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MANAGEMENT OF TEACHING MATHEMATICS IN ENGLISH IN HIGH SCHOOLS FOLLOWING THE ORIENTATION TOWARDS DEVELOPMENT OF STUDENT'S CAPACITY

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INTRODUCTION

1. Rationale of the study

Global integration in education and training is an inevitable and rapidly growing trend. Vietnam has deeply integrated into the economy worldwide, so Vietnamese education and training are also gradually integrating into the global education system.

Resolution No. 29 NQ/TW dated November 4, 2013 at the 8th Conference of the 11th Central Executive Committee on radical changes in education and training stated: "Actively and positively integrate into the globe to develop education and training, while at the same time education and training shall meet the requirements of international integration to develop the country."

In high schools, Mathematics plays an important role in contributing to the formation and comprehensive development of both the quality and capacity of students.

Incorporating English in Mathematics is a solution bringing many benefits to students which helps to develop their qualities and abilities through learning Mathematics and motivates them to learn English, hence the opening of many opportunities.

With the above reasons, we have selected "***Management of teaching Mathematics in English in high schools following the orientation towards development of student's capacity***" as our research topic.

2. Research objectives

On the basis of theoretical and practical research, writers proposed management measures about teaching Mathematics in English in high schools following the orientation towards development of students' capacity and meeting requirements of the fundamental and comprehensive innovation of high school education.

3. Research objects and subjects

3.1. Research objects

Teaching Mathematics in English in high schools following the orientation towards development of students' capacity.

3.2. Research subjects

Management of teaching Mathematics in English high schools following the orientation towards development of students' capacity.

4. Scientific hypothesis

Management of English learning in high schools following the orientation towards development of students' capacity is a new topic with many difficulties and limitations in teaching activities at schools. If management measures are proposed and implemented synchronously following the orientation towards development of students' capacity, teaching Mathematics in English in high schools will contribute to the formation and development of the qualities and abilities of students identified in the newly established general education program (2018), as well as contribute to the fundamental and comprehensive renovation of high school education and international integration in education and training.

5. Research duties and scope

5.1. Research duties

1) Research the theoretical basis of teaching activities, management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity.

2) Survey the current situation of teaching activities, management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity.

3) Propose measures, survey the necessity and feasibility of measures and testing some measures to manage teaching Mathematics in English in high schools following the orientation towards development of students' capacity.

5.2. Research scope

The thesis only researches teaching activities, management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity.

Survey the current situation of 42 high schools, ensuring the level of typical representatives.

Experiment certain measures in 3 high schools.

The research period starts from the 2016-2017 school year to the end of the 2019-2020 school year.

6. Approach and research methods

6.1. Approach

- Approach to capacity; systematic approach, approach to content and management functions; practical approach; operational approach

6.2. Research methods

- Theoretical research methods; practical research methods; mathematical statistical methods

7. Defense arguments

1) Management of teaching Mathematics in English in high schools following the current content orientation brings limited results. Therefore, management of teaching Mathematics in English in high schools is changed to following the orientation towards development of students' capacity.

2) Proposal of management measures related to teaching Mathematics in English in high schools following the orientation towards development of students' capacity needs to have impacts on all elements of teaching activities and management of teaching activities.

8. New contributions of the thesis

1) Clarify the theoretical issues of teaching activities and management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity.

2) Assess objectively the current situation of teaching activities and management of teaching Mathematics in English learning in high schools following the orientation towards development of students' capacity.

3) Propose scientific and possible measures for the management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity.

9. Structure of the thesis

In addition to the introduction, conclusion and recommendations, references, appendices, the thesis consists of 03 chapters:

Chapter 1: Theoretical basis of management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Chapter 2: The current situation of management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Chapter 3: Management measures for teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Chapter 1.
THEORETICAL BASIS OF MANAGEMENT OF TEACHING MATHEMATICS IN ENGLISH IN HIGH SCHOOLS FOLLOWING THE ORIENTATION TOWARDS DEVELOPMENT OF STUDENT''S CAPACITY

1.1. LITERATURE REVIEW

1.1.1. Research on teaching Mathematics following the orientation towards development of students' capacity

Foreign authors and organizations are J.A. Commenski; J.A. Komensky; V. A. Cruchetsky; Blomh & Jensen (2007), Niss (1999); Rasmussen (2011), PISA (2003). Vietnamese authors are Bui Van Nghi; Dao Tam; Nguyen Huu Chau, Tran Vui; Nguyen Ba Kim; Nguyen Phu Loc; Nguyen Anh Tuan, Duc Thao; Tran Kieu; Do Duc Thai (2018) … These studies clarified teaching Mathematics following the orientation towards development of students' capacity.

1.1.2. Research on teaching Mathematics in English

Julie Dearden; Andy Kirkpatrick of Griffith University, Australia; British Council research; Mohamad Fadhili Bin Yahaya - Language Institute, University of Teknologi MARA, Malaysia and associates: Mohd Asri Bin Mohd Noor, Ahmad Azman Bin Mokhtar, Rafizah Binti Mohd Rawian,, Kamaruzaman Jusoff; Masafuni Nagao, John M. Rogan, Marcelita Coronel Magno,… Authors in Vietnam such as Pham Van Hoa, Ton Nu My Nhat,... Research all suggests that teaching Mathematics and science subjects in English aims to improve foreign language competence of students and teachers, acting as a key for students to access deeper expertise in line with the general trend of education of the world.

