DEVELOPMENT OF MATH MANIPULATIVES FROM LOCAL MATERIALS FOR MULTIGRADE 1 AND 2

**ABSTRACT**

**Purpose**:

The study's objective is to develop manipulative teaching materials for Math 1 and 2. and learn how professionals assess manipulative teaching resources for first and second grade mathematics. Examine Mathematics 1 and 2's learning competencies to see how manipulatives can be used.

**Methods**:

The researcher used the research and development (R&D) model of Bough and Gall. Here, math manipulatives from local materials are developed, evaluated, and can be used in teaching selected learning competencies in Mathematics 1 and 2 where math manipulatives can be used.

**Major Findings**:

This study was conducted to develop and validate math manipulatives as instructional materials in teaching specific topics in Math 1 and 2. The researcher made use of the Research and Development model as method of research with the following phases: Identification of learning competencies where math manipulatives can be integrated, development of the math manipulatives and validation of the IMs using face validation tool developed by the DepEd. Learning Resources Management and Development System. The developed IMs was evaluated by School Learning Resources Management and Development Committee of Balasi Elementary School of Flora district.

From the data gathered, the research yielded the following findings: math manipulatives can be used in teaching telling time, multiplication as repeated addition, missing patterns, and addition and subtraction. The developed math manipulatives passed the criteria for evaluating IMs set by the LRMDS.

**Conclusions**:

There are five learning competencies where math manipulatives can be integrated into telling and writing time, illustrating multiplication as repeated addition, determining the missing terms in each continuous pattern, illustrating addition as putting together or combining sets, and subtraction as taking away or comparing elements of sets. All the math manipulatives are rated valid and passed the criteria set by the School Learning Resources Management and Development System.

**KEYWORDS**

*Manipulative Materials, Learning Resources Management and Development System, Evaluation Tool, Indigenized, Local materials, Learning Competencies.*

**1. INTRODUCTION**

One of the sustainable development goals is that everyone has the right to be educated with equality and progress towards universal education.

Therefore, the Department of Education supports the right of indigenous people for a relevant and responsive basic education related to their context, beliefs, practices, skills and identities that help them to promote and value their indigenous knowledge.

Thus, on July 6, 2011, the Department of Education signed its pledge of commitment to the Philippines response to indigenous People and Muslim Education (PRIME) Program. The agency also affirms that with focus and firm commitment there will be a serious progress in making Education for All a reality for IP and Muslim learners.

In addition to this, the IPED PSF supported its Deped field offices in planning and implementing various activities align with thrust of the IPED program to support public schools and other education programs in making the curriculum culturally responsive and developing culturally appropriate learning resources.

To ensure the implementation of the said program, the respective schools/learning programs established institutionalized partnership between the indigenous communities to align the DepEd competency to their Indigenous Knowledge System and Practices (IKSP’s) and indigenous learning system as a basis of making lesson and instructional materials.

In connection to the statement, the utilization of indigenous/indigenized instructional materials would help teachers to motivate learners to be more interested in Mathematics. This material will play a vital role in pupil’s participation. It will widen teacher’s imagination and creativity, and it can make teaching and learning Math easier and less stressful.

Aguda (1996) stated in his book that the speech of Dr. Lasam, former DECS Superintendent (1984) encouraged teachers to utilize office papers to give to learners who may not have money to buy their papers. She furthermore said that one should not crave for imported materials if such could be substitute with the utilization of indigenous materials. She emphasized the value of practicality and that there is money in garbage of waste materials if only these could be disposed properly.

The Department of Education Culture and Sports through its non-formal Education Program (NFEP) should educate our people on the great advantage of utilizing indigenous materials for household purpose. The Teachers and student should find ways and means to process available indigenous materials into useful project and equipment. All the teachers therefore should try to expose their students to indigenous materials so that they could utilize these for their projects in craft and design activities.

Along this line, the students shall be able to develop desirable values like economy, thrift, frugality complied with aesthetic like development of beauty, arts and orderliness in the home and schools. (Aguda 1996)

In the study of Fien, 2010, it was stressed that formal education systems have disrupted the practical everyday life aspects of indigenous knowledge and ways of learning, replacing them with abstract knowledge and academic ways of learning. According to the author, at present, there is a grave risk that much indigenous knowledge is being lost and, along with it, valuable knowledge about ways of living successfully.

Based on the above studies, it can be concluded that the use of indigenous instructional materials helps lead students become more participative in class. This is due to opportunity to integrate their culture and tradition. This is also aids them in attaining awareness of the different indigenous groups. Students will be proud of their heritage and reverent to the heritage of others.

Said studies also imply that there is a need to find ways on how indigenous knowledge may be integrated into education that will bring the benefits of helping society to sustain indigenous knowledge and to gain respect for local culture.

