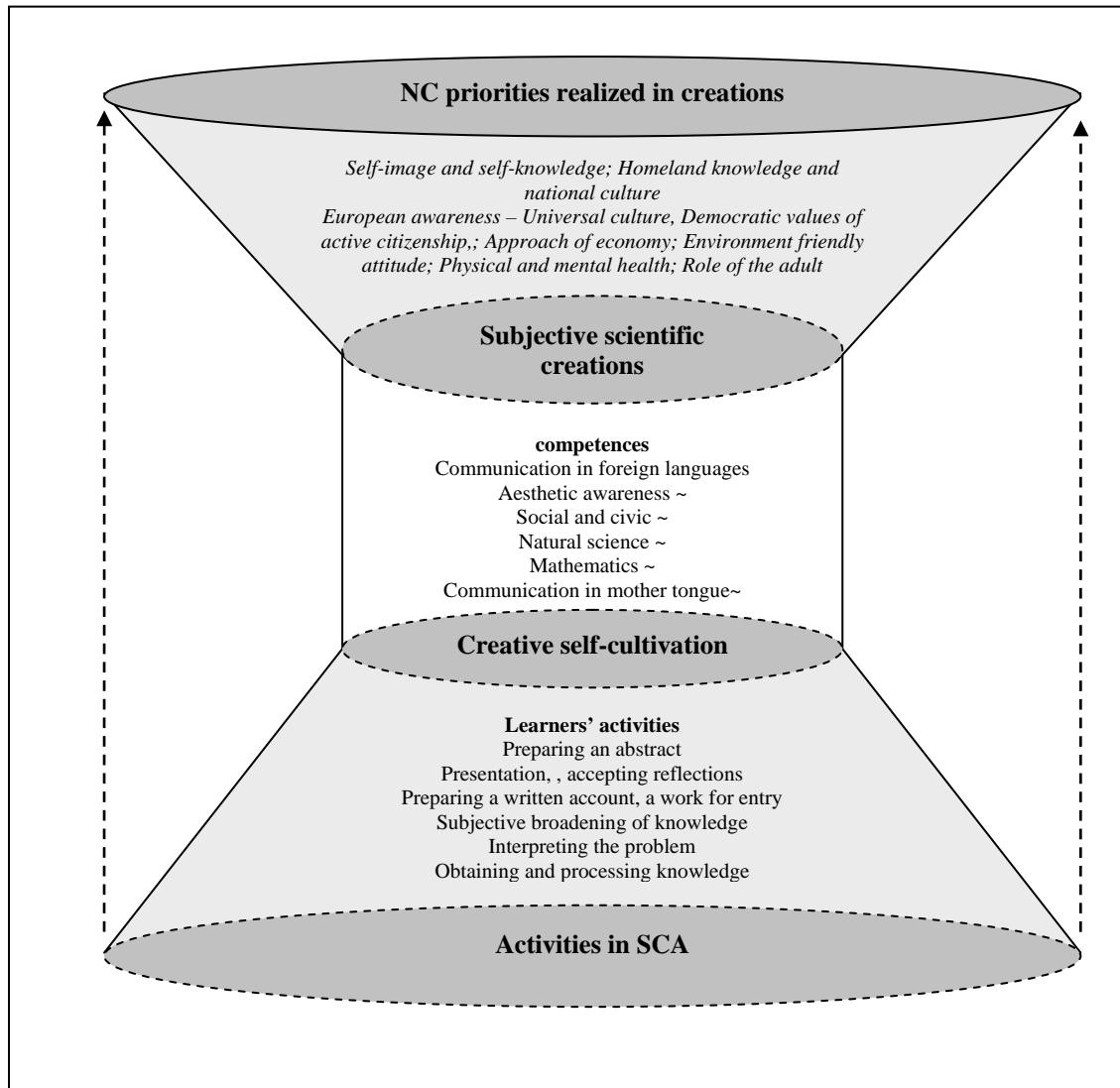


Figure 3. Activities in Scientific Children's Association related to the National Curriculum

2.1. *The effects of SCA activities on key competences emphasized by the National Curriculum*

Table1. *The effects of SCA activities on key competences emphasized by the National Curriculum*

NC key competences	Activities in SCA								
	Obtaining knowledge	Text processing	Text creation	Posing a problem	Subjective creation	Preparing an account	Presentation	Accepting the reflection of the jury	Preparing an abstract
Communication in mother tongue	+++	+++	+++	+	+++	+++	+++	+++	+++
Mathematics	+			+++	+	+			
Natural science	+++	+	+	+++	+++	+	+		
Digital	+++	++	++	+	+	+++	+++		+
Effective, self-motivated learning	++	++	++	++	++	++	++	++	++
Social and civic	+	+	+	+	+	+	+	+	+
Initiation and entrepreneurship	+	+	+	+	+	+	+	+	+
Aesthetic and artistic awareness and expression						++	++		

