THE ACTUAL STATE OF PHYSICS TEACHERS' COGNITION ON THE CONCEPT OF RADIATION IN KOREA

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Introduction

- Because there is a possibility that traditional concepts obtained and maintained by students through daily life and school education give absolute influences on learning a new concept to reinforce the traditional concept or induce a wrong concept as a new concept, the necessity for investigating preconception possessed by the students prior to concept learning is being emphasized.

- Traditional studies have indicated inaccuracy of concept description, diagram, and graphs used in school education as sources of the wrong concept .

- When a science concept possessed by science teachers is not scientific, the results of instruction conducted by these teachers will not only distort further or reinforce the student's preconception, but also provide sources inducing another misconception for a new concept.

- In the 7th national curriculum, as the Physics II is an advanced elective curriculum to be learned after completing the Physics I, even a physics teacher often has insufficient teaching experience on the concept of radiation in current situation that a lot of students avoid the Physics II.

- Especially, as it is treated in the last chapter in the 12th Grade, its lesson often is not performed properly because of preparation for the College Scholastic Ability Test and the class preparation of teachers is often careless.

- Therefore, this study aims to identify the concepts to be noted when teachers teach and provide reference materials to be considered in teaching and writing textbooks.

Research Methods

- This study intends to provide materials for effective teaching of conception through survey conceptions possessed by the teacher, considering that the conception of teacher gives an absolute effect on forming of the students' scientific conception.

- Accordingly, preconceptions of teachers were surveyed through a questionnaire.

- Points considered in preparing a questionnaire is to check up if a responder knows the concept accurately by making him/her explain his/her own opinion on the reason as well as to select an answer in an objective test.

- The quantitative analysis was focused on the objective multiple-choice test, and the validity, meaning, or interpretation of the analysis results were based on the subjective descriptions prepared directly by the teachers.

Type	Element	No. of question	Form
Basic Concept	Understanding of terms	2	Descriptive type
	Radiation units	1	Multiple choice type
	Kinds of radiation	2	Multiple choice type Descriptive type
	Generation of radiation	1	Multiple choice type
High Concept	Properties of radiation	1	Descriptive type
	Radioactive decay	2	Multiple choice type Descriptive type
	Radiation damage	1	Descriptive type
	Applications of radiation	1	Descriptive type

Results and Discussion

- This study intends to provide materials for effective teaching of conception through survey conceptions possessed by the teacher, considering that the conception of teacher gives an absolute effect on forming of the students' scientific conception.

- Accordingly, the responders were made explain their own opinion for questions in the questionnaire. Teachers responded the questionnaire were 126 science teachers who participated in the teacher training.

- Among them, teachers with less than 5 years of career were 54.5% and teachers with over 5 years of career, so it was found that most teachers had less than 5 years of career.

- However, it was found that the teachers possessing an experience to teach radiation concept was only 76.2% of total responders, this indicated indirectly that there would be a lot of difficulties in teaching the radiation concept in future.

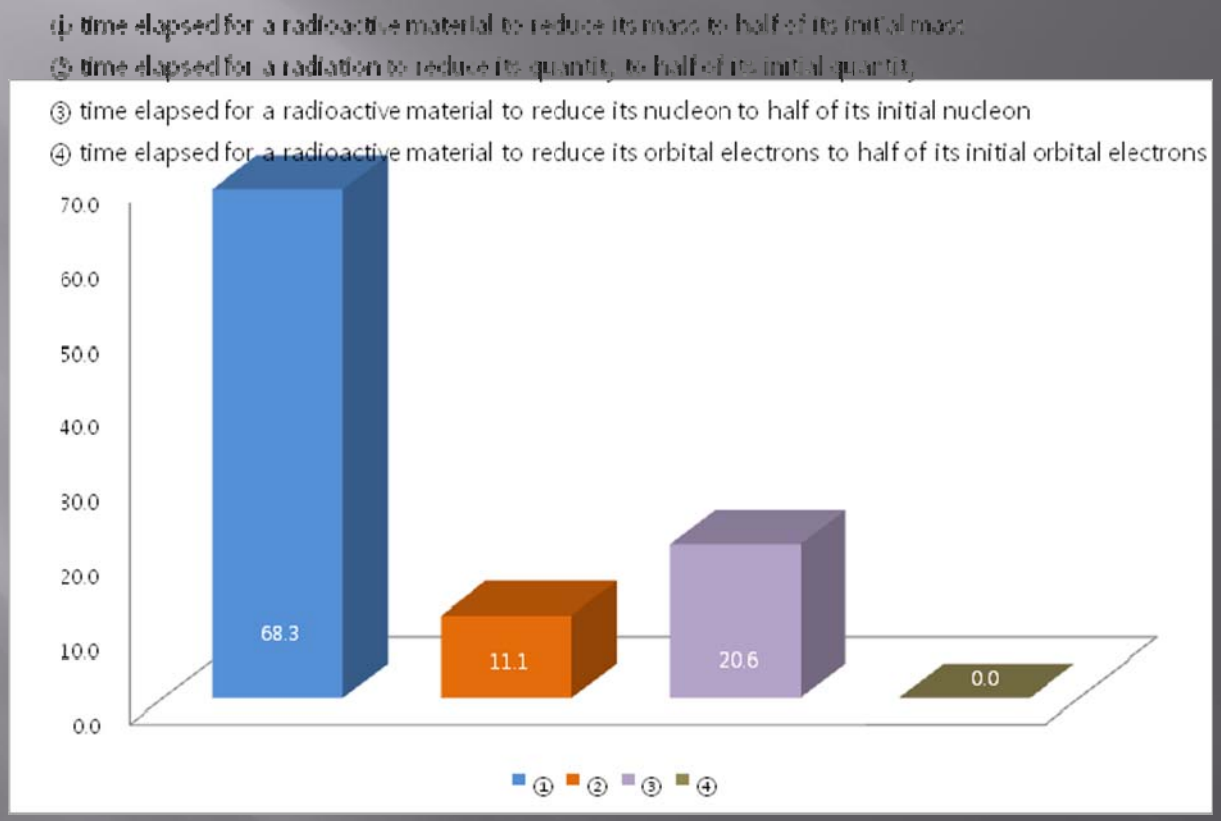

Fig. 1. Response result for understanding of terms 'half-life'

