# Teaching Arithmetic Operation of Division with Montessori Division Board Set to Two Children with Autism Spectrum Disorders: A Case Study

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***Abstract***

This study shows how the Montessori division board set could help children with autism spectrum disorders to learn, operate and apply the arithmetic operation of division, which is generally not taught to these children, as it is considered too challenging. As a result of this study, the authors hope to generate a further interest in promoting the use other Montessori apparatus and educational pedagogy for children with special educational needs in Singapore.

## *Teaching Arithmetic Operation of Division with Montessori Division Board Set to Two Children with Autism Spectrum Disorders: A Case Study*

From 1899 to 1901, through daily intense observations of mentally retarded children for two years in lunatic asylum, where she was then the director of the State Orthophrenic School of Rome, Dr Maria Montessori developed her educational pedagogy. Her approach proved extremely successful (see Lillard, 2005; Standing, 1957), such that mentally retarded children with her intervention, were not only able to read and write, but were also able to pass public examinations, taken together with typical children (Standing, 1957). She became convinced that the issue of mental deficiency was more of a *pedagogical problem* rather than a medical one (Standing, 1957). Intuitively, she might have suspected that the brain changes physiologically as a result of experience from the environment (Wolfe & Brandt, 1998). The environment affects how the genes work and genes determine how the environment is interpreted.

As a result, it is not surprising to find the environment of a Montessori classroom "very organized, both physically (in terms of layout) and conceptually (in terms of how the use of materials progresses) … research in psychology suggests that order is very helpful to learning and development, and that Dr Montessori was right on target in creating very ordered environments in schools. Children do not fare as well in less ordered

environments … the potential neurological impact of presenting orderly sequences of materials intended to tune the senses" (Lillard, 2005, p.33).

The Montessori environment highlights the foundation for structured teaching is the principle of modifying the environment to accommodate the young children's needs. In the case of children with autism, "this structured teaching can in large part be traced to the Treatment and Education of Autistic and related Communication handicapped Children (TEACCH) program, the first statewide program dedicated to services for children with autism and communication disabilities and their families" (Simpson, 2005, p.120). The TEACCH program was developed by Eric Schopler in the 1970s and has been validated as effective by the Committee on Educational Interventions for Children with Autism (2001), supporting the need to create organization in the physical environment and providing elements of structured teaching that will cater to the needs of learners with autism in terms of their thinking, learning and neurobehavioral patterns, also known as the *culture of autism* (Meisbov, Shea, & Schopler, 2004).

In this study, the authors' search for peer-reviewed research literature for subjects on "Montessori and Autism" from databases like ERIC (Education Resources Information Center) via EbscoHOST, Psychinfo and ProQuest Education, failed to yield any results, other than articles that suggest how Montessori method may be used for children with disabilities (Flowers, 1993; Pickering, 2004). A recently published peer-reviewed report based on an internet survey of treatments used by parents of children with autism (Green et al, 2006), and another recent paper on autism intervention updates (Francis, 2005) did not list the Montessori approach as an intervention strategy for children with autism. However, Lillard (2005) in her book – *Montessori: The Science behind the Genius* – has evaluated and found Montessori theory and practice to be scientifically supported with more than 500 published research papers. However, there is still a gap in research on how Montessori theory and practice can be applied as an intervention approach for children with autism.

According to Standing (1957), besides her own keen observations on how children learnt, Dr. Maria Montessori further developed her pedagogy by learning from special education pioneers like Jean Itard and Edouard Seguin. She believed that "... the child constructs himself, that he has a *teacher within himself* and that this inner teacher also follows a program and a technique of education, and that we adults by acknowledging this unknown teacher may enjoy the privilege and good fortune of becoming its assistants and faithful servants by helping it with our co-operation" (Montessori, 1997, p.4). She then extended her pedagogy to typical children. It became so popular and effective, in many countries with diverse cultures for the past eighty years that it is now forgotten as a viable pedagogy for special needs education.

