



ORIGINAL ARTICLE

Students and Lecturers' Perceptions of Pre-service Teachers' Geography Education Competence Level and Influencing Factors in Five Initial Teacher Training Programs in the Southeast and Mekong Delta Regions of Vietnam

Thang Van Ha

Ho Chi Minh City University of Education, Ho Chi Minh City, Vietnam

Email: thanghv@hcmue.edu.vn

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ABSTRACT

Developing learners' qualities and competence is the main orientation and central goal of the Vietnamese Education System in the current period. Therefore, quality teacher training plays an important role in achieving these goals. This study assessed the geography education competence level of pre-service teachers and the factors affecting them. This study adopted a quantitative approach. It was designed as a cross-sectional investigation in which 40 lecturers and 167 pre-service teachers at 5 initial teacher training programs/courses in Southern Vietnam were randomly sampled by the stratified random and simple sampling. The results indicated that there was a significant difference in the assessment of the student teachers' competence by the two groups. Further, the strongest influencing factors on the development of the competences were learning facilities and students themselves. The study discussed the implications for faculty members and those involved in designing initial teacher education programs for students majoring in geography.

1. INTRODUCTION

Pedagogical universities are introducing innovations in training students according to professional competence, which are aimed at meeting the new requirements of the 2018 General Education Curriculum in Vietnam. This process requires research to summarize and evaluate pedagogical theory and practice as a basis for proposing solutions (Bui, 2017). The training for geography pre-service teachers is not out of the above trend. This study focused on examining how students self-assess their achievement of competency indicators based on the Geography education competence (GEC) framework; compared with the teacher's assessment. At the same time, it analyzed the impact of factors affecting the formation and development of this competence. Research questions included:

- *To what extent do pre-service teachers' geography self-assess their GEC?*
- *Are students' self-assessments like their lecturers' assessments of their performance?*
- *To what extent do students and lecturers agree on the statements related to the measures applied in the training process for the formation and development of GEC for students?*

The results of this study provided lecturers and Geographic pedagogical training curriculum designers the valuable reference data for the program and training quality improvement.

2. LITERATURE REVIEW

2.1. Concepts of Geography Education Competence

To establish the concept and the structure of GEC, this study applied the approaches: (1) The concept of geography education emphasizes that geography education is an overlap between geography and education, whereby

geography is a means of education; (2) The essential relationship between teaching and education, in which teaching is considered as a means for education. Thus, geography teachers' competence includes educational, teaching competence, and educational competence through teaching Geography; (3) As a school subject, Geography provides a system of geographical knowledge, skills, and personality for students. (4) Geography pedagogical content knowledge is a combination of pedagogical knowledge and geographical knowledge to serve geography education, which is the type of knowledge typical for geography teachers. In addition, the author analyzed the outcome standards of the geography teacher training curriculum of some universities, before deciding the draft of the competence framework. (5) The author referred to the outcome standards for pre-service geography teachers at some university programs to build the GEC structure. (6) Then, the author applied the process of determining the general competence structure proposed by Nguyen et al. (2016) to describe in detail the components, elements, and behavioral quality indicators of GEC.

(1) According to Bednarz (2000), geographical education is not just about Geography but is about geography teaching, learning, thinking, and related educational and cognitive processes. Geographical education is a field of study that defines the two relevant academic fields, namely geography and education. Specifically, geographical research is concerned with the complex and interrelated surface of the Earth - the area where humans live. Education is divided into three separate areas (Figure 1). The first one includes research on learning and building a theoretical understanding of the learning/teaching/educational process. The second one is concerned with the study of teacher training, the process of preparing and building a knowledge base for teachers. The third one improves practice in the classroom, in management, or in the development of policy related to education. The geography education concept is an important basis for establishing the concept of the GEC for geography pre-service teachers.

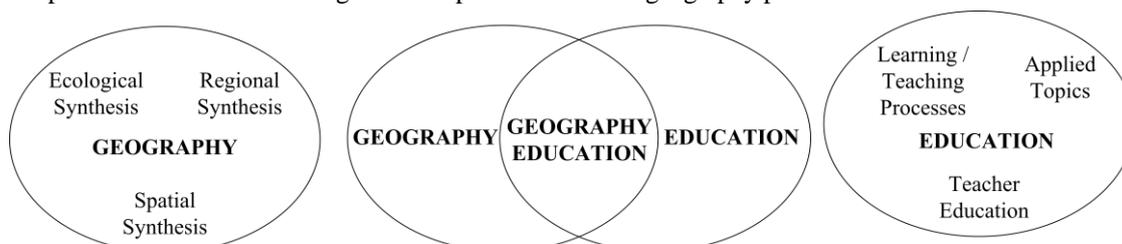


Figure 1. Geographical Education defined as an overlap between Geography and Education
(Source: Bednarz, 2000)