Piaget (1952) suggested that youngster’ and adults’ thoughts, language, and actions differ in both quantity and quality. According to Piaget (1971), learners move through four stages of intellectual development (sensorimotor, preoperational, concrete operations, and formal operations) and learning involves either add new information to existing psychological frameworks (assimilation) or developing or evolving new cognitive structures (accommodation). Piaget hypothesized that children were not mentally mature enough to grasp abstract mathematical concepts if their teachers only presented the concepts in writing (using words, numbers and symbols). According to Piaget, children need several experiences with concrete materials and drawings to learn abstract concepts. Piaget believed that as children mature to their adolescence their need for concrete experiences diminishes but never ceases.

Indeed, through utilization of indigenous instructional materials, we could help our community to manage waste, lessen environmental pollution and preserve the good values and principles that are good and can be adapted and passed from generation to generation.

Indigenous Instructional Materials can make mathematics more enjoyable and fun for our IP pupils. Using them can form a focal point, attract attention, arouse interest and promote a desire to learn. It can also build pupil’s confidence to be engage with the materials and even make them repeat the activity during their free time since they are expose to all kinds of existing indigenous material. Moreover, it provides opportunity to parents to be involve in their children’s school life. It unburdens them to buy materials from the market for their children’s assignment and project in school.

Balasi, Flora, Apayao is rich in local materials that can be used and indigenous practices that will be applied in classroom teaching. It is the responsibility of a teacher to be sure that their learners understand the competencies they must be learn and apply in their life by providing instruction and materials that they can relate to.

The utilization of indigenized instructional Material helps teachers to integrate the IP’s culture and tradition. This may also lead pupils to be more participative during Math lesson. Therefore, it is on this ground that the researcher being a teacher of the IPED School is motivated to undertake the study on developing Math manipulatives from Local Materials for Grade 1.

**2. LITERATURE REVIEW AND RESEARCH METHODS**

The research consists of five phases. Phase I of this study is the identification of topics where manipulative materials can be used followed by phase II that is the development of the manipulative material, phase III is the evaluation of the manipulative instructional material, phase IV is the incorporation of comments and suggestion, and V is the finalization of instructional materials.

**2.1. Study Design**

The researcher used the research and development (R&D) model of Bough and Gall. Here, math manipulatives from local materials are developed, evaluated, and can be used in teaching selected learning competencies in Mathematics 1 and 2 where math manipulatives can be used.

**2.2 Participants**

The pupil respondents of this research will be the Grade 1 and 2 pupils at Balasi Elementary School, Flora District with an enrolment of 5 pupils of which 2 are males and 3 are females for Grade 1 and 4 male and 4 female for grade.

This study will involve also the School Learning Resources Management and Development System evaluation team that composes of the school head and three members of the committee in evaluating instructional materials using evaluation-rating sheet used by the Department of Education to evaluate and validate instructional material like manipulatives.

**2.3. Instrumentation**

This study will use the following instrument:

1. Evaluation Tool

The evaluation or validation tool will be used in this study is the evaluation-rating sheet used by the Department of Education to evaluate instructional materials and it has three factors.

Factor A is the content quality of the manipulative material. It is rated as 4 being Very Satisfactory (VS), 3- Satisfactory(S), 2-Poor, and 1-Not Satisfactory. In this factor, the manipulative must score at least 30 points out of the maximum 40 points to pass this criterion.

Factor B composes other findings about the information contained in the manipulative. It is rated 4 – Not Present, 3 – Present but very minor and must be fixed, 2 – Present and requires major development, and 1- Poor, Do not evaluate further. In this factor, the manipulative must score at least 16 points out of a maximum of 16 points to pass this criterion.

Factor C composes the additional requirements for manipulative. It involved the instructional design and the technical design of the material.It is rated as 4 being Very Satisfactory (VS), 3- Satisfactory(S), 2-Poor, and 1-Not Satisfactory. In this factor, the manipulative must score at least 18 points out of a maximum 24 points to pass this criterion.

Space for comments and recommendations was also included below the questionnaire.

2. Face Validation Tool

Face validation tool was designed after models wherein questionnaire was used to evaluate the manipulative materials. The following scale was used: 5 – highly valid; 4 – valid; 3 – undecided; 2 – not valid; 1 – strongly not valid. The questionnaire was used to determine the validity of the manipulative. It consists of four (4) sub – criterion as follows: the material used, rules, questions, and the manipulative materials itself. Space for comments and suggestions was also included below the questionnaire.