3. THE ESTABLISHMENT OF SCIENTIFIC CHILDREN'S ASSOCIATION

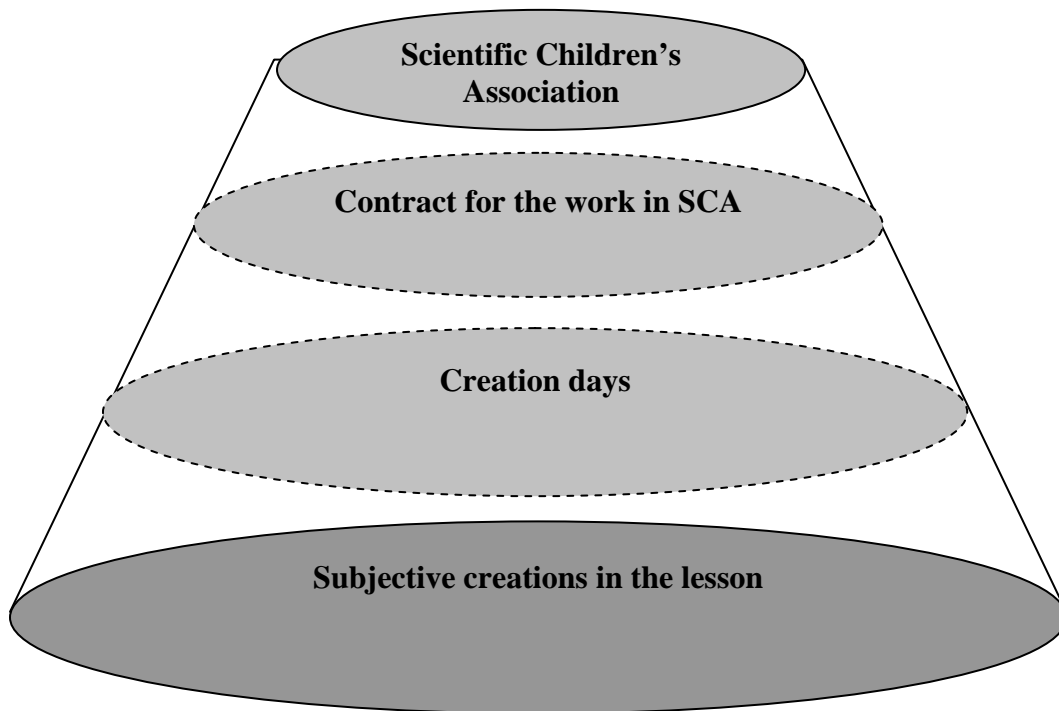


Figure 4. Phases of the establishment of SCA

3.1. How to support subjective creation in the lesson?

Teachers manage the acquisition of thematic learning material by pedagogical processes, in which the system of activities facilitating this acquisition prevails. Having students create is a possible way of building the motivating factors on each other.⁴ (ZSOLNAI J. 1995.235.p).

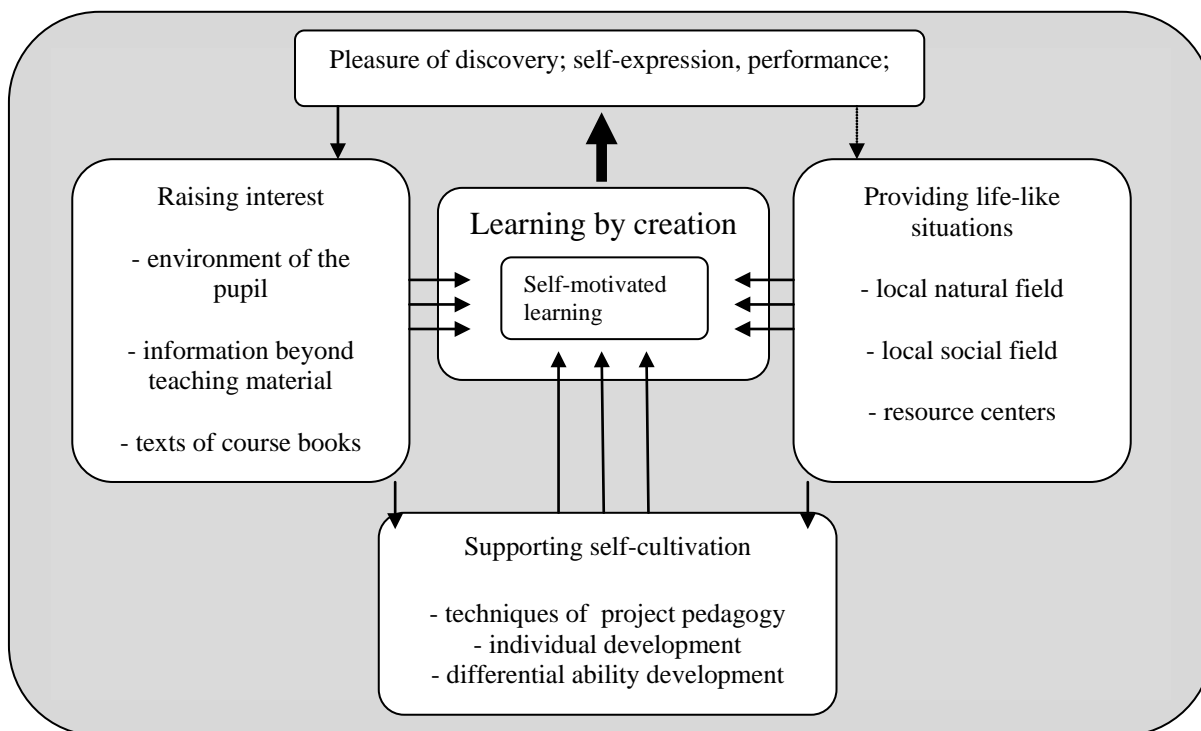


Figure 5. Motivation in the lesson

⁴ Zsolnai, József: Az érték közvetítő és képességfejlesztő pedagógia. (The pedagogy of value transmission and ability development.) ÉKP Központ – Holnap Kkt. – Tárogató Kiadó 1995.235.p