Dr. Maria Montessori did not believe in the didactic form of teaching of her days as she found them boring (Lillard, 2005), but she endorsed what we now called *play-based curriculum*. Dr Montessori, like Nutbrown (1994), believed that play is a process rather than a subject. It is within subjects that one should look to play as a means of teaching and learning rather than as a separate entity. This has probably led to developing

specially designed “toys” for children to promote incidental learning. These varied learning materials have been field-tested and loved by children to work with. Those that the children failed to show interest or ignored, were discarded, and replaced by those that are popular and pleasurable (Lillard, 2005). According to Lillard (2008), Dr Montessori “watched children in the classroom and thought about their developmental needs; she developed materials that she thought would suit those needs; and she then watched the children with the materials, and revised and refined them until she thought she had a material that would meet one or more specific needs” (p.21). The existing set of Montessori materials in use today have stood the test of time to be developmentally appropriate and desired by children for their simplicity, as children do naturally seek them out in the environment (Gettman, 1987).

**How This Study Came About**

The first author is a parent with three autistic sons of whom the oldest, a high-functioning autistic is attending a mainstream secondary school, and the other two are currently attending the Structured Teaching for Exceptional Pupils (STEP) program at Margaret Drive Special School, Singapore. The first author’s interest is on how these specially designed Montessori apparatus could be used for children with autism and who have been in the TEACCH program. The second author, who holds a Montessori diploma from the London Montessori Teacher Training College, is a registered professional counselor with the Australian Institute of Professional Counselors, Perth, Western Australia, as well as the only board-certified educational therapist outside the United States registered with the Association of Educational Therapists, California, and has previously taught mathematics to children with autism at the Center for Exceptional Children, Singapore. Both authors share a common interest in working toward incorporation of Montessori materials as intervention tools to teach mathematical concepts and operations to children with autism.

The TEACCH multifaceted approach has encouraged other compatible programs for children with autism to be integrated, such as behavioral techniques (e.g., prompting, shaping, reinforcement and response cost procedures), neo-behavioral approaches (e.g., incidental teaching and functional behavioral analysis), and developmental appropriates practices (Mesibov et al., 2004). As a result, the authors of this study firmly believe that the Montessori educational materials should be introduced in the TEACCH program. The curriculum used for the STEP program conducted at Margaret Drive Special School is mainly taken from the TEACCH Preschool Curriculum Guide that, unfortunately, does not include the teaching of the arithmetic operation of division. The authors felt that it would be interesting to study how the Montessori division board set could help children with autism to learn, operate and apply the mathematical concept of division, which is generally not taught, as it is considered too challenging for them.

**Research Questions and Corresponding Study Propositions**

The authors have proposed the following research questions (RQs) and their corresponding study propositions (CSPs) (see Yin, 2003):

RQ1: How could the Montessori division board set help children with autism *learn* arithmetic concept of division?
CSP1: The Montessori division board set could provide a learning framework for children with autism to build learning of division concept.

RQ2: How could the Montessori division board set help children with autism *operate* the arithmetic function of division?
CSP2: The Montessori division board set could provide means for children with autism to operate concretely on the function of division.

RQ3: How could the Montessori division board help children with autism *apply* the operation of division in problem solving?
CSP3: The Montessori division board set could provide a learning framework for children with autism to apply concretely the operation of division to problem-solve.

## ***Methodology***

The authors have chosen case study as the research method as the study required the understanding of the complex processes (Yin, 2003) of how the Montessori division board set could help children with autism learn, operate and apply the mathematical concept of division. The processes are considered complex as children with autism differ in their thinking, neurobehavioral patterns and learning (Mesibov et al., 2004) when compared to non-autistic typical children and also between autistic individuals. Moreover, there is no requirement in this study to control behavioral events, but rather to focus on contemporary event of learning processes of division by children with autism as opposed to historical events (Yin, 2003). Finally, the intention of this study was to generalize to theoretical propositions (see Yin, 2003) of compatibility with the TEACCH approach and not to populations or universes.

The research method of this study has adopted Yin's (2003) five components of research design, using a multiple-case replication design, where there are two units of analysis: the two subjects involved in this study are a child aged 11, diagnosed with moderate autism and a full-scale intelligence quotient (FSIQ) of 55 based on WISC-III, and the other child aged 10, diagnosed with mild autism and a FSIQ of 72, also based on WISC-III. Both subjects were found to satisfy the prerequisites of being able to count from 1 to 100. There were all together six sessions based on the Montessori's 3-period lessons (Lillard, 2005) for learning the mathematical vocabulary needed to understand the concept of division, and 33 worksheet exercises for the gradual building of mathematical concepts on division according to the eight goals in this study:

1. To understand concept of divisor by fixing numerator and changing the divisor (Exercises 1-6);
2. To understand concept of dividend/numerator by fixing the divisor and changing the numerator (Exercises 7-10);

