Analysis of Achievement in the purview of Concept Map on Pictograph for Grade III student: A case study

Dr.SubriSen

Department of Education ,Sidho-Kanho –Birsha University, Purulia, W. B., India

ABSTRACT: Present work is dealt with the analysis of achievement on Pictograph in the purview of concept mapping for a grade III student. A case study is done taking answers of five questions and their revision by a grade III student. Although weakness in numerical computation is recorded, the learner understands and capable of solving problems on Pictograph.

I. INTRODUCTION

A concept map is a diagram that illustrates the relationship between concepts.It is a graphical tool widely used by graphic designers, engineers, and architects to structure and organize knowledge(https://tophat.com).Concept maps usually represent ideas and information as circles or boxes connected by labeled arrows in a hierarchical structure that branches downward. Concept mapping is a great way to build on previous knowledge by reconnecting new information.

II. LITERATURE REVIEW

Several investigations related to concept mapping are done by the scholars. Some of them are listed below.

Malatjie and Machaba (2019) examined the learners' conceptual understanding of coordinates and transformation geometry through concept mapping. Vodovozov and Raud (2015) argue that a concept map is more effective as a teaching and learning tool than an assessment tool. Hay, Kinchin, and Baker (2008) claimed that the concept map measures aspects of learning that traditional tests cannot measure, such as learners' misconceptions. The abstract nature, the selective preference, the fragmented knowledge structures, and the subdivision of new information are reported in the literature as the cause of the students' difficulties (Trigueros and Ursini, 2003; Bills, 2001; Carlson, 1998; Williams, 1998). Concept mapping is applied to several areas also (Anohina-Naumeca, 2014; Bixler et. al., 2015).

Research Gap

No evidence is found for case study on the unit of Pictograph for Grade III students according to the Central Board of Secondary Education (CBSE).

Design of the Study

After reviewing the different books and questions, following steps are followed to evaluate the concepts achieved by the learner:

1. A concept map is formed based on content of the unit Pictograph for Grade III students mentioned in CBSE syllabus.
2. Five questions are framed to evaluate the concepts related to concept mapping.
3. Time taken by the learner to answer those questions is recorded.
4. Necessary clarifications are asked verbally to comprehend the reasons and process she applied to solve those problems.
5. Sheis asked to revise those answers for correcting mistake done by her.
6. Time taken by the learner to revise those answers is recorded.
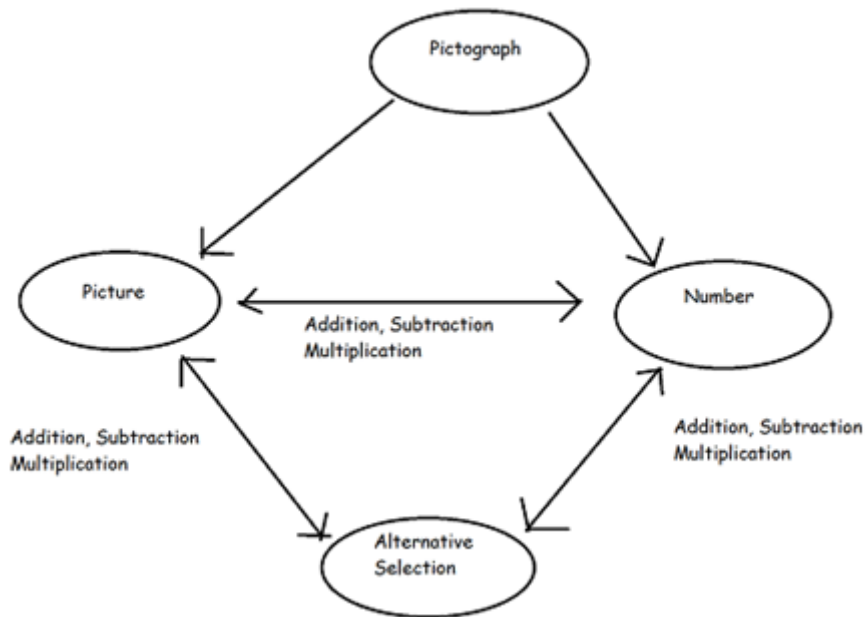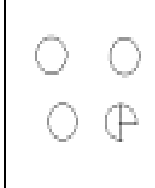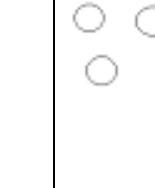7. Analysis of the answers, and revisions done by her.

