# Mathematic game critique critical thinking sample

Art & Culture, Symbolism



Mathematics is a creative and reasoning activity engaging generalization and abstraction to recognize, define and use relationships and pattern. Math's symbolic nature gives a powerful, concise and precise means of communication. Mathematical concepts have progressed across all humanities from ancient times and are always advancing. It is essential to technological and scientific development in many arenas of endeavor. Moreover, to its applied usage, learning mathematics is a valuable quest in its own right, giving opportunities for challenge, originality, and leisure (Board of Studies NSW, 2012). To learn mathematics, students must be taught with a curriculum or syllabus that gives skills, knowledge, and understanding in measurement and geometry, number and algebra, and statistics and probability (Board of Studies NSW, 2012).

This can be achieved by developing mathematical understanding, communication, fluency, logical reasoning, problem solving skills and analytical thought. These competences enable student's to react to familiar and unfamiliar circumstances by using strategies to make knowledgeable decisions and decipher problems significant to their everyday lives and further education (Board of Studies NSW, 2012). Mathematical games are a basic tool for teaching mathematical concepts and developing significant capabilities required to understand mathematics. The following study critically elaborates the mathematical value for games in students at the Early Stage or Stage 1. It focuses on the place for games in the mathematics curriculum, ability of games to involve students and teach valuable mathematics ideas, and how to adapt game play for different learners.

#### Dominoes

Dominoes or domino is the collective gaming pieces forming up a domino set (Kennedy, Johnson & Tipps, 2010). A domino means any rectangle made from joining two corresponding squares edge to edge. The outdated domino set is made up of 28 dominoes, nicknamed tiles, cards, spinners, tickers, and stones set (Kennedy, et al. 2010). Each side is distinct with a number of pips (spots) or is blank. These sets can be played in many different games depending on the players. However, most of the domino games are blocking games, where the objective is to blank one's hand while hindering the opponent's. To end the game, a score can be derived from counting the number of spots in the losing opponent's hands. Furthermore, dominoes can also be used to play other simpler games that help children or students in learning mathematical concepts and competencies. For example, in Lonely Domino all dominoes are set face up, and one domino is selected and proclaimed lonely, and must join up one or more dominoes whose number adds up to nine (Kennedy, et al. 2010). The student will then select the domino or dominos that are suitable for the lonely dominos. Additionally, a teacher can take two dominos, announce the total pips on the dominos, and show one domino to the student to identify how many spots must be on the other domino.

Dominoes are excellent in teaching and learning mathematical concepts and processes addressed in the games. Such games allow students to practice on what they learn in a normal classroom lesson. Use of such games is known as engaged learning and is the best way of reinforcing their understanding and addressing the needs of children with special needs. Dominoes are suitable for teaching students at Stage 1 where they count, read, order, and write two and three digit numbers and apply numerous recording methods and strategies. Students can form a domino train by counting the dots as the dominoes face up. The gameplay can take turns enabling students to count and use numerous recording numbers to ensure it forms a train as per the game rules. Furthermore, students can learn multiplication and division, and subtraction and addition through the domino train game. For example, students can practice through the math's operation domino snake. The first player starts with placing a single domino face up and the next player must place his/her domino next to the that of the first player to ensure that the sum or total of the pips going in a single direction matches 4 or the target number specified by the players or teacher (Kennedy, et al. 2010). This concept can be used in addition, subtraction, multiplication, or division processes.