**4. Data Collection Procedure**

The researcher asked permission from the cluster head of Balasi Elementary School to conduct the study. Data and results were collected over a period of 2 months in identifying topics and learning competencies in Mathematics 1 and 2 where math manipulatives can be used, developing mathematics manipulatives for identified topics in Mathematics 1 and 2 where manipulatives can be used, evaluating the math manipulatives using the evaluation rating sheet by the School LRMDS Committee, and gathering data through the use of a face validation tool as a guide in determining the respondents’ feedback regarding the manipulative materials after exposure. The weighted mean was solved, and then the grand mean was used for the general interpretation of the responses.

**5. Data Analysis**

The researcher used the four-point scale to describe the validity of the manipulative material.

The table shows the limits of description and verbal description for the different factors used in the validation of the study.

List 1: Limits of description and verbal validity for the different factors used in the validation of the study

|  |  |  |
| --- | --- | --- |
| **Scale** | **Limits of Description** | **Verbal Validity** |
| 5 | 4.20 – 5.00 | Highly valid |
| 4 | 3.40 – 4.19 | Valid |
| 3 | 2.60 – 3.39 | Undecided |
| 2 | 1.80 – 2.59 | Not valid |
| 1 | 1.00 – 1.79 | Strongly not valid |

**6. Ethical Considerations**

Ethical approval for the study was obtained from the Institutional Review Board of the Graduate School. Participation was voluntary, and participants were informed of their right to withdraw at any time without penalty.

**Tables**

Table 1. Topics and learning competencies where a math manipulative can be used

|  |  |  |  |
| --- | --- | --- | --- |
| **Learning Competencies** | **Topic** | **Math Manipulatives** | **Picture** |
| Tells and writes time in minutes including a.m. and p.m. using analog and digital clocks.  **M2ME-IVa-5**  Tells and writes time by hour, half-hour and quarter-hour using analog clock.  **M1ME-IVb-3** | Telling and Writing Time | Hold me!  Click Clock | C:\Users\DepED\Desktop\RPMS 2019\IMG20190318145725.jpg |
| Illustrates multiplication as repeated addition using  **32.1 groups of equal quantities**  **M2NS-IIf-38** | Multiplication as repeated addition | Make Three, Make Two | C:\Users\DepED\Desktop\RPMS 2019\IMG20190427074518.jpgC:\Users\DepED\Desktop\RPMS 2019\IMG20190427074837.jpg |
| Determines the missing term/s in a given continuous pattern using one attribute (letters/ numbers/events).  e.g.  A,B,C,D,\_\_  2,3,\_\_5,6,7  \_\_,Wed, Thur, Fri  Aa, Bb, Cb, \_\_,\_  **M1AL-IIIg-1**  Determines the missing term/s in a given repeating pattern using one attribute (letters, numbers, colors, figures, sizes, etc.).  e.g.  A,B,C,A,B,C,A,  **M1AL-IIIg-2** \_\_ | Patterns | What’s Missing?  Fill me. | C:\Users\DepED\Desktop\RPMS 2019\New folder\IMG20190319164750.jpgC:\Users\DepED\Pictures\Saved Pictures\IMG20190319162136 (2).jpgC:\Users\DepED\Desktop\RPMS 2019\IMG20190319162503.jpg |
| Illustrates addition as “putting together or combining or joining sets”  **M1NS-IIa-23**  Illustrates subtraction as “taking away” or “comparing” elements of sets.  **M1NS-IIf-24** | Addition and Subtraction | Toss and Fill In | C:\Users\DepED\Desktop\RPMS 2019\New folder\IMG20190320155319.jpgC:\Users\DepED\Desktop\RPMS 2019\New folder\IMG20190320152635.jpg |

Math Manipulatives name and how to use it.

• Hold me! Click Clock

Let a pupil toss the dice for hour hand and two dice for the minute hand. Let the pupil arrange the dice to look like an analog clock with the card as guide then let her/him manipulate the wood clock to show the time. If the answer is correct, the children will clap their hands. If ever her/his answer is wrong, then allow another pupil to help her/him.

• Make Three, Make Two

Let them pick a flash card in the basket, let them show the written multiplication sentence in repeated addition using the math manipulatives. For example, 3x4 I have three groups with four in each group. Put four objects in each group. After putting four objects in each group, count all of them to figure out the total by adding each object in each group.

• What’s missing? Fill me.

Place five or more familiar numbers/ letters on the bamboo or basket and have the sit or stand around it. Discuss the numbers then ask them to close their eyes while you remove one or two of the numbers/letters. When they open their eyes, have the children take turns trying to guess which of the numbers/ letters are missing. After a correct answer is given, mix up the positions of the numbers or letters and the game start again.

• Toss and fill in

This is Pair activity. They must toss first the symbol (addition and subtraction). Then toss the dice for the addends then put in line with the coconut shells then count the number of shells to be put inside it. Same with the other player. After that, both players will count all the shells to figure out the total number.

