

## Teaching Technology In Multi-Age Groups In Russia

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**Annotation.** The article describes the peculiarities, functions and potentialities of teaching technology in multi-age groups. Ways of children's interaction at the different stages of the lesson are analyzed; examples of theme plans and lesson plans are given.

**Key words:** teaching, multi-age group, technology, interaction of children of different age, lesson.

Many years of research, and also analyzing the work of a number of Russian educational institutions make it possible to state that multi-age group teaching offers great potential nowadays. **By multi-age groups we mean groups of children who differ in their calendar (passport) age and in their physical and social development, but are united on the basis of shared interests or tasks.**

Multi-age groups can be permanent and temporary. They are formed, either purposely or spontaneously, in a number of urban schools, mostly in private or experimental ones, and also in many rural schools. By a number of criteria, teaching in multi-age groups is more effective than the traditional school system.

Multi-age group teaching is especially important in small and ungraded rural schools which make up to 70% of schools in some regions of Russia. Teaching in classes of one or a few children, it is difficult to provide successful education results. In this case, uniting children of different ages into multi-age classes for simultaneous studying according to different education plans might be the way out.

In spite of a great diversity of multi-age groups, they share such particular features, as uniting schoolchildren of different ages and facilitating interaction of older and younger children. The older children tend to be leaders in the interaction process. But the younger children also play an important part in the interaction by stimulating the activity of the older children and the groups as a whole.

Children's interaction in multi-age groups is characterized by the following **psychological mechanisms**:

- **The imitation mechanism** for the younger schoolchildren, when they try to copy the older children's behavior;
- **The mechanism of "social growing-up"** is in action for the older participants of the interaction process, as children are always eager to feel grown-up, to perform the part of an adult person, e.g. by acting as the teacher's assistant.
- While organizing the younger children's work, the older children have to set certain requirements to the other children's behavior, and have to fulfill those requirements themselves, demonstrating patterns for imitation. So, **the mechanism of self-education and self-stimulation** is turned on.

Multi-age groups are characterized by **mutual education** which consists in the following: the older children patronize the younger children; the older children teach the younger children; the younger children try to imitate the older children; the older children cannot allow the younger children to surpass them in anything; the younger children are challenged to catch up with the older children and surpass them in something; their co-operation and teamwork contribute to the atmosphere of mutual understanding and respect, to the favourable education climate [4].

One can speak about a number of **functions of teaching in multi-age groups**.

**Function of children's social and psychological support.** Integrating children from different forms into a multi-age group contributes to broadening and enhancing their contacts, their mutual enrichment, makes the atmosphere more emotional; it allows to decrease psychological tension and to vary the children's activities; it facilitates the older children's assistance to the younger children in their studies; it provides

support of schoolchildren who for various reasons cannot succeed among their peers or at regular lessons, but start to feel their potential while helping the teacher to organize the younger children's work.

**Compensatory function.** Among peers, only some children can become leaders. In multi-age groups, the older children are given more chances to be leaders by acting as consultants, teachers' assistants, group leaders.

Children's teamwork contributes to mutual enrichment of children of different age, to the development of their creativity and independence. Research shows that multi-age groups are characterized by better co-operation and lower conflict levels than same-age groups. In case of difficulty, multi-age groups' inner resources help to avoid conflicts.

**Stimulating function.** Working together in multi-age groups helps the children to bring out the qualities that would be unnoticed in regular classrooms: activity, reliability, initiative, thoughtfulness. With the older children, it stimulates their organizational skills and independence in task solving. Our research shows that studying in multi-age groups proves more effective for developing children's motivation and cognitive interests. Such classes also stimulate the development of humane personal and business relationships between pupils of different forms.

**Function of self-organizing.** The older children become organizers in preparing and conducting various class activities. In the long run, a high level of self-organization is developed which manifests itself in the children's independent work and their ability to solve educational tasks under the leadership of the older children acting as consultants.