Games that challenge students in technology, science, math, and engineering are referred to as STEM games and are part of engaged learning. Dominoes can be applied in the classroom by adding time in the timetable for gameplay, in the relevant mathematical processes and concepts. Students can be allowed to practice what they have learnt in the classroom through dominoes. Additionally, dominoes can be used in math lessons where students are allowed to play and then taught the significance and capabilities they have developed. Dominoes are easily adaptable to students in Stage 1 and are easy to learn and understand (Kennedy, et al. 2010). This is especially for students with special needs such as English issues. Their potential to engage students is very high as they are numerous types of games that can be played using dominoes (Schiro, 2009). One of the learning outcomes of Stage 1 students is to be able to describe mathematical methods and situations using mathematical and everyday actions, language, material, symbols, and diagrams (Board of Studies NSW, 2012). Dominoes have the capability to allow students to use terms such as plus, add, equal to, take away as strategies of wining or simply playing the game. Moreover, numbers or playing dominoes can be combined using words such as double or more. When teaching students in theory they may not understand some phrases. However, through dominoes it is easy to answer a question or solve a problem through observation and simple guidance. Dominoes are a vital learning tool in teaching students with different learning needs or special needs. Students can also represent and recognize multiplication as repeated groups, addition, arrays through model division or grouping. However, dominoes do not address all the requirements in Stage 1 mathematics syllabus. It cannot be used to understand, teach or learn measurement and geometry or probability and statistics in mathematics.

### **Mahjong Game**

Mahjong originated from China and can be played by either four to a single player (Khee, 2007). The basic concept involves tile-matching. There are a hundred and thirty six tiles with different graphics or symbols on one side of the tile. Some tiles however are similar, but there is a range of differentiation between the symbols that there are only two or four tiles with the same symbol. The tiles are arranged in a pile up, and the players must win by successfully identifying alike tiles and removing them from the pile up (Khee, 2007). However, only the accessible tiles can be removed while those below or covered by other tiles must be left until the tiles are uncovered. Mahjong can be manipulated or customized for mathematical learning and developing numerous competencies associated with cognitive development. Mahjong games can be used in problem solving and communication. Mahjong games can be designed with tiles that have mathematical calculations rather than symbols. For example, one tile can have the addition calculation or equation i. e 1+2 and the matching tile should be the sum of 1 and 2 (Khee, 2007). This can be done in either addition and subtraction and multiplication and division. The learning outcomes will ensure the student can describe mathematical methods and circumstances using mathematical actions, language, materials, symbols, and diagrams (Board of Studies NSW, 2012). In such a game, it is easier to support one's conclusions by demonstrating or explaining how answers or tile match. Moreover, the

constant juggle of numbers and calculations also develops a range of mental strategies through the material used in the game for addition and subtraction and multiplication and division.

In the classroom, teachers can implement mahjong as a competition in the classroom. Competitions are a challenging activity in learning, and the game makes it more interesting and fun. Students can be divided in groups to compete with each other. Furthermore, mahjong can also be implemented to cater for special needs students. For instance, it can be used to assess a student's response that is not well competent in written or spoken language. Additionally, mahjong can be realized through co-curriculum activities and as additional learning lessons. The game is compatible with all kinds of students and is easily adaptable. Students with intellectual disability can easily adapt to visualizing the mathematical calculations in a friendlier environment that encourages communication and socialization. Its potential to engage student is not as good as expected in the mathematics curriculum. Most of the mathematics curriculum is not well demonstrated in mahjong. Nonetheless, it is can easily engage students through customized games that address the relevant mathematical concepts and processes. Students can easily adapt to symbolic representations of calculations and number while developing the problemsolving skills, communication and reasoning competencies required for Stage 1 learning outcomes.

Mahjong has a slight influence or place in the mathematics curriculum. It can develop the basic mathematical learning outcomes in several curriculum topics such as addition and subtraction and multiplication and division. The student can describe mathematical methods and situations using ordinary actions, language, materials and informal recordings. However, mahjong can only be used to address numeric and algebra mathematical concepts and processes. Geometry and measurement are not addressed, thus limiting the amount of learning outcome expected. The usability and time needed to understand or play the game can be challenging and may consume more time for learning. Mahjong is better suited for home-based learning rather than in a classroom setting. Nonetheless, mahjong is still applicable and of value in developing life skills for students (Khee, 2007). Teachers should attempt and encourage students to engage is such games; rather than, more modern games that have little educational value especially in the subject of mathematics that pose as a challenge to most students.