Table 2. Experts validation rating of hold me click clock using the different factors.

* **Hold Me! Click Clock**

|  |  |  |
| --- | --- | --- |
| FACTORS | Mean | Verbal Description |
| 1. Content | 3.82 | Valid |
| 1. Other Findings | 3.85 | Valid |
| 1. Additional Requirements for   manipulatives | 3.8 | Valid |
| Overall mean | 3.82 | Valid |

In terms of content, the evaluators rated the IM’s with 3.82 which is described as valid. A rating of 3.85 was obtained for other findings to include conceptual errors, factual errors, grammatical and typographical errors and other errors and 3.82 for the additional requirements for manipulatives. The Hold me! Click Clock obtained overall rating of 3.82 described as valid.

Table 3. Experts validation rating of Make Two Make Three using the different factors.

* **Make Two, Make Three**

|  |  |  |
| --- | --- | --- |
| FACTORS | Mean | Verbal Description |
| 1. Content | 3.89 | Valid |
| 1. Other Findings | 4 | Valid |
| 1. Additional Requirements for   manipulatives | 3.65 | Valid |
| Overall mean | 3.84 | Valid |

In terms of content, the evaluators rated the IM’s with 3.89 which is described as valid. A rating of 4 was obtained for other findings to include conceptual errors, factual errors, grammatical and typographical errors and other errors and 3.65 for the additional requirements for manipulatives. The Make two, Make Three obtained overall rating of 3.84 described as valid.

Table 4. Experts validation rating of Make Two Make Three using the different factors

* **What’s missing? Fill me**

|  |  |  |
| --- | --- | --- |
| FACTORS | Mean | Verbal Description |
| 1. Content | 3.82 | Valid |
| 1. Other Findings | 3.4 | Valid |
| 1. Additional Requirements for   manipulatives | 4 | Valid |
| Overall Mean | 3.74 | Valid |

In terms of content, the evaluators rated the IM’s with 3.82 which is described as valid. A rating of 3.4 was obtained for other findings to include conceptual errors, factual errors, grammatical and typographical errors and other errors and 4 for the additional requirements for manipulatives. The Make two, Make Three obtained overall rating of 3.74 described as valid.

Table 5. Experts validation rating of Make Two Make Three using the different factors

* **Toss and Fill in**

|  |  |  |
| --- | --- | --- |
| FACTORS | Mean | Verbal Description |
| 1. Content | 3.55 | Valid |
| 1. Other Findings | 3.4 | Valid |
| 1. Additional Requirements for   manipulatives | 3.73 | Valid |
| Overall Mean | 3.56 | Valid |

In terms of content, the evaluators rated the IM’s with 3.55 which is described as valid. A rating of 3.4 was obtained for other findings to include conceptual errors, factual errors, grammatical and typographical errors and other errors and 3.73 for the additional requirements for manipulatives. The Make two, Make Three obtained overall rating of 3.56 described as valid.

Table 2 to Table 5 validation results of the math manipulatives using the evaluation sheet with different factors. It shows that all the developed math manipulatives had passed all the criteria in the school level. It is recommended for further evaluation and allowed to use by the Grade 1 and 2 teacher and learners of Balasi Elementary School.

3. results and discussion

This section presents the developed manipulative instructional materials from local materials and used by the Grade 1 and 2 learners of Balasi Elementary in Flora District, followed by a detailed discussion of the findings

The first math manipulative developed is the hold me click clock. This instructional material is intended to teach pupils develop their skills in telling and writing time. The Instructional Material is made from circular wood for the frame, cut plastic for the minute and second hand of the clock and hand-woven basket for the flash cards. Research shows that using manipulatives that using manipulatives helps improve the environment in math classrooms. When students work with manipulatives and then are given a chance to reflect on their experiences, not only is mathematical learning enhanced, but math anxiety is also greatly reduced. as manifested in the research conducted by Cain-Caston, 1996; Heuser, 2000)

Using corn cobs and bamboo sticks as a counters and coconut shells and bamboo tub as depositor, illustrates that the concept of repeated addition is multiplication. This instructional material consists of corn cobs and stick as counters and bamboo and coconut shell. This Make Two, Make Three enhances pupil’s ability in solving multiplication as repeated addition. Manipulatives have also been shown to provide a strong foundation for students mastering the number relations mathematical concepts (The Access Center, October 1, 2004)

The third math manipulative is What’s missing? Fill me consist of bamboo tub and basket made of “nito” as a depositor, bamboo sticks with numbers and letter cards pasted and wooden shapes. It helps learners develop skills in identifying, determining missing pattern and it improves pattern recognition, critical thinking and spatial awareness.

