# Organizing Learning Games in Teaching Mathematics at Grade 1

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**ABSTRACT:** Grade 1 is the first grade of primary school level, students begin to move from the main play-based activity to the main learning-based activity. Because it is just the beginning, the learning activity is still new and confusing for the children. The games have interesting and helpful content suitable for children's perceptions. In addition, in the innovative education in Vietnam according to competency-based learning, learning games are extremely necessary for teachers. In this article, we clarify the concept and advantages of learning games in the process of teaching Mathematics and propose a process for designing and organizing learning games. At the same time, illustrate an activity of teaching Mathematics in primary school which using learning games.

**KEYWORDS:** learning games, Grade 1, primary school, Mathematics, learning through playing.

## I. INTRODUCTION

The game is a natural and necessary activity to satisfy the diverse entertainment needs of people. Therefore, this is the most effective practical educational method for the formation of students' personalities and intelligence. A game simply is a fun activity with a certain theme and content and has rules that participants must comply with. Learning games are understood as games with content associated with students' learning activities in order to help students learn in class more excitedly, positively, and happy. The game has the main task of education and intellectual development for students. Learning game design is building a complete game including the name of the game, the rules of the game, the way it is organized, and the form of participation, and in each game, the designer must define the goal clearly, specifically that the game brings to the participants.

## II. LEARNING GAMES AND LEARNING GAMES IN MATHS

### A. Learning Games

Learning games are studied by teaching theorists and it is said that: all games associated with teaching (methods, forms of organization and practice do not take into account the content and nature of the games) are called learning games. The learning game is actually an oriented game for the intellectual development of students.

However, there are still many different conceptions, such as: E.I. Chikhieva believes: "The game is called a learning game or a teaching game because that game is associated with a certain teaching purpose and requires appropriate teaching materials attached".

P.G. Xamarucova said that the type of games that are considered learning games "are games with the main task of educating and developing students' intelligence".

According to Dinh Van Vang, a learning game "is a game with rules often devised by adults for students to play. It is a type of game that requires students to perform a process of intellectual activity to solve the learning task set as a play task, through which the student's intelligence develops" [30];

Learning games are simply understood as games with content associated with students' learning activities in order to help students learn in class more exciting and happily. Content of the game is a competition about a certain intellectual activity such as attention, quick wits, imagination, creativity... For example, puzzles, exhibitions, quizzes,…

From the above concepts, in our opinion we think that:

- Learning game is an educational method that conveys specific content to learners through playing, creating opportunities for them to discover the content of the lesson themselves in an active and enjoyable way, and memorize knowledge naturally.

- The game in teaching Mathematics is a game where the content of playing is associated with the content of the lesson and integrated into the process of teaching Math for students to improve educational effectiveness.

## B. Roles of Learning Games

Learning games help improve students' learning interests and promote students' active learning. At the same time, learning games create conditions for students to demonstrate their knowledge, and skills as well as the ability to apply the knowledge and skills acquired in the process of participating in the activities of the learning game. Besides, in the process of playing, learners also demonstrate social skills, communication skills, cooperation as well as cognitive abilities such as detecting and solving problems, critical thinking

Learning games can be considered as an experiential activity: The current and future teaching orientation is to create conditions for learners to participate in experiential activities in their own way and suitable for themselves. Learning games will give students the opportunity to be directly exposed to the topic of knowledge and actively interact with the knowledge content contained in the learning game. There, students will be mobilized both in terms of hearing, sight, and movement. Through learning games, teachers also observe behaviors, attitudes and have accurate feedback on learners' cognitive levels.

Learning games that allow adjusting the number of participants, can even be played individually or in pairs: Learning games are suitable for a variety of learning organizations ranging from the whole class, group work to pair or individual teaching. Learning games can also be held in the classroom or outside the classroom, at school or at home. Depending on each specific case, teachers can adjust to suit the teaching conditions.