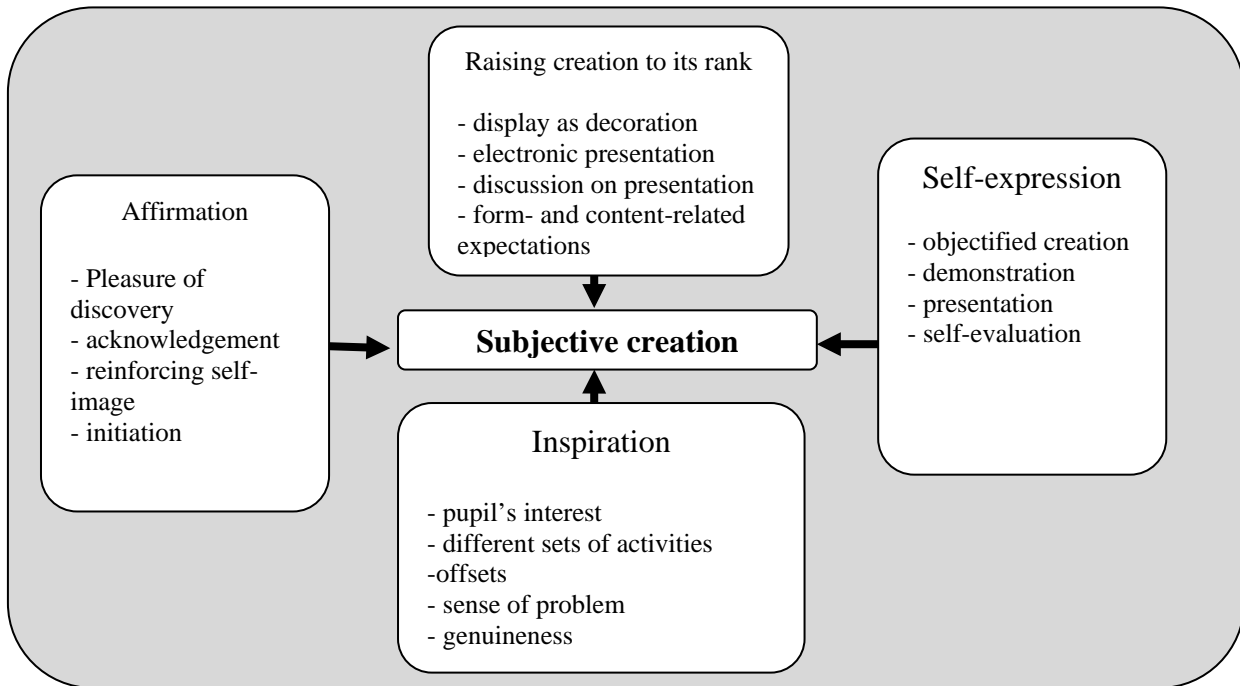


Figure 6. Subjective creation

3.2.1. The need for the days of creation

Supporting the regular subjective creation in the lesson may establish an active pedagogical context that stimulates the future development of institutional pedagogical processes.

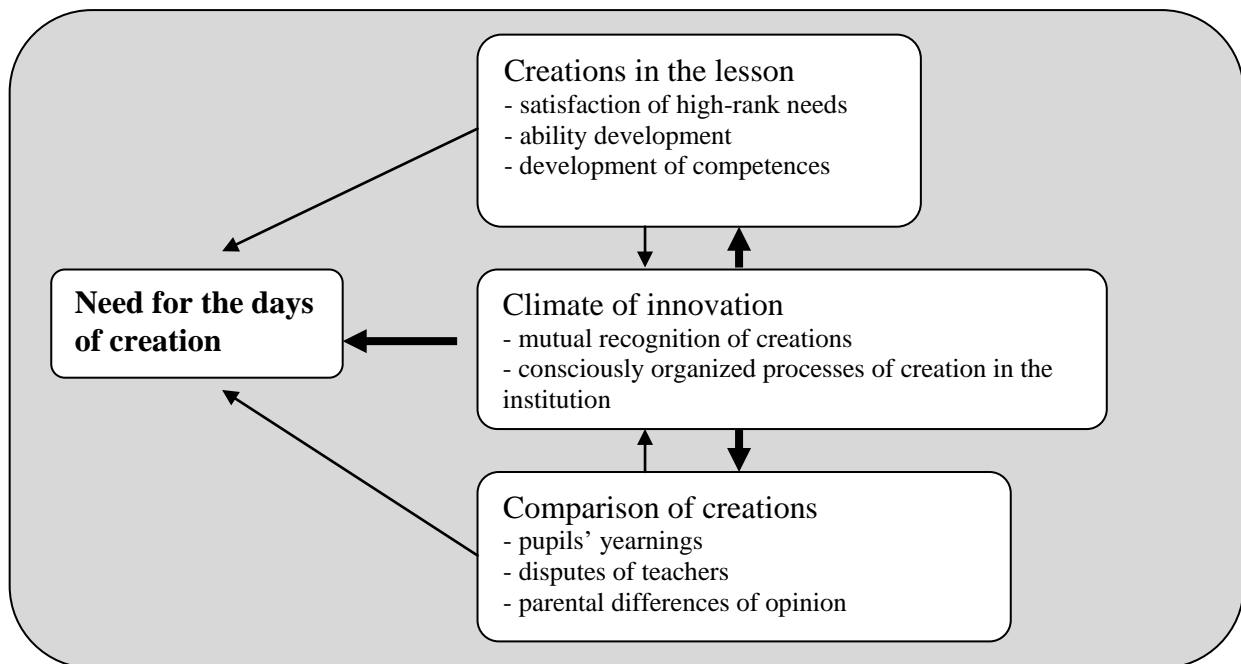


Figure 7. Active pedagogical context.

3.2.2. Organizing the days of creation

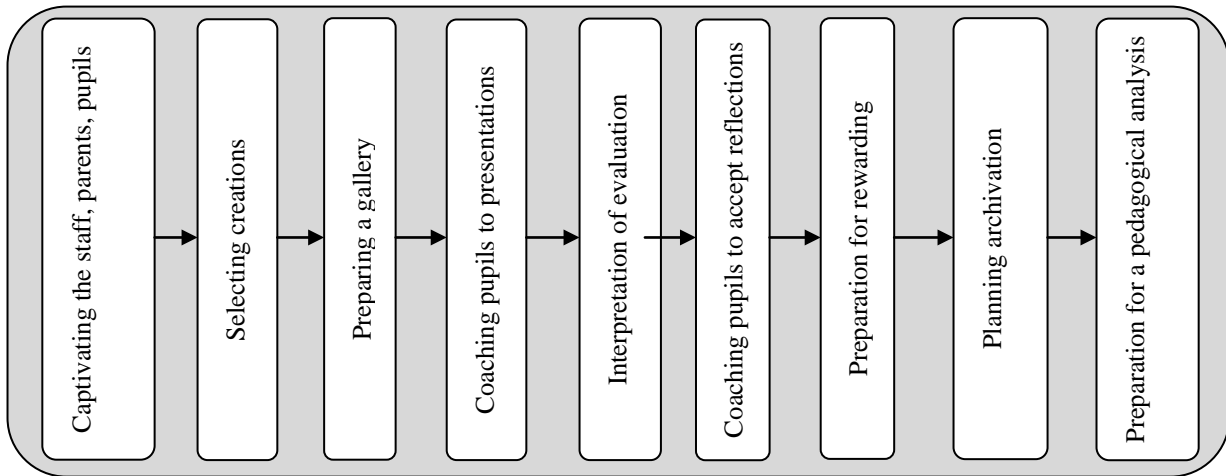


Figure 8. Organization of the days of creations.

