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DESIGN THE CAPACITY STRUCTURE FRAMEWORK TO APPLY KNOWLEDGE INTO PRACTICE FOR STUDENT THROUGH CHEMISTRY TEACHING IN HIGH SCHOOL

LeThi Phuong[1] and Huynh GiaBao [2]
[1]Chemical team –KonTum High School, KonTum Province, Vietnam
[2]Faculty of basic science - TienGiang Medical College, TienGiang province, Vietnam

ABSTRACT
The capacity to apply knowledge into practice is one of the essential competencies that need to be developed for students from elementary school to university. The functional framework that applies knowledge into practice plays an important role in teaching to train and develop this competency for high school students and is meaningful for teachers in building a rating scale. force. This article presents the process of building a competency framework to apply knowledge into practice for students through chemistry exercises in high school.

Key Words: Competency framework, applying knowledge, practice, high school, teaching chemistry.

1. INTRODUCTION
Teaching activities not only focus on developing knowledge for students but also practice essential competencies. One of the competencies that learners must have in life is the capacity to apply knowledge into practice. To strengthen the association of teaching in schools with real life and contribute to the formation of the high school students' capacity to apply knowledge into practice and scientific research,The Ministry of Education and Training has launched and organized the "National Science and Technology" contest for high school students to encourage students to apply knowledge of different subjects to solve practical situations. It enhances the capacity of students to apply synthesis, self-study, self-study, and creativity, and promotes the association of theoretical knowledge and practice in schools with real life. At the same time, promoting teaching under the motto "learning with practice" [1]

Chemistry is an experimental science. Chemical knowledge associated with real life.However, in the reality of teaching in high schools today, most teachers only focus on providing theoretical knowledge for students, practicing skills in exams, tests with theoretical questions theory, multiple choice. The development of the capacity to apply knowledge to real life and solving practical problems has not been given due attention. Most students do not know how to work independently, work in groups scientifically to acquire knowledge.They have not been guided and familiarized with scientific research methods and application of scientific achievements into practice [2].Therefore, in teaching subjects in general schools in general and in chemistry teaching in particular, it is extremely important to apply active teaching methods to

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develop creative thinking for students. Currently, there are no scientific research and design the capacity structure framework to apply knowledge into practice for student in high school
This article has in-depth research on the capacity to apply knowledge into practice and build a framework of the capacity to apply knowledge into practice for students in the teaching process in general and chemistry in particular. In particular, the study of the Competency Framework to apply knowledge into practice for students has many theoretical and practical meanings in the development of criteria and tools for capacity assessment for high school students. It is in line with the goal of capacity development education in the current period.

2. CONTENT

2.1. Competence

2.1.1. Capcapacity concept

According to the psychologists' point of view: Energy is an individual's psychological property consistent with the specific requirements of a certain activity in order to ensure that the activity is highly effective.
Emphasizing on the performance of the capacity, FEWeinert said: “Competence is the capacity to effectively and responsibly execute actions, solve tasks and problems in the professional fields, social or individual in different situations on the basis of applying knowledge, skills, techniques and experience as well as a willingness to act ”[3].
From the above points of view, we believe that: *"Competence is the capacity to appropriately apply a system of knowledge, skills and attitudes to successfully perform a job in a certain context".*