3. To understand the concept of quotient by including elements of people pictures receiving the quotient/sharing (Exercise 11);
4. To reinforce concept of dividend/numerator by fixing the divisor and changing the numerator and concept of quotient (Exercises 12-17);
5. To transfer learning to real life pictures (sweets) (Exercises 18-20);
6. To provide opportunity for symbolic division manipulation (Exercises 21-26);
7. To teach the subjects to understand meaning of numerator and divisor via using real life objects and pictures (Exercises 27-29); and
8. To teach the subjects to solve real world problem by using real objects for dividends and pictures for divisors. (Exercises 30-33);

The duration of each session was not fixed so as to allow time for the two subjects to develop their concepts of division, make mistakes, learn from mistakes, and for the authors to intervene where necessary to check for understanding or reinforce ideas. It was essential to follow the two subjects and encourage them in their learning process to know, understand, operate and apply the arithmetic function of division. The six sessions were carried out according to the following scheme of work:

Session 1: 3-Period Lesson (Skittle, bead, multiplication board) + Exercises 1 to 3
Session 2: 3-Period Lesson (Skittle, bead, multiplication board) + Exercises 4 to 6
Session 3: Exercises 7 to10
Session 4: Exercises 11 to17
Session 5: Exercises 18 to 22
Session 6: Exercises 22 to 33

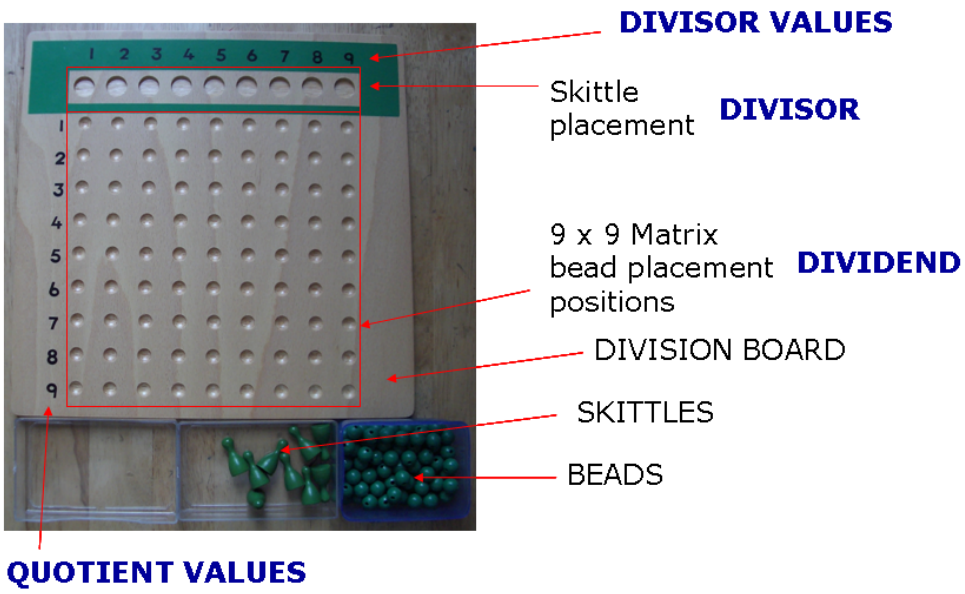
To establish the inter-rater reliability of this study, the authors made video clips on the two subjects at work during each session and showed them to five special education professionals for their respective evaluations and responses.

**Logic Linking Data to the Propositions and Criteria for Interpreting the Findings**

According to CSP1, it states that the Montessori division board set could provide a learning framework for children with autism to build learning of division concept. Findings (see the section on results) from this study support this proposition that can be seen from two perspectives: firstly, it is to analyze and make explicit whether there are learning framework evidences in the design and planned use of the Montessori division board set; and secondly, to observe and record evidences whether the two subjects in this study have actually applied the learning framework to build the learning of division concept from given worksheet exercises 1 to 17.

In their research on children's model of division, Squire and Bryant (2003) discovered that young children found it easier to solve concrete partitive division, that is, when the objects to be shared are grouped by divisor rather than by the quotient. The Montessori division board set is designed to provide such concrete experience of learning partitive division. Its organization and layout are shown in Figure 1.