Learning games must provide a variety of learners: Learning games provide teachers with many options to organize flexible and diverse forms of teaching. For example: sitting on a chair or not sitting on a chair; can organize play on the board or on the floor or even mounted on the wall, in the classroom or outside the classroom; In small or large groups or individually, teachers or students can both act as supervisors and assessors, documentation may or may not be required, etc.

Learning games must support learning: Games provide students with situations to demonstrate what they have learned. These students can also practice and demonstrate what they have mastered through the teacher's lectures or from their own self-study activities.

Learning games provide teachers with instant feedback about learners. Students want and need feedback on their learning. The game provides learners with instant feedback to serve as a basis for learners to appropriately adjust their learning activities. This can be seen as an invaluable learning opportunity for every learner.

Learning games will help unleash the potential of the classroom. In addition, learning games can bring students' readiness and better focus on teaching content after participating in learning game activities.

Learning games can be seen as a "tool" to engage students in learning activities and a great "warm-up activity" to get students ready to participate in the lesson. In such games, unsolvable questions or problems seem to be "just a small part" of the game because it is just the teacher's way of posing a problem or introducing the content of the lesson.

Learning games help improve teamwork, and cohesion among class members. Through participating in play activities, students are trained in cooperative working rules and see the meaning of sharing and cooperative activities.

Learning games help train students to be disciplined because the only way to win in each game is to follow the rules given by the game.

Learning games help foster students' ability to work individually and in groups. Learning games emphasize the importance of both individual and group work by giving students the opportunity to work alone and then bringing them into small groups to share ideas. The pressure created by the game will help students form and practice problem-solving skills and promote creativity.

Learning games can be seen as substitutes for activities that review lesson content. Through participating in the learning game, with the requirements that can be repeated, the knowledge and skills in the lesson will be consolidated and deepened.

## C. Characteristics of Learning Games

Each learning game has its own characteristics and has certain effects on the formation and development of the psychology, personality, and intelligence of learners, and each game has its own advantages in educating students.

Although there are many types of learning games, games have a common structure which is: the purpose, the action, rules, participants, processes, situations, and relationships. The tasks, rules, and relationships in the learning game are organized relatively closely within the allowable framework of the teaching tasks and are pre-oriented in learning goals and content.

Learning games are created and used by teachers and adults based on the requirements of teaching theory, especially teaching the theory of specific subjects; They are one of the educational activities that do not follow a rigid structure but are organized flexibly, in accordance with the content of the lesson and contribute to making the lesson more lively, attracting students' attention to the lesson.

The learning game makes students cooperative in exciting ways. The learning game contains certain themes, content, and certain rules that players must follow. The learning game is both fun and entertaining and has great educational significance for people. The learning game has a special meaning for the age of students, expressing the natural need for activities, and creating in students the real and important vibrations in life. While taking part in learning games, students reflect on the reality around them, and at the same time show a certain attitude towards the environment.

**Organizing Learning Games in Teaching Mathematics at Grade 1**

The learning game has an attractive emulation: Children can compete with each other or with teams in a class or groups in the class. Thus, students can study and play the lessons in the most natural way, they do not feel bored but are always interested when participating in learning activities. Through competitions or games, students have the energy to excel in their studies.

Along with learning, play is an indispensable need of primary school students, although it is no longer the main activity, the play still plays an important role. Theory and practice have proved that: If you know how to organize for students to have fun in a reasonable and correct way, it will bring educational effectiveness. Through the game, children not only develop intellectually, physically, and aesthetically but also develop many moral qualities and behaviors. Therefore, organizing games is used as an important method to form and educate ethical behavior for students.

## D. Principles in designing learning games

### Learning games must be lively, attractive

We propose this principle based on the nature of the game as well as on the relationship between the psycho-physiological characteristics of students in the primary school stage in designing and using games in teaching.