The Toss and Fill in consist of wooden dice with numbers and symbols written on it, “agurong” as a counters, bamboo sticks, coconut shells and bamboo tub as a depositor. This instructional material is intended for learners to develop their skills in performing the rudiments of addition and subtraction. It allows learners manipulate with their own during their leisure time. Learning math through manipulatives can foster “Learning is Fun”. It makes the classroom environment a hands-on zone. It serves as a motivating tool for children to avoid absenteeism. Students learning computational skills tend to master and retain these skills more fully when manipulatives are used as part of their instruction (Carroll and Porter, 1997).

According to the evaluators, the materials are culturally relevant since it depicts the common livelihood of the Agta people, which is weaving, and the materials are easy to handle. It is recommended for teachers and learners to use the developed math manipulative for it makes learning enjoyable and lasting because the materials are available in the community so that learners can even use it outside the classroom. With math manipulatives, they enjoyed learning by doing and easily learned the target competencies. As per observation, these materials are recommended for usage by teachers and learners even in higher grades to make the teaching learning process more meaningful

4. Conclusion

This study was conducted to develop and validate math manipulatives as instructional materials in teaching specific topics in Math 1 and 2. The researcher made use of the Research and Development model as method of research with the following phases: Identification of learning competencies where math manipulatives can be integrated, development of the math manipulatives and validation of the IMs using face validation tool developed by the DepEd. Learning Resources Management and Development System. The developed IMs was evaluated by School Learning Resources Management and Development Committee of Balasi Elementary School of Flora district.

From the data gathered, the research yielded the following findings:

1. Math manipulatives can be used in teaching telling time, multiplication as repeated addition, missing patterns and addition and subtraction.

2. The developed math manipulatives passed the criteria for evaluating IMs set by the LRDMDS. This chapter present the analysis and interpretation of data gathered in this study.

**Disclaimer (Artificial intelligence)**

The author hereby declares that NO generative AI technologies such as Large Language Models (Chat GPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript. All research, analysis, and content creation were performed solely by the authors, ensuring the authenticity and integrity of the work presented in this thesis.

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**Appendix A**

**Summary of Evaluation of Math Manipulatives**

**Title:** Hold me! Click Clock

**Type:** Manipulative

**Intended for:** Grade 1 and 2

**Subject Area:** Mathematics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **FACTOR A:** Content | Evaluator | Evaluator | Evaluator | Average |
| 1. Content reinforces, enriches, and/or leads to the mastery of certain learning competencies for the level and subject it was intended | 4 | 4 | 4 | 4 |
| 2. Material has the potential to arouse interest of the target users. | 4 | 4 | 4 | 4 |
| 3. Facts are accurate. | 3 | 3 | 4 | 3.3 |
| 4. Information provided is up-to-date. | 4 | 4 | 4 | 4 |
| 5. Visuals are relevant to the text. | 3 | 4 | 4 | 3.6 |
| 6. Visuals are suitable to the age level and interests of the target user. | 3 | 4 | 3 | 3.3 |
| 7. Visuals are clear and adequately convey the message of the subject or topic. | 4 | 4 | 4 | 4 |
| 8. Typographic layout/ design facilities understanding of concepts presented. | 4 | 4 | 4 | 4 |
| 9. Size of the material is appropriate for use in school. | 4 | 4 | 4 | 4 |
| 10. Material is easy to use and durable. | 4 | 4 | 4 | 4 |
| **TOTAL POINTS** | 37 | 43 | 43 | 38.2 |
| Mean 3.82 | | | | |
| Note: Resource must score at least 30 points out of a maximum 40 points to pass this criterion. Please put a check mark on the appropriate box | | | | |
| **Factor B. Other Findings**  Note down observations about the information contained in the material, citing specific pages where the following errors are found: | Evaluator | Evaluator | Evaluator | Average |
| 1. Conceptual errors. | 4 | 4 | 4 | 4 |
| 2. Factual errors. | 3 | 4 | 3 | 3.3 |
| 3. Grammatical and/or typographical errors. | 4 | 4 | 4 | 4 |
| 4. Other errors(i.e., computational errors, obsolete information, errors in the visuals, etc.) | 4 | 4 | 4 | 4 |
| **TOTAL POINTS** | 15 | 16 | 15 | 15.3 |
| Mean 3.825 | | | | |
| Note: Resource must score at least 16 points out of a maximum 16 points to pass this criterion. Please put a check mark on the appropriate box | | | | |
| Factor C. Additional Requirements for Manipulative  Instructional Design | Evaluator | Evaluator | Evaluator | Average |
| 1. Adequate support material is provided. | 3 | 4 | 3 | 3.3 |
| 2. Activities are summarised; extension activities are provided. | 4 | 4 | 4 | 4 |
| 3. Suggested activities support innovative pedagogy. | 4 | 4 | 4 | 4 |
| Technical Design | | | | |
| 4. Manipulative is safe to use. | 4 | 4 | 4 | 4 |
| 5. Size and composition of manipulative is appropriate for intended audience. | 4 | 4 | 4 | 4 |
| 6. Suggested manual tasks within the activities are compatible with the motor skills of the intended users. | 4 | 4 | 4 | 4 |
| TOTAL POINTS | 23 | 24 | 23 | 23.3 |
| Mean 3.8 | | | | |
| Total Mean 3.815 | | | | |
| Other Comments | | | | |
| The marking on the clock should be painted so that it will be visible and not easily be erased. | | | | |
| Recommendation | | | | |
| Using this manipulative clock, it make learning enjoyable and lasting because of the engagement of learners to the materials which is available in the community. So, it is recommended for the learners to use this material even in outside the classroom. | | | | |
| Note: Any material that fails Factor B must not be recommended for use in public schools until the identified issues have been fixed. | | | | |
| (Please tick the appropriate box) | | | | |
| i. | I/We recommend the approval of this material for possible use in public schools provided thatic the corrections/ revisions included in this report are made. (For commercial resources (non-DepED owned resources) the Publisher must implement all recommended corrections/ revisions in their next printing or provide errata.) | | | |
| ii. | I/We do not recommend the approval of this material for possible use in public schools for the reasons stated below and/or cited in this evaluation report. (Please use separate sheet if necessary.) | | | |