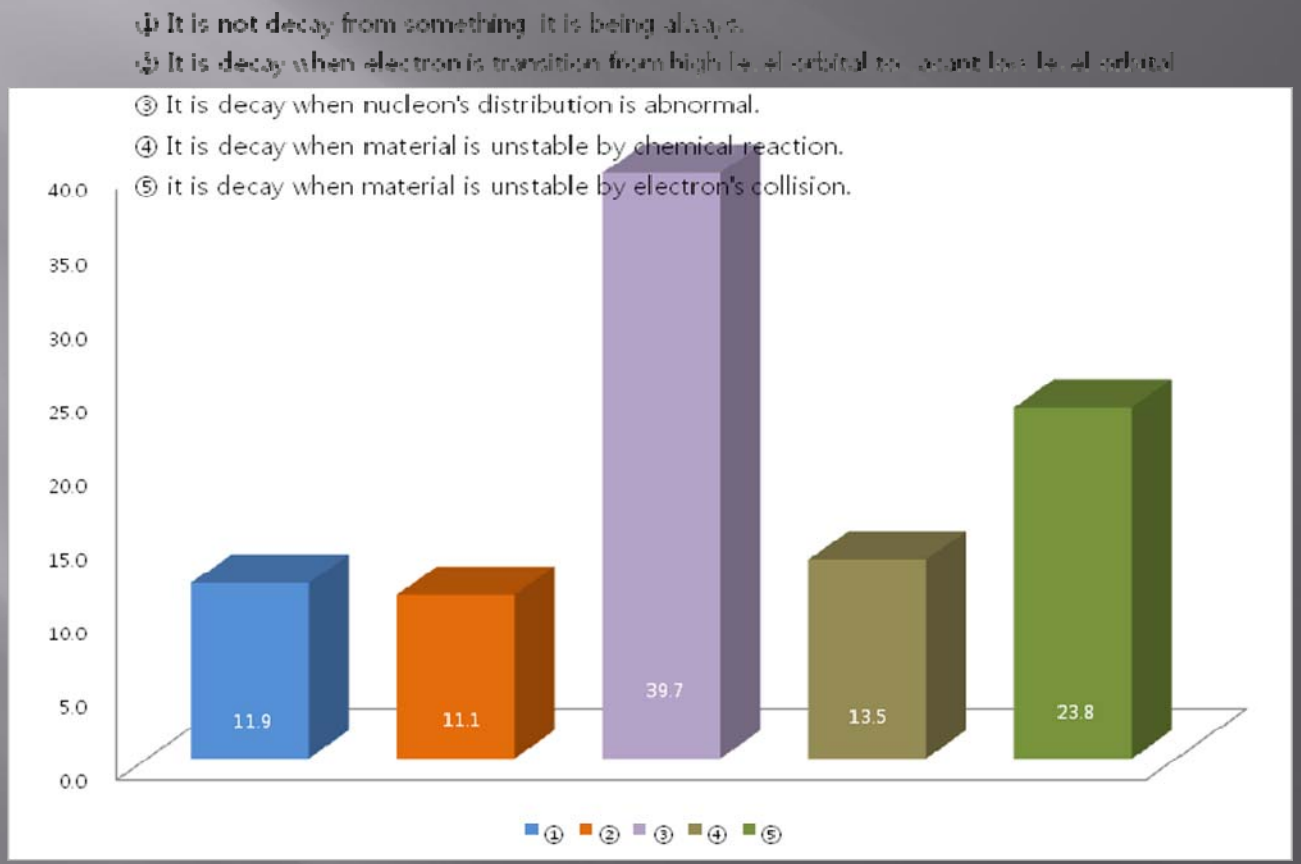

Fig. 2. Response result for 'decay of radiation'

Assessment of physics teacher's awareness state

- In the results of assessment on the actual awareness state on radiation of teachers, it was found that 'very good' was 1, 'good' was 3, normal is 1, and 'insufficient' was 6

Type	Concept	Level
Basic concept	Radiation, Radioactivity	insufficiency
	Half-life	good
	Radiation units	insufficiency
	Kinds of radiation	good
	Natural radiation	good
	Generation of radiation	insufficiency
High concept	Properties of radiation	usual
	Radioactive decay	insufficiency
	After radioactive decay	very good
	Radiation damage	insufficiency

Conclusion and Suggestion

- The results of actual awareness state on the concept of radiation of teachers that 'insufficient' was resulted in 6 seems to have a lot of problems when it is considered that they are teachers specialized in the physics, while it is taken account that they have relative short career and have scarce experience of teaching the concept of radiation.

- Taking the actual state of education into account that the radiation concept is introduced in the last chapter in physics II on 12^{th} grade and great portion of time must be invested to prepare the College Scholastic Ability Test, it may be understood to some degree, but it is classified clearly into the concept to be taught in the 7^{th} national curriculum, so it seems that the teachers must have a correct concept on it.

- Furthermore, the concept of radiation is introduced not only in the 12th grade but also the 'Environment' chapter in Common Science in the 10th grade, so the accurate concept on it should have been obtained.

Reference

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