Primary school students, especially in the first grade, often have a carefree, refreshing and joyful mood. Children with developed visual memory dominate over verbal memory. Children's perception is generally, less detailed and unstable, perception is often associated with visual images. Children's cognitive needs change from curiosity to discovery. The student's attention still is weak and unsustainable, easily distracted by sounds and events other than the learning content. Students often pay attention to subjects and lessons with vivid and attractive visual aids, pictures, and learning games. Therefore, we need to attract students with new activities, with vivid and attractive colors, and special properties, different from usual, which will stimulate students to feel and perceive positively and exactly.

The design and organization of learning games in teaching Maths at 1st grade will attract children to group activities and collective activities so that they have the opportunity to develop their rational cognitive processes in a timely manner and comprehensive way. Therefore, the design and organization of learning games in teaching play a very important role in improving the efficiency of math learning in primary school. To promote that role, each learning game for primary school students - the age where emotional objects are specific, vivid phenomena, the process of acquiring knowledge goes from vivid visual to abstract thinking, from abstract thinking to real life, must be really attractive, stimulating the positivity, independence, and creativity of students.

Learning games in order to actively work for students must create opportunities for them to be interested, voluntarily participate in games, and actively use their knowledge and intellectual capacity to solve problems in dynamic playing situations. Therefore, the design and organization of learning games in teaching Maths at Grade 1 need to be lively and attractive. Then, learning games will attract students, make students focus on lessons, and increase their ability to explore and discover not only mathematical problems but also practical problems in real life

### Learning games must be suitable for practical

Based on the research on the content of the Mathematic subject at the first grade, the characteristics of learning games, and the current situation of designing and using games in teaching Mathematics in some primary schools in Vietnam, it is found that primary school students love to participate in learning games. The design and organization of learning games in teaching Mathematics at grade 1 must ensure relevance to reality. The content of the 1st grade Math learning game is designed to "contribute to the formation and development of mathematical competence with some requirements: performing simple thinking operations; giving out and answer questions when making arguments and solving simple Maths problems; selecting mathematical operations and arithmetic formulas to present and express (spoken or written) the contents, ideas, and ways of solving problems; be able to use mathematical language in combination with general language and body language to express mathematical contents in simple situations; be able to use simple math learning tools and means to perform simple Math learning tasks" [5].

In particular, the design of learning games must be suitable for students' abilities, attracting many students to participate. Learning games must be carefully prepared, and suitable for students both in terms of aesthetics and content. Students are interested in the game because by taking part in learning games, they will be creative, be adults, know their strengths, and know how to organize their own work. Teachers are the organizers of learning for students. We need to respect their opinions, need to identify what extent of students' interest in the game and how learning games affect students' learning.

In addition, learning games must be safe and economical in accordance with the school's facilities. Teachers must rely on practical conditions to clearly define goals, organization, and visual aids that need to be carefully prepared. So that, when they go to class, they do not lose time, limit, and waste material. When applying any learning game that uses visual aids, it is necessary to prepare carefully, clearly, and beautifully to attract students' attention. Primary school students are very active, teachers must be able to manage the class, to organize games skillfully to ensure student safety while playing is essential.

**Organizing Learning Games in Teaching Mathematics at Grade 1**

**Learning games must create opportunities for students to develop specific competencies associated with the content of Mathematics**

It is seen that in addition to having fun, students need to form knowledge, and skills, develop specific competencies of Maths subject in learning Maths. Learning games bring students to recreational activities with content associated with the lesson. Learning games must be associated with the goals and the content of each lesson: Any lesson has a set goal combined with the content of knowledge imparted. When organizing learning games, it must be appropriate to the characteristics of the lesson to help students see the world more accurately and clearly. When choosing and designing learning games suitable to the content of the new lesson, the positiveness of the learning game can be promoted while forming and consolidating lesson knowledge for students.