1.1.3. Research on management of teaching Mathematics in English following the orientation towards development of students' capacity

Around the world: studies mainly focus on educational policies of countries towards teaching in English, or on the status of this program, application level, effectiveness as well as difficulties and undesirable effects of teaching in English, all of which I pointed out above. In Vietnam, no in-depth studies on the aforementioned are found.

1.1.4. General assessment

- Inherited content: theoretical basis of capacity-oriented teaching; studies on teaching Mathematics in English following the orientation towards development of students' capacity

- Unresolved issues:

+ Intensive issues related to teaching activities, management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

+ No complete and objective assessment of the current situation of teaching activities and management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

+ No proposed measures with scientific basis and feasibility to improve management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

- Issues to be resolve:

+ Research and solve theoretical problems on teaching activities, management of teaching activities, management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

+ Fully and objectively assess the actual situation of teaching activities and management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

+ Research and propose measures to manage teaching Mathematics in English in high schools following the orientation towards development of students' capacity

1.2. BASIC CONCEPTS

1.2.1. Student's capability in teaching Mathamatics in English

1.2.1.1. Capability

Capacity is a combination of suitable skills, knowledge and attitudes for the psychological characteristics of an individual, ensuring successful preformance of activities.

1.2.1.2. Student's capability

Student's capability includes knowledge, skills, and attitudes expressed through students' learning and creative activities.

1.2.1.3. Mathematical capability

Mathematical capability is a specialized capacity including the following components: mathematical thinking and reasoning in English; mathematical modeling; mathematical problem - solving; mathematical communication in English; use of mathematical learning tools and equipments.

1.2.1.4. Student's capabilities in teaching Mathematics in English

On the basis of the capability framework and features of the new general education program in 2018, the author obtains a capability framework and qualities that needs developing for English learning following the orientation towards development of students' capacity:

Six capabilities: *mathematical thinking and reasoning in English; mathematical modeling; mathematical problem - solving; mathematical communication in English; use of mathematical learning tools and equipments; application of IT to Mathematics*

Five qualities: *patriotism, kindness, hard work, honesty, responsibility*

1.2.2. Teaching activities, teaching activities following the orientation towards development of students' capacity

1.2.2.1. Teaching activities

Teaching activities are a continuous series of teaching by teachers, learning by students interweaving and interacting with each other in a certain space and time with an aim of reaching teaching goals through the following elements: teaching environment, teaching content, teaching methods, forms of teaching, testing and assessment.

1.2.2.2. Teaching activities following the orientation towards development of students' capacity

Teaching activities following the orientation towards development of students' capacity is the following process: to build a teaching environment which is composed of the qualities and capacity; design teaching content, select teaching methods, test and assess results according to quality and capacity.

1.2.2.3. Teaching Mathematics in English following the orientation towards development of students' capacity

Teaching Mathematics in English in high schools following the orientation towards development of students' capacity can be considered as the following process: to build a teaching environment which is comprised of the qualities and mathematical competence in the English teaching environment; design teaching content that ensures both Mathematics and English development; select teaching methods so that students can develop their capacity; select suitable forms of teaching to teach Mathematics in English; test and assess results according to quality and capacity.

1.2.3. Management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

1.2.4.1. Management

Management is an organized, purposeful influence of the managing object on the managed object in order to make the most effective use of the potentials and opportunities of the system, through the process of planning, implementing, testing and assessing performance of members of the organization to achieve the proposed goals.

1.2.4.2. Management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity is to plan, organize the implementation, direct, test and assess teaching Mathematics in English according to the following content: building teaching environment, designing teaching content, selecting teaching methods, organizing forms of teaching, testing and assessment following the orientation towards development of students' capacity.

1.3. TEACHING MATHEMATICS IN ENGLISH IN HIGH SCHOOLS FOLLOWING THE ORIENTATION TOWARDS DEVELOPMENT OF STUDENTS' CAPACITY

1.3.1. Objectives of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Objectives of teaching Mathematics in English in high schools following the orientation towards development of students' capacity must be developed at the beginning of the school year, suitable to schools' resources, ensuring interdisciplinary relationship and the common goal of education; especially to help students to form and develop the following capabilities: mathematical thinking and reasoning in English; mathematical modeling; mathematical problem- solving; communication in English; use of mathematical learning tools and equipment; application of IT. Common skills are also found, such as: self-control and self-study; problem-solving and creativity; communication and cooperation along with the main qualities: patriotism, kindness, hard work, honesty, responsibility.

1.3.2. Content of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Content of teaching Mathematics in English in high schools following the orientation towards development of students' capacity is designed based on the standard Mathematics curriculum in English in high school, helping to achieve the teaching environment, suitable conditions and resources of schools. At the same time, it ensures the practicality, modernity, taking into account the interdisciplinary relationship and development of the English competence.

1.3.3. Methods of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Teaching Mathematics in English in high schools following the orientation towards development of students' capacity must: be appropriate to the content; help to achieve the teaching environment; promote the active role of students; personalize teaching activities so that students can express their qualities, abilities and strenghs.

1.3.4. Forms of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Teaching Mathematics in English in high schools following the orientation towards development of students' capacity has the following characteristics: a diverse way of organizing learning activities; promoting the active role of students in using teaching equipment; building factors that stimulate potential competence and creativity of students; exchange of teacher-and-student roles, creating an atmosphere of lively debate and criticism.