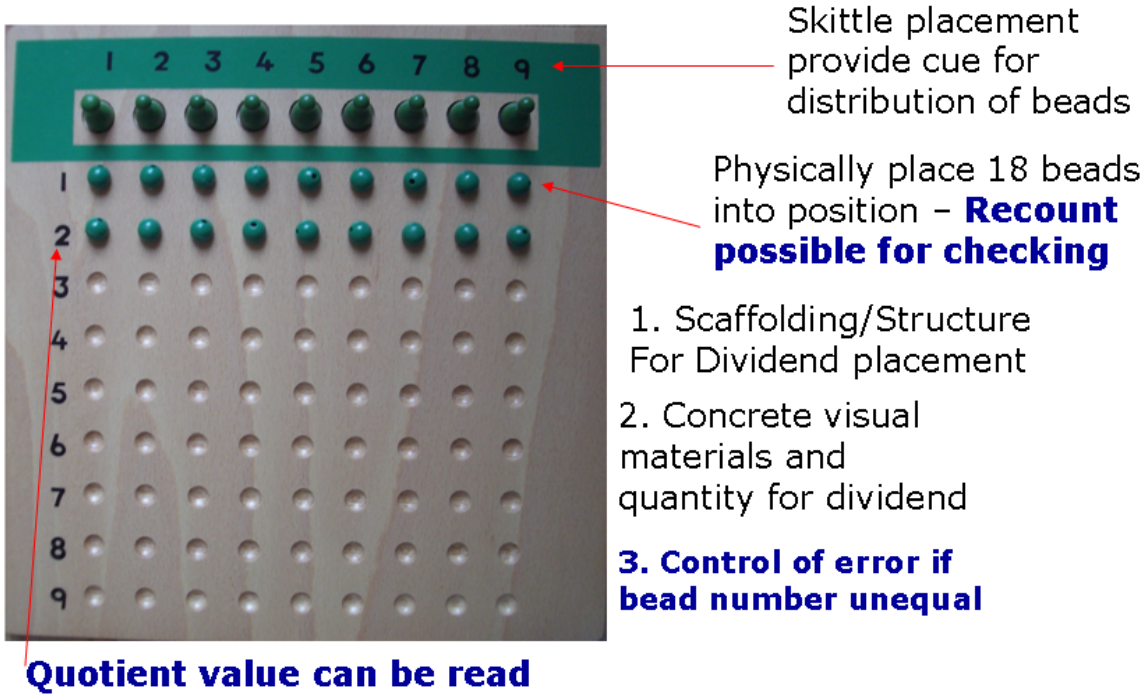
**Figure1:**
**Division Board Set**




Visually, the division board organizes clearly the locations for placement of divisors with green skittles (circular flat base) with corresponding sequentially labeled divisor values from one to nine and from left to right. Dividend quantity is represented by using green beads to be placed in small circular depressions and shared equally with the divisors/skittles, resulting in the quotient values read sequentially from top to bottom on the left of the board. The example that follows describes how the division board set works.

For example, a division problem is given: 18 ÷ 9 = ? The number 18 is a dividend value while 9 is a divisor value. The symbol ? represents the unknown quotient. 18 divided by 9 gives the quotient value of 2 (see Figure 2). The learner takes out 9 skittles and places them sequentially from left to right, providing a concrete experience of handling and seeing divisors and counting them as they are placed in position.

**Figure 2:**
**Sample Problem: 18 ÷ 9 = 2**




Next, the learner counts 18 beads from the pool of beads and places them in the nearby empty container, which not only makes the dividend value concrete, but also allows them to physically manipulate and count meaningfully. The counted 18 beads are then distributed equally with all the skittles, allowing physical and concrete experience of the division process. Finally, the quotient value is read from the left, revealing the value of 2, which is another visually concrete experience of deriving value of the quotient.

The Montessori division board set is designed with a good control of error for the correct number of skittles to be placed, as the placement of skittles is visually numbered with any missing skittle clearly observed. It is also designed for control of error for number of beads for division problems without remainders, where incorrect counting of beads will result in some skittle not having the same number of beads as the rest. The design of the division board with its depressions, beads and skittles also allows visual and physical counting to check for the correct quantities and results. Hence, the Montessori division board set is pedagogically designed for learning division in that it operationalizes the abstract concept of division by making the processes concrete, thereby providing appropriately for children with autism, who are concrete thinkers rather than abstract thinkers (Mesibov et al., 2004). Moreover, the visually structured activities with visual organization and visual clarity, helps such children with difficulty in organization and sequencing to overcome their potential weakness. In addition, the design of the activity also allows them to overcome difficulty to combine or integrate the ideas (Mesibov et al., 2004) in division by visual clarity of the relationships (divisor, dividend, and quotient).

