International Journal of Research in Special Education

E-ISSN: 2710-3870
P-ISSN: 2710-3862
IJRSE 2022; 2(2): 34-40

www.rehabilitationjournals.com
Received: 28-04-2022
Accepted: 30-05-2022

Salini CS
M.Sc., Child Development,
St. Teresa's College,
Autonomous, Ernakulam,
Kerala, India

Dr. Dhanya N
Assistant Professor,
Department of Home Science,
St. Teresa's College,
Autonomous, Ernakulam,
Kerala, India

Corresponding Author:
Salini CS
M.Sc., Child Development,
St. Teresa's College,
Autonomous, Ernakulam,
Kerala, India

Development of an activity book for instilling the concept of time, money and measurement

Salini CS and Dr. Dhanya N

Abstract
Mathematics is a crucial element with regards to a child life yet a difficult subject to master. The traditional method of mere memorization may not be useful for children while they are trying to apply the concepts in their real life. Activity books which can help children learn difficult mathematical concepts in a fun way is essential and the present study has led to the duration of such an activity book. The tool was tested amongst 4th graders and its effectiveness has been recorded. The study is an example of how topic specific materials can help students to learn in a fun way.

Keywords: Math's, time, measurement

1. Introduction
Mathematics is the science and study of quality, structure, space, and change. Mathematicians seek out patterns, formulate new conjectures, and establish truth by rigorous deduction from appropriately chosen axioms and definitions. It is one of the essential component in our life. Without proper calculations and management our day become messy. Because arithmetic and logical thinking are the foundations of science and technology, mathematics has been viewed as an essential discipline. The study of math's is important as it allows you to train your brain to think logically, accurately and carefully helping you to make logical and informed decisions in your life. It also helps you to build confidence to undertake common routine tasks more confidently such as measuring ingredients when cooking and calculating change when shopping. Researchers are now discovering that excellent math training in early years is critical to later success in establishing number sense and eventual arithmetic proficiency. However, that education must be thoroughly and thoughtfully connected with age-appropriate developmental milestones and informed by instructors' extensive topic knowledge and pedagogical expertise. Early reading is frequently mentioned in discussions about early learning, but early math abilities are sometimes overlooked. As a part of kindergarten preparedness, preschool and early learning curricula stresses on writing, learning letters, and word identification, while paying little or no attention to number sense and fundamental arithmetic concepts, which are also critical abilities for children to grasp as they reach primary school.

2. Methodology
2.1 Selection of Area
The study primarily included students pursuing 4th grade. This is because the topic under consideration is a part of the syllabus of the students of this grade. The area selected for the conduct of the study included rural (Vypin) and urban parts (Edappally) of Ernakulam district. The survey and intervention was conducted from 4 schools in Ernakulam city including St. Joseph - Njarackkal, St. George - Edapally and Anglo Indian OLS LP School - Kunjithai. Students undertaking education under both State and CBSE syllabus were taken into consideration.

2.2 Selection of Sample
Eighty students were selected for assessing their knowledge on the concepts of time, money and measurement. The need for intervention for a particular student was determined according to his/her scores obtained via assessment. A score below 20 out of 45 was considered as the borderline to direct those in the need for intervention. From the assessment it was found that around 30 students scored less than 20 points in the assessment, and these

students were considered for further intervention

2.3 Development of tool
Three tools were developed as part of the study. A tool was developed to conduct a market on existing products covering the same topics. Further the second tool which is an activity book based on the concepts of time, money and measurement was developed. The third tools was a questionnaire to evaluate the knowledge of the sample with regard to the discussed topics.

2.4 Evaluation using the developed tools
Market survey was conducted to evaluate the relevance of the developed tool. A pretest was conducted to evaluate the current knowledge of the sample regarding the topics before administration of the activity book. Posttest was also conducted to evaluate the relevance of the tool.
A total of 80 students were considered for the assessment and a pre-test was administered to understand the awareness of students related to the concept of time, money and measurement. The Survey was conducted through school visits, personal and group interview and online test. A copy of the pretest is attached in the appendix.