**Advanced learning function.** While working in a multi-age team, the younger children participate in solving older children's educational tasks, spontaneously or purposely, e.g. by listening to the teacher explaining the material to the older children or to the older children reporting about their work. Such classes reveal the younger children's unexpected potential, which gives them self-confidence and makes it possible for the teacher to raise his requirements for the children and see their real talents and abilities. Working together with the older children, the younger children can see their prospects and understand the importance of their current work for their future success.

Multi-age groups prove especially effective in teaching technology. It is conditioned by the fact that education content and activity types of different age groups often coincide. Table 1 illustrates the similarity of education content in Years 5-7 with the help of the syllabus.

Table 1

Technology Syllabus

№	Sections	Number of academic hours			
		5	6	7	8
1	Agricultural technologies	34	34	34	17
2	Culinary technologies	6	6	4	2
3	Housekeeping	4	4	3	
4	Machines (home appliances)	2	2	2	2
5	Woodwork or sewing technologies	8	8	8	4
6	Graphic design	2	2	2	
7	Basics of electrotechnics	2	2	2	
8	Basics of economics			2	
9	Industries. Professional self-determination			2	

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10	Art work	4	4	3	3
11	Project work	6	6	6	6
	<b>Total:</b>	68	68	68	34

While organizing the work in multi-age groups it is important:

- To define the common tasks for all group members and to particularize them for every age group;
- To define the common education content or joint activities and to specify them for every age group.

Let us illustrate this by the example of a number of Technology Sections in teaching rural children.

**Table 2**

### Educational aims and content for multi-age groups (2 hours per week)

Education content	Education aims	
	Year 5	Year 6
<b>1. Agricultural technologies – 34 hours</b> <i>Autumn term – 18 hours</i> Year 5 – annual and perennial decorative plants. Year 6 – perennial vegetable plants. Personal hygiene and work safety rules.	Developing diligence and creative attitude to work. Learning respect for working people and interest to agriculture.	Developing aesthetic taste and loving and caring attitude to nature.
	Learning methods of experimenting with plants. Getting acquainted with technologies of growing annual and perennial decorative plants.	Broadening the knowledge of experimenting with plants. Getting acquainted with technologies of growing perennial vegetable plants. Learning basics of economics.
<i>Spring term – 16 hours</i> Year 5 – perennial vegetable plants. Year 6 – biennial vegetable plants. Personal hygiene rules.	Developing the skills of growing agricultural plants. Forming the interest for local nature. Broadening the knowledge of methods of experimenting with plants, perfecting the skills of planning, making observations and reporting one's work.	
<b>2. Culinary technologies – 6 hours</b> Sanitary requirements and work safety rules, organizing one's workplace. Laying the table. Providing the ingredients. Year 5 – the notion of food. Meals. Vegetables as nutrients. Preparing vegetables for cooking. Dishes made from raw, boiled and stewed vegetables. Sandwiches. Hot drinks. Year 6 – Influence of industry and agriculture on the environment. Nutrition physiology. Food ingredients. Milk and dairy products. Cereals.	Forming the knowledge of sanitary requirements and work safety rules in cooking. Developing the skills of laying the table. Getting acquainted with the variety of vegetable dishes. Learning to cook vegetables, eggs, sandwiches, hot drinks.	Developing the knowledge of laying the table for dinner. Getting acquainted with the variety of dishes made from milk and dairy products, cereals and pasta.
	<b>3. Housekeeping – 4 hours</b>	

Home interiors. National traditions. Interior decoration. Basics of yard and garden design. Year 5 – rational home grounds design. Year 6 – household buildings. Sanitary requirements and fire code.	Forming the knowledge about home interiors, kitchen interiors. Acquiring the knowledge of home grounds design.	Developing the knowledge about home interiors, apartment design, the role of color and lights. Acquiring the knowledge about household buildings, their functions, fire code.
<b>4. Machines – 2 hours</b> a) Turning, milling, drilling machines. Basic information about machines. Year 5 – simple and transmission machines. Functions, design, use, care. The drilling machine. Year 6- The turning machine. Operating techniques. 6) Home appliances. The sewing machine. Functions. Design. Safety rules. Year 5 –the hand-operated sewing machine. Year 6 – the treadle sewing machine. Cooking appliances. Home electronics and tools.	Forming general knowledge of machines, their functions and design. Learning to operate the machines and appliances.	Developing the knowledge of different kinds of machines. Learning to operate the turning machine. Learning to care for machines and appliances.

