IN ORDER TO TEST AND ASSESS RESPONSE TO CHEMICAL TEACHING CLOSE TO THE REAL-LIFE AND DEVELOPMENT CAPACITY OF STUDENTS

Pham Van Hoan[(1*)], Hoang Dinh Xuan[(2)], Pham Van Cong[(3)]

[(1)] Hanoi College of Foreign Languages and Technology;

[(2)]Nguyen Trai High School, Thuong Tin, Hanoi; [(3)]Tay Bac University

Abstracts: *In recent years, teaching Chemistry in connection with reality and developing students' capacity has become a mandatory requirement and this is in line with the trend of world education. However, while the teaching of Chemistry has made positive changes in the direction of being associated with practice and capacity development, the national high school exams in Chemistry in recent years have not been successful. fully responsive. The content of the questions and exercises in the exam questions are still questions to test knowledge and skills. In many questions of the exam, the practicality is not appropriate. This will reduce the motivation and effectiveness of innovating Chemistry teaching towards practice and developing learners' capacity. The article discusses some good and bad issues of the national high school exams in Chemistry in recent years and proposes measures to have a good exam, with the right teaching orientation associated with the practice. practice and develop students' capacity.*

Keywords: *Exams, capacity, problem-solving, teaching chemistry, real life.*

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(*) Email: pvhoannd@gmail.com

1. INTRODUCTION

In the General Education Program – Master Program recently promulgated by the Ministry of Education and Training (Ministry of Education and Training, 2018a), some views on building the high school chemistry curriculum are:

"… 2 . Ensuring practicality: The Chemistry curriculum emphasizes practicality; avoid a computational bias; Focusing on equipping tools with concepts and methods of using tools, especially helping students to have practical experimental skills, skills to apply chemical knowledge in understanding and solving at a high level and certain problems of practice, meeting the requirements of life.

3. Implement career orientation requirements The Chemistry program concretizes career-oriented educational goals. On the basis of identifying the areas of professions and technological processes that require in-depth chemical knowledge, the program selects core educational content and learning topics, helping students to deepen their understanding of this knowledge. Chemical knowledge has many practical applications, preparing for career orientation."

The General Education Program – The Master Program (MOET, 2018a) prescribes general competencies including problem-solving (and creativity); autonomy and self-study, communication, and cooperation capacity. The General Education Program - Chemistry (Ministry of Education and Training, 2018b) stipulates that "Chemistry forms and develops in students' chemical competence - a specific expression of natural science competence" with component capacity: Chemical perception; Learning about the natural world from a chemical perspective; Apply knowledge and skills learned.

From 2000 up to now, through the activities of a number of educational projects with ODA loans (Education Project Management Board), the Ministry of Education and Training has implemented teaching innovation in the direction of developing learners. These projects are: Vietnam-Belgium Project (Vietnam-Belgium Project - Improving the quality of training for primary and secondary school teachers in the northern mountainous provinces of Vietnam (VIE 04 019 11), Lower Secondary Education Development Project (Phase 1, Phase 2), Upper Secondary Education Development Project (Phase 1, Phase 2), Primary Education Development Project (SEQAP), Project Lower secondary education in the most difficult areas, "Project for lower secondary education in the most difficult areas, phase 2; Secondary education development program phase 2. One of the main activities of these educational projects is to innovate teaching in the direction of promoting the initiative and activeness of learners in acquiring knowledge. Teaching methods and techniques in this direction include: project teaching, contract teaching, six hats technique, tablecloth technique, brainstorming technique, questioning technique 5W1H, KWL, teaching Blended learning, flipped classroom, micro-teaching, etc. have really helped change the quality of education in the direction of developing learners' capacity

The evaluation of the results of the educational process in general, and the learning outcomes in particular, have the opposite impact on the educational and teaching process. Therefore, it is necessary to have a consistency between teaching and assessment, one of which is the exam questions.