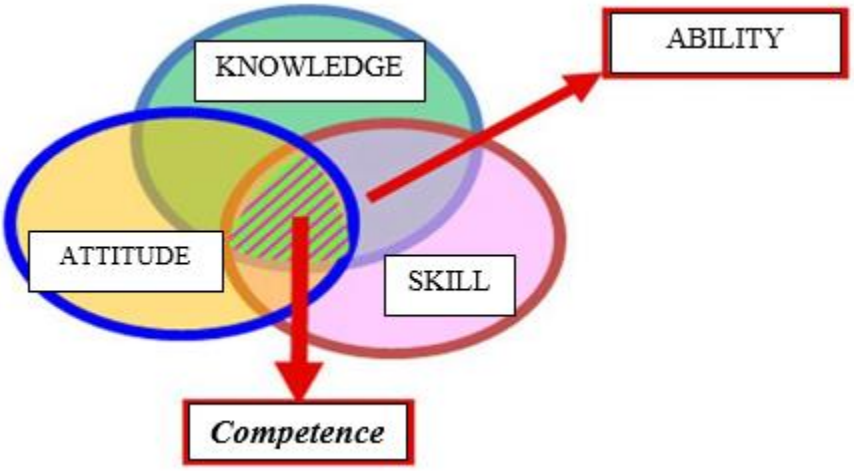

Figure 1.*Components of competency*

2.1.2. The structure of capacity

According to the structural approach, the general structure of Competence is described as a combination of four component competencies: Professional Competence, Methodological Competence, Social Competence and Individual Competency. The general structure of the competency is depicted by the diagram below:

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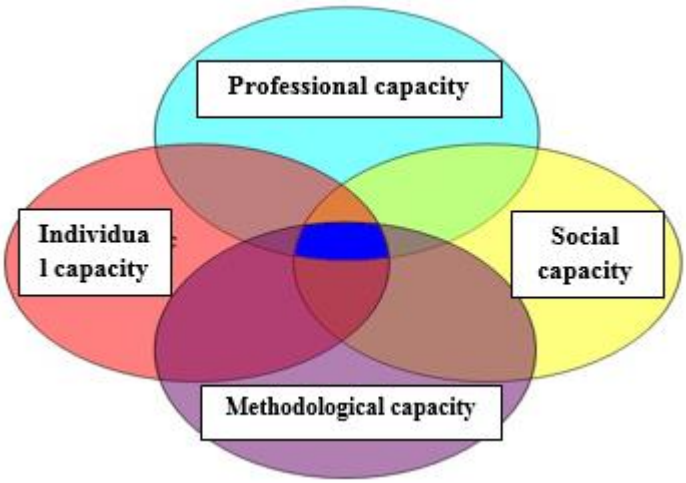

Figure 2. The structural components of the capacity

2.2. The capacity of applying knowledge into practice

According to author Tran TrungNinh (2014) [4] has researched on "Developing capacity to apply knowledge into practice for students through applying constructivist theory in teaching Chemistry".He introduced the concept "The capacity to apply knowledge of students is the capacity of learners themselves to mobilize, use knowledge, skills learned in class or learn through real life experiences to effectively solves problems posed in life's diverse and complex situations and has the capacity to transform it. The capacity to apply knowledge demonstrating the qualities and personality of people in the process of operation to satisfy the need to occupy knowledge ".

The authors Pham Van Hoan, Hoang DinhXuan (2016) [5] said that the learners' capacity to apply knowledge is the capacity to access and perceive the problem in the lesson content related to practice. To develop the capacity to apply knowledge, learners need to know to collect and process information, present problems and provide directions to solve that problem with knowledge and skills. In order to apply knowledge to practical problems, learners need to be able to flexibly adjust the learned knowledge to suit the reality, first of all, it is necessary to formulate the basic knowledge system for students.

On the basis of the research of other authors, we give the definition of the capacity to apply knowledge into practice as follows: The capacity to apply knowledge into practice is a series of activities that are purely performed by individuals. knowledge to mobilize knowledge in solving practical problems

From affirmative studies, the person capable of applying knowledge into practice will meet the following requirements:

1) Having knowledge of the activity (defining the purpose, scientific basis, manner of action and conditions for performing the action).

2) Performing a certain series of logic activities (to be learned and trained).

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3) Solve problems in familiar situations and also new elemental situations (other complex diverse situations of life).
4) Evaluate and draw from experience activities in different situations and conditions.

2.3. Design the capacity structure framework to apply knowledge into practice for student in high school

2.3.1. Principles of building the capacity to apply knowledge

Principle 1. Ensuring the science

This is a general, mandatory rule for capacity building. The structure of the capacity to apply knowledge must be clear, logical, and reasonably correlated between the component competencies and the criteria.**Principle 2.**Ensure objectivity

Building the scale structure must be clear and scientifically correct. Building criteria must fully reflect the constituent capacity in order to develop students' capacity to apply knowledge. The evaluation criteria, the level of competency must adhere to the program objectives in high school.