Organizing multi-age classes, it is essential to regulate the children's interaction, so that to avoid the younger children being suppressed by the older children. For that purpose, the teacher should do the following:

- Make careful choice of the content and forms of children's team activities, as well as of the ways and means of encouragement;
- Explain to the children the importance of their joint work, demonstrate its usefulness for everybody;
- Demonstrate the importance of everyone's efforts for the success of the group and for the development of one's personality and one's personal success;
- Employ various forms and ways of the older and the younger children's interaction, taking into consideration their previous interaction during class and extra-curricular activities;
- Have a clear idea of every activity's content and functions, of the younger and the older children's roles at every stage of the lesson.

For organizing children's joint work the teacher can use activity cards specifying the types and order of actions for every age group at every stage of the work.

Speaking about the ways and means of organizing and encouraging the children's work in multi-age groups, one can mention the following: setting the common task which should be clear, achievable and interesting for everybody; using problem tasks, creating situations of group search; organizing different age micro-groups and pairs for solving the common task or part of it; setting creative tasks for micro-groups as pre-class and class activities; discussing the results together; using games; organizing competitions, contests, performances, etc.

Let us consider **the ways of organizing the children's interaction in multi-age groups at different stages of the lesson.**

***Checking homework:***

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- the older children choose or make up questions and tasks for the younger children and ask them;
- the older children check and assess the younger children's homework;
- the older children help the younger children if they have difficulty answering their homework;
- the younger children are encouraged to listen to the older children's answers and to assess them (when the material is not very difficult, mainly of descriptive character);
- the younger children ask questions to the older children while the new material is being studied.

Some kinds of homework can also be prepared together: searching for materials; preparing visual materials; creative tasks (making up crosswords, tables, etc.); research and analysis tasks; preparing presentations.

***In task setting***, the following variants of children's interaction are possible:

- 1) Questions for discussion: Taking into consideration what we studied earlier, what your homework was, what can the theme be for the older ones? for the younger ones? What do the themes have in common? What is the difference between them? What are you expecting from the lesson? What can the older and the younger children do together? Which knowledge can be useful for you in future life? What do you think is the best way to study this theme? Who would like to deepen one's knowledge of the theme? Which parts of it? Who thinks it useful to study this theme? Which level do you think you need? How would you like to present the results of your work? Which parts can you study yourself and which parts require assistance? How can you help the teacher in teaching this theme, etc.
- 2) In class, the older children can share their knowledge of parts of the theme familiar to them and speak about its practical use in their lives or for studying other themes and subjects.
- 3) Creating a problem situation, watching a video fragment for further discussion.

At the end of the task setting stage, the children formulate, on the basis of the tasks set, the content and forms of their joint work, the ways of interaction of the older and the younger children (where necessary), distribute the work between the age groups, discuss the rules and stages of the work, and the ways of summarizing and presenting the results of their collective and individual work.

***While studying the new material***, the following ways of organizing the group work are possible:

- the older children explaining the material to the younger children;
- drawing diagrams, plans and tables together;
- finding additional information;
- finding facts and examples to prove the theoretical points.

Each multi-age group is given a problem, a text and a number of questions (tasks) to answer. Every participant of the group must understand the whole of the material and be ready to answer the questions. The older pupils explain the difficult parts to the younger children, if they have problems. When the groups are ready, the teacher organizes a discussion for all the children where everybody is encouraged to make a contribution.

***While practicing the material***, various ways of organizing the group work can also be used:

- asking questions after the new material has been explained;
- preparing questions for other groups;
- doing tasks together;
- discussing supplementary sources read in preparation for the lesson;
- organizing games and competitions;
- doing supplementary tasks;
- making crosswords, watching and discussing films and presentations;
- providing individual assistance to the younger children in practicing and revising the material in

class or at home.

