Science typically provides students with a variety of opportunities to explore and examine real materials or models closely even if they are visually impaired. Science naturally provides visually impaired students with the opportunities to develop their tactile exploration and fine motor skills through the exploration and manipulation of real materials. But traditionally science teaching mostly depend on visual instruction. Thus makes science learning difficult for visually impaired students. On the other hand, blind students have no visual input at all. So, some arrangements and accommodation should be done at teaching due to visual impairment.

**Method**

Design based research (DBR) method was used in this study. DBR approach has been suggested as a solution for the connections between educational research and praxis. The research was carried out in three steps:

**First Step**

Visually impaired students' individual needs have been identified in terms of scientific process skills and conceptual understanding regarding "The particulate nature of matter" unit. At this step, the embedded single-case design was used.

**Second Step**

Instructional materials and activities were designed.

**Last Step**

Instructional materials and activities were designed. In the last step, the instructional materials that are designed for teaching particulate nature of matter to visually impaired students were evaluated in terms of practicality, applicability and shortcomings. At this stage, the embedded single-case design was used.

**The Participants**

Participant of this activity was eight students.

<table>
<thead>
<tr>
<th>Student No</th>
<th>Vision Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Low Vision</td>
</tr>
<tr>
<td>02</td>
<td>Blind</td>
</tr>
<tr>
<td>03</td>
<td>Low Vision</td>
</tr>
<tr>
<td>04</td>
<td>Blind</td>
</tr>
<tr>
<td>05</td>
<td>Blind</td>
</tr>
<tr>
<td>06</td>
<td>Low Vision</td>
</tr>
<tr>
<td>07</td>
<td>Low Vision</td>
</tr>
<tr>
<td>08</td>
<td>Low Vision</td>
</tr>
</tbody>
</table>

**Data Collection Tools**

Academic achievement test and semi-structured interview form were used as a data collection tools to determine the effectiveness of instructional design. Achievement Test: Test was developed in order to measure students’ achievement before and after teaching. Semi-structured interview form: Form is used for the purposes of determining the conceptual learning levels of the students.

**Findings**

In this section, the findings obtained as a result of the analysis of study data are presented in titles first stage, second stage and last stage.

**First Step**

According a result of interviews and observation analyses, it was identified that no activities towards student’s use of any tools or materials during the lessons. This case creates an obstacle to structuring of knowledge especially for visually impairment students. It was decided that using tools and materials at the particulate nature of matter to visually impaired students by using case design was used.

**Second Step**

Activity and material were designed based on the information obtained from the students. Activity: Activity is designed appropriately to 5E. 5E learning activity was developed by the researchers based on the “Particulate Nature of Matter” unit’s objectives.

Material: The activity of “Particulate Nature of Matter” was planned for the purpose of bringing “to comprehend that particulate, blanked and moving nature of matters.” learning outcomes to visually impaired students.

The particulate nature of matter was taught to visually impaired students in the “Particulate Nature of Matter” unit. At this step, the embedded single-case design was used.

**Conclusion**

Students’ success was observed as 78% when interviews and tests were analysed compared with the analysis that have done before starting implementation of instructional design. Nearly all of the students said they were quite satisfied with model and will be satisfied if all courses would be taught with this model. Therefore material has been found useful by researchers.

**References**