1.3.5. Testing and assessment of results of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Testing and assessment of results of teaching Mathematics in English in high schools following the orientation towards development of students' capacity is to consider the level of achievement of the output according to the competence

determined in the teaching environment, which is implemented in a variety of ways throughout the teaching process. At the same time, testing and assessment must attach importance to helping students with learning methods and improving learning results; guiding and adjusting teaching and learning methods in the teaching process.

1.3.6. English competence of teachers and students in teaching Mathematics in English in high schools following the orientation towards development of students' capacity

In order to effectively organize Mathematics classes in English, in addition to mathematical competence, the following English skills are very important: listening and understanding mathematical content in English; speaking about mathematical content in English; reading mathematical texts in English; writing mathematical texts in English.

1.4. MANAGEMENT OF TEACHING MATHEMATICS IN ENGLISH IN HIGH SCHOOLS FOLLOWING THE ORIENTATION TOWARDS DEVELOPMENT OF STUDENTS' CAPACITY

1.4.1. The necessity of management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

- Meet the requirement of managing teaching Mathematics in English following the orientation towards development of students' capacity at schools
- Ensure teaching activities aim at the development of general and specific students’ capacities
- Meet the requirement of standardization of quality assurance conditions in high schools

1.4.2. Content of management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

1.4.2.1. Build plans to teach Mathematics in English in high schools following the orientation towards development of students' capacity

Plan to teaching Mathematics in English following the orientation towards development of students' capacity is the process of scientifically establishing the objectives, content, methods and forms of teaching and assessment; preparing resources to achieve the highest results accordingly.

1.4.2.2. Organize and manage activities of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

- Organize the management staff of teaching Mathematics in English in high schools following the orientation towards development of students' capacity
- Organize activities of teaching Mathematics in English in high schools following the orientation towards development of students' capacity in steps; organize the reform of forms and methods of testing and assessment of students’ learning outcomes following the orientation towards development of students' capacity

- Decentralize in schools, organizing coordination activities among staff, teachers and students in teaching Mathematics in English

1.4.2.3. Direct activities of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

- Direct the implementation of the content of teaching Mathematics in English following the orientation towards development of students' capacity
- Direct the coordination, ensuring the resources and effectiveness of teaching Mathematics in English
- Direct the development of mechanisms and policies, creating motivation for teachers and students

1.4.2.4. Test and assess activities of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

- Test and assess the development of teaching environment and content
- Test and assess the selection of appropriate assessment methods and forms for each content, activity and object.
- Develop criteria for assessing quality of teaching periods
- Test and assess results of teaching Mathematics in English following the orientation towards development of students' capacity

1.4.3. Subject of management of teaching activities in high schools following the orientation towards development of students' capacity

The thesis identifies two main subjects: high school principals and heads of specialist teams.

1.5. FACTORS AFFECTING MANAGEMENT OF TEACHING MATHEMATICS IN ENGLISH IN HIGH SCHOOLS FOLLOWING THE ORIENTATION TOWARDS DEVELOPMENT OF STUDENTS' CAPACITY

1.5.1. Objective factors

- Global education integration
- The policy of radically and comprehensively reforming education and training

1.5.2. Subjective factors

- Perception of the management staff and teachers
- Management capacity of the management staff in high schools
- Resources for teaching Mathematics in English

CHAPTER 1 CONCLUSION

1. The thesis clarified the theoretical basis of the topic: overview of the research topic; introduce concepts related to teaching Mathematics in English and its management

2. Building a capacity framework to develop teaching Mathematics in English in high schools following the orientation towards development of students' capacity: mathematical thinking and reasoning in English; mathematical problem-solving; mathematical modeling; mathematical communication in English; use of mathematical tools and equipment; application of IT to Mathematics

3. Clarifying the content of the curriculum in high schools following the orientation towards development of students' capacity, including teaching environment; teaching content; teaching methods; teaching forms; testing and assessment of teaching activities; English competence of teachers and students

4. Clarifying the content of management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity, including plans; organization; direction; testing and assessment

5. Factors affecting management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Chapter 2.
THE CURRENT SITUATION OF MANAGEMENT OF TEACHING MATHEMATICS IN ENGLISH IN HIGH SCHOOLS FOLLOWING THE ORIENTATION TOWARDS DEVELOPMENT OF STUDENTS' CAPACITY

2.1. OVERVIEW OF SURVEY OF THE CURRENT SITUATION

2.1.1. Overview of high schools

2.1.2. Some features of educational reform in high schools

2.1.3. Characteristics of high schools teaching Mathematics in English

Schools developing the earliest model of teaching Mathematics in English are those with gifted English classes such as high schools specializing in foreign languages. Also high schools for gifted students, usually each province has one high school for gifted students starting to teach Mathematics in English recently.

2.2. ORGANIZATION OF SURVEY OF THE CURRENT SITUATION

2.2.1. Survey purpose

To properly and objectively assess the current situation, clarify the strengths and weaknesses to act as a basis for proposals of measures to manage teaching Mathematics in English in high schools following the orientation towards development of students' capacity.