The design of learning games is not only suitable for the content of the lesson but also needs to contribute to the realization of the lesson objectives, and develop Mathematical specific competencies: "Math contributes to the formation and development of develop students' mathematical competence (the most concentrated expression of computational competence) including the following core components: mathematical thinking and reasoning ability; mathematical modeling ability; ability to solve mathematical problems; mathematical communication competence; ability to use tools and means of learning mathematics" [5].

**Learning games must have a certain goal and educational purposes**

The purpose of the game is to promote the active learning of students. Therefore, the task of playing, the rules, and actions of the game require students to use their senses, and intellectual manipulations, especially thinking manipulations such as analysis, synthesis, generalization, and abstraction to acquire knowledge of the lesson or subject.

Each learning game must be a game aimed at stimulating students' positivity, independence and creativity. On the other hand, the purpose of learning games is to actively engage in learning activities for students, to create opportunities for them to be interested, to voluntarily participate in the game, to actively use their knowledge and their intelligence to solve learning tasks in vivid play situations with elements of mutual emulation.

**Each math learning game needs to have rules.**

The way to disseminate the rules must be concise and easy to understand. Disseminating the rules of the learning game should be clear, simple, easy to remember, easy to implement, and not require a long time for training. In addition, the learning game should take place in a short time, not be too difficult, suitable for the learning level of students.

**Math learning games need to have rich and attractive themes and content**

The theme of the learning game should be specific, making sure it matches the goal of the warm-up activity or review activity. It should be short, stimulating curiosity, and attracting students' attention. Ensuring the attractiveness shows the attractiveness shown in both the content and the form of play. The content of play follows the teaching content but must be able to stimulate creativity, inquisitiveness and eagerness to learn. The rich and varied form of play stimulates interest and attracts students' attention to the lesson with many rules of the game that change frequently.

**III. HOW TO DESIGN AND ORGANIZE LEARNING GAMES**

**A. Step 1: Identify goals of learning game**

Game Goal: Answer the question "What is the game used for?". The purpose must be stated clearly, coherently and specifically. Teachers need to clearly state in front of the class, using language that is easy to understand and remember.

Teachers need to identify all 3 goals (knowledge, skills, attitudes) that students need to achieve after taking part in the learning games. It is possible to add some other skills that need to be formed for students. Like a jigsaw puzzle, students know how to solve questions to open the puzzle pieces of the picture, or like quizzes students must know to be able to choose the right answers.

**B. Step 2. Identify the content of the learning game**

The content of the learning game must be rich and diverse, related to the content of the previous lesson or the learned knowledge/skills; Teachers need to use language that is easy to understand and remember. Make sure each individual student understands and applies it.

The content of the learning game must be based on the knowledge and skills of Maths. Based on the content of the lesson, and the specific conditions, teachers choose the appropriate learning game.

How to proceed:
- Teacher states the learning game content and disseminates game rules.
- Teachers need to clearly determine where the learning game will be held, at a specific time.

- Prepare to organize the game: The teacher prepares all playing tools. The teacher estimates the number of participants and the location of the learning game. Teachers need to understand the rules of the learning game and find ways to make it easy for students to understand. Teachers need to have other options to avoid sudden changes. Teachers must ensure that the steps taken are safe for students.

**Organizing Learning Games in Teaching Mathematics at Grade 1**

## C. Step 3: Determine the type of learning game to design

Depending on each lesson, the teacher designs a different learning game. The design of learning games should be appropriate to the student's level. Depending on each class, teachers can design different learning games. Depending on the lesson, the teacher chooses different games. Learning games help students gain a deeper and faster understanding faster in lessons.

## D. Step 4: Identify means and tools to organize learning games (if necessary).

Means and tools can be teaching aids or software.

Depending on the different articles, we choose different design software. Teachers also can use some software such as Quizizz, word wall, and Kahoot,...

Prepare means: The means of playing can be prepared by the teacher in advance or by the students before starting to play. The means of play must ensure practical service for the game, the image must be sharp and clear, the specimen must be the same or close to the real object...