**Summary of Evaluation of Math Manipulatives**

**Title:** Make Two, Make Three

**Type:** Manipulative

**Intended for:** Grade 1 and 2

**Subject Area:** Mathematics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **FACTOR A:** Content | Evaluator | Evaluator | Evaluator | Average |
| 1. Content reinforces, enriches, and/or leads to the mastery of certain learning competencies for the level and subject it was intended | 4 | 4 | 4 | 4 |
| 2. Material has the potential to arouse interest of the target users. | 4 | 4 | 4 | 4 |
| 3. Facts are accurate. | 3 | 4 | 4 | 3.6 |
| 4. Information provided is up-to-date. | 4 | 4 | 4 | 4 |
| 5. Visuals are relevant to the text. | 4 | 4 | 4 | 4 |
| 6. Visuals are suitable to the age level and interests of the target user. | 3 | 3 | 4 | 3.3 |
| 7. Visuals are clear and adequately convey the message of the subject or topic. | 4 | 4 | 4 | 4 |
| 8. Typographic layout/ design facilities understanding of concepts presented. | 4 | 4 | 4 | 4 |
| 9. Size of the material is appropriate for use in school. | 4 | 4 | 4 | 4 |
| 10. Material is easy to use and durable. | 4 | 4 | 4 | 4 |
| **TOTAL POINTS** | 36 | 37 | 40 | 38.9 |
| Mean 3.89 | | | | |
| Note: Resource must score at least 30 points out of a maximum 40 points to pass this criterion. Please put a check mark on the appropriate box | | | | |
| **Factor B. Other Findings**  Note down observations about the information contained in the material, citing specific pages where the following errors are found: | Evaluator | Evaluator | Evaluator | Average |
| 1. Conceptual errors. | 4 | 4 | 4 | 4 |
| 2. Factual errors. | 4 | 4 | 4 | 4 |
| 3. Grammatical and/or typographical errors. | 4 | 4 | 4 | 4 |
| 4. Other errors(i.e., computational errors, obsolete information, errors in the visuals, etc.) | 4 | 4 | 4 | 4 |
| **TOTAL POINTS** | 16 | 16 | 16 | 16 |
| Mean 4 | | | | |
| Note: Resource must score at least 16 points out of a maximum 16 points to pass this criterion. Please put a check mark on the appropriate box | | | | |
| Factor C. Additional Requirements for Manipulative  Instructional Design | Evaluator | Evaluator | Evaluator | Average |
| 1. Adequate support material is provided. | 3 | 4 | 3 | 3.3 |
| 2. Activities are summarised; extension activities are provided. | 3 | 3 | 4 | 3.3 |
| 3. Suggested activities support innovative pedagogy. | 4 | 4 | 4 | 4 |
| Technical Design | | | | |
| 4. Manipulative is safe to use. | 4 | 4 | 4 | 4 |
| 5. Size and composition of manipulative is appropriate for intended audience. | 3 | 4 | 3 | 3.3 |
| 6. Suggested manual tasks within the activities are compatible with the motor skills of the intended users. | 4 | 4 | 4 | 4 |
| TOTAL POINTS | 21 | 23 | 22 | 21.9 |
| Mean 3.65 | | | | |
| Total Mean 3.84 | | | | |
| Other Comments | | | | |
|  | | | | |
| Recommendation | | | | |
| With these bamboo tubes and, the learners enjoyed learning by doing and easily learned the target competencies. As per observation, these materials are recommended for usage by teachers and learners even in higher grades to make the teaching learning process more meaningful. | | | | |
| Note: Any material that fails Factor B must not be recommended for use in public schools until the identified issues have been fixed. | | | | |
| (Please tick the appropriate box) | | | | |
| i. | I/We recommend the approval of this material for possible use in public schools provided thatic the corrections/ revisions included in this report are made. (For commercial resources (non-DepED owned resources) the Publisher must implement all recommended corrections/ revisions in their next printing or provide errata.) | | | |
| ii. | I/We do not recommend the approval of this material for possible use in public schools for the reasons stated below and/or cited in this evaluation report. (Please use separate sheet if necessary.) | | | |