2.2.2. Survey content

- Investigate the current situation of teaching activities, management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity
- Investigate factors affecting teaching activities and management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

2.2.3. Samples and survey subjects

39 management staffs, 81 teachers, 560 students of 42 high schools

2.2.4. Survey methods

Questionnaire: Multiple choice questions and a 5-level Likert scale questions; discussion and interview by topic

2.2.5. Methods of processing survey data

Use SPSS software to process the data

2.3. THE CURRENT SITUATION OF TEACHING MATHEMATICS IN ENGLISH IN HIGH SCHOOLS FOLLOWING THE ORIENTATION TOWARDS DEVELOPMENT OF STUDENTS' CAPACITY

2.3.1. The current situation of setting goals for teaching Mathematics in English in high schools following the orientation towards development of students' capacity

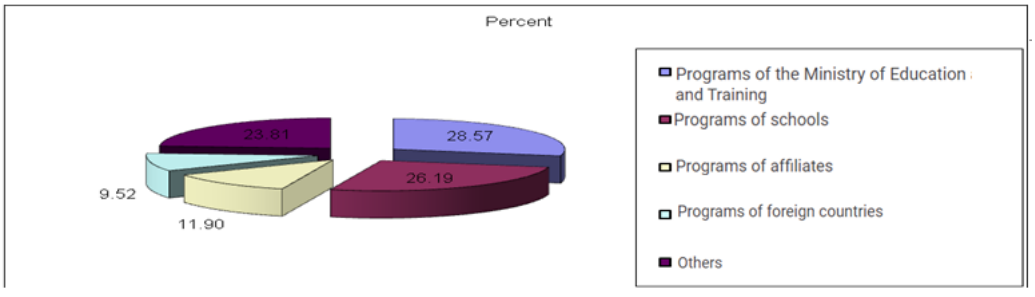
Variable	*Content*	*Average*	*Standard deviation*
MTD1	Teaching environment identified the capacity system and qualities that need forming	3.32	0.58
MTD2	Teaching environment is built on the basis of general objectives of the educational program and specific objectives of the subject	3.45	0.61
MTD3	Teaching environment shows the relationship between Mathematics and real life and social environment	3.46	0.62
MTD4	Teaching environment is designed in accordance with resources of schools	3.56	0.62
Representative variable MTD		**3.45**	**0.52**

Although there are different opinions in schools and survey subjects, general results show that the management staff, teachers and students initially paid attention to the teaching environment following the orientation towards development of students' capacity, expressed in an average of 3.45 out of 5 points, with a standard deviation of 0.52. However, this content was not focused proportionately to its actual importance and requirements of schools.

2.3.2. The current situation of developing content for teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Variable	*Content*	*Average*	*Standard deviation*
TND1	Teaching content is built to develop personal attributes of quality and capacity	3.46	0.59
TND2	Teaching content helps students to use knowledge and skills in Mathematics and English	3.41	0.57
TND3	Teaching content ensures students' progress in each stage and throughout the whole learning process	3.34	0.53
TND4	Teaching content meets the requirements of knowledge and skill specified in the program	3.26	0.52
TND5	Teaching content helps develop IT application and exploit data resources in cyberspace	3.25	0.50
Representative variable TND		**3.34**	**0.43**

Data analysis results show that this factor has a mean of 3.34, standard deviation of 0.43 which means that most of the opinions are "in confusion", while a few answered "to agree". This means this content has not been done well in high schools. Stages in content development are evaluated equally with no outstanding features.



The results show that differences are found in the application of programs to build teaching content.

2.3.3. The current situation of methods of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Variable	***Content***	***Average***	***Standard deviation***
TPP1	Teaching methods aim to promote students' strengths and limit their shortcomings.	3.53	0.60
TPP2	Teaching methods help personalize according to the needs and competence of each student, thus promoting each student's positive spirit.	3.41	0.59
TPP3	Teaching methods are consistent with the content and environment of relevant lessons	3.39	0.58
TPP4	Teaching methods disseminate how to learn and think, encourage students to self-study and be creative.	3.37	0.57
Representative variable TPP		**3.43**	**0.48**

Data analysis results show that this factor has Mean = 3.43, standard deviation = 0.48, which means that there is a better perception in terms of teaching methods compared with teaching environment. However, the “in confusion” answer remains dominant.

2.3.4. The current situation of organization of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Variable	***Content***	***Average***	***Standard deviation***
THT1	The teaching form is suitable with the duration and scale of teaching.	3.22	0.46
THT2	The teaching form is flexible, teachers and students are interchangeable roles.	3.05	0.62

THT3	The teaching form allows students to promote independence, self-control and to assess self-improvement.	3.01	0.59
THT4	The teaching form is deiverse, either inside or outside the classroom, either mainstream or experienced.	2.89	0.59
Representative variable THT		**3.06**	**0.44**

Data analysis results show that this factor has Mean = 3.06, standard deviation = 0.44, which means that the vast majority of respondents answered "in confusion" for this content. This is the lowest rated content. This shows that teachers are afraid to innovate their teaching methods.

2.3.5. The current situation of assessment of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Variable	***Content***	***Average***	***Standard deviation***
TKT1	Assessment to measure achievement levels of mathematical and English competence	3.96	0.56
TKT2	Assessment with various methods and forms, suitable for each teaching content	3.87	0.57
TKT3	Assessment based on capacity and the formation and development of capacity	3.86	0.50
TKT4	Assessment to reflect information to timely adjust teaching activities.	3.97	0.39
Representative variable TKT		**3.39**	**0.38**

Data analysis results show that this factor has Mean = 3.93, standard deviation = 0.38, which means that the vast majority of opinions answering 4 questions in this content are "to agree". There are many reasons for this: plus point mechanism, students' demand for testing and experience of schools in organizing tests.