(2) Pham (2017) defines education (in a narrow sense) as the process by which educators help learners to form their attitudes and behaviors towards the community. The teaching concept, according to Pham (2015), is a process of interaction between teachers and learners to support them in acquiring scientific knowledge, skills, and operational competencies; on that basis, personality qualities are formed in learners. The teaching contents in schools are structured and logical, following the disciplines and consistent with learners' psycho-physiological laws (Tran, 2015). The relationship between teaching and education is the relationship between means and purpose. The teaching process must lead to the educational process because the ultimate goal of teaching is also to instill morals into humans (Gonoblohin, 1976).

Therefore, teachers' competence includes teaching and educational competence in which "Educating competence through teaching subjects" belongs to the education competence according to the concept of Nguyen and colleagues (2015). Accordingly, the criteria competencies are built based on the understanding of the function of teaching - equipping knowledge, forming skills and attitudes, developing diverse capacities and personalities among students; the role and effect of the subject in educating students; the ability to educate students about the teaching contents, methods and forms of school subjects. In addition, UNESCO's Education Development Strategy for the 21st Century also emphasizes: Teachers are trained to be educators rather than experts in imparting knowledge (Tran, 2015). To fulfil their role, teachers design a teaching plan that integrates teaching with education. They clearly show the objectives, contents, and teaching methods suitable for the specific subject, students' characteristics, and the educational environment (Nguyen & Do, 2019). The GEC is built on an educational approach through teaching Geography in high schools.

(3) Geography subject provides students with rich knowledge about nature, population, people's socio-economic activities all over the Earth and corresponding skills to apply their geography knowledge and skills to their life. Through learning geography, students develop a scientific worldview and adjust cognitive perspectives. For example,

Geography contributes to the formation of good qualities in a student's personality, such as love for the motherland, a sense of sovereignty, and responsibility for the living environment and community (Nguyen & Nguyen, 2006).

Applying the above concepts to the establishment of the concept of geography education in schools, we believe that geography education is, first, to teach geography to equip learners with basic geographical knowledge, to develop geography skills and motivations. Through teaching, geography performs its educational function; in other words, geography becomes a means for education to serve some important goals with one of the top priorities being the development of responsible and active global citizens (Bednarz, 2000).

(4) Pedagogical content knowledge - Geography (PCK-G) is the combination of geographic knowledge and pedagogical knowledge in Geography teachers. The interference between different fields of knowledge, geographic skills, and pedagogical knowledge will create different teaching methods. PCK-G is unique for geography teachers. It is a type of knowledge that integrates geographical knowledge and pedagogical knowledge to teach geography (Cochrane, 1991). It is necessary to clarify three aspects to understand the structure of PCK-G: (1) What geography teachers will teach (subject knowledge): geographical knowledge, learning skills, and motivation, (2) How geography teachers will teach (methodological knowledge): teaching skills to help students learn geography, and (3) Why do geography teachers teach it this way (beliefs in the subject). It helps students become responsible and active global citizens (Figure 2) (Blankman et al., 2015).

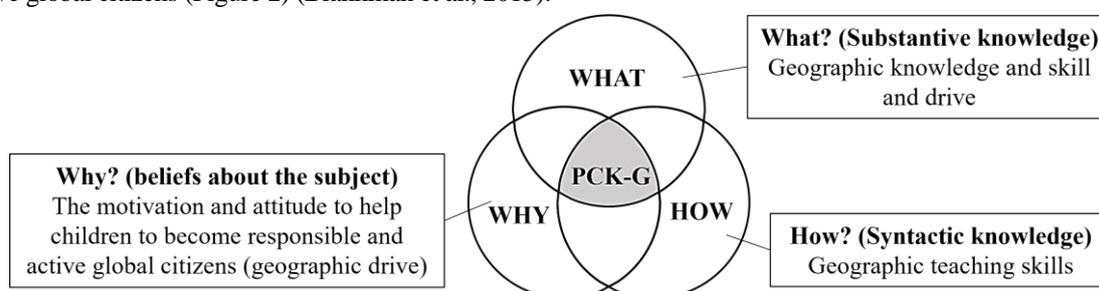


Figure 2. PCK-G for the subject of Geography (Blankman et al., 2015)