3.2.3. The continuation of the days of creation

The creativity-based efficiency of pupils having prepared outstanding subjective creations may be further developed by providing a creation-based pedagogical climate continually. A key criterion of this is the institutional preference of the values of subjective creation and self-cultivation. Meanwhile, students are supposed to undertake learning these values the prerequisite of which is teachers' devotion to support learning them.

3.3. Offering a contract for the work in Scientific Children's Association

For those pupils whose performances proved to be outstanding on the days of creation the opportunity to take part in the work of Scientific Children's Association is to be offered. In addition, a contract for the work is to be provided including the expectations for the participating pupils as well as the benefits pupils are offered by the institute.

3.4. How to organize the Scientific Children's Association?

First of all, the team of teachers operating the Association has to be set up with the participation of those creative ones who are capable of identification with the essence of the underlying pedagogy of the Association. Then, a group of pupils with an appropriate headcount and compound is to be set up, in which the main activities of the Association is regularly registered. Finally, other persons who are competent in the given field of science and apply adequate research methods in reality are to be involved.

4. LEARNING IN SCIENTIFIC CHILDREN’S ASSOCIATION

In Scientific Children’s Association a creation-centered learning takes place, in the course of which pupils’ self-motivated learning is facilitated by their tutors. The result of this process is subjective creation. The facilitation of self-motivated learning is presented below based on the questions frequently posed during the expert trainings for teachers participating in SCA.

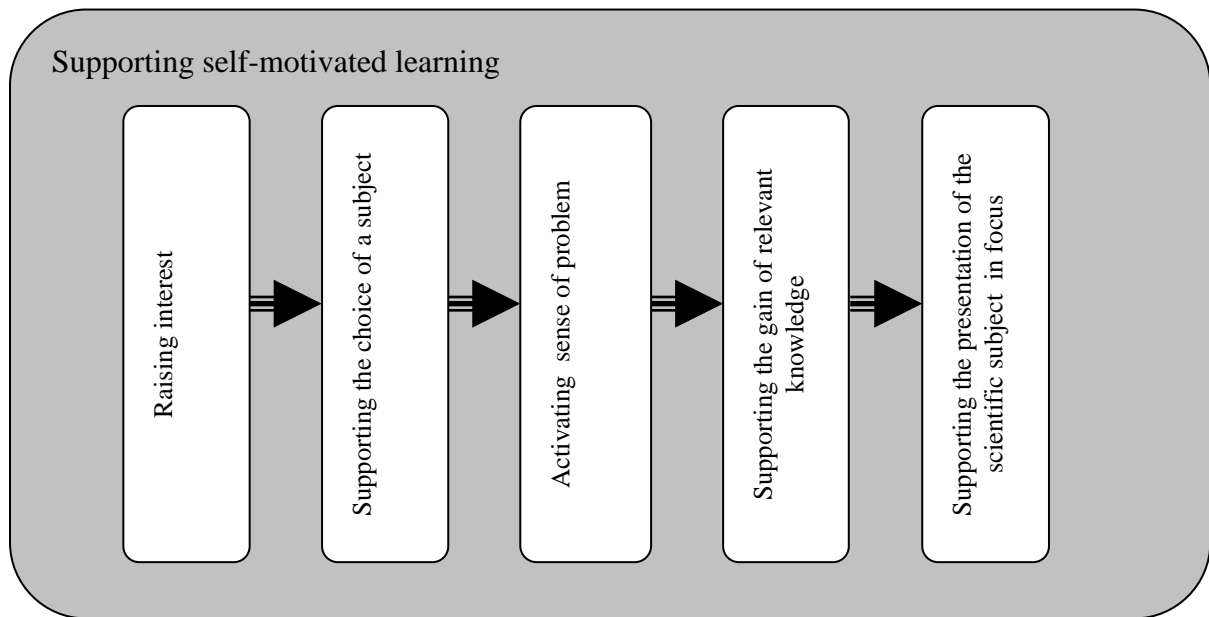


Figure 9. The process of supporting self-motivated learning.

4.1. How to raise pupils’ interests?

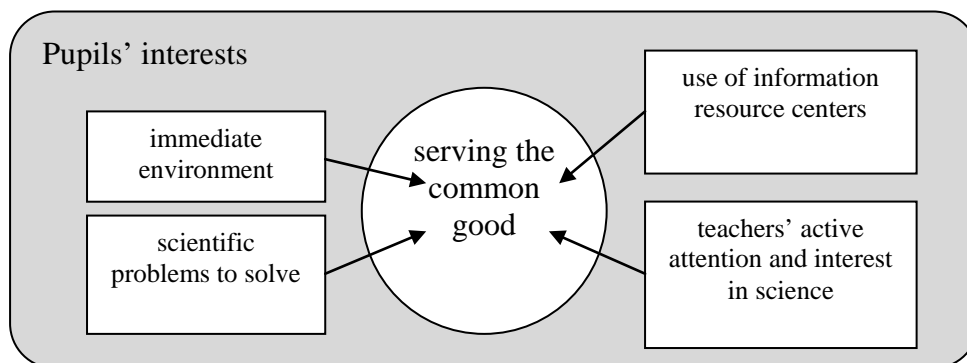


Figure 10. How to raise pupils’ interests?

4.2. How to support pupils' choice of a scientific subject?

The first option is the way from literature propagating general knowledge to choosing a subject. This way is offered to those pupils who have been working in SCA for a short time. The second option is the way from the map of science to choosing a topic offered to those who have been working successfully within the framework of SCA for many years and are capable of handling the book written by András Schranz entitled as "The map of science - A small encyclopedia about the whole of the science."⁵ (SCHNARZ 1995.)