Thirty students who scored less than 20 out of 45 were considered for intervention. The intervention was conducted via administration of developed work book and activity kit. A post-test was also conducted to evaluate the effectiveness intervention.

2.5 Data analysis
The results of the intervention on awareness regarding time money and measurement using the developed work book and activity kit were consolidated and presented in the form of figures and tables. Percentages and mean scores were considered to identify the efficiency of intervention. The sample included students from various schools and the respondents were from both rural and urban area.

3. Results and Discussion
3.1 Market Survey to Identify the Available Educational Materials based on the concepts of time, money and measurement
The market survey conducted to check the availability of educational materials on concepts of time, money and measurement is depicted in the table given below.

Table 1: Market survey details

Sl. no.	Name of Product	Type of Product	Price (Rs.)
1.	Let's learn about money	Paper back	199
2.	100 days of money, fraction and telling time	Paper back	675 (Offline) 496 (Amazon.in)
3.	Learning Maths	Paper back	795 (Offline) 636 (Flipkart)
4.	Toy clock for early learning for kids in time	Plastic	499 (Offline) 299 (Amazon.in)
5.	Telling the time peppa practice	Paper back	199 (Offline) 182 (Amazon.in)
6.	My first learning clock	Plastic	999
7.	Laura telling the time	Paper back	385 (Amazon.in)
8.	Schand's mental mathematics	Paper back	385 (Offline) 233(Amazon.in)
9.	NCERT mathematics worksheet for class 4	Paper back	300 (Offline) 233(Amazon.in)
10.	Measuring up	Paper back	477 (Amazon.in)
11.	Azotus worksheet for grade 4	Work sheet	999 (Amazon.in)
12	The art and science of teaching children about money	Paper back	871 (Amazon.in)
13.	Brette Sember Everything about money	Paper back	320 (Amazon.in)
14	Dummy learning clock		299 (Amazon.in) 499 (Offline)

A market survey was conducted to identify the educational tools already available in the market with regards to the concept of time, money and measurement. The survey was conducted in conventional offline markets as well as from major shopping websites like amazon.in and Flipkart. The investigator collected information concerning the different types of tools available alongside with its price. The price of the same product on online and offline portals were also noted. It was interesting to observe from the survey that online products were cheaper and widely used by the customers than the offline ones. The survey indicated that there was only a limited amount of education tools for the selected concepts and hence the investigator felt that there is a scope for development of new tools with regards to the topic of time, money and measurement.

3.2 Development of workbook and activity Kit
A workbook and an activity kit were developed and administered to children who had difficulty to understand concept of time, money and measurement as a part of intervention. The work book consisted of activities that the child could undertake in order to comprehend the concepts well. The activities were systematically arranged in separate sections in such a way that the child can proceed to learn from simpler to complex topics.
An introduction to digital and analogue clocks, clock elements including hour and minute hands, the distinction between minute and hours, and am and pm were included amongst the activities that presented the notion of time. Writing about one's daily routine with time specifications, identifying the time displayed through clock figures, identifying the correct position of the minute and hour hands for a particular time, and calculating the difference between two stated times were incorporated as activities. The following segment comprised of money concept activities which featured an introduction to Indian notes and coins, followed by activities on identifying Indian currencies, matching the right pairs, and writing the amount in words and numerals. Activities to determine the cost of a product were also included in the workbook.
The exercises for the measurement concept comprised of introduction to the concepts of kilometers, meters, and centimeters in terms of length, kilograms and grams in terms of weight, and liters and milliliters in terms of capacity. The students were then given a set of activities that included measuring the length of supplied images and

noting the measurement using a measuring jar.