Hong and his colleagues introduced the Conceptual Model of the Knowledge Base for Geography (Geo-KBT) with six components: Orientations toward teaching geography; knowledge of geography curricula; knowledge of students' understanding of geography and responses to geography learning; knowledge of instructional strategies appropriate for geography; knowledge of assessment of geography learning; and knowledge of educational contexts (Hong et al., 2018). The relationship between the teaching of content knowledge and methodological knowledge is an area that many geographic educators in Vietnam have studied. A typical example is the research of Nguyen and Do (2016) entitled: The role of lecturers and departments in teaching basic science to develop pedagogical competence for Geography student teachers. This study analyzed and oriented the role of basic science subjects in developing competencies for Geography student teachers. The author also discussed the approaches to determine PCK in geography student teachers in a study in 2020. The PCK model and PCK for Geography teachers (PCKG) were applied to build the structure of Internal Pedagogical Geography Knowledge of Geography student teachers (PGK-ST). PCK-ST includes Geography teaching orientations, Geography education curriculum knowledge, knowledge of students' geographic understanding, Geography teaching strategies knowledge, and knowledge of assessment in teaching geography (Nguyen & Ha, 2019). PCK-G is the important theoretical foundation to establish the relationship between GE and EC in the GEC structure of geography pre-service teachers.

Notably, the TPCK (Technological Pedagogical Content Knowledge) model was established by Mishra et al. (2006) based on the Shulmans' PCK model (1986). This model gives an overview of three basic knowledge types that teachers need to apply ICT in their teaching: Technological Knowledge (TK), Pedagogical Knowledge (PK), and Content Knowledge (CK), as well as the interrelationship between them (Punya & Koehler, 2006). For geography teachers, it is a combination of geography knowledge, skills, pedagogical knowledge, and technology. The author adopts the TPCK model to establish and describe the Applying ICT in teaching geography in high schools of GEC's geography pre-service teachers (Figure 3).

From the above theoretical approaches, Nguyen and Ha (2019) note that "GEC is defined as the ability that geography teachers identify and implement specific strategies, processes, and measures to formulate and develop geography competencies for their students based on subject curriculum requirements, cognitive characteristics, learners' behavior, and diverse learning situations".

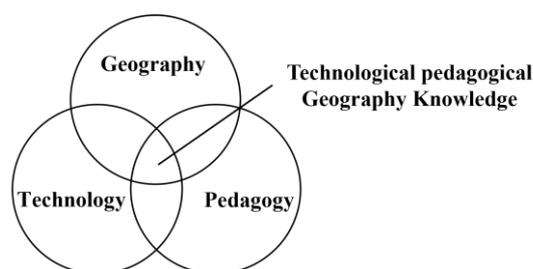


Figure 3. *Technological Pedagogical Geography Knowledge (developed by Punya & Koehler, 2006)*

GEC is a mixture of GC and EC in the geography teachers' competence structure, in which EC is conceived as teaching competence and education competence through teaching geography. Thus, teaching geography competence is a basic component of the GEC. The teacher performs the educational function of geography by teaching this subject.

GEC is revealed to the outside through geography teachers to use teaching and educational strategies suitable to the characteristics of the subject and their students. A professional geography teacher knows how to support their students to form and develop geography competence through a skilful combination of teaching methods, techniques, and facilities with teaching content; based on a deep understanding of learners in the educational contexts. The GEC is transferred from the teacher to the learner and is further developed by them.

(5) In addition, the author analyzed the outcome standards of the Geography teacher training curriculum of some universities, including An Giang University (An Giang University, 2018), Dong Thap university (Dong Thap University, 2018), Can Tho University (Can Tho University, 2019), Sai Gon University (Sai Gon University, 2020), HCM City University of Education (Ho Chi Minh City University of Education, 2019), Da Nang University of Education (Da Nang University, 2020), and Hanoi National University of Education (Hanoi National University of Education, 2020), which were referenced to build the competence structure of geography education in this study. The output standards of Geography teacher training curricula are designed based on the University Outcome Standards issued by the Vietnamese Ministry of Education and Training in 2012. However, their standards and classifications are not the same. The common elements include:

- **Geography competence:** Knowledge and skills related to objects, tasks, methodologies, and research methods regarding geographical science.
- **Professional competence:** Knowledge and skills in theory and educational methods in general and in geography education.
- **General competence:** Knowledge and basic skills for studying, researching, and developing the profession of a geography teacher.