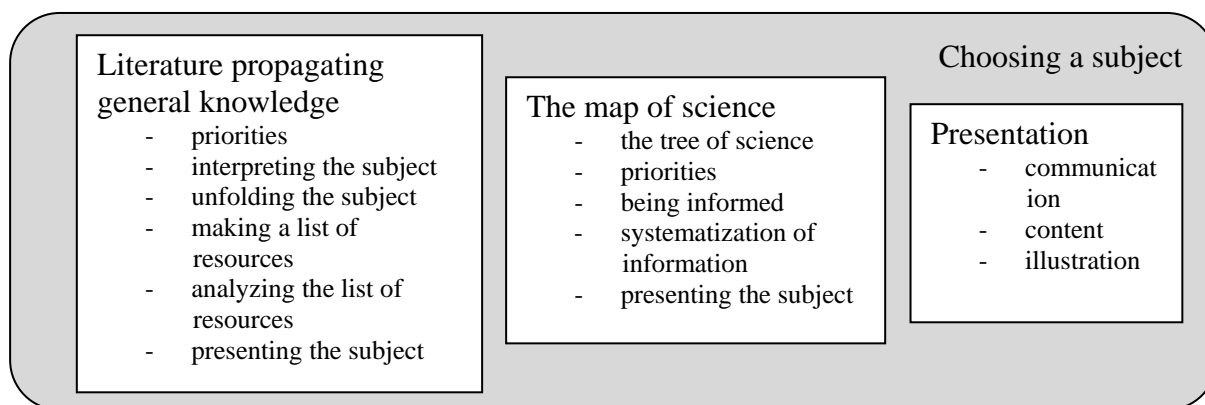


Figure 12. How to support pupils' choice of a scientific subject?

⁵ Schranz, András (főszerkesztő): A tudomány térképe. (The map of science.) Keraban Kiadó, 1995.

4.3. How to activate pupils' sense of problem?

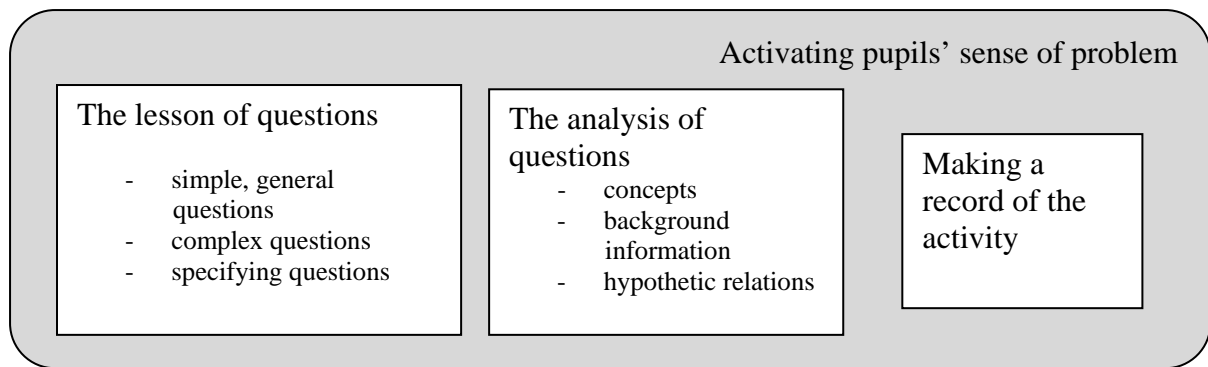


Figure 13. How to activate pupils' sense of problem?

4.4. How to have pupils gain the relevant knowledge?

The process of having pupils gain the relevant theoretical knowledge and get acquainted with the methods of observation and measurement is supported by research methodologies of the relevant disciplines, the extensive literature of which can be found in libraries.

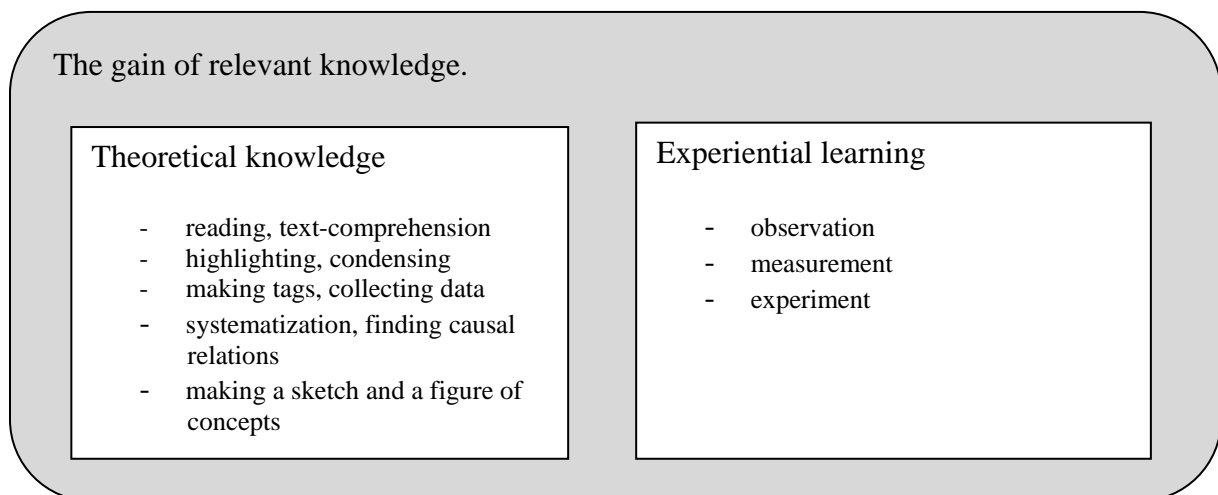


Figure 14. How to have pupils gain the relevant knowledge?