**At the testing stage**, joint work of the older and the younger children is also possible:

- the older children can develop, conduct, check and analyze tests for the younger children;
- contests and competitions among the groups;
- mutual assessment, self-assessment and self-checking;
- group discussions, etc.

There are also possible ways of organizing the children's interaction **at the summing-up stage**:

- analyzing the lesson in micro-groups (What new things have you learnt at the lesson? What have you learnt to do? What will be useful for you in your future life? What else would you like to learn on this theme? What caused you difficulty in studying the theme? What things did you fail to study well enough and where do you need assistance, etc.);
- discussing further work (What should we do at the next lesson? How should we distribute the work?); it is especially important for defining the variant component of the education content.

To find out whether the material has been learnt well enough, how the children perceive it, what their attitude is, it is sometimes enough for the teacher to ask the children to do the following:

- sum up the main thing you have found out as a result of studying the theme (at this lesson);
- name the theme of the lesson (if it was not defined at the beginning of the lesson);
- say what tasks have been solved at the lesson.

In any case, in multi-age classrooms special attention should be paid to analyzing the collective work of the children of different ages, so that to enhance the development of their relationships and increase in such a way the educational value of the lessons.

So, there are different ways of organizing the children's interaction in multi-age groups. Their choice is conditioned by many factors, such as: the age range of the children, education content, types of educational activity required, the children's previous experience of working in multi-age groups, etc. Let us illustrate the choice of ways for organizing the children's interaction by the example of a multi-age class for three age groups.

### **Theme: Family Party – Years 5, 6, 7.**

**Aim:** practicing the skills of laying the table and culinary skills.

#### **Learning objectives:**

- learning to plan a family party;
- practicing the skills of laying the table and culinary skills;
- Year 5 – learning the skills of laying the table for breakfast, learning how to cook sandwiches, eggs and vegetables;
- Year 6 – learning the skills of laying the table for a party, learning how to cook national dishes and dishes made from potatoes;
- Year 7 – learning the skills of laying the table for a party, learning how to cook meat dishes and things from yeasted and laminated dough.

#### **Educational objectives:**

- Encouraging interaction between the children of different ages;
- Developing the children's motivation for teamwork;
- Developing activeness, initiative, mutual assistance, thrift;
- Developing aesthetic taste;
- Developing communicative skills.

**Lesson type:** practical class.

**Teaching methods:** explaining; problem solving; group discussion; elements of competition.

**Activity forms:** group work, pair work, individual tasks.

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**Equipment:** CD player, technological cards, task cards, tableware, vases with flowers, table cloths, handmade gifts.

**Preparatory stage:**

1. Choosing the holiday the children would like to celebrate.
2. Forming multi-age groups considering the tasks chosen and preparing the tasks:  
Group 1 – Years 5 and 7 – making the invitations;  
Group 2 – Years 5, 6, 7 – making the gifts;  
Group 3 – Years 6 and 7 – collecting information about tableware history.
3. Reviewing the theme “Culinary technologies”.

### Lesson Plan

№	Stage	Teacher’s actions	Children’s actions		
			Year 5	Year 6	Year 7
1	Explaining the theoretical material necessary for fulfilling the practical tasks (Appendix 1).	Delivering the information, formulating the task: “What do we need to do to prepare for our party?”	Listening to the teacher, helping the teacher to adjust the lesson plan.		
2	Checking the homework – making invitations to the party (Appendix 2).	Listening to the children’s answers, giving problem-based tasks to the groups.	One pupil from every group answers, others add to his answer.		
3	Designing the room decoration, planning the menu for 10 people, making a technological card for cooking one of the dishes (Appendix 3).	Distributing the tasks among the groups, assisting and consulting the children.	Distributing individual tasks. Individual work. Group reports.		
4	Demonstrating a model for laying the table (for 1 person) and a fragment of the amusement program (Appendix 4).	Distributing the technological cards for laying the table and task cards, controlling the activity with the help of the older children.	One group member lays the table. The others make up the amusement program. Year 7 pupils tell interesting facts from the history of tableware.		
5	Demonstrating the skills of giving and receiving presents (in pairs); estimating the expenses.	Watching the children, controlling, consulting. Controlling the activity with the help of the older children.	Years 5 and 6 – pair work. Year 7 pupils estimate the expenses.		
6	Summing-up	Organizing mutual assessment in the groups. Giving out the assessment forms. Making conclusions, giving marks. Offering to solve a rebus. Summing the lesson up.	The leader of each group gives marks to the group members who assess his work. The pupils sign the assessment forms and put the forms in the boxes corresponding to the marks. The pupils solve the rebus.		

