



## Learning Concepts of Sounds through Asking Questions in First Grade

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### ABSTRACT

*This study examines the processes of first-grade students' science learning about sounds through asking questions. The unit was implemented in a public school in northern city of Taiwan. The paper provides descriptive data on children's science learning from their investigations. The data are collected in interviews, the worksheets, the transcripts of taping during the classes. Through dividing questions into several senses: seeing, hearing, touching, and feeling parts, the researcher combined the answers of children's five senses and acquired their viewpoints. Asking five senses separate questions assists young children's interactions and capacities with interpretations and relations. When children are encouraged to response, revise and dialogue through five senses separate questioning they are able to express and explore increasingly complex ideas.*

**KEYWORDS:** sound concept, first-grade, asking questions, concept learning

### INTRODUCTION

One of Novak's assertions is that human beings are meaning makers (Mintzes & Wandersee, 2005). The assertion indicates learner-centered spirit of human constructivism. In other words, the agreement implies the transformation of learner-centered spirit. How can we guide young children to achieve meaningful learning through transformation of the learner-centered agreement? First, we must consider how they think and answer, especially for their intuitive conceptions. Second, the teaching sequences are arranged in learner's psychodidactic features, not sequent the materials logically (Nussbaum, 2005).

Few studies have been done on exploring children's intuitive learning characteristics in the early years of schooling, since children of this age are usually considered to be unable to construct abstract scientific concept, and consequently the science taught tends to be hands-on activities. We nevertheless believe that it is possible for young children to carry out a meaningful scientific activity, which utilizing intuitive learning characteristics.

The aim of this article is to declare a learning experience with first-grade students by way of asking separate five-sense questions about learning sounds. Through the method of asking questions, the researcher finally integrate children's responses to get a deep understanding about their concept learning.

#### Framework

##### *Children's intuitive learning characteristics*

Recent related studies about brain science identify the fact children's thinking style is different from the adult (Sternberg, 1999). They usually utilize the right-hemisphere brain to operate, so children's thinking style is more sensitive and they explain things by using processes. On the opposite side, the adult's expression belongs to deductive style and focuses on details. In a brief, the children's picture in their brain is macro and holistic, they are constrained to limited expression and unable to response the question holistically.

Novak (1984) mentioned that children answer "I do not know" is not actually what they talk. It maybe represents unprepared, or that they do not know how to answer it. Therefore, we cannot ignore the crucial question, and carefully think the real meaning in children's opinions.

##### *Children's expression characteristics-explaining the processes*

Young children usually answer the question by talking many settings or how they act, and so on. They do not know how to express their ideas in mind and extract the main points in adult's thinking style, so they talk what they saw, heard, and felt using everyday languages.

For further exploring and understanding their ideas, we could ask questions as follows: what did you see in the

activity? What did you hear or feel? The researcher constructed children's pictures in their minds by combined their answers of five-sense questions. Therefore, we got a clear understanding about their learning processes.

## MATERIALS & METHOD

### *Participants*

Thirty students come from a public school, which is located in the northern area of Taiwan, but only six students are interviewed.

### *Interviews*

To explore what children learn in sound conceptions, the researchers design the questionnaire as a research tool. The process of developing the questionnaire includes drawing a concept map, the enactment of propositions, the related contexts and open-ended questions. The domains of sound conceptions in elementary school incorporate: kinds of sounds, the observation of vibration in sight, hearing, and touching, and the awareness between sounds and vibration. Through examining the hierarchies and propositions of concepts by three subject specialists, the validity of concept map is acquired.

According to the statements of valid propositions, we design open-ended questions. The question can be differentiated from five-sense feeling such as sight, hearing, or touching. Finally, the statements of open-ended questions are examined by three subject specialists, so we complete the enactment of a questionnaire.

## RESULTS AND DISCUSSION

### *Students understanding of sound travel*

(a) Sound can be traveled through speaking, do not need medium

Many students think that sound travel by speaking, shouting, so they can hear sound through no medium. The reason is that we can hear each other by talking. They do not see the air move and naturally think so.

(b) They accept that sound can be traveled through a string, but the wooden table can not travel the sound.

The string is similar to the wire of the telephone. The wooden table is not a shape of the line. Children easily relate the string to a wire of the telephone rather than the wooden table.

### *Students do not relate the relationship of sound and vibration*

They do not know that sound arouse is related to the vibration. They observe the phenomenon of a triangle vibration, but they do not infer their relationship through a series of activities. This is a cause effect question. They need to learn more knowledge, then resolve the problem.

Sound concept is abstract and invisible to observe the movements. Young children usually make a decision through their sight operation more than hearing, touching in scientific activities. The hearing and touching can add children impression. Hence, future studies can deeply explore the use of representations to assist children's concept learning in sounds.

## REFERENCES

- [1] Mintzes, J. J. & Wandersee, J. H. (2005), Research in Science Teaching and Learning: A Human Constructivist View. In J. J. Mintzes, J. H. Wandersee, & J. D. Novak(eds.), *Teaching Science for Understanding: A human constructivist view*. Burlington, MA: Academic Press.
- [2] Novak, J. D. & Gowin, D. B. (1984), *Learning how to learn*. Cambridge, London: Cambridge University Press.
- [3] Nussbaum, J. (2005), History and Philosophy of Science and the Preparation for Constructivist Teaching: The Case of Particle Theory. In J. J. Mintzes, J. H. Wandersee, & J. D. Novak(eds.), *Teaching Science for Understanding: A human constructivist view*. Burlington, MA: Academic Press.
- [4] Sternberg, R. J. (1999), *Handbook of Creativity*. Cambridge, London: Cambridge University Press.