A toolkit comprising three activities based on the concept of time, money and measurement respectively were prepared. Making a clock, drawing the specified time, and a time jigsaw were among the time-related instruments. Money additions and a balancing puzzle were offered for the money idea. There were also calculations with regards to notes and coins, as well as representations of products with values. Weight balancing tools, measurement coloring activities, and length measurement activities were also included.

The intervention using developed tool was very effective as significant difference were observed in the pre and post test scores of children after intervention. The developed tool hence was found immensely beneficial for children for comprehending and learning the concepts of time, money and measurement if properly introduced to the market.

Fig 1: Excerpts from Activity book

4.3 Concept of Time

The knowledge of the students with regards to the concept of the time before and after the intervention is depicted under the following headings.

An evaluation was conducted to understand the awareness knowledge of the participants regarding time concept. The assessment was conducted via questionnaires in which the respondents were asked to answer specified questions. The grading was done in the form of stars so that the respondents do not get demotivated even if they could not perform well in a given set of questions.

4.3.1 Awareness regarding time differences

The details of awareness regarding time difference has been presented in and Table 2.

Table 2: Knowledge of time difference

Sl. No	Pre test	Post test
1	1.9	3

A Pretest was conducted to understand the awareness of respondents regarding the concept prior to intervention. The mean score of the pretest was found to be 1.9 which indicates that the respondents were not much aware about time concept. The intervention was done with the help of developed worksheets and tool kit which consisted of questions including real life situations where time plays a major role. This enabled the respondents to relate to the questions and understand the concept better. This was proceeded by the posttest which included the same questions as the pretest. Significant difference was observed between pre-test and post-test as the respondents could achieve a mean score of 3 after intervention. This points out that the intervention provided to the respondents were effective.

4.3.2. Concept of being early and late with regard to time

The particulars of awareness regarding the concept of being earlier and later according to the concept of time has been presented in Figure 2.

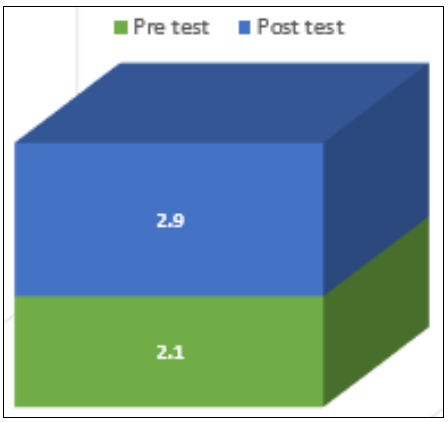

Fig 2: Concept of being early and late

An evaluation was undertaken to determine the selected sample's awareness of the idea of being earlier or later with reference to time. The evaluation was carried out using a question that requested respondents to specify the earlier and later time periods in the provided time period. Prior to intervention, the pre-test was used to determine the respondent's current knowledge of the idea. The mean pre-test score was 2.1, indicating that the respondents were unfamiliar with the subject. The intervention was done through the developed worksheet that provided an awareness on the concept. This was proceeded by the post test conducted which included the same question as the pre-test. Significance difference was observed where the respondents achieved a mean score of 2.9 after the intervention.

4.3.3 Identification of time

The results regarding the identification of time has been presented in table 3.

Table 3: Identification of time

Sl. No	Pre test	Post test
1	1.6	2.9

Identification of time is one of the most essential daily skills that an individual has to develop in early years of education. The level of awareness regarding this concept was analyzed by finding the mean scores from the respondents in the study. The mean score of the pre-test was 1.6 which is indicated that the children were facing difficulties in identifying the time in real life as well. The intervention was provided with the developed workbook and tool kit which significantly improved the posttest mean score (2.9). This indicates that the concept which was taught through activities and kinesthetic approach were efficiently imbibed into the children.

4.3.4 Positioning of hour and minute hand

The results regarding the positioning of hour and minute hand is shown in Table 4.