Teachers can design games on projectors with creative and attractive sounds, images, and videos. Teacher neet to identify the time, space, and location of the game.

## E. Step 5: Organizing the learning game

On the basis of the designed script and prepared learning and teaching materials, teachers select appropriate software and tools, and organize them in the following steps:

- The teacher introduces the name and purpose of the learning game. The name of the game is a factor that stimulates curiosity, and imagination, and attracts students; At the same time, the game name also partly tells the learning game's content.

- The teacher determines the form and number of players (playing groups): Determining the form of play is individual play, in pair group, or large group to clearly and fairly assign both quantity and quality. It is possible to elect a manager as a teacher or a student. If students play in groups, they must name the group, and select the group leaders and secretaries so that the students will not be confused. All children in the class should participate so that they can have fun and be trained. Can play in turn so that all are involved and avoid causing fatigue and overwhelm for students.

- Guiding to play:

+ Identify participants in the game: Number of participants, number of participating teams (several teams participating), game manager, referee.

+ Tools used to play: Boards, A4 size paper….

+ How to play: Each specific thing of a player or team, playing time, and things players can't do.

+ How to confirm the results and how to calculate the points, how to solve the games (if any).

- Making the game: Can organize a trial play to note for student common mistakes before playing officially.

- Comments and evaluations after the game: Teachers or referees are students who comment on the attitude of each team to participate in the game, and the bad work of the teams to draw experience. The referee announces the playing results of each team and individual and awards the prize to the winning team. Some students mentioned knowledge and skills in the lesson that the game implemented.

- Draw lessons from experience: Depending on the purpose of the game administrator, the lessons learned for each game will be different. But all the lessons are aimed at making the next game more successful.

- It is necessary to clearly define the time to organize the learning game: Opening activity (warm-up); Discover and formation of new knowledge; Practice and Application. Teachers should also clearly define where the learning game will take place: in the classroom or out of the classroom. Careful and thoughtful identification will help organize the learning game more effectively. In addition, the safety factor for students must also be taken into account.

Building a summary: Depending on the type of learning game, the teacher builds a way of commenting and summarizing. Summarize, announce results, rank teams or display products and general comments.

The allocation of time to conduct a learning game is an important factor determining the effectiveness of this form of teaching. Each learning game can be roughly divided into 3 steps as follows:

- Setting up the game: the teacher should spend about 20% of the total time on this step. At this step, the teacher should agree with the students on the space to organize the game, distribute relevant materials or tools, divide the students into groups, and agree on the rules of the learning game.

- Conduct the learning game: this step usually takes about 60% of the total time. This step includes warm-up, demo activity, emphasizing the rules of the learning game, evaluating results and declaring the winner (team).

- Summary of the game: about 20% of the total time. In this step, the teacher directs students to return to learning activities to summarize and emphasize the content that students have mastered and reinforced through games.

When organizing a learning game, the teacher must plan the whole learning game, and consider all factors: knowledge content, time spent in the whole game, time spent in each step of the game, the time to conduct the learning game in the classroom, and even consider the ability to attract learners to participate in the activities of the learning game. In addition, when conducting a

learning game in the classroom, teachers may need corrective action by adding questions, tasks, or adding rules to the learning game. Each learning game can be adapted to a variety of content and is used throughout the learning process.

## IV. CONCLUSIONS

The organization of learning games in teaching Maths at grade 1 brings positive effects on the learning process of students. Using learning games not only helps students understand and consolidate the content of Math knowledge gently but also helps them develop thinking ability, imagination, creativity, and the ability to express themselves clearly. Learning games can develop students' interest in learning, creating trust and passion for learning. Thereby forging them with the virtues, qualities and working style of the new-era workers. Based on the proposed process, with their creativity, teachers can design, develop and organize learning games in teaching Maths to improve the effectiveness of Maths teaching at primary school.

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