2. CONTENT

2.1. The role of testing and assessment in teaching

Testing and evaluation have three basic functions

- Management function: The management function is expressed through the classification or selection of learners and the maintenance and development of quality standards;

- Function of controlling and adjusting teaching and learning activities: For teachers and schools, assessment aims to control activities right in the teaching and learning process, then make decisions to adjust and improve teaching mechanism to ensure the development of teaching quality. For students, the test and evaluation information received (expressed in scores and comments) from teachers and their own self-assessment helps learners control and adjust their learning.

- Educational function and learner development: The process of assessing learning outcomes are effectively implemented, which has the effect of developing learning motivation for students. In addition, combined with control and adjustment functions, SA contributes to the comprehensive development of morality, intelligence, body, and beauty to prepare learners for life, which is the development of students' qualities and capacities.

Testing and evaluation is an indispensable activity to determine the effectiveness of the achievement of teaching goals, thereby orienting and motivating teachers to innovate teaching methods, and motivating students to innovate learning methods. to improve the quality of educational achievement. Evaluation is also to detect the good and bad sides, difficulties, and problems and determine the causes to propose solutions to improve teaching and learning quality and educational effectiveness.

Testing and evaluation have the position of being the locomotive that pulls the whole training process up, creating quality innovation in training. Testing and assessment provide information about students' learning outcomes. Many important decisions are based on test scores. Testing and evaluation can have a two-way effect: creating positive changes in the training process; or can bring obstacles to the development of education. Testing and evaluation deviating from the training goals or using exam types that are not suitable for the purposes of testing and evaluation all lead to negative impacts, hindering the process of program improvement and development curriculum, teaching materials, and teaching methods.

In essence, there is no contradiction between assessment of competence and assessment of knowledge and skills. Competency assessment is considered a higher development step than knowledge and skills assessment. To demonstrate that students are competent to some extent, opportunities must be given to students to solve problems in real-world situations. At that time, students have to both apply the knowledge and skills learned at school, and use their own experiences gained from experiences outside of school (family, community, and society) to solve practical problems

The ability to solve problems (and creativity) can be assessed through solving the questions and exercises in the exam. However, some common competencies will be difficult to assess through test and assessment questions (such as self-control and self-study, communication, and cooperation capacity) because they do not show okay when taking the test.

2.2. About the national high school exam in recent years

The National High School Exam is used to assess high school graduation and as a basis for admission to universities and colleges. Due to the national nature and very importance to the

future of learners and the reputation of teachers, the content of the national high school exam will be a guideline for teachers' teaching activities and students' learning activities

Considering the content of the Chemistry section in the National High School Exam in recent years (Ministry of Education and Training, 2016 - 2021), we can see the following advantages and limitations.

2.2.1. Advantages

- The content of the exam questions basically assessed the students' perception of basic knowledge: The last exam questions met the basic requirements, and assessed the minimum knowledge and skills. on Chemistry relevant to the regions. In the structure of the national high school graduation exams in recent years, there are about 15-20 questions at the level of knowledge according to the Bloom cognitive scale (accounting for 35 to 50% of the total score). This is in accordance with the Standards of Knowledge and Skills in Chemistry (Ministry of Education and Training, 2010), suitable for general education.

The exam questions were interested in assessing students' practical and experimental skills: In these tests, there are a number of sentences associated with practice and experiments that are very good (question 80, reference 2021; question 77, topic). Exam 2019 with code 213; question 53, exam question 2018; question 201; question 63, exam question 2017; question 201; question 50, exam 2016 code 136). However, the practicality of some experiments needs to be reviewed (sentence 64, 2018 exam paper, code 201; question 78, 2019 exam question code 213).

- A number of requirements have been evaluated for the competency of the component "Chemical perception";

- Valuing the ability to apply learned knowledge and skills: The questions are only partially solved.

2.2.2. Defect

However, the national high school exams in recent years still have some limitations.

