USING MOMENTUM VECTOR DIAGRAM TO TEACH COLLISION

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This study aimed to enhance students' understanding of collisions. A teaching method called 'Momentum Vector Diagram (MVD)' was designed to help students realize the concept of the vector quantity of momentum as well as help them understand and solve the collision problem correctly. The experiment was conducted with a group of grade-10 students and the effectiveness of the MVD methods was compared with a traditional teaching.

The MVD method asks students to follow four activity steps (see an example in figure 1):

- Step 1: Translate a problem statement into a motion diagram.
- Step 2: Draw a momentum vector diagram of each ob- ject before collision and add them vectorially to find the total momentum before collision.
- Step 3: Draw a momentum vector diagram of each object after collision using the principle of conservation of momentum.
- Step 4: Find unknown.

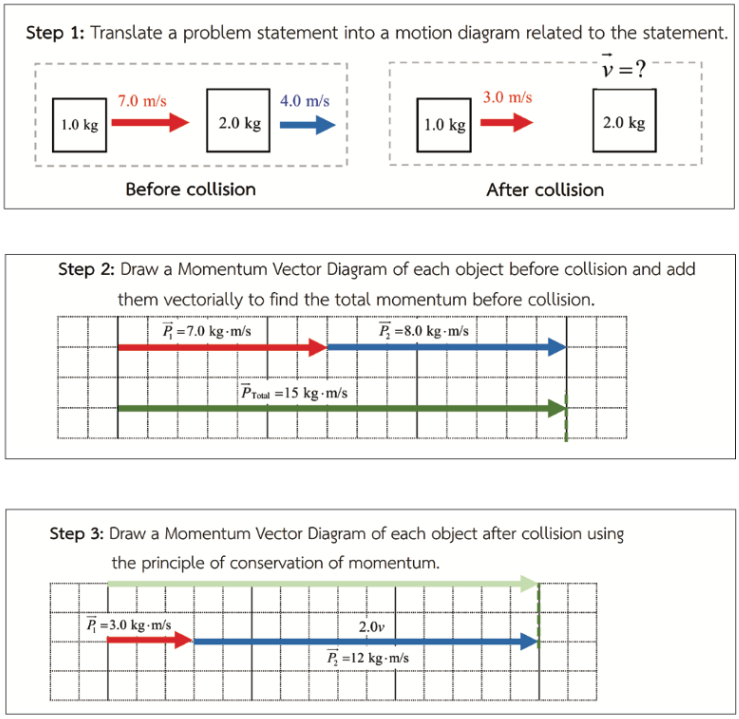

Figure 1: Example of using MVDs in solving a problem

The results indicated that the students who studied with the MVD method had a higher average score than the students who studied with the traditional teaching method (2.4 ± 0.6 vs 1.6 ± 0.5). Additionally, the class averaged normalized gains <g> were in a medium regime for the traditional method (<g> = 0.35) and in a high regime for the MVD method (<g> = 0.76). Therefore, the MVD seems to be an effective teaching tool in enhancing high-school students' problem-solving skill in the topic of collision.