(6) The author applied the process of building competence standards of Nguyen Thi Lan Phuong and colleagues (2016) to establish the GEC structure for geography student teachers. Accordingly, based on the definition of GEC, the author identified the competence components, thus determining the corresponding indicator and behavioral quality index, and finally designed the competence development path and a detailed description.

From that, GEC includes the geography competence, the competence to apply scientific-educational knowledge to geography education in high school, and the Supplemental competence. These components are divided into smaller elements in which the competence has its signs. GEC is a "dynamic system" because it is often influenced by external factors such as socio-economic development, education, and training innovation. According to Nguyen and Ha (2019), GEC includes three components (Figure 4). Specifically:

Geography competence is the teachers' ability to apply their geographical knowledge in order to serve the purposes of geography education in schools, to learn and study geography.

Education competence (the ability to apply scientific knowledge of education to geography education at school) is the ability of geography teachers to flexibly apply educational knowledge into geography education in each specific context covered in the curriculum.

Supportive competence is the geography teachers' ability to apply their understanding of related fields to the process of performing the role of geography education in high schools. Two important competency components are the use of ICT in teaching geography and the use of foreign languages.

In this study, the GEC's structure of Geography pre-service teachers is comprised of three components. Firstly, it is geography competence, which indicates pre-service teachers' abilities to apply geography and related sciences methodology, apply foundation knowledge of Earth science, cartography, remote sensing, and geographic

information systems, and analyze the components, relationships, processes, laws, and changes of nature, socio-economic systems at a local, national, regional, and global level. Applying geography teaching methods and techniques, designing and using geography education facilities, assessing competence in geography education, designing lesson plans in geography education, developing geography curriculum in high schools, and conducting scientific research in geography education, are the elements of pre-service teachers' abilities to apply scientific-educational knowledge to geography education in high school, also known as education competence. Last but not least, pre-service teachers need to have supportive competence, as shown in their applying ICT in teaching geography in high schools and using foreign languages in geography education.

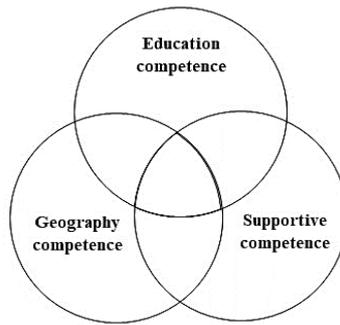


Figure 4. GEC is a blend of Geography competence, Education competence, and Supportive competence (Nguyen & Ha, 2019)

2.2. Factors affecting Geography pre-service student teachers' GEC

The university teaching process is a complex structural system consisting of factors including teaching purposes and tasks, lecturers and students' activities, content, methods, teaching facilities, and results. This process takes place in a certain social and technical environment (Dang & Ha, 2008). The interactive pedagogical model emphasizes the reciprocal relationship between learners, teachers, and the environmental factors in educational activities (Pho, D.H., Ngo, 2016). In addition, teaching technology focuses on the following factors, including output products corresponding to the output standards and training objectives. The expected result is that pre-service geography teachers have the basic competencies to be able to practice after graduation. The initial level of learners is determined as the input competence of students when they begin to participate in the training process; Technological and teaching processes are aimed at developing learners compared to their initial level. This process is carried out by lecturers through the operation of the training program elements. The quality of education is reflected in the competence of learners achieved through assessments. These factors and processes are implemented in the pedagogical space, which is an interactive and open environment to always be suitable for the ever-changing socio-economic, scientific, and technological contexts (Nguyen, 1993).

