Compose the topic of integration to foster the competency of integrating natural science knowledge for students of Can Tho University’s Physics Pedagogy with Webquest _method

Thu K. T. Tran

Department of Physics Education, CanTho University, Can Tho, VietNam

*Corresponding author’s e-mail address: ttkhu@ctu.edu.vn

Abstract. Description integrated science competency of physics education students is important work. Lecturers may be evaluating their students based on level of integrated science competency description table exactly. The paper presents result about structure and expression competency model integration science and give examples of integrated teaching to students through the X-rays topic to develop their skills and knowledge.

1. Introduction

Improve the quality of comprehensive education, attach importance to the application of knowledge into practice, develop creativity, self-study, encourage lifelong learning in students [5]. In Vietnam, The new general education program has been implemented since 2019. Whereby, "science" subjects will stars to teach to students (grades 4-5) in elementary, junior high school with "natural sciences" subjects (grades 6-9) and elective subjects in natural sciences: physics, chemistry, biology for high school students (grades 10-12) to direct their career.

The teacher should be equipped and develop skills teach integrated knowledge or coordination, organize interdisciplinary teaching [4]. The best way to learn and perceive natural phenomena of the real world in science should be based on an effective interdisciplinary teaching [8].

The integrated teaching ability of pedagogical students include the knowledge, skills and attitudes [1, 2], the capacity to integrate scientific knowledge is a core competence of integrated teaching capacity in high school. The steady integration of knowledge helps students develop integrated ideas and the concepts of the environment so that they can compile and teach the subject better integrate in high school.

Integrated teaching to develop higher-order thinking, teaching physics for education student should approach competency. "Method of development is progressive. This means, the assessment must be required at the level [6].

Based on the research for the Bloom’capacity model, we have the given table to describe for the integrating science five level during general physics training, this help for the rating is specified and science.
2. Literature Review

2.1. The Three Domains of Learning
The committee identified three domains of educational activities or learning [2]
Cognitive: mental skills (knowledge)
Affective: growth in feelings or emotional areas (attitude or self)
Psychomotor: manual or physical skills (skills).

2.2. Webquest method
Defining a webquest
A WebQuest is an inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the internet [3].

Producing a webquest
An introduction that sets the stage and provides some background information.
A task that is doable and interesting.
A set of information sources needed to complete the task.
A description of the process the learners should go through in accomplishing the task
A conclusion that brings closure to the quest.

3. Findings

3.1. The integrated science competency of physics education student in teaching general physics show in the table 1

| Competence component | Standards |
|----------------------|-----------|
| Knowledge            | General physics knowledge |
|                      | Physical research method |
|                      | Integration science theory |
| Skills               | Integrated skill in the physics subject |
|                      | Integrated skill in the science (physics - chemistry and biology) |
|                      | Study skill groups the general physics of students |
| Attitudes            | Positive, self-reliant in the study of general physics |
|                      | Recognizing the importance of knowledge in general physics, the knowledge of integrating the subject and the integration of theoretical knowledge with other sciences to have integrated teaching ability in high school |

3.2. Each standard description in 5 level, they are from the lowest level of competency in the figure 1.
Figure 1. Capacity is described in five levels.

Thus, the new matrix would look similar to this

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---------|---------|---------|---------|---------|
| General physics knowledge |
| Physical research method |
| Integration science theory |
| Integrated skill in the physics subject |
| Integrated skill in the science (physics - chemistry and biology) |
| Study skill groups the general physics of students |
| Positive, self-reliant in the study of general physics |
| Recognizing the importance of knowledge in general physics, the knowledge of integrating the subject and the integration of theoretical knowledge with other sciences to have integrated teaching ability in high school |
3.3. The X-ray topic teaching with webquest method Website: https://sites.google.com/a/ctu.edu.vn/x-rays-theme/home

Introduction

Each type of atom has its own characteristic electromagnetic spectrum. X-rays is at the top of the high frequency of the atomic spectrum and are characteristic of the atom. In this theme, we study the specific X-rays and some of their important applications. Research into the application of X-rays into medical X-ray imaging, the inhibitory effect they have during cell proliferation. Application of X-rays in airport baggage handling, protein structure analysis, crystals structure studies, atomic shapes, superconducting materials studies. X-rays can irritate the atom then fluorescence (which emits typical electronic wave radiation), making fluorescent X-ray fluorescence a valuable analytical tool in many fields from art to archeology.

The task

Study the applications of X-rays in the following aspects

Group 1: History, energy ranges, properties of X-rays
Group 2: Medical X-rays imaging
Group 3: Protein and crystals structure analysis, atomic shapes, superconducting materials studies
Group 4: Art to archeology
Group 5: Astronomy

Information sources
https://en.wikipedia.org/wiki/X-ray
https://www.fda.gov/radiation-emittingproducts/radiationemittingproductsandprocedures/medicalimaging/medicalx-rays/default.htm
https://www.orau.org/ptp/PTP%20Library/library/Subject/Early%20Publications/A_Text_book_of_radiology__X_rays__.pdf
https://proteinstructures.com/Experimental/Experimental/protein-crystallography.html
https://www.cambridge.org/core/services/aop-cambridge-core/content/view/8D6FAD3025CCA979E533D03BC0522A7/S0885715600008563a.pdf/xrays_in_art_and_archaeology_an_overview.pdf
https://en.wikipedia.org/wiki/X-ray_astronomy
https://www.youtube.com/watch?v=hTz_rGP4y9Y
https://www.youtube.com/watch?v=T1WwHh4b__M&pbjreload=10

The process

Create 4 student/group. Request they to the tasks and reports with powerpoint software.

Conclusion

Understanding X-rays is an interesting topic because it is related to many disciplines, an interdisciplinary topic, student want to do task in this theme, they must use knowledge from other disciplines together. Although hard work, but certainly this will help students in real life.

4. Conclusions and Recommendations

In conclusion, this article presents the structure and expressions of integrated science capabilities for students of physical education in CanTho University. Lecturers who compose these topics can provide opportunities for students to develop skills and improve their knowledge of integration, meeting teacher standards after they graduate. The above description is a useful tool for instructors in evaluate the progress of students.
In addition, through the web-based learning activities, students are also trained in self-study, group work and information technology skills.

Integrated teaching process should be done regularly, which can be accomplished by instructors giving students a short essay test after each topic, aiming to assess their integration competence, if passed this test, instructors tasked with continuing with a new topic, and so on.

References
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[6] Roegiers X 1996 Khoa sư phạm tích hợp, hay làm thế nào để phát triển các năng lực ở nhà trường The pedagogy of integration, or how to develop competences at the school (Hanoi, Vietnam: Nhà Xuất Bản Giáo Dục Vietnam Education Publishing House)
[7] www.ndt.org
[8] You H S 2017 Why teach science with an interdisciplinary approach: history, trends, and conceptual frameworks Journal of Education and Learning 6