Finally, the Montessori division board set activity allows children with autism to overcome their cognitive difficulty in generating meaning or making sense of the division activity event (Mesibov et al., 2004) and also helps remove anxiety, as the process of doing division, within the learning framework of the division board is sequentially predictable and structured (Mesibov et al., 2004). As explained earlier, the division board set has sound pedagogy embedded in the design for teaching division. Moreover, its design caters to TEACCH understanding of autistic learners in their thinking, neurobehavioral patterns and learning. The Montessori division board set is certainly a learning framework suitably designed for autistic learners. The evidences to support CSP1 from second perspective as well as for CSP2 and CSP3 are described in the section on results.

**Validity of Design**

The construct validity of the research design of this study was established by daily reports on each subject's learning progress based on the three corresponding study propositions (CSPs). The backward design (Wiggins & McTighe, 2005) was also used for constructing the curriculum, instructional plan and worksheets through the process of engineering learning based on the eight goals listed earlier.

The internal validity of this study was established using the explanation-building of current observed learning processes of the two subjects with the TEACCH approach, on how it had catered to their differences in thinking, neurobehavioral patterns and learning (Mesibov et al., 2004) and the use of backward design (Wiggins & McTighe, 2005) approach to establish the goals of activities. On the other hand, the external validity was established by using replication of the study or multiple cases of children with mild and/or moderate autism.

The overall reliability of this study was established by following the case study protocol involving the use of the Montessori 3-period lessons for learning vocabulary and worksheet exercises to build mathematical concepts of division gradually and also be adopting a structured teaching methodology (Mesibov et al., 2004). Moreover, an attempt was made for simple inter-rater reliability of the evidences by showing video clips of the two subjects at work during each daily session to five experienced non-Montessori teachers in special education on whether the evidences based on the five CSPs were present. The value was determined by percentage of agreement among the five raters on the presence of evidence observed.

## *Results*

**CSP1:** *The Montessori division board set could provide a learning framework for children with autism to build learning of division concept.*

As explained earlier, the Montessori division board set has a good learning framework in its design and planned use. The findings from observations made did show that both the subjects with moderate and mild autism actually made use of the learning framework to build their learning of division concept from worksheet exercises 1 to 17 with details described below. There was more than 80% agreement amongst the five special education professionals (or raters) who listened to the first author's presentation as well as viewing of the short video clips to establish evidences of the learning framework and its actual usage observed in both subjects.

1. **Scaffolding/Elements of structure**
   Generally, both subjects were observed to be able to correctly read the questions and then to make use of the scaffolding, by firstly identifying the divisor value, counting the number of skittles and placing it accordingly in the respective positions on the division board. Thereafter, both looked for the value of the dividends, counted the number of beads, and then placed them by distributing equally with the skittles in an orderly manner. Both then read the quotient value on the left of the division board and wrote the value in the given worksheet. Both had thus made use of the scaffolding and elements of structure of the division board to work out the solution to each problem given in the worksheet. All five raters agreed that there was evidence from watching the short video clips.

2. **Acceptable visual learning/concrete visual materials that developed solution**
   As both subjects were observed to make use of the division board set appropriately to develop solutions to problems in the given worksheet, the concrete visual learning materials were acceptable to them. All five raters agreed that there was evidence from watching the short video clip.

3. **Consistent work system/reusable consistent material to build learning**
   Both subjects re-used the division board set materials to solve the problems from worksheets 1 to 17 successfully. This showed that the division board set supported a consistent work system to solve division problems and also provided a re-usable consistent material to build learning of division. Four of the five raters agreed that there was evidence from watching a short video clip.

4. **Attachment to routines/stable learning framework**
   Both subjects could understand the use of the division board set and did routinely use it to solve the division problems at different difficulty level. The division board set had provided a stable learning framework for the learning of division. All five raters agreed that there was evidence from watching the short video clip.

5. **Appropriate organization and sequencing of learning processes**
   As both subjects followed the order of making use of skittles for divisors and then beads for dividend distribution on the division board, the division board provided them an appropriate organization and sequencing for their learning process of division. Four of the five raters agreed that there is evidence from watching the short video clip.