Firstly, the level of calculation complexity and roundabout is still reflected in many questions, not necessarily difficult about Chemistry content. This number of questions accounts for about 15-20% of the total number of questions in the exam

Secondly, some (many) questions in the exam papers lack the practicality of the mentioned content as well as the purpose of the experiments and practical techniques. Example:

- Unrealism about the existence of objects used in the test: Many questions use mixtures that do not exist in reality, and this has been repeated in the exam for many years. For example a mixture of Na, Na_2O, and K_2O (question 75, reference topic 2021); mixture X includes Fe, Mg, and $Fe(NO_3)_3$ (question 77, reference topic 2021); a mixture of Na, K_2O, Ba and BaO (verse 75, reference topic 2019); Mixture X includes Al_2O_3, Ba, K (question 80, 2018 exam question, code 201); mixture X includes $FeCO_3$, $Fe(NO_3)_2$, Al (question 80, 2019 exam question, code 213); Dissolve mg of a mixture of FeO, $Fe(OH)_2$, $FeCO_3$ and Fe_3O_4,... (question 37, 2016 exam question, code 136); completely burn the mixture X including methyl propionate, methyl acetate and 2 open-chain hydrocarbons (Question 43, 2016 exam question

paper, code 136); Heat m grams of mixture X including Fe, $Fe(NO_3)_2$, $Fe(NO_3)_3$, a,nd $FeCO_3$ (Question 44, 2016 exam question, code 136); Completely ignite mixture X consisting of malonic aldehyde, acrylic aldehyde, and an open-chain monofunctional ester (question 33, 2016 exam question paper, code 136); mixed solution of 0.2M NaOH and 0.1M $Ba(OH)_2$ (question 50, 2016 exam question, code 136); a mixture of a mol Fe and 0.45 mol Mg into solution Y includes $Cu(NO_3)_2$ and $AgNO_3$ (with a molar ratio of 2: 1) – question 72, exam question 2021, code 206; a mixture of Cu, CuO, Fe, and Fe_2O_3, recalculated without regard to the composition of the mixture – question 75, exam question 2021, code 206; a mixture of 2 amines and 2 alkenes - question 78, exam question 2021, code 206); conduct the experiment in unreal conditions (aluminum heat in an inert gas environment – question 78, exam question 2018, code 201); use solutions containing mixtures of solutes used when electrolysis is impractical (discussed below).

- Not suitable for the purpose and technique of practice: The determination of the composition of a mixture of substances is usually done with a sample of a substance obtained after a process of production or research or investigation of a substance sample (for example the composition of an unknown ore sample; the composition of the cast iron/steel sample after the iron and steel smelting process; the composition of the industrial wastewater sample, domestic wastewater; the extracted sample from a plant, the animal sample, etc.). In the exam questions, there are some questions that do the opposite: mix substances and then go to determine the composition of the mixture. It is not practical to perform the hydrocarbon cracking reaction (question 70, exam question 2021, code 206). Since the cracking process does not apply to hydrocarbons with small molecular weight (eg butane), the products obtained in addition to the smaller alkanes and alkenes must also contain hydrogen (Nguyen Huu Dinh, 2006).

To determine the composition of samples of mixed organic compounds, chromatography is used to determine the percentages of substances and their formulas. These techniques require only very small amounts of substance but have very high accuracy and very short determination times. In the exam questions, the questions show burning organic matter (in no small amount) and then determining the volume of water, the volume of CO_2, N_2, etc. are difficult and accurate measurements to make. very low, long time no use. The determination of the composition of a mixture of inorganic solids is usually accomplished through the following steps: i) convert the mixture to a solution by suitable methods, and then ii) use appropriate titration methods (volume-acid-base titration, complexation titration, precipitation titration, oxidation- reduction titration) to determine the content of substances (Nguyen Tinh Dung, 1998). In the exam questions are often mixed mixtures that do not exist in practice, determining quantities by complex techniques with very low accuracy (weighing quantities of substances of unknown purity, measuring the volume of emitted gases,...).

The application of electrolysis is for metal plating (electroplating) or for the preparation of rare and precious metals (molten electrolysis to produce aluminum, sodium or solution electrolysis to separate gold, silver, copper or metal plating) or electrolyze a solution of NaCl

(with diaphragm) to prepare chlorine, NaOH or (without a diaphragm) to prepare Javanese/Javen water.