Fig. 1. Concept Mapping on Pictograph for Grade III (CBSE)

III. RESULTS AND DISCUSSIONS

SattwikaSen, a student of Grade III has given five questions on the unit Pictograph. She answered all five questions and author recorded the time taken by Sattwika to answer those questions.

Question 1: Let us suppose number of customers visited a shop last week is listed below

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday

= 100 customers
Answer the questions below
- How many customers visited the shop last week?
- Which day, the highest number of customers visited the shop?
- Which day lowest number of customers visited the shop?
- How much more customers visited the shop in Wednesday than Monday?

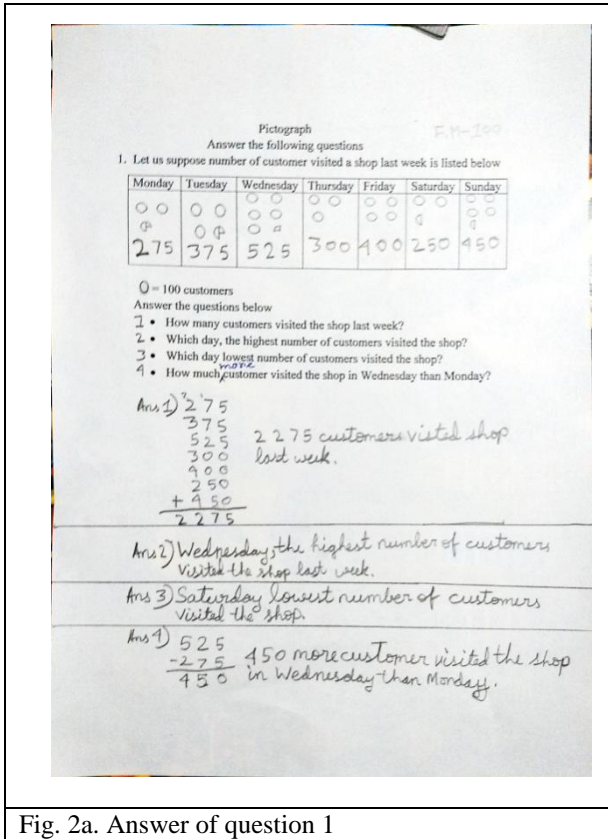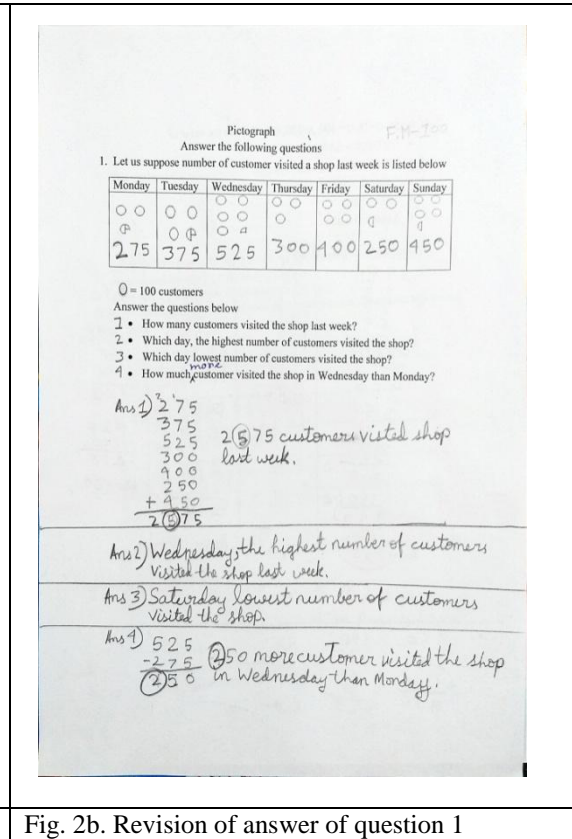| Fig. 2a. Answer of question 1	Fig. 2b. Revision of answer of question 1

Question 1 has four parts and to avoid complexity she marked those parts as 1, 2, 3 and 4. It is observed that she converted picture to number properly. Fractional part of the picture is understood. But in case of long addition she made a mistake. At the time of subtraction she made another mistake. Time taken to answer this question is 12 minutes approximately (3 min to understand the question, 2 min to calculate the number of visitor for seven days, 3 min to answer first part of the question, 1 min each for second and third part, 2 min for fourth part).After completion of answer of all questions author asked her to revise those answers. She took 4m 34 s to revise the answers of question1 (1st part 3 min, 2nd part 30

s, 3rd part 20 s and 4th part 44 s). After discussing, author came to know that she is absent-minded. At the time of revision she corrected the mistakes made by her. So, lack of expertise in numerical computation is found.