4.5. How to support the presentation of the examined scientific subject?

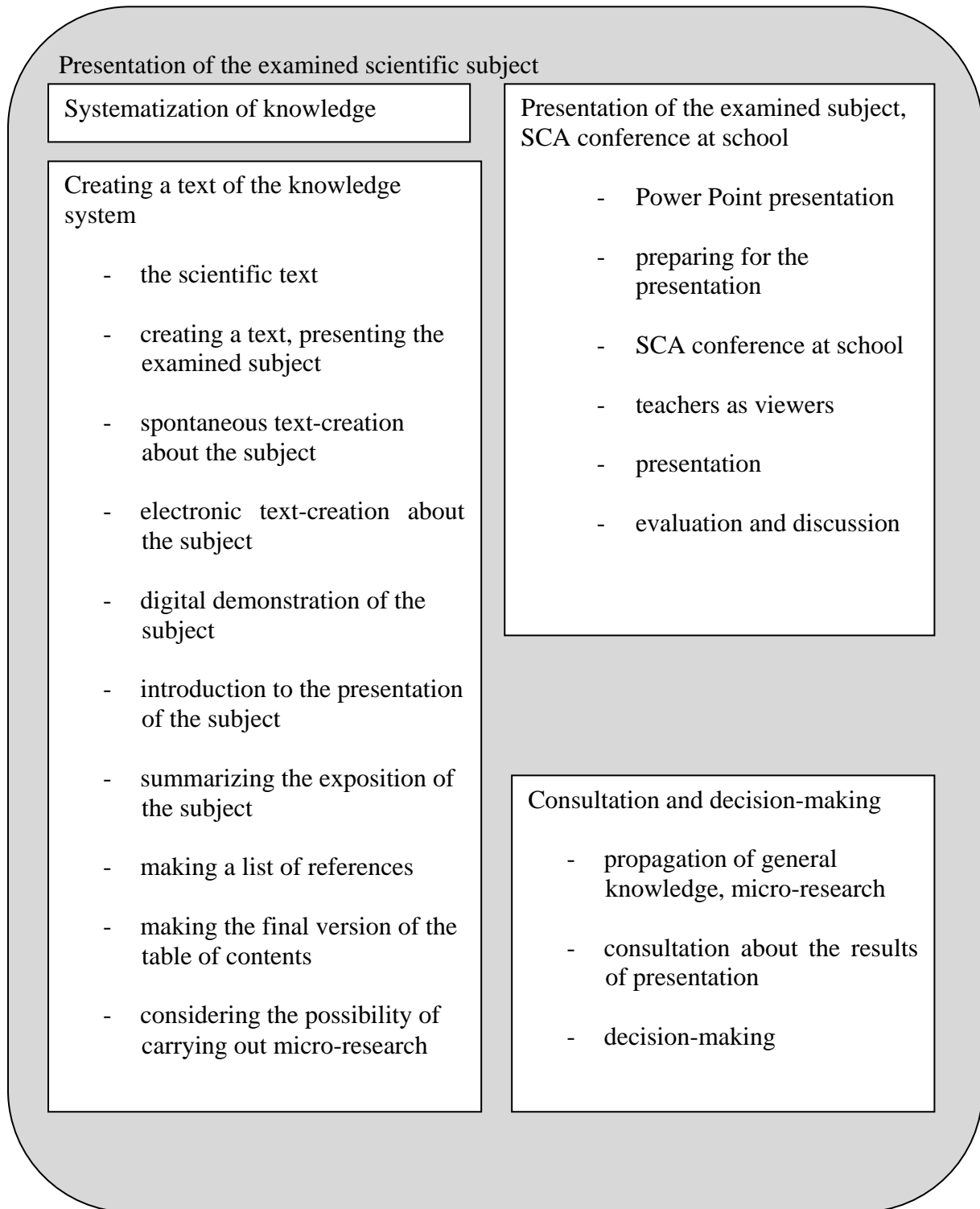


Figure 15. How to support the presentation of the examined scientific subject?

5. LEARNING HOW TO CREATE WORKS PROPAGATING GENERAL KNOWLEDGE WITHIN THE FRAMEWORK OF SCIENTIFIC CHILDREN’S ASSOCIATION FOR PRIMARY SCHOOLS

During the facilitation of learning how to create works propagating general knowledge teachers are to focus on three key questions: What can be considered to be a creation propagating general knowledge? When is it reasonable to encourage pupils to create works like this? What are the expectations that pupils are to meet?