In the exam papers, there are many questions about electrolysis of mixtures that do not exist in reality, and the purpose is not suitable for the application of electrolysis. Example: Electrolysis of a mixed solution of NaCl and 0.05 mol $CuSO_4$ - calculate the electrolysis time (Question 38, 2016 exam question, code 136); Electrolyte 200 ml of a solution consisting of 1.25M $CuSO_4$ and NaCl a mol/l, to determine the value of a (question 65, 2017 exam question, code 201);

Electrolysis of solutions including $Cu(NO_3)_2$ and NaCl (question 75, exam questions 2018, code 201); electrolyze a solution containing m grams of a mixture of $CuSO_4$ and NaCl, calculate the value of m (question 78, exam questions 2019, code 213); electrolysis of molten MCl_2, collecting chlorine gas (question 13, exam questions 2016, code 136);

In practice, the burning of organic substances (hydrocarbons, ethanol) is used as fuel. However, in many questions in some exams, the purpose of burning organic matter (in which mainly organic substances have many applications, not as fuel) is to calculate the amount of water, and the volume of gas CO_2. Example: Burn it all up 4.32 grams of a mixture of sucrose and glucose yields CO_2 and m grams of water. Calculate m (Question 70, exam question 2020, code 217); burning esters, lipids,... (questions 79 and 80, exam questions 2017, code 201);

The simplest way to determine the mass of a specimen is to weigh it; To determine the volume of a gas sample, it is measured with gas cylinders (gasometer). In the exam questions, the questions that use m grams of a mixture of known substances for the circular experiment ultimately require calculating the value of m (Example: questions 63, 73, 75 - reference question) exam 2021; question 71, exam question 2020, code 217; question 78, exam question 2019, code 213) or use V liters of gas after a complicated experiment requires calculating V (Example: question 71, reference question 2021; question 78, exam question 2019, code 213);

Some questions even contain contradictory data. For example, for manufacturing processes, many factors affect the performance of each stage/step and ultimately the performance of the whole process. Therefore, the performance of each production process is often difficult to repeat even with timely monitoring and adjustment. Therefore, it is common to have to determine process efficiency on a product basis, not impose yields and then calculate the product (hydrolysis of mg of sucrose with 90% efficiency,... calculate m - question 24, exam question 2016, code 136; ferment glucose alcohol with 75% efficiency - question 57, exam question 2019, code 213.

The determination of molecular formula of organic matter has now changed due to the development of science and technology: elemental analysis by modern equipment (Nguyen Huu Dinh, 2006), determination of molecular mass by mass spectrometry quantity of MS, no longer using outdated techniques (burning, determining C, H, ..- costly chemicals, time, low accuracy). Therefore, authors should consider this when formulating related questions.

Some questions also need to pay attention to the purpose of the experiment. In experimental practice, it is possible to take a definite quantity of an unknown metal to react with an acid, and on the basis of the volume of hydrogen gas obtained, find the approximate atomic mass of that metal. In practice, don't react a known metal with acid just to calculate the volume of hydrogen gas released, if you don't know what the gas is for; or in the experiment to determine or measure the volume of NO gas is not practical (question 37, exam question 2016, question 136; question 77, exam question 2017, question 201; question 73, exam question 2018; question 201; ...). Likewise, oxidizing a metal mixture to oxide, then reacting with V liters of the acid solution, then requires calculating V (question 23, exam question2016, code 136;…).

Besides a number of questions related to practice, the experiment has the effect of assessing students' practical skills, there are still questions that need to ensure the practicality of the experimental problem: Experiment for Ba (OH)2 solution reacts with a mixed solution of AlCl3 and Al2(SO4)3 - question 64, exam question 2018, code 201; question 73, question 77, exam question2017, code 201; use an impractical mixture to react around and then ask about something else (question 75, exam question 2021, question code 206).