**Summary of Evaluation of Math Manipulatives**

**Title:** What’s missing? Fill me

**Type:** Manipulative

**Intended for:** Grade 1 and 2

**Subject Area:** Mathematics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **FACTOR A:** Content | Evaluator | Evaluator | Evaluator | Average |
| 1. Content reinforces, enriches, and/or leads to the mastery of certain learning competencies for the level and subject it was intended | 4 | 4 | 4 | 4 |
| 2. Material has the potential to arouse interest of the target users. | 3 | 3 | 4 | 3.3 |
| 3. Facts are accurate. | 4 | 4 | 4 | 4 |
| 4. Information provided is up-to-date. | 4 | 4 | 4 | 4 |
| 5. Visuals are relevant to the text. | 3 | 4 | 4 | 3.6 |
| 6. Visuals are suitable to the age level and interests of the target user. | 4 | 4 | 4 | 4 |
| 7. Visuals are clear and adequately convey the message of the subject or topic. | 4 | 4 | 4 | 4 |
| 8. Typographic layout/ design facilities understanding of concepts presented. | 3 | 3 | 4 | 3.3 |
| 9. Size of the material is appropriate for use in school. | 4 | 4 | 4 | 4 |
| 10. Material is easy to use and durable. | 4 | 4 | 4 | 4 |
| **TOTAL POINTS** | 37 | 38 | 40 | 38.2 |
| Mean 3.82 | | | | |
| Note: Resource must score at least 30 points out of a maximum 40 points to pass this criterion. Please put a check mark on the appropriate box | | | | |
| **Factor B. Other Findings**  Note down observations about the information contained in the material, citing specific pages where the following errors are found: | Evaluator | Evaluator | Evaluator | Average |
| 1. Conceptual errors. | 4 | 4 | 4 | 4 |
| 2. Factual errors. | 3 | 3 | 3 | 3 |
| 3. Grammatical and/or typographical errors. | 4 | 3 | 4 | 3.3 |
| 4. Other errors(i.e., computational errors, obsolete information, errors in the visuals, etc.) | 4 | 3 | 4 | 3.3 |
| **TOTAL POINTS** | 15 | 13 | 15 | 13.6 |
| Mean 3.4 | | | | |
| Note: Resource must score at least 16 points out of a maximum 16 points to pass this criterion. Please put a check mark on the appropriate box | | | | |
| Factor C. Additional Requirements for Manipulative  Instructional Design | Evaluator | Evaluator | Evaluator | Average |
| 1. Adequate support material is provided. | 4 | 4 | 4 | 4 |
| 2. Activities are summarised; extension activities are provided. | 4 | 4 | 4 | 4 |
| 3. Suggested activities support innovative pedagogy. | 4 | 4 | 4 | 4 |
| Technical Design | | | | |
| 4. Manipulative is safe to use. | 4 | 4 | 4 | 4 |
| 5. Size and composition of manipulative is appropriate for intended audience. | 4 | 4 | 4 | 4 |
| 6. Suggested manual tasks within the activities are compatible with the motor skills of the intended users. | 4 | 4 | 4 | 4 |
| TOTAL POINTS | 16 | 16 | 16 | 16 |
| Mean 4 | | | | |
| Total Mean 3.74 | | | | |
| Other Comments | | | | |
| These materials are culturally relevant since it depicts the common livelihood of the Agta people which is weaving and the materials are easy to handle. | | | | |
| Recommendation | | | | |
| The baskets are attractive and useful however the cardboard should be laminated to be more durable for future use. | | | | |
| Note: Any material that fails Factor B must not be recommended for use in public schools until the identified issues have been fixed. | | | | |
| (Please tick the appropriate box) | | | | |
| i. | I/We recommend the approval of this material for possible use in public schools provided thatic the corrections/ revisions included in this report are made. (For commercial resources (non-DepED owned resources) the Publisher must implement all recommended corrections/ revisions in their next printing or provide errata.) | | | |
| ii. | I/We do not recommend the approval of this material for possible use in public schools for the reasons stated below and/or cited in this evaluation report. (Please use separate sheet if necessary.) | | | |