Table 4: Knowledge of Positioning the hour and minute hand

Sl. No	Pre test	Post test
1	1.6	2.6

The concept of hour and minute hand serves as the basis of noting time in a clock. This concept requires high visual and spatial awareness on part of the reader to accurately note the time. It is a skill which can be established only through repeated exposure. This concept was efficiently taught in through the intervention by usage of clock pictures and letting the respondents to practice the positioning of hour and minute hand for a given set of time periods. The difference of mean scores between pretest (1.6) and posttest (2.6) scores indicate that the students learned the concept well, they just have to practice more for instilling the learned knowledge by heart.

4.4 Concept of money

An evaluation was conducted to understand the awareness of the participants regarding money concept. The assessment was steered via questionnaires in which the respondents were probed to answer specified questions. The grading was done in the form of stars so that the participants do not get discouraged even if they could not perform well in a given set of questions.

4.4.1 Identification of notes and coins

The results on the awareness regarding the concept identification of notes and coins has been depicted in Fig-3.

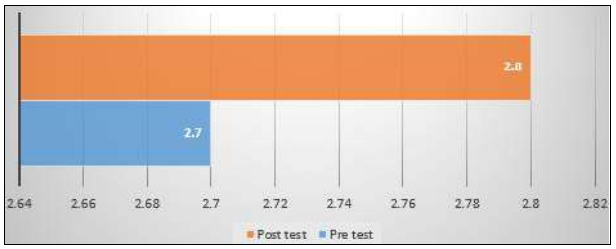

Fig 3: Identification of notes and coins

It was good to note that most of the respondents had the knowledge to identify notes and coins, hence much intervention was not required. Yet the intervention included explanations of Indian currencies and their values to help the respondents who still faced difficulties with regard to this concept. The difference between the pre and post-test mean scores is not much significant in this case which is 2.7 and 2.8 respectively.

4.4.2 Product value calculations

The results regarding calculations of product value has been depicted in Table 5.

Table 5: Product value calculations

Sl. No	Pre test	Post test
1	2.1	2.7

Product value calculation is a skill which is immensely required while handling purchase and sales related data. Children have to be exposed to situations were money tractions are involved in order to strengthen the awareness of this concept. The intervention material involved tasks in which the value of various product like teddy bears, cake, and water bottle was displayed and mock transactions using figures of currencies provided in work book enabled the child understand to the concept better. From Table 9, it is clear that the children only had a mean score of 2.1, which significantly increased to 2.7 after intervention. With proper guidance and practice, the students will gain firm

knowledge on the topic.

4.4.3 Understanding of denominations

The results regarding the understanding of denominations has been presented in Fig 4.

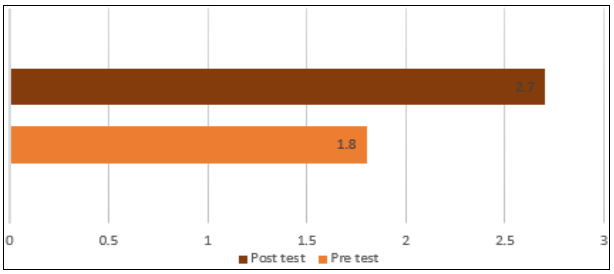

Fig 4: Understanding regarding denominations

India is a country with numerous types of currencies with different values. The presence of two set of coins and notes of the same value is a cause of concern for many children. The pre-test scores makes it very evident that the children found the concept of denomination very hard to grasp. The worksheet used for intervention included pictures of Indian currencies and repeated exposure to such worksheets enabled the students to understand the concept better. The posttest mean score of 2.7 indicates that the intervention process was fruitful.

4.4.4 Concept of balance amounts

The results regarding the concept of balance amount has been depicted in Figure 5.