Principle 3. Ensure comprehensiveness

Each component competency of the competence of applying knowledge includes specific criteria. All the criteria in the competency framework are closely related to form the set of criteria. The previous criterion is the foundation of the following criteria.

2.3.2. The capacity structure framework to apply knowledge into practice

Competency structure that applies knowledge into practice can be defined to include a series of activities, also known as component competencies. The component competencies are arranged according to a defined logic.That is the logic of applying knowledge to effectively solve practical problems posed in diverse and complex situations. The capacity structure to apply knowledge into practice includes 5 component and 10 criteria, which are described by the diagram below:

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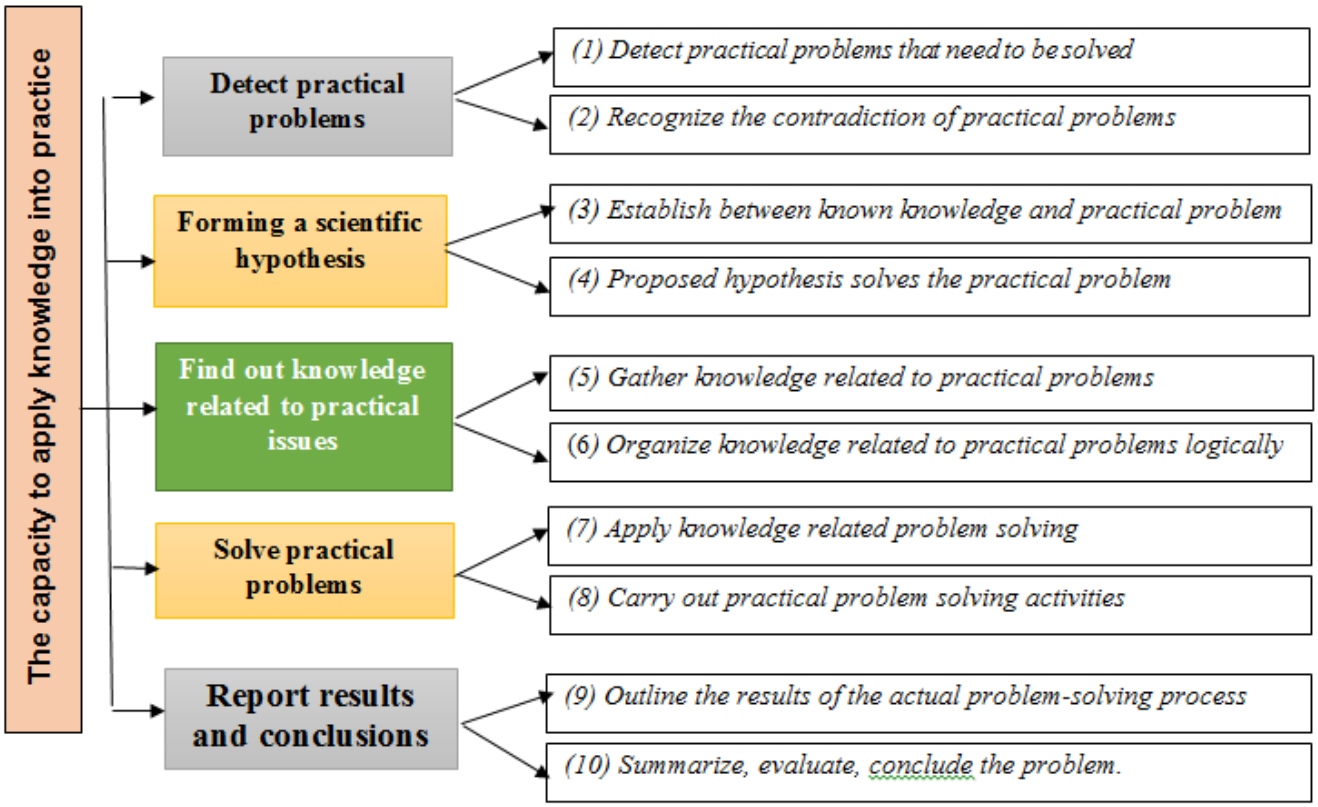

Figure 3. The capacity structure framework to apply knowledge into practice

2.3.3. The level of expression of competency criteria in applying knowledge of students

On the basis of the capacity structure of applying knowledge, we construct a table describing the expression level of 10 criteria across 3 levels. The score of criteria of applying knowledge capacity for high school students is as follows: Level 1: 1 point; Level 2: 2 points; Level 3: 3 points

Inside:

Level 1. The capacity to apply knowledge is at an average level: Students have shown capacity but not often. Need to be further developed

Level 2. Capacity to apply knowledge at a fair level: Students have shown quite often but not actively, needing to promote.