#### **Color My World**

Color my world is a simple game for early learning and is essential for developing skills in identifying shapes and symbols in mathematics or other sciences (LaRose, 2007). The game can be played individually or in a group of up to six people or even more depending on the game set up. The overview involves players coloring a shape or numerous shapes in a picture according to the presented shape. This can also be customized to include other mathematical symbols. The picture is a large paper that has numerous shapes used to design a design or real layout of the real world (LaRose, 2007). For instance, a picture can have a housed designed with a square and a triangle and a tree in the shape of an oval and a rectangle. There are many shapes that can be used to construct figures or designs that can relate to the real world. The designs must be printed to ensure the shapes are accurate and not confusing or rather match to those in the mathematics curriculum. The game must be accompanied by separate cards with all the shapes to be included in the game. To play, the card should be shown to the student and the student should color the shape shown in the card (LaRose, 2007). Thus, after coloring the whole picture according to the cards shown, the winner is selected by assessing, which student has correctly colored all the illustrated shapes and symbols (LaRose, 2007).

Color my world addresses geometry, patterns, and fractions in mathematical concepts (Board of Studies NSW, 2012). Geometry involves the study of three-dimensional and the illustration of shape, pattern, position, and size of

objects (Board of Studies NSW, 2012). Students are able to achieve learning outcomes in Stage 1 related to geometry and measurement. When a card with a triangle is shown the students must look for all the triangles in the picture and color them with the specified color. This allows students to compare and identify several objects and shapes based on their look or length using suitable and uniform units. Furthermore, the student can describe mathematical situations using the materials, symbols, and diagrams to recognize shapes and patterns (LaRose, 2007). The shapes can also be divided into fractions and students directed to color only a certain fraction of shape with one color and the other fraction with a different color. This promotes reasoning and communication through vision.

The game can be implemented through a practical lesson in the classroom. Instead of getting students to practice through an exercise or simple test, the teacher can alternatively engage the whole class in playing color my world. In addition, the game can be implemented as part of the overall assessment test of the geometric or fraction learning lessons. Students are tested and reviewed on their understanding of different shapes in different sizes, positions, and patterns (Board of Studies NSW, 2012). The game has no variation in ideas, and is a straight forward game that develops the essential skills needed to work mathematically with shapes and objects or understand geometry. Its potential to engage with students is very high since it relates to the world and what students normally see or experience in real-life. As the name suggests, color my world is a game about the world represented in pictures. For example, the picture of a house trees and a dog all designed from mathematical shapes and symbols is more appealing than

Page 10

learning about triangles and other shapes from a mathematics textbook. Color my world has remarkable potential of appealing to the students learning process and outcomes.

Color my world has an inconsequential place in learning mathematics for Early Learning and Stage 1 student. This is because it only addresses shapes and how to identify them in mathematical learning. Although it develops reasoning, problem-solving skills, language and communication, it is limited to shapes or geometry. The mathematics curriculum covers numerous topics that are significant, but cannot be addressed or learnt from the game. Such limitations can easily disqualify the game for inclusion in the syllabus. However, according to the education or teaching ethics, it is a valuable method of teaching students with special needs. Additionally, it can also be used to enrich students with understanding through a simple and more adaptable method of visualizing the pictures and coloring the shapes. The game is of value to geometrics especially for early learning students and should be considered as an essential part of the mathematics syllabus or curriculum (LaRose, 2007).

In conclusion, games have a significant value in mathematical learning and can be similarly integrated in the mathematics curriculum. They have a potential in developing the desired learning outcomes and developing the essential competencies and life skills for successful learning. However, they are limited to specific mathematics concepts and processes; thus can only be used partly. Games enrich the students by making learning more fun and interesting.

## References

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