- Some errors in technique, expression, and accuracy: Experimental drawings are not suitable (sentence 16, 2016 exam question, code 136); A few other passing errors also need to be noticed to avoid misunderstandings about the knowledge. For each substance, there is only 1 unique structural formula; conversely, there can be more than 1 substance with 1 structural formula - that is, configuration isomers (geometric and optical isomers). However, in the exam paper, there is a question about the appropriate number of structural formulas of substance X (Question 71, exam question 2017, question code 201; question 70, topic 2018, subject code 201).

Overall assessment: In general, the national high school exam questions in the past 5 years have had many advantages, avoiding knowledge errors as mentioned before (Pham Van Hoan, 2016). The structure of the exam questions is quite suitable, which has the effect of differentiating the student's level. However, the practicality of some issues in the exam should be paid more attention to be consistent with the educational orientation associated with practice and capacity development for students.

2.2.3. Proposals

The development of questions that can assess learners' ability is a new and difficult task, so there needs to be more thorough training on this policy for teachers, including those who compile the exam questions prepared by the Ministry of Education and Training. Education and Training convened.

Teachers (who are the ones who prepare exam and test questions) need to be trained and learn more about production processes, materials used in life, and resources used in production. chemistry. The use of such materials in the test, the test has the indirect effect of providing students with knowledge about the actual production, and use of chemicals in life. Besides, modern chemistry research methods and practical techniques (determination of mixture

composition, determination of molecular formula of substances, separation, purification of substances, ...) also need to be taught update staff to avoid asking inappropriate questions.

In order for teaching to be associated with real-life and developing learners' capacity to be really effective, exams and tests, in addition to assessing the cognitive level (knowledge, skills) need to assess the capacity of students. learners, including problem-solving ability and chemistry competence - a part of natural science competency.

3. CONCLUSION

Reviewing the questions and exercises in the national high school exams in recent years (2016 - 2021) can see the responsiveness in accuracy, and the requirements for assessing knowledge and skills have been quite well improved. However, the requirements of assessing students' ability and especially the reality of the issues raised in these exams still need attention.

If the questions of the tests, the national high school exams in Chemistry can assess the student's chemical ability, in line with the reality of Chemistry in life and production, the Innovating teaching in the direction of promoting the activeness and initiative of learners in receiving knowledge, developing learners' capacity will be developed and maintained. In order for chemistry teaching to be associated with reality and develop learners' capacity to be really effective, those involved in compiling national high school exam questions and chemistry teachers need to be trained and retrained training on practical problems Chemistry in production and life.

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ĐỂ VIỆC KIỂM TRA, ĐÁNH GIÁ ĐÁP ỨNG VIỆC DẠY HỌC HÓA HỌC GẦN VỚI THỰC TIỄN ĐỜI SỐNG VÀ PHÁT TRIỂN NĂNG LỰC HỌC SINH

Tóm tắt: *Trong nhiều năm trở lại đây, việc dạy học Hóa học gắn với thực tế và phát triển năng lực cho học sinh trở thành yêu cầu bắt buộc và điều này phù hợp với xu thế của giáo dục thế giới. Tuy nhiên, trong khi việc dạy học Hóa học đã có những chuyển biến tích cực theo hướng gắn với thực tiễn và phát triển năng lực, thì các đề thi Trung học phổ thông quốc gia phần Hóa học trong nhiều năm trở lại đây lại chưa hoàn toàn đáp ứng được như vậy. Nội dung các câu hỏi, bài tập trong các đề thi vẫn là các câu hỏi kiểm tra kiến thức, kĩ năng. Trong nhiều câu hỏi của các đề thi, tính thực tiễn chưa phù hợp. Điều này sẽ làm giảm động lực và hiệu quả của việc đổi mới dạy học Hóa học theo hướng gắn với thực tiễn và phát triển năng lực người học. Bài viết trao đổi một số vấn đề được và chưa được của các đề thi Trung học phổ thông quốc gia phần Hóa học trong các năm gần đây và đề xuất biện pháp để có một đề thi tốt, đúng định hướng dạy học gắn với thực tiễn và phát triển năng lực cho học sinh.*

Từ khóa: *câu hỏi, năng lực, giải quyết vấn đề, dạy học Hóa học, thực tiễn, thi THPTQG.*