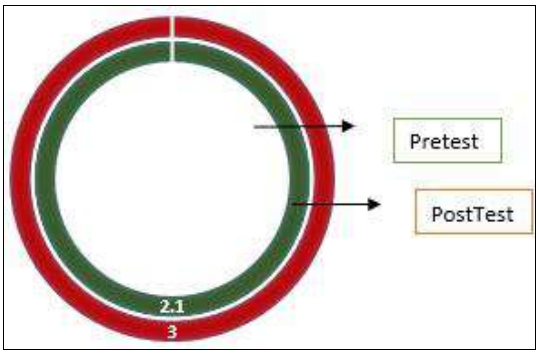

Fig 5: Concept of balance

The final concept which was assessed with regards to money was the concept of balancing. A comprehensive awareness regarding the various denominations and its value and a strong sense of abstract calculation is required to master this concept. The combination of workbook and activity kit helped in teaching this concept by proceeding from concrete activities to abstract calculations. The difference between the pre-test (2.1) and post-test (3) mean scores points out the success of the intervention process.

4.5 Concept of measurement

The understanding of the students with regards to the concept of the measurement before and after the intervention is revealed under different subheadings below.

Assessment was organized to reveal the knowledge of the students regarding measurement concept. The valuation was directed via survey in which the respondents were delved to answer specified questions. The grading was done in the form of stars so that the respondents do not get disheartened even if they could not perform well in a given set of questions.

4.5.1 Concept of liter and milliliter

The results regarding the concept of liter and milliliter has been depicted in through Table 6.

Table 6: Awareness of the concept of liter and milliliter

Sl. No	Pre test	Post test
1	1.8	3

The knowledge on the concepts of liter and milliliter is very essential to understand the volume of various items used in day to day life and it is also important to recognize the relation of these two units. The scores prior to intervention (1.8) showed that the awareness regarding this concept was poor and the intervention which focused on the kinesthetic aspect of learning brought out a clear cut improvement in the awareness among the respondents.

4.5.2 Concept of weight

The results regarding awareness on the concept of weight has been presented in Fig 6.

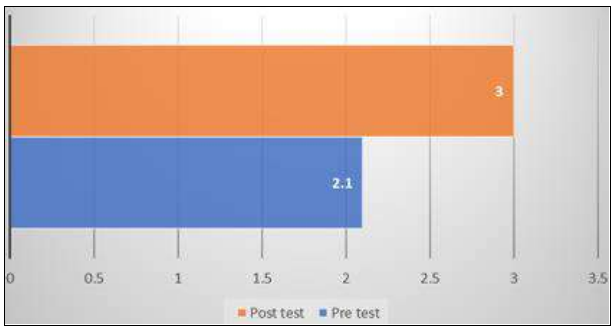

Fig 6: Concept of weight

The students had average awareness regarding the concept of weight. The various units and its conversion were the major concepts taught through intervention. Activities paired with awareness classes regarding the units has helped the students learn the concept better. The students were very much involved in all the activities and was able to understand the concept of units and its conversion in much better way. The multisensory approach adopted in intervention could be the reason for quick understanding of the concept amongst children.

4.5.3 Concept of distance

The results concerning the concept of distance has been presented in table 7.

Table 7: Concept of distance

Sl. No	Pre test	Post test
1	2.1	3

From figure 14, we can observe that the knowledge of the respondents on the topic were limited, but after the intervention, their mean score raised to 3 indicating a good progress within the children. The intervention using tool kit and activity chart processed from concrete activities to abstract puzzle. This gradation helped the respondents in

knowing the concept better, which is being reflected in the post score of three.in understanding the concept from simple to complex problems, thereby enabling them to learn in more effective way.

4.5.4 Abstract concept of measurement

The results regarding the abstract concept of measurement is depicted in Figure 16 and table 17.

Table 8: Abstract concept of measurement

Sl. No	Pre test	Post test
1	1.4	3

Gaining abstract thinking capability is very difficult especially with regards to measurement. Once the respondent had completely understood the concept of concrete measurements, the next level of intervention leads to abstract measurement concept. The gradual progression paired with activities had led to higher retention of knowledge regarding the concept of abstract measurement among the respondents. Hence the intervention can be considered as effective.