2.3.6. The current situation of the English competence of teachers and students in teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Variable	***Content***	***Average***	***Standard deviation***
GKA1	Teachers can listen and understand English when teaching well	3.52	0.63
GKA2	Teachers can deliver the lessons in English well	3.63	0.70
GKA3	Teachers can read and understand Mathematics texts in English well	4.18	0.60
GKA4	Teachers can write Mathematics texts in English well	4.17	0.58
Representative variable GKA		**3.88**	0.60
HKA1	Students can listen and understand English when	4.17	0.58

	learning well		
HKA2	Students can speak English well	4.00	0.57
HKA3	Students can read and understand Mathematics texts in English well	4.58	0.49
HKA4	Students can write Mathematics texts in English well	4.56	0.50
Representative variable HKA		**4.33**	**0.45**

The results show that teachers' listening and speaking skills are much worse than that of students, while reading and writing skills are basically not of a big difference. The results also show that students' basic listening and speaking skills met the demand, reading and writing skills absolutely met. However, in the case of teachers, only reading and writing skills met the demand. The other two were quite limited.

2.3.7. Evaluation of the current situation of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Variable	***Content***	***Average***	***Standard deviation***
DGC1	Students join in to learn both Mathematics and English	3.98	0.61
DGC2	Learning English enables students to achieve both goals of learning Mathematics and practicing English skills	3.84	0.65
DGC3	Learning Mathematics in English helps students get more benefits than learning Mathematics in Vietnamese	3.42	0.69
Representative variable DGC		**3.75**	**0.57**

Data analysis results show that this factor has an average of Mean = 3.75, which means that a lot of opinions rate 4 while some parts rate 3 of "in confusion". Basically, students are quite satisfied with the organization of English learning following the orientation towards development of students' capacity

2.4. SURVEY OF THE CURRENT SITUATION OF MANAGEMENT OF TEACHING MATHEMATICS IN ENGLISH IN HIGH SCHOOLS FOLLOWING THE ORIENTATION TOWARDS DEVELOPMENT OF STUDENTS' CAPACITY

2.4.1. The current awareness of the management staff and teachers' about the management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Variable	***Content***	***Average***	***Standard deviation***
NT1	Management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity is necessary	4.14	0.66
NT2	Management of of teaching Mathematics in	3.85	0.38

	English in high schools following the orientation towards development of students' capacity aims at two purposes: to develop mathematics competence and English competence		
NT3	Management of of teaching Mathematics in English in high schools following the orientation towards development of students' capacity helps overcome the limitations of this content in practice	3.75	0.45
Representative variable NT		**3.91**	**0.41**

Interviews with the management staff and teachers about this content show that their awareness about English learning in high schools following the orientation towards development of students' capacity is still in its infancy, yet somehow they have already seen its importance. Average score of 3.91 shows high awareness about this content.

2.4.2. The current situation of building plans to teach Mathematics in English in high schools following the orientation towards development of students' capacity

Variable	***Content***	***Average***	***Standard deviation***
KH1	The plans of teaching Mathematics in English based on the Mathematics curriculum are suitable for teaching following the orientation towards development of students' capacity	3.28	0.56
KH2	Building plans of teaching Mathematics in English ensure contents of the teaching activities such as: teaching environment, teaching content, teaching methods and evaluation	3.50	0.60
KH3	Plans of teaching Mathematics in English is based on reality, taking into account fluctuations and changes.	4.22	0.43
Representative variable KH		**3.67**	**0.46**

The results show that the planning and implementation of schools are relatively good with the average of 3.67, which means the majority of the surveyed approve with statements of the question.

2.4.3. The current situation of organizing activities of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Variable	***Content***	***Average***	***Standard deviation***
TC1	Schools organize the management staff for teaching Mathematics in English	3.69	0.47
TC2	Schools organize activities of teaching Mathematics in English following the	3.53	0.52

	orientation towards development of students' capacity such as: teaching environment, teaching content, teaching methods and evaluation		
TC3	Schools have decentralized and applied coordinating methods in teaching Mathematics in English	4.31	0.48
Representative variable TC		**3.84**	**0.40**

The results show that this factor has an average value of 3.84, which means that the majority of the evaluators approved in 116 surveys. The management staff rated more positively with an average of 4.31 as of TC3.

2.4.4. The current situation of directing activities of teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Variable	***Content***	***Average***	***Standard deviation***
CD1	Well direct the implementation of teaching Mathematics in English according to the contents of teaching activities following the orientation towards development of students' capacity such as: teaching environment, teaching content, teaching methods and evaluation	3.78	0.71
CD2	Well direct relevant departments, ensuring resources for teaching Mathematics in English	3.59	0.56
CD3	Well direct the development of mechanisms and policies, creating motivation for teachers and students	3.47	0.55
Representative variable		**3.61**	**0.53**

Data analysis results show that this factor has Mean = 3.61, standard deviation = 0.53. This means the majority of the answers to the 3 questions of this content are "to agree", a large number are "in confusion". Through the survey, it was found that the management staff rated more positively than teachers.

2.4.5. The current situation of testing and evaluating teaching Mathematics in English in high schools following the orientation towards development of students' capacity

Variable	***Content***	***Average***	***Standard deviation***
KT1	Develop a set of criteria for evaluating periods of teaching Mathematics in English following the orientation towards development of students' capacity	2.94	0.53
KT2	Well assess the implementation of content of teaching Mathematics in English following the	3.16	0.46

	orientation towards development of students' capacity		
KT3	Select appropriate assessment methods and forms; use evaluation results to adjust teaching Mathematics in English	3.50	0.64
Representative variable KT		**3.20**	**0.47**

The total average of 3.20 means that this is the lowest rated content, almost all respondents are "in confusion", which means they believe that this content is not well-established.

