


AMN TÜRK
ÜNİVERSİTESİ

Principles of Development of a Chemistry Unit to Visually Impaired Students




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This work was funded by the Scientific and Technological Research Council of Turkey by the Grant # 114K725. The authors would like to thank the teachers and students who voluntarily participated in this study.


Science education has been identified by some special educators as a one of the most useful and most valuable content area for many students with special needs. It is obvious that visually impaired students perform as effectively as other students in science if their needs due to lack of vision are taken into consideration.





Visually impaired students can't use sight or use very little. They also have problems in the learning process with the inability to see. For this reason, different learning styles are needed in the learning of visually impaired students.





How to learn?

 Seeing: Usually low vision students use their sense of sight .



Hearing: Blind and low vision students learn this way. 

 Touching: Blind and low vision students learn this way. But Blind students often use touch.

Smelling: Visually impaired students recognize their surroundings with smell. 

Visually impaired students learn by touching objects, listening to the sounds of objects, smelling and looking at their tastes.

Therefore, in the education of the visually impaired, Relief-tactile alphabets (Braille Alphabet) or auditory materials (such as audio books) are needed.

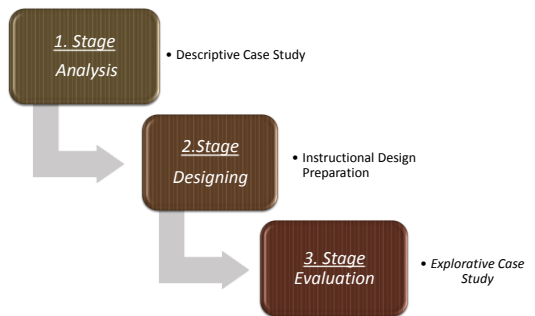
What's the challenges of visual impairment in the classroom?

- Slow reading skills
- Difficulty to meet the learning demands of education classroom
- Fewer opportunities to acquire visual information
- Learning difficulties
- Lack of teaching supporting material
- Delays which impact on the student's academic development in concept learning

Purpose of The Study

In this study, we developed an instructional design to teach the concepts regarding matter and heat in light of the students' individual needs and investigated the efficacy of instructional design model developed following the implementation.

Research Design



The study was conducted as a Design Based Research (DBR) method. DBR is used as a response to the gap between basic and applied research practices.

Participants

Student No	Vision Level
Ö1	Low Vision
Ö2	Blind
Ö3	Low Vision
Ö4	Blind
Ö5	Blind
Ö6	Low Vision
Ö7	Low Vision
Ö8	Low Vision

This is a case study representing a 8th grade classrom taking science in special school for blind based in Erzurum/Turkey. Participant of this activity was eight students including three blind students.

Data Collection Tools

Observation Form

Achievement Test

Student Interview Form

Developing Materials



Example of Instructional Process



Teacher: What were the initial temperature of waters?
 O3, O4, O7: Temperature of both glass jars were 78 °C.
 Teacher: Ok. What is the last temperature?
 O1, O4: It is 59 °C.
 O3, O7: It is 54 °C.
 O4: hmm, last temperature is 54 °C in small glass jar. Temperature is 59 °C in small glass jar placed inside another bigger jar.
 Teacher: Ok. Temperature dropped to 59 °C from 78 °C. Can you compare temperature change of the small jar with temperature change of small glass jar placed inside another bigger jar?
 O4: So, temperature change of small glass jar placed inside another bigger jar is less. Because there is gap between jar.
 O7: The small jar contact with air. There are gap in the other jar. The gap blocked cooling of water.
 Teacher: O5 tell me: What were the initial temperature of waters?
 O5: um, 78 °C.
 Teacher: O8 and O6 tell us: What were the initial temperature of waters?
 O8: it was 78 °C.
 O6: Single jar was 78 °C. Other jar was 78 °C.
 Teacher: What is the last temperature?
 O5, O6, O8: Small jar is 55.9 °C. Other jar is 60 °C.
 Teacher: Can you tell me which jar is cold?
 O6: small jar is cold.
 Teacher: why?
 O6: Big jar and gap are provided thermal insulation.
 Teacher: O8 tell us: What is result to be drawn from activity?
 O8: Temperature decrease was less in the glass jar that was placed into big plastic jar. Because plastic jar behaved as an insulator. It reduced the amount of heat transferred through the environment. The air between the jar become an insulator.

Findings

The Success of Pre-Test/ Post-Test

Achievements	Ö1		Ö2		Ö3		Ö4		Ö5		Ö6		Ö7		Ö8		Success Regarding Achievements	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test		
6.6.1.1	20	40	0	60	40	100	20	60	80	80	0	80	40	100	0	40	25	70
6.6.1.2	66.6	100	66.6	66.6	0	66.6	0	33.3	100	0	100	66.6	66.6	0	33.3	29	66.6	
6.6.1.3	33.3	33.3	33.3	66.6	66.6	0	66.6	66.6	66.6	0	100	66.6	66.6	0	66.6	33.3	66.6	
6.6.1.4	No Questions																	
6.6.2.1	100	50	100	100	100	50	100	100	0	0	0	50	50	0	18.9	31.3	81.2	
6.6.2.2	100	50	100	100	100	100	50	100	100	50	50	0	0	50	50	25	50	
6.6.2.3	0	50	0	100	0	50	0	50	100	0	100	50	50	0	50	18.8	68.8	
Success	17.1	36.2	28.6	60.9	15.2	64.3	10	44.3	47.1	75.7	0	70.9	39	57.1	14.3	43.8	21.4	56.7

The Success of Observation

Achievements	Ö1	Ö2	Ö3	Ö4	Ö5	Ö6	Ö7	Ö8	Success Regarding Achievements
6.6.1.1.	83.3	100	100	100	100	100	100	66.6	93.7
6.6.1.2.	100	75	100	100	100	100	100	75	93.7
6.6.1.3.	100	100	100	100	100	100	50	50	93.7
6.6.1.4.	No Questions								
6.6.2.1.	100	50	100	100	50	100	100	50	81.2
6.6.2.2.	100	50	100	100	100	100	100	100	93.7
6.6.2.3.	100	50	100	100	50	100	100	50	81.2
Success	94	78	100	100	89	100	94	72	89.5

Results and Discussion

- This study aimed to develop an activity, as part of a large project, which is accessible to visually impaired students in teaching unit of matter and heat which is found difficult to comprehend even by the sighted students. For this purpose we have designed an activity based on using tactile and aural material (talking thermometer) for making science more accessible to 6th grade students in a special school for visually impaired.
- The activity is basically consists of simple, economical and easily accessible everyday materials.
- Then students were questioned through inquiry based questions during the following 5-10 minutes. In the follow up interviews two hours after the activity took place nearly all of the students were able to answer questions about thermal insulation concept.

- The result of learnings happening in the environments where the students are made to participate actively in the lessons being more effective.
- With this study, the result of lack of vision senses of low vision and blind students not causing any obstacle to instruction of these students, necessary knowledge may be brought to students by using appropriate methods and techniques and adaptations suitable to vision disability levels was reached.

- Visually impaired students differ according to type and level of vision disability. In general and special education environments of visually impaired students, the diversity of the students should absolutely be considered. In learning environments where general education needs as well as special needs are considered, students may actualize a more effective and efficient learning.
- The tools and materials to be used should be available in easily accessible places, if necessary, each tool should be labeled with big sized typefaces for those with low vision, and Braille for those who are blind. Students should be informed for an activity to be performed, audio descriptions should be available on the condition of focusing on blind students.

Thanks for listening...



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