5. Summary and conclusion

The study undertaken by the researcher was on "Development of an Activity Book for Instilling the Concept of Time, Money, and Measurement''. A market survey was conducted to understand the types of educational materials readily available in market. This was proceeded by a pretest which was conducted as part of the study to evaluate the awareness of the students regarding the concept of time, money and management. The Study was conducted in St. Joseph school Njarackkal, St. George School Edapally and Anglo Indian OLS LP School Kunjithai with the help of a self-designed questionnaire. The sample for the study was determined using purposive sampling technique. The required responses were collected through school visits, personal and group interviews and online test. Fourth graders including 80 students were selected for the purpose of assessment. The scores of the assessment were evaluated carefully to assess the need for intervention. A score below 20 out of 45 was considered as the limit to determine intervention. Thirty students were identified to score below 20 marks in the assessment, and these students were provided with intervention. The intervention was conducted with the help of developed activity kit and work book. The work book included several activities on the concept of time, money and measurement in the form of three modules with the suggested activities suitable for different types of learners. Posttest was conducted to evaluate the effectiveness of the intervention and prepared tools among the participants. The results were analyzed by finding the mean score and comparing the mean scores before and after the intervention.

Findings

The findings of the study can be summarized as below

5.1 Market Survey to Identify the Available Educational Materials

The survey indicated a shortage of educational tools for the selected concepts and a scope for development of new tools on the topics of time, money and measurement.

5.2 Development of workbook and activity Kit

- The work book consisted of activities that the child can undertake to understand the concept of time, money and measurement. The activities were systematically arranged so that the child can proceed from simpler topic to complex one. Separate sections were provided for the concept of time, money and measurement.
- A toolkit with three activities each for the concepts of time, money, and measurement were also prepared.

5.3 Concept of time

- The intervention with regards to the concept of time was conducted. Significant improvements were observed in the post test scores which was conducted after the intervention. The most significant difference observed was with regard to the concept of identification of time and Recognition of AM and PM.

5.4 Concept of money

- The intervention provided for the concept of money included practical exposures regarding money transactions. From the results it's evident that the children could gain better insight regarding the topic after intervention. Sharp increase in mean score was observed regarding awareness of various factors like denominations, correct transaction and concept the concept of balance amounts.

5.5 Concept of measurement

- The concept is of high relevance in daily life yet the pretest scores concerning this concept were poor. The intervention was conducted using activity kit and workbook which significantly improved the post test scores. Significant difference was observed in the concrete concept of measurement were the pretest score of 1.3 improved to 2.9 after intervention.

Conclusion

The present study discusses on "Development of an Activity Book for Instilling the Concept of Time, Money, and Measurement''. This study was proposed in order to assess the knowledge of the respondents on the concepts of time, money and measurement. A workbook and activity kit was prepared as a part of intervention.

From the study, it's apparent that the respondents had limited knowledge on the topic before providing with intervention and from the posttest results we can conclude that the students had great improvements upon their knowledge on the concept of time, money and measurement. This study points out that better classroom management and teaching strategies should be implemented by the teachers and school authorities to help the children gain better understanding on the concepts of time, money and measurement and learn about it more effectively.

Limitations

- A diverse group of students could be included
- More concept regarding to mathematics can be included in intervention

Recommendations

- The study put forth the following implications
- There is a need for development of kinesthetic based mathematical learning material

- The study can be extended covering larger group a Work book and activity kit can be developed including more.

6. References

1. A textbook of child development, Rajammal P, Devadas N Jaya. Macmillan India Limited. 1984;35(36):41-48.
2. Aerni PW. Teacher self-efficacy and beliefs for teaching mathematics in inclusion settings (Publication No. 3353198) [Doctoral dissertation, The College of William and Mary in Virginia]. Pro Quest Dissertations Publishing; c2008.
3. An introduction to child study 3rd edition, Ruth Strang, The Macmillan company New York. 1951;396(401):365-378.
4. Danya Hashem. Advances in Medical Education and Practice. 2022;13:275.