Level 3. The capacity to apply knowledge at a good level: Students show their capacity frequently and positively. Need to be maintained.

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Table 1.The table describes the levels of expression of the criteria

Criteria	***Level***		
	1	**2**	**3**
Detect practical problems that need to be solved	Detecting practical problems that need to be solved more flexibly under the supervision of the teacher.	Discovering a practical problem needs to be actively addressed.	Cite a practical problem that needs solving into one question.
Recognize the contradiction of practical problems	*Contradictions have not been pointed out in practical issues*	*Point out contradictions in practical issues*	*Identify the inconsistency in your problem with questionable questions*
Establish between known knowledge and practical problem	*Analysis clarifies the relationship to some of the problem contents.*	*Analysis clarifies the relationship to many issues.*	*Analyze and clarify the relationship for all problem content.*
Proposed hypothesis solves the practical problem	First step to realize the relationship between practical issues and teaching topic.	Identify the focus of a practical issues and raise research questions.	Proposing scientific hypotheses and practical problems.
Gather knowledge related to practical problems	*Gathered less relevant knowledge content*	*Gathered many related knowledge content*	*Collect fully curated content related knowledge*
Organize knowledge related to practical problems logically	Initially identified some knowledge related to practical issues.	Identify knowledge and skills related to practical issues.	Arrange related knowledge and skills practical issues according to logic and science.
Apply knowledge related problem solving	Initial application of knowledge related to solving practical issues.	Can use proofs, knowledge, skills in solving practical problems but not suitable	Use proofs, knowledge, skills in solving practical issues appropriately
Carry out practical problem solving activities	The first step proposes a method to solve the practical issues.	Develop procedures, conditions to solve practical issues	Implementing a practical issues solving process in a flexible way, appropriate to the

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			context.
Outline the results of the actual problem-solving process	Initially predict a number of results of solving practical issues.	Show some of the results of the practical problem solving process	Show the results of the practical problem resolution process.
Summarize, evaluate, conclude the problem.	Report the results, draw the problem conclusions.	Show solutions to improve, apply and solve related practical issues	Evaluate and criticize the impact and results of solving practical issues
Inside: Level 1: equivalent to the level not yet reached, 1 point. Level 2: equivalent to the level achieved, gaining 2 points. Level 3: equivalent to a good level, gets 3 points.			

2.4. Building capacity assessment toolkit

Based on the competency framework to apply knowledge into practice, we have built a table of criteria and assessments of students' competency.

The observation criteria assessment sheet helps teachers to intentionally observe the criteria of the capacity to use knowledge through students' learning activities, thereby assessing both knowledge, skills and competencies. conveying knowledge according to the purpose of the lesson

The observation checklist design must meet the requirements: must have clear observation criteria suitable to the object and adhere to the criteria of the capacity to carry knowledge. The process of designing an observation checklist includes the following steps:

Step 1: Determine the goal, scope, time and object of observation and assessment
Step 2: Determine the reviewer.
Step 3: Develop observational criteria and attainment level for each criterion.
Step 4: Complete the assessment criteria and level accordingly.
Step 5: Determine how to process evaluation data.