**CSP2:** *The Montessori division board set could provide means for children with autism to operate concretely on the function of division.*

The Montessori division board provided the two subjects a means to operate concretely on the concept of division from worksheet exercises 18 to 22. All the five raters who viewed the short video clip agreed on the presence of evidences observed in both subjects. Three interesting and surprising findings were noted. Firstly, both subjects took pride in what they were doing and did not like to be wrong in their answers. There was a need to develop a sensitive and tactful way not to hurt each subject's ego, such as requesting him to check without revealing what was wrong, finger pointing to the problem but not saying anything other than check. Secondly, the handling of beads was observed to be difficult for both subjects as they each sought their own ways or excuses to reduce or avoid using them. Thirdly, given freedom, the two subjects could develop their own algorithms for handling the beads. The subject with moderate autism had resorted to using the lowest dividend value problems and then built up to problems with higher dividend value by adding the different values of beads through rearranging the existing beads to form a new divisor value. The subject with mild autism, on the other hand, had resorted to using fingers to count on the bead positions, which to him was equivalent to putting the beads. In addition, instead of using all the skittles, he used only two to mark the first and the last positions of the skittles for his visual organization to distribute the beads. Details of the evidences are as given below:

1. **Identify divisor from worksheet.**
   Both subjects were observed to correctly identify each divisor given in their worksheets as they studied the worksheet to determine the correct number of skittles and then putting them on the division board accordingly. Over a period of time, an interesting development was observed in the subject with mild autism who had developed a shortcut to work out the division by putting only the first and the last skittles to demarcate the positions needed to help him distribute correctly the beads.

2. **Take correct number of skittles**
   The two subjects were observed to take the correct number of skittles. The subject with moderate autism faithfully took the correct number of skittles all the time, whereas the other with mild autism used only two skittles to demarcate the first and the last positions of the number of skittles needed to help him distribute correctly the beads. In any case, the meaning of reflecting the correct number of skittles was demonstrated.

3. **Put skittles in divisor positions from left to right**
   Both subjects were observed to correctly reflect the correct number of skittles from left to right. The subject with moderate autism faithfully put the skittles from left to right, whereas the subject with mild autism put only the leftmost skittle and the rightmost skittle to demarcate the first and the last positions of the number of skittles needed to help him distribute the beads. In any case, the goal of reflecting physically the numbers of skittle positions were observed.

4. **Identify dividend from worksheet**
   The two subjects were observed to correctly identify each dividend from the given worksheet since they knew the number of beads needed to solve each division problem. Over a period of time, an interesting development was noted in the subject with moderate autism: he would choose to work on the problem with the smallest dividend first. This could have been the result of frustrations he had faced due to his weak fine motor skills for handling a large number of small beads. His algorithm was to use all the counted beads in a problem with larger dividend value by adding the balance of beads required after rearranging all the beads based on the new divisor.

5. **Take correct number of beads**
   Both subjects were observed to take the correct number of beads. Over a period of time, both developed their own mechanisms to overcome the "chore" of this task in different ways because of difficulty in handling the small beads which could roll away easily. The subject with moderate autism would begin working on problems with the smallest dividend first and then worked up to the largest number so as to only take the balance of beads needed to top-up to the new larger dividend number. On the other hand, the subject with mild autism would avoid taking the beads altogether; he used his fingers to count the bead positions on the division board that were distributed equally from left to right based on the divisor skittle positions until he hit the dividend value. Occasionally, he lost count and needed to restart the counting again.

6. **Distribute beads equally to all the skittles with counting**
   Both subjects demonstrated evidences of understanding the concept, with the subject with moderate autism faithfully putting all the beads, while the other with mild autism distributed virtually via his finger counting of the bead positions according to number of skittles.

7. **Identify quotient as total number of beads for each skittle**
   The two subjects were observed to be able to identify the quotient value by correctly observing the value on the division board and then transferring the value to the given worksheet or pointing to the value on the board before writing the answer in the worksheet.

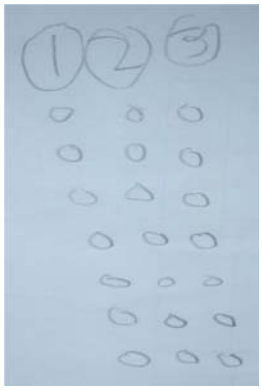
8. **Write the quotient in the worksheet**
   Both subjects were observed to write the quotient value correctly into the given worksheet.