2.4.6. Assessment of the current situation of the management of teaching Mathematics in english in high schools following the orientation towards development of students' capacity

Variable	***Content***	***Average***	***Standard deviation***
DB1	Schools plan to train staff for teaching Mathematics in English	3.24	0.61
DB2	Schools regularly direct and supervise the training of staff for teaching Mathematics in English	3.98	0.53
DB3	Schools organize diverse methods of training for teaching Mathematics in English	3.30	0.51
Representative variable BD		**3.51**	**0.47**

Data analysis results show that average = 3.51, standard deviation = 0.7. This means that most of the responses to the 3 questions are "in confusion". In all 3 questions, the results show that the management of English learning in high schools following the orientation towards development of students' capacity observe various limitations.

2.5. GENERAL ASSESSMENT OF THE CURRENT SITUATION OF THE MANAGEMENT OF TEACHING MATHEMATICS IN ENGLISH IN HIGH SCHOOLS FOLLOWING THE ORIENTATION TOWARDS DEVELOPMENT OF STUDENTS' CAPACITY

Variable	***Content***	***Average***	***Standard deviation***
AH1	Policy of fundamental and comprehensive reform in education of the Party, policy on learning English of the Government and the demand for human resources in the globalized economy	3.33	0.49
AH2	Resources and capacity to apply IT in management and teaching	3.78	0.42
AH3	Competence of the management staff to manage teaching Mathematics in English in high schools following the orientation towards development of students' capacity	4.10	0.53
AH4	Perceptions of the management staff and teachers	4.29	0.48

	in teaching Mathematics in English in high schools		
Representative variable AH		**3.86**	**0.38**

Among the 4 factors, AH2, AH3 and AH4 are considered to bring the most intensive influence on the management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity. The cognitive factor has the greatest influence.

2.6. GENERAL ASSESSMENT OF THE CURRENT SITUATION OF THE MANAGEMENT OF TEACHING MATHEMATICS IN ENGLISH IN HIGH SCHOOLS FOLLOWING THE ORIENTATION TOWARDS DEVELOPMENT OF STUDENTS' CAPACITY

Variable	***Content***	***Average***	***Standard deviation***
QL1	Managing student's teaching Mathematics in English following the orientation towards development of students' capacity made a positive contribution to the formation and development of student's capacity	3.28	0.45
QL2	Management of teaching Mathematics in English following the orientation towards development of students' capacity was focused	3.52	0.50
QL3	Management of teaching Mathematics in English following the orientation towards development of students' capacity is necessary	3.97	0.59
Representative variable QL		**3.59**	**0.44**

2.6.1. Strengths and causes

- The education sector enforced specific guidelines and policies for teaching Mathematics in English; students' English competence is growing.

- The demand of students in learning science subjects in English is increasing; teachers' English competence is growing.

2.6.2. Weaknesses and causes

- Awareness of the management staff and teachers; development of teaching plans and content; organization of teaching activities; mechanisms and resources

- Teaching Mathematics in English is a new teaching activity which is difficult for mass application; conservative mindset of a part of the management staff and teachers; limited resources for teaching Mathematics in English; limited knowledge about teaching Mathematics in English of a part of the management staff

CONCLUSION OF CHAPTER 2

First, results of practical research on management of teaching Mathematics in English following the orientation towards development of students' capacity clarified strengths and weaknesses as well as shortcomings and challenges.

Second, the current situation of the above issues helps us to have an overall picture of teaching activities and management of teaching Mathematics in English nowadays.

Third, through research on theoretical and practical basis, we find that it is necessary to manage teaching Mathematics in English following the orientation towards development of students' capacity.

Chapter 3.
MANAGEMENT MEASURES FOR TEACHING MATHEMATICS IN ENGLISH IN HIGH SCHOOLS FOLLOWING THE ORIENTATION TOWARDS DEVELOPMENT OF STUDENTS' CAPACITY

3.1. PRINCIPLES FOR MEASURES DEVELOPMENT

The development of measures: to guarantee the purpose, practicality, feasibility and effectiveness

3.2. MANAGEMENT MEASURES FOR TEACHING MATHEMATICS IN ENGLISH IN HIGH SCHOOLS FOLLOWING THE ORIENTATION TOWARDS DEVELOPMENT OF STUDENTS' CAPACITY

3.2.1. Organize activities to raise awareness of the management staff and teachers about the management of teaching Mathematics in English in high schools following the orientation towards development of student's capacity

- Purpose of the measure

To build determination to act for all members related to teaching Mathematics in English in high schools following the orientation towards development of student's capacity.

- Meaning of the measure

Awareness of teaching Mathematics in English in high schools following the orientation towards development of student's capacity of the management staff and teachers plays a crucial role in the implementation process and greatly affects the effectiveness of this activity in high schools.

- Content and methods of the measure

Raise awareness and sense of responsibility of the management staff regarding the management of teaching Mathematics in English in high schools following the orientation towards development of student's capacity.

Raise awareness and sense of responsibility of teachers directly teaching Mathematics in English in high schools following the orientation towards development of student's capacity.

Raise awareness and sense of responsibility of teachers in the schools regarding the management of teaching Mathematics in English in high schools following the orientation towards development of student's capacity.

- Conditions to implement the measure

Applied to all schools, so this measure is effective only if determination of all individuals and units in schools are observed.

3.2.2. Systemalize activities of teaching Mathematics in English in high schools following the orientation towards development of student's capacity

- Purpose of the measure

Develop plans and programs to teaching Mathematics in English in high schools following the orientation towards development of student's capacity.