Table 2. Assessment form of capacity to handle knowledge for students

1. School: ....
2. Student's name: ..... …… …….

No.	Criteria	Point		
		(1)	(2)	(3)
1	Detect practical problems that need to be solved			
2	Recognize the contradiction of practical problems			
3	Establish between known knowledge and practical problem			
4	Proposed hypothesis solves the practical problem			
5	Gather knowledge related to practical problems			
6	Organize knowledge related to practical problems logically			
7	Apply knowledge related problem solving			

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8	Carry out practical problem solving activities			
9	Outline the results of the actual problem-solving process			
10	Summarize, evaluate, conclude the problem.			
Total score				
Level 3 is 3 points, level 2 is 2 points, level 1 is 1 point				

Table 3.Synthesize results of capacity assessment in a class

1. School: .... 2 Class:											
N0	***Full name***	***Criteria***									***Total score***
		1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***
1											
2											
……											
Total score teacher observed											

Teacher enter the evaluation criteria form through observation to evaluate the corresponding expression level for each group of students. Teacher calculates the observation score for each manifestation capacity of each student or the average of all students based on the proposed 3-level scale of expression. From there, the vocational capacity of each student or the whole class can be assessed. If the observed teacher score is close to level 1, it should be further developed. If the point of view is close to level 2, it should be promoted. If the point of view is close to level 3, it should be maintained.

2.5. Results of survey of teachers about competency frameworks

To check the suitcapacity of the elemental energies, criteria, and evaluation levels, we surveyed 40chemistry teachers who are directly teaching chemistry at high schools. In the survey questions, the criteria were coded as follows: “Very suitable / Strongly agree” = 3, “suitable / Agree” = 2, “Not suitable / Disagree” = 1, Data on mean value (TB), standard deviation (SD) and test T-test value (P) were processed by SPSS software for calculation.

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Table 4. Appropriateness of component competencies of the capacity to apply practical knowledge

Ingredient capacity	***Use level***			***Average***	***SD***	***P***
	ery suitable	*suitable*	*Not suitable*			
Detect practical problems	32	7	1	2.78	0.46	<0,001
Forming a scientific hypothesis	35	5	0	2.88	0.53	<0,001
Find out knowledge related to practical issues	14	25	1	2.3	0.34	<0,001
Solve practical problems	39	1	0	2.98	0.53	<0,001
Report results and conclusions	35	5	0	2.88	0.53	<0,001

Table 5. Level of agreement manifestations of the capacity to apply knowledge into practice

Level	*Strongly agree*	*agree*	*Disagree*
	13(32.5%)	27 (67.5%)	0 (0%)
Average	2,42		
SD	0.43		
P	< 0,001		

The survey results show that the majority of teachers participating in the survey agreed with the elements of capacity applying knowledge with criteria (manifestations). That shows that the capacity framework to apply knowledge into practice of high school students is appropriate and feasible.

3. CONCLUSION

Through the process of building capacity framework to apply knowledge into practice for students in teaching chemistry in high schools, we received positive feedback from educational experts and high school teachers. The capacity framework for applying knowledge into practice for high school students is built with 5 capacity components with 10 specific criteria used to build out the process of organizing teaching activities. On the basis of the capacity framework to apply knowledge into practice for high school students, we have applied to build a table of criteria and assessment of the capacity to apply knowledge into practice of students. The results of experimental evaluation used in chemistry teaching at high schools have given results reliable and have the effect of promoting students to develop their capacity to apply knowledge into practice.

REFERENCES

[1]. John Dewey (2012), *Experience and education*, Youth Publishing House, Hanoi.
[2]. Vietnam Ministry of Education and Training (2018), *General Education Program* - Master Program

ISSN: 2582-0745
Vol. 4, No. 02; 2021

[3]. Weiner. F. E (2001), *Vergleichende Leistungsmessung in Schulen - eineumstrittene Selbstverstondlichkeit*, In F. E. Weinert (ed), Leistungsmessung in Schulen, Weinheim und Basejl: Beltz Verlag.
[4].Nguyen ThiThanh, Hoang Thi Phuong, Tran TrungNinh (2014), "Developing the capacity to apply knowledge into practice for students through applying constructivist theory to teaching Chemistry", *Journal of Education education*, number 342, p.53-54.59.
[5]Pham Van Hoan, Hoang DinhXuan (2016), "Developing for high school students the capacity to apply knowledge in problem solving through the use of organic chemistry experiments", *Journal of Education,* No. 393 , pp. 46-51.
[6]U.S. Department of Education (2007), *Report of the Academic Competitiveness Council*, Education Publications Center, Washington.