**CSP3:** *The Montessori division board set could provide a learning framework for children with autism to apply concretely the operation of division to problem-solve.*

The Montessori division board set had provided the two subjects the means to apply concretely on the concept of division from worksheet exercises 22 to 33. There was more than 80% agreement amongst the five raters who viewed the short video clip showing the two subjects applying concretely the main concept of division. An interesting accidental

discovery of transfer of division know-how was noted when the subject with mild autism observed the first author's preparation of the worksheets and desired to show the author that he could solve the problems. The first author told him to wait until work session but he went over to take a blank sheet of paper and started working out the first division problem (i.e., 21 ÷ 3) by drawing out the equivalents of skittles and beads (see Figure 3) needed and quickly arrived at the answer. This interesting finding implies that with given time and practice, the division board know-how could become a transferable skill.

**Figure 3:**
**Transfer of division board learning to paper by the subject with mild autism**



The following evidences were observed to support CSP3:

1. **Count number of sweets correctly**
   Both subjects showed difficulty in counting the number of sweets when the number was greater than 12. This might be explained by their difficulty in organization and sequencing skills (Mesibov et al., 2004), especially for laying out the sweets to be counted properly.

2. **Write the total number of sweets in the worksheet**
   Both subjects were observed to be able to write the total number of sweets correctly in the given worksheet.

3. **Count the number of people to share sweets with**
   The two subjects were noted to be able to count the number of people to share sweets with.

4. **Write the total number of people to share sweets with in the given worksheet**
   Both subjects were observed to be able to write the total number of people to share sweets with.

5. **Represent correct number of skittle**

Both subjects observed to be able to represent the correct number of skittle. The subject with mild autism would only use two skittles to represent the total number of skittle positions to consider when sharing.

6. **Take correct number of beads and distribute among the skittles**
   Both subjects were noted to understand the concept of the correct number of beads. The subject with mild autism would substitute the actual beads by counting with his fingers the bead positions from left to right.

7. **Identify quotient as total number of beads for each skittle and write the quotient in the given worksheet**
   Both subjects were observed to be able to identify conceptually the total number of beads for each skittle by looking at the quotient value on the left of the division board.

## *Discussion*

Findings of the case study research suggest that both subjects with moderate and mild autism could learn, operate and apply division concept with appropriate educational pedagogy. This is in contrast to the general belief that division concept is considered too abstract and thus not taught in the curriculum for autistic children.

The findings of this study certainly support Dr Maria Montessori's insight that the mental deficiency problem in asylums of her time was a *pedagogical problem* rather than a medical one (Standing, 1957), as division can be taught given the appropriate pedagogy. In addition, as described earlier, the Montessori division board set has embedded a pedagogical principle that is consistent with the TEACCH approach (Mesibov et al., 2004) in that it is a visually structured activity whose visual organization and visual clarity are essential for visual and concrete learners with difficulty to combine or integrate ideas, allowing the solutions to be worked out with organization and sequence in a predictable learning framework. The Montessori division board set is thus found to be most suitable for use and ought to be integrated as one useful activity within the TEACCH work system.

This study also highlights the potential that many of the Montessori materials and hence, its curriculum, though currently are used for non-autistic typical children with effectiveness (Lillard, 2005), could also be used for children with autism, opening up more opportunity for children with autism to access mainstream education curriculum. This, the authors hope, might lead to a more inclusive society as children with autism could learn together with non-autistic typical children using a differentiated curriculum with a collaborative integration of appropriate Montessori materials and the TEACCH approach to support their learning. Perhaps the Montessori educational pedagogy and its materials might be considered and used in the universal design for learning (Hitchcock, Meyer, Rose, & Jackson, 2002; McGuire, Scott, & Shaw, 2006) by converting its

materials and intent into some suitable equivalent digital versions, allowing electronic manipulation and customization for different learner preferences and needs.

## *Conclusion*

Dr Maria Montessori developed her pedagogy by observing how mentally challenged children learned and learning from special education pioneers such as Jean Itard and Edouard Seguin. Her success with these exceptional children was extended to typical children. It became so popular and effective for the past eighty years, with typical children in many countries with diverse cultures, that it is now forgotten as a viable pedagogy for special needs education. This study has shown how the Montessori division board set could also help children with autism to learn, operate and apply the arithmetic operation of division, which is generally not taught, as it is considered too challenging. As a result of this study, the authors hope to generate a further interest in promoting the use other Montessori apparatus and educational pedagogy for children with special educational needs in Singapore.

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