- Meaning of the measure

Reduce the impact of environmental changes; avoiding waste and redundancy of resources; building standards for inspection; determining the way and methods to perform the tasks: improving operational efficiency, saving costs, resources, developing capacity of the staff, reducing possible errors, reducing working pressure and building good teamwork spirit.

- Content and methods of the measure

Developing a plan to teach Mathematics in English following the orientation towards development of student's capacity in accordance with the current situation.

Designing a framework for teaching Mathematics in English following the orientation towards development of student's capacity in accordance with the current situation.

Implementing a program of teaching Mathematics in English following the orientation towards development of student's capacity.

- Conditions to implement the measure

Qualified management staff build plans; qualified teachers develop curriculum and participate in teaching Mathematics in English whose capacity meets the standard of Mathematics and foreign language training.

3.2.3. Organize and direct activities of teaching Mathematics in English in high schools following the orientation towards development of student's capacity

- Purpose of the measure

To organize teaching Mathematics in English following the orientation towards development of student's capacity in high schools in an optimal way, and contribute to the improvement of the quality and effectiveness of teaching and teaching activities management following the orientation towards development of student's capacity.

- Meaning of the measure

Organizing and directing teaching Mathematics in English following the orientation towards development of student's capacity helps to focus all resources and attention on this activity in order to improve the effectiveness of teaching activities.

- Content and methods of the measure

Organizing and directing the development of curriculum for teaching Mathematics in English following the orientation towards development of student's capacity

Organizing and directing the selection of methods of teaching Mathematics in English following the orientation towards development of student's capacity

Organizing and directing the selection of forms, means, and environment of teaching Mathematics in English following the orientation towards development of student's capacity

Organizing and directing the assessment of students' learning outcomes following the orientation towards development of student's capacity

- Conditions to implement the measure

Principals, Heads of Mathematics Department of high schools have the capacity to organize teaching activities following the orientation towards development of student's capacity; teachers have not only Mathematics competence but the capacity to perform teaching activities following the orientation towards development of student's capacity.

3.2.4. Direct the application of IT and communication in teaching and management of teaching Mathematics in English in high schools following the orientation towards development of student's capacity

- Purpose of the measure

Exploiting the strengths of IT and communication; creating an unhindered connection to share resources, exchange information and solve problems online

- Meaning of the measure

The application of IT and communication in management of teaching Mathematics in English promoted the effectiveness of management of teaching activities.

- Content and methods of the measure

To implement the measure, it is necessary to ensure the following content: create specialized emails for the management staff, teachers and all students; choose the right social network to set up groups; develop regulations on organization of teaching activities on the Internet and social networks; organize learning activities on the Internet and social networks.

- Conditions to implement the measure

To implement the measure, it is necessary to ensure the following requirement: members have IT capacity

3.2.5. Direct the development of assessment criteria for teaching Mathematics in English in high schools following the orientation towards development of student's capacity

- Purpose of the measure

Providing criteria to objectively assess the quality of teaching Mathematics in English in high schools following the orientation towards development of student's capacity.

- Meaning of the measure

The criteria to assess teaching Mathematics in English in high schools following the orientation towards development of student's capacity bring the following meaning: helping to objectively assess the quality of teaching; createing motivation for the implementation of innovation and improvement of the quality of teaching; scientifically unifying methods of teaching.

- Content and methods of the measure

- Find the basis for creation of a set of criteria to evaluate the quality of teaching Mathematics in English in high schools following the orientation towards development of student's capacity

- Identify the students’ ability that needs forming in teaching Mathematics in English in high schools following the orientation towards development of student's capacity

- Develop a set of criteria to evaluate the quality of teaching Mathematics in English in high schools following the orientation towards development of student's capacity

- Apply a set of criteria to evaluate the quality of teaching Mathematics in English in high schools following the orientation towards development of student's capacity

- Conditions to implement the measure

High schools must use the established set of criteria to evaluate the quality of teaching Mathematics in English following the orientation towards development of student's capacity.

3.2.6. Direct the development of mechanisms and conditions to ensure the quality of teaching Mathematics in English in high schools following the orientation towards development of student's capacity

- Purpose of the measure

To establish physical and financial conditions for the organization of teaching Mathematics in English in high schools following the orientation towards development of student's capacity.

- Meaning of the measure

Promoting teaching and learning activities, building confidence and motivation for teachers and students.

- Content and methods of the measure

Developing mechanisms to motivate teachers and students to teaching Mathematics in English following the orientation towards development of student's capacity

Improving the facilities, promoting the application of IT, meeting the requirements of teaching Mathematics in English in high schools following the orientation towards development of student's capacity *(Appendix 3.3)*

- Conditions to implement the measure

Principals build adequate resources

3.2.7. Actors' role in the implementation of measures

Actor **Measure**	**Director of the Department of Education and Training**	**Principal**	**Leader**	**Teacher**
Measure 1		X	X	X
Measure 2		X	X	X
Measure 3		X	X	X
Measure 4		X	X	X
Measure 5		X	X	X
Measure 6	X	X	X	X

3.3. SURVEY OF THE NECESSITY AND POSSIBILITY OF PROPOSED MEASURES

3.3.1. Survey purpose

Collecting information evaluating the necessity and feasibility of the proposed measures in management of English learning in high schools following the proposed orientation towards development of students' capacity

3.3.2. Survey content and methods

- Survey content: necessity and feasibility
- Survey methods: questionnaire with 4 rating levels

3.3.3. Survey objects

Director, deputy director of the Department of Education and Training; Head of Secondary Education, Examination and Quality Accreditation Department; principals and vice principals of high schools; Head of specialist teams in high schools and high school teachers.