## Appendix 1

### Theory

They say that being a host (hostess) is an art. This is really so, because having guests does not only mean that they should be given a delicious dinner. Other things are very important, too. Oliver Goldsmith, an English classic (the name should be on the board), pointed out wisely that every dish is delicious when seasoned with hospitality. To make it so, you should think over every detail of the party. Could you tell me what we should think about? (The children make suggestions and the teacher writes the correct ones on the board).

1. Inviting the guests.
2. Preparing and decorating the place.
3. The party menu.
4. Laying the table.
5. Amusing the guests.
6. Giving and receiving the presents.
7. The party expenses.

Every party is based on these three pillars (writing on the board):

- Festive activities;
- Festive competitions;
- Festive mood.

Do design a good party, you need a good mood. We have agreed to plan three parties: a birthday party, a Women's Day party and a New Year party.

## Appendix 2

### Examples of Task Cards

1. You are invited to a party. You promised to come, but now you cannot keep your promise. What should you do?
2. You invited a person to parties twice and every time he said he could not come. Should you invite him again?
3. How many days before the party should invitations be given?

## Appendix 3

### *Questions for Group 1:*

1. What safety rules should you observe while making sandwiches?
2. What kinds of sandwiches do you know?

### *Questions for Group 2:*

1. Name the country that tea comes from.
2. Which ways of making yeasted dough do you know?

### *Questions for Group 3:*

1. Why is meat pounded before cooking?
2. What kind of things can you make from laminated dough?



**Technological cards**

***Group 1***

Technological card: «Laying the table for tea»

Items: a tablecloth, a set of plates, a tea set, a samovar, a cutlery set, a napkin, a vase with flowers.

<b>What to do</b>	<b>Items needed</b>
1. Cover the table with the tablecloth	Tablecloth
2. Put the samovar, the vase, the sugar-basin, the tea-pot and the candy dish in the middle of the table	Samovar, tea-pot, candy dish, vase, sugar-basin
3. Put the plates on the table	Tea sets, plates
4. Put the cutlery on the table	Forks, spoons
5. Put the napkins on the table	Napkins

***Group 2***

Technological card: «Laying the party table »

Items: tableware, a tablecloth, a set of plates, a cutlery set, a cup, a napkin, a vase with flowers.

<b>№</b>	<b>What to do</b>	<b>Items needed</b>
1.	Cover the table with the tablecloth	Tablecloth
2.	Put the spice set and the vase in the middle of the table	Spice set, vase with flowers
3.	Put the plates on the table	Dinner plates, salad plates, bread plates
4.	Put the cutlery on the table	Forks, spoons
5.	Put the cups on the table	Cups
6.	Put the napkins on the table	Napkins

***Group 3***

Technological card: «Laying the party table »

Items: a tablecloth, a set of plates, a cutlery set, glass ware or crystal ware, napkins, a vase with flowers, candlesticks.

<b>№</b>	<b>What to do</b>	<b>Items needed</b>
1.	Cover the table with the tablecloth	Tablecloth
2.	Put the spice set, the vase and the candlesticks in the middle of the table	Spice set, vase with flowers, candlesticks
3.	Put the plates on the table	Dinner plates, salad plates, bread plates
4.	Put the cutlery on the table	Forks, spoons, knives
5.	Put the glass ware or the crystal ware on the table	Glasses, wine glasses
6.	Put the napkins on the table	Napkins

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