Question 2:

If ☆=50, O=75, □ = 100, Δ=150, then find out the value of

- □ΔOO☆☆- ΔΔ☆
- OOO☆- Δ□
- □ΔO☆☆- ☆Δ
- □OOO☆-Δ□
- ΔΔΔO☆☆- Δ☆

Fig. 3a. Answer of question 2	Fig. 3b. Revision of answer of question 2

Solution of problem 2 is shown in Figure 3a and its revision in Figure 3b by Sattwika. Like question number 1, she separated different parts of the question by giving labels. She transformed pictures into numbers rightly but there was a mistake in the long addition. Time taken to solve this problem was 12 minutes. There was a mistake in the first part, but she unable to detect it in 36 seconds and said there is no mistake. After giving help, it is found that she correct it in 2 minutes. She revised the second part in 50 seconds, third part in 34 seconds, fourth part in 1 minute 2 seconds and fifth part in 53 seconds correctly.

Fig. 4. Answer of question 3	Fig. 5. Answer of question 4

Question 3.The total number of students in different years is shown below:

Year	number of students
2016	350
2017	500
2018	450
2019	550
2020	600

Prepare a pictograph of these students using a Symbol Φ to represent 50 students and answer the following questions:
a. In which year number of the students was least?
b. In which year number of student decreased in number compared to previous year?

Meaning of the question (especially 3b) is not understood in first attempt and second attempt. In third attempt with the help for analyzing the question literally, she answeredof this question properly and confidently. Time taken to answer this question is 15 minutes.She revised this answer in 2 minutes 44 seconds rightly.

Question 4.
The number of sea animals in a sea animal aquarium are as shown:
• There are 40 star fishes.
• The number of sea horse is double the number of star fish.
• The number of turtles is 20 less than the number of star fish.

Which pictograph correctly represents the number of see animals in the aquarium?
Δ= 10 sea animals

In this question author initially provided three alternatives for selection. Those options were not correct but Sattwika identified the fact and asked author to provide a right option which was listed by author, and she correctly answered. Only 2 minutes was taken by her to answer this question. She took just 45 seconds to revise this answer.

Question 5.
It is given that in a village there are
☆☆☆ Dogs, ☆☆☆☆O Rats and
☆☆O Cats.
Given that ☆ =15, O =200.
Number of Rats present in that village are
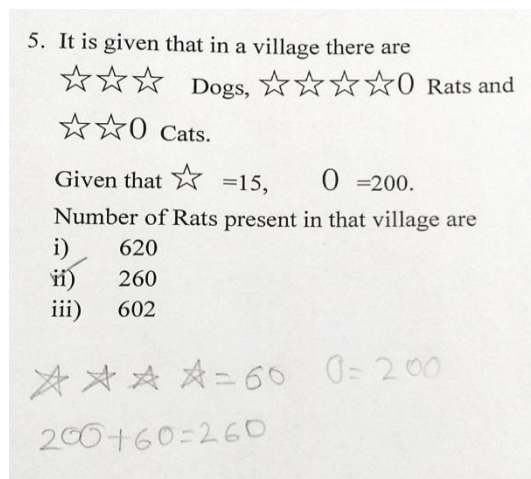i) 620
ii) 260
iii) 602

Fig. 6. . Answer of question 5

Answer of question 5 is presented in Fig. 6. Without any mistake she solved this problem within 50 seconds and revised in 30 seconds.

IV. CONCLUSION
From above mentioned discussions following points may be considered as conclusion.
1. Sattwika has a weakness in long additions.

2. Conversion from picture to number and its reverse is good.
3. Weakness in language to understand the word problem is found.
4. Expertise in selecting options (MCQ type) is found.
5. Fractional part of picture and its transformation into number is well understood.
6. No misconception about pictograph is detected.

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