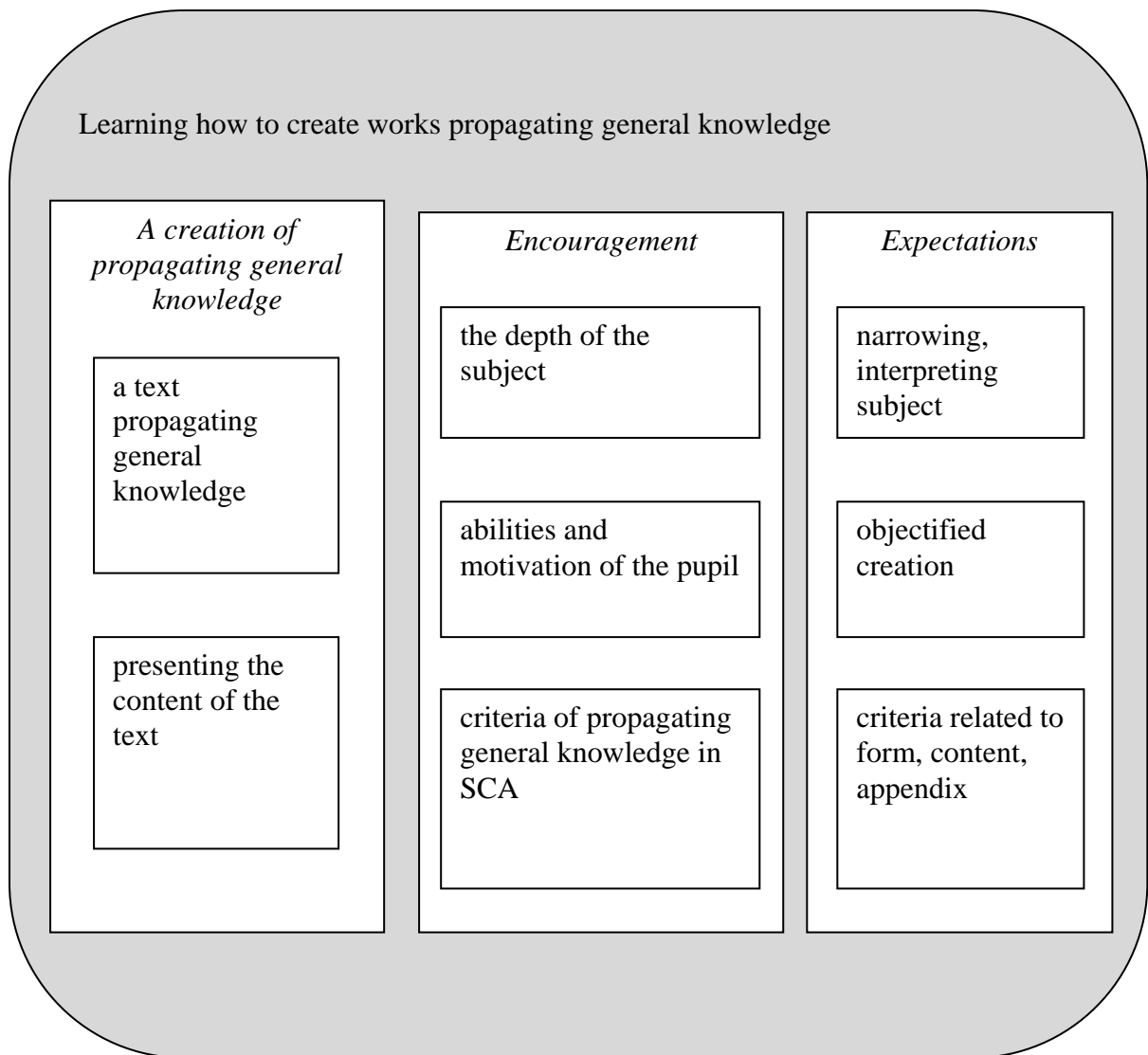


Figure 16. The facilitation of learning how to create a work propagating general knowledge.

6. LEARNING THE ELEMENTS OF RESEARCH METHODOLOGY IN SCIENTIFIC CHILDREN'S ASSOCIATION

How to teach the elements of research methodology?

Teachers supporting pupils' preparation for the scientific creation are supposed to study the adequate research methodology relevant to the subject chosen by the pupil. When we are uncertain or when imparting the knowledge seems to be beyond us, we are to find a scientist who is a master of the relevant research methodology. We may also contact universities, museums, institutes of research, libraries, archives etc. to find the right expert to give us a hand. Based on our experience, we can conclude that these experts are usually glad to be involved in the work of SCA.

7. LEARNING THE ELEMENTS OF MICRO-RESEARCH IN SCIENTIFIC CHILDREN'S ASSOCIATION

Within the framework of SCA, subjective creations propagating general knowledge may contain research methods relevant to the examined field of research. These works stimulate the facilitation of applying the elements of micro-research. The key questions of this process are the following:

- „What can be regarded to be micro-research on the level of primary education?“
- „When is it reasonable to encourage pupils to learn the elements of micro-research?“-
- „How to facilitate the process of learning?“
- „How to support the preparation for making an account of the micro-research?“
- „What are the right techniques to support the preparation for the presentation?“