3.3.4. Survey results on the necessity and feasibility level of constructed measures

Assessment of the necessity and feasibility level of the measures

Constructed measures	**Necessity level**					**Feasibility level**				
	None	Little neces -sity	Nec es- sary	Extre- mely neces -sary	Aver -age	None	Little neces -sity	Neces -sary	Extre- mely neces- sary	Aver- age
	+1	+2	+3	+4		+1	+2	+3	+4	
Measure 1	0	0	58	78	3.57	0	0	62	74	3.54
Measure 2	0	0	77	59	3.43	0	0	81	55	3.40
Measure 3	0	0	32	104	3.76	0	0	45	91	3.67
Measure 4	1	9	72	54	3.32	0	16	69	51	326
Measure 5	0	1	102	33	3.24	0	1	103	32	3.23
Measure 6	0	2	61	73	3.52	0	6	60	70	3.47

3.4. TESTING

3.4.1. Organization of testing

3.4.1.1. Testing purpose

To determine the effectiveness, feasibility and necessary conditions to implement some of the proposed measures

3.4.1.2. Testing hypothesis

Two measures are selected to conduct testing.

The first hypothesis: It is possible to improve the quality of teaching Mathematics in English following the orientation towards development of students' capacity should the measure of "*Organizing and directing activities of teaching Maths in English in high schools following the orientation towards development of students' capacity*" be applied.

The second hypothesis: It is possible to improve the quality of teaching Mathematics in English following the orientation towards development of students' capacity should the measure of "*Directing the application of IT and communication in teaching Maths in English in high schools following the orientation towards development of students' capacity*" be applied.

3.4.1.3. Content and methods of the experiment

- *Content of the experiment*
- *Methods of the experiment*

Group	Testing before impact	Impact	Testing after impact
Testing group	O1	Affected	O2
Comparison group	O1	Not affected	O2

3.4.2. Analysis of the experiment results

3.4.2.1. Results of formation and development of students' knowledge, skills and attitudes when learning Mathematics in English following the orientation towards development of students' capacity on testing the measure

	Comparison group			Testing group		
	Before (O_1)	After (O_2)	O_2 - O_1	Before (O_1)	After (O_2)	O_2 - O_1
Question 1	314	321	7	282	319	37
Question 2	308	322	24	302	357	55
Question 3	310	324	14	309	366	57
Question 4	292	312	20	295	342	47
Question 5	313	317	4	312	321	9
Question 6	311	288	-23	308	321	13
Question 7	303	315	12	291	353	62
Question 8	312	326	14	311	336	25
Question 9	314	315	1	298	336	38
Question 10	311	330	19	310	333	23
Average ($\overline{X}$)	308.8	317	8.2	301.8	338.4	36.6
Reliability r_{SB}	0.87	0.91		0.86	0.87	
Variance (δ)						
Standard deviation (δ^2)	6.8	11.6		10.1	16.2	
Random probability (p)	p of the comparison group			p = 0.037		
	p of the testing group			p = 0.00001		
	p of the 2 groups before impact			p = 0.044		
	p of the 2 groups after impact			p = 0.0018		
Effect score (ES)				SMD = 3.16		

Through data processing results, SMD = 3.16 indicates that the influence of the measure on teaching results is incredibly high which means the measure can be applied in pedagogical activities.

3.4.2.2. Results of students' progress in Mathematics when learning in English following the orientation towards development of students' capacity when testing the measure

	Comparison group			Testing group		
	Before (O_1)	After (O_2)	O_2 - O_1	Before (O_1)	After (O_2)	O_2 - O_1
Average ($\overline{X}$)	5.72	6.14	0.42	6.14	7.52	1.38

Standard deviation (δ^2)	1.65	1.67		1.60	1.52	
Random probability (p)	p of the comparison group			p = 0.047		
	p of the testing group			p = 0.000000008		
	p of the 2 groups before affected			p = 0.044		
	p of the 2 groups after affected			p = 0.000000002		
Effect score (ES)				SMD = 0.83		
Correlation of the testing group				r = 0.82		

Input results of the testing group reached 5.72 points, the comparison group got 6.14 points, the O2 -O1 deviation was 0.42 points. Output results of the testing group reached 7.52 points, the comparison group got 6.14 points, the O2 -O1 deviation was 1.38 points. The results showed that the testing group had a much higher score than the comparison group. Learning results of the majority of students are variable in a positive way, which means that they have made learning progress.

CONCLUSION OF CHAPTER 3

1. In order to improve the effectiveness of management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity, it is necessary to synchronously implement the proposed measures herein.

2. The proposed measures herein, through certain surveys, are considered to be of utmost necessity and high possibility which can be easily implemented in the management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity.

3. The experiment results of both measures confirmed its effectiveness in improving the quality of management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity.

CONCLUSION AND RECOMMENDATIONS

1. CONCLUSION

- The thesis contributed to the supplement and development of the theoretical basis of the management of teaching Mathematics in English in high schools following the orientation towards development of students' capacity.

- The thesis surveyed and analyzed comprehensively the current situation of English learning management in high schools following the orientation towards development of students' capacity.

- Based on theoretical and practical research, the thesis proposed 6 measures to manage English learning in high schools following the orientation towards development of students' capacity. Those are presented as follows:

2. RECOMMENDATIONS

- For the Ministry of Education and Training
- For the Department of Education and Training
- For principals of high schools

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