**Summary of Evaluation of Math Manipulatives**

**Title:** Toss and fill in

**Type:** Manipulative

**Intended for:** Grade 1 and 2

**Subject Area:** Mathematics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **FACTOR A:** Content | Evaluator | Evaluator | Evaluator | Average |
| 1. Content reinforces, enriches, and/or leads to the mastery of certain learning competencies for the level and subject it was intended | 4 | 4 | 4 | 4 |
| 2. Material has the potential to arouse interest of the target users. | 4 | 4 | 4 | 4 |
| 3. Facts are accurate. | 4 | 4 | 4 | 4 |
| 4. Information provided is up-to-date. | 3 | 3 | 4 | 3.3 |
| 5. Visuals are relevant to the text. | 4 | 4 | 4 | 4 |
| 6. Visuals are suitable to the age level and interests of the target user. | 4 | 4 | 4 | 4 |
| 7. Visuals are clear and adequately convey the message of the subject or topic. | 4 | 4 | 4 | 4 |
| 8. Typographic layout/ design facilities understanding of concepts presented. | 3 | 3 | 3 | 3 |
| 9. Size of the material is appropriate for use in school. | 3 | 3 | 3 | 3 |
| 10. Material is easy to use and durable. | 4 | 4 | 4 | 4 |
| **TOTAL POINTS** | 37 | 37 | 38 | 37.3 |
| Mean 3.73 | | | | |
| Note: Resource must score at least 30 points out of a maximum 40 points to pass this criterion. Please put a check mark on the appropriate box | | | | |
| **Factor B. Other Findings**  Note down observations about the information contained in the material, citing specific pages where the following errors are found: | Evaluator | Evaluator | Evaluator | Average |
| 1. Conceptual errors. | 3 | 3 | 3 | 3 |
| 2. Factual errors. | 4 | 4 | 3 | 3.6 |
| 3. Grammatical and/or typographical errors. | 3 | 3 | 3 | 3 |
| 4. Other errors(i.e., computational errors, obsolete information, errors in the visuals, etc.) | 4 | 4 | 4 | 4 |
| **TOTAL POINTS** | 14 | 14 | 13 | 13.6 |
| Mean 3.4 | | | | |
| Note: Resource must score at least 16 points out of a maximum 16 points to pass this criterion. Please put a check mark on the appropriate box | | | | |
| Factor C. Additional Requirements for Manipulative  Instructional Design | Evaluator | Evaluator | Evaluator | Average |
| 1. Adequate support material is provided. | 4 | 4 | 4 | 4 |
| 2. Activities are summarised; extension activities are provided. | 3 | 3 | 3 | 3 |
| 3. Suggested activities support innovative pedagogy. | 3 | 3 | 3 | 3 |
| Technical Design | | | | |
| 4. Manipulative is safe to use. | 4 | 4 | 4 | 4 |
| 5. Size and composition of manipulative is appropriate for intended audience. | 4 | 3 | 3 | 3.3 |
| 6. Suggested manual tasks within the activities are compatible with the motor skills of the intended users. | 4 | 4 | 4 | 4 |
| TOTAL POINTS | 22 | 21 | 21 | 21.3 |
| Mean 3.55 | | | | |
| Total Mean | | | | |
| Other Comments | | | | |
| The materials enhances the development of desired behavior such as appreciation and utilization of local products as learning materials and it helps both the learner and the teacher to make the learning relevant and easy since it is readily available in the community. | | | | |
| Recommendation | | | | |
| It is therefore recommended to use these materials in all grade levels in teaching the four basic operations since it is designed for learner’s manipulation. | | | | |
| Note: Any material that fails Factor B must not be recommended for use in public schools until the identified issues have been fixed. | | | | |
| (Please tick the appropriate box) | | | | |
| i. | I/We recommend the approval of this material for possible use in public schools provided thatic the corrections/ revisions included in this report are made. (For commercial resources (non-DepED owned resources) the Publisher must implement all recommended corrections/ revisions in their next printing or provide errata.) | | | |
| ii. | I/We do not recommend the approval of this material for possible use in public schools for the reasons stated below and/or cited in this evaluation report. (Please use separate sheet if necessary.) | | | |

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**LEARNERS MANIPULATINGN THE DEVELOPED MATERIALS**