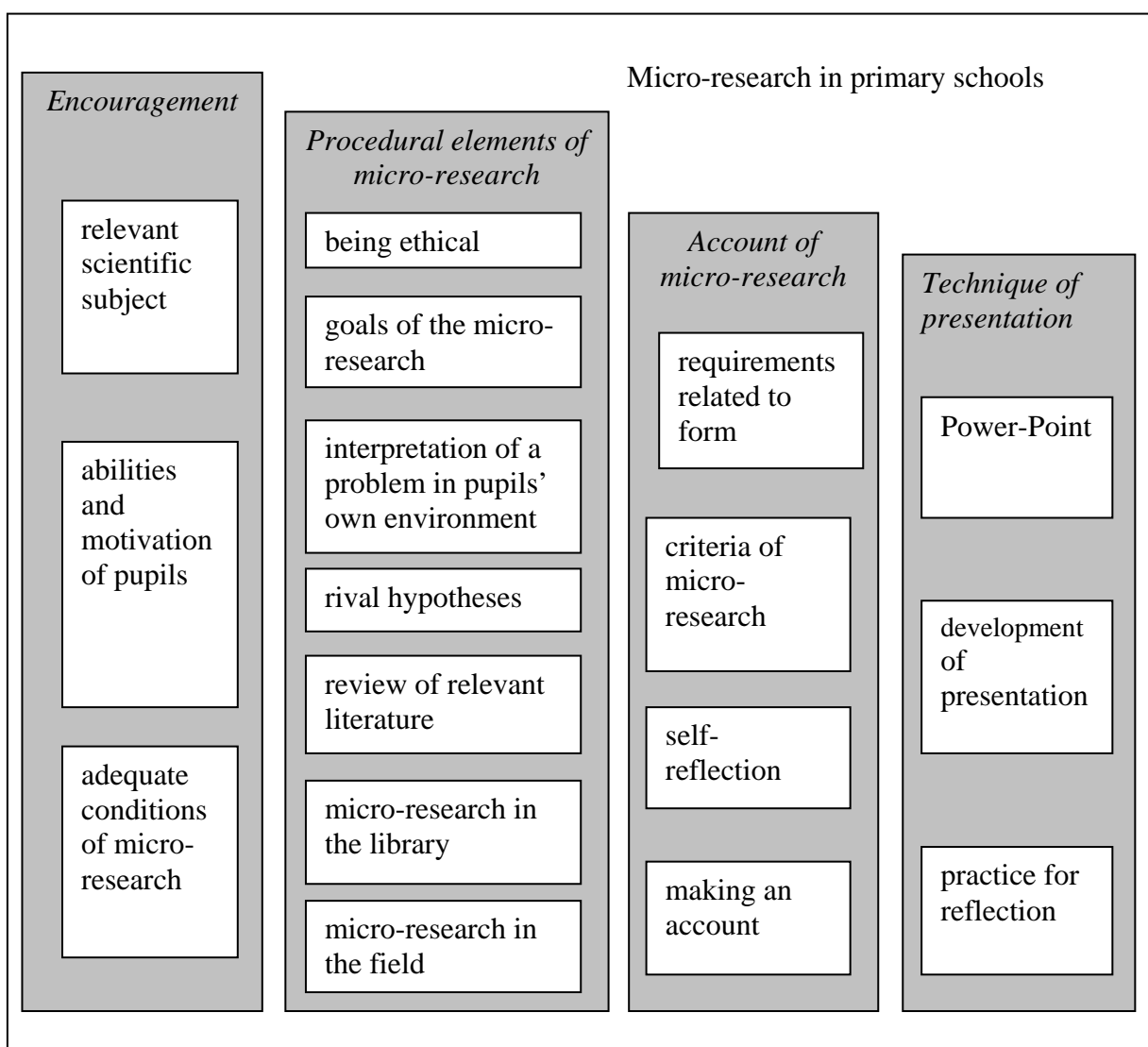
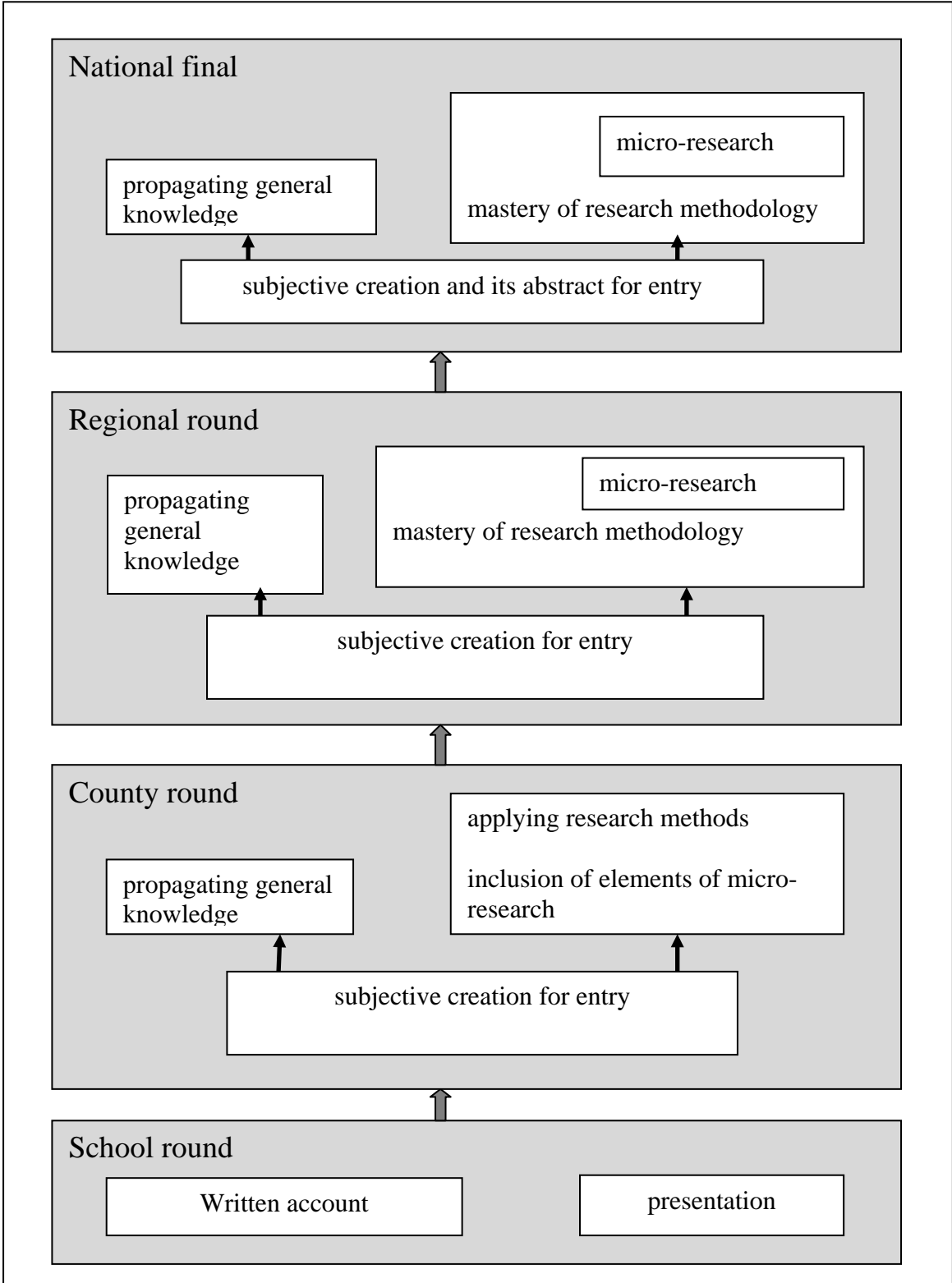


Figure 17. Learning the elements of micro-research.

8. THE COMPLEX, PROGRESSION-BASED COMPETITION OF SCIENTIFIC CHILDREN'S CONFERENCE



9. SELF-REFLECTION ON SCIENTIFIC CREATION IN THE PRIMARY SCHOOL

Regarding that self-reflection is considered to be an organic part of scientific work we should carry out our own self-reflection keeping the essence of the pedagogy of SCA in mind. The analysis of our own contribution should be based on the works and recorded presentations of our pupils, in which the essence and results of the pedagogical processes are realized. The analysis of our performance should be compared with the analysis of the results gained from the experience of ten years' work in SCA. After this comparison we should take the benefits of the work in SCA into consideration.

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