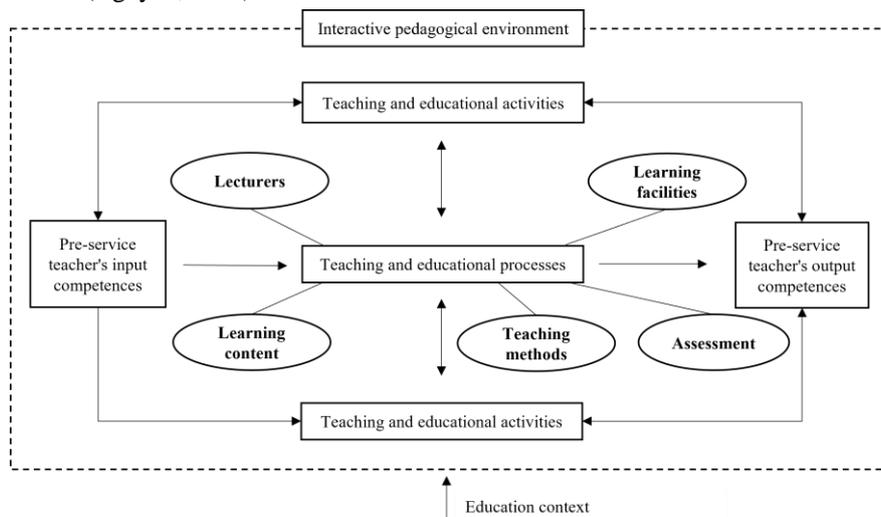


Figure 5. Factors affecting Geography pre-service teachers' GEC

From the above approaches, the affecting factors students' GEC development include (Figure 5):

- Lecturers: Professional capacity, educational capacity, quality, and pedagogical style.
- Pre-service teachers: Cognitive capacity, career motivation, learning, and self-study methods.
- Learning content: Knowledge, skills, attitudes, and values to form the GEC of future teachers.
- Teaching methods: Methods and forms of organizing the educational and teaching process.
- Learning facilities: ICT infrastructure, teaching facilities, and equipment.
- Assessment: assessment methods, tools, and implementation of assessments.

3. MATERIALS AND METHODS

Quantitative research following a survey design was used as the main method in this study. Specifically, the study investigated the lecturers' and students' perceptions of the achievement of students' GEC, as well as their level of agreement with the statements about the factors affecting the formation and development of this competence. The survey was conducted through a questionnaire.

This study used a random sample of 40 lecturers and 146 students at 5 geography teacher training institutions, including Ho Chi Minh City University of Education, Saigon University, An Giang University, Dong Thap University, and Can Tho University. The lecturers who participated in the survey were geography lecturers and geography teaching method lecturers; Juniors and seniors studying Geography teaching methods modules.

Sample sizes were determined differently between lectures and students. For lecturers, the sample size corresponding to the population was 46, and the error rate was 0%; 40 questionnaires were obtained, accounting for 86.9%. Yamane Taro's simple sample calculation formula was used for 230 Juniors and seniors.

$$n = \frac{N}{1 + N \times e^2}$$

Note: *N*: Population; *n*: Sample size; *e*: margin of error

The students' sample size was 146, with an acceptable error of ± 0.05 (5%). Applying probability sampling from the population technique to calculate the number of specific surveys for each faculty or subject. The results are presented in Table 1. Thus, the sample size of the study was 186 questionnaires, in which the proportion of lecturers and students was 21.5% and 78.5%, respectively. The number of questionnaires for students added 5% because invalid surveys would be discarded. These backup surveys did not affect the predefined survey rate.

Table 1. Sample size distribution by the training institutions based on a defined population

No	Pre-service geography teacher training institutions	Quantity and Ration					
		Lectures			Students		
		Population	Survey participants	%	Population	Sample size	%
1	Department of Geography (HCMUE)	15	15	100	80	51	34.7
2	Department of Pedagogy Social Sciences (SGU)	7	4	57.1	39	25	17
3	Department of Education (CTU)	11	10	90.9	39	25	17
4	Department of Education (AGU)	6	6	100	52	33	22.6
5	Department of Education (DTU)	7	5	71.4	20	13	8.7
	Total	46	/		230	147	100
	Survey participants		40	86.9	146	167	113.6

Research tool: The questionnaires were designed with closed-ended questions. The number of questions was similar for lecturers and students. Each questionnaire was structured into two parts, including survey participant information and content.

The survey content was structured into two parts, with the first one being the perception of students and their lecturers about the students' GEC indicator. Students self-assessed their competence level by the end of the third or fourth year. The lecturers assessed the student's ability level when finishing the course. This section included 14

observed variables built on the behavioral quality indicators of GEC components. The rating scale was built on a 5-point scale with the performance response type: (1) Completely not proficient; (2) Not proficient; (3) Not yet proficient; (4) Proficient; (5) Very proficient. The second one was the agreement of the lecturers and students with the statements about the factors affecting the formation and development of students' GEC. This section included 17 observed variables classified according to 6 influencing factors, including instructor qualifications, student capacity, training curriculum, training and assessment methods, and learning facilities. Likert scale is built on a 5-point with the agreement: (1) Strongly disagree; (2) Disagree; (3) Neither; (4) Agree; (5) Strongly agree.

Data collection and analysis: Research data was collected from online survey results through 2 questionnaires using the Google Form tool. They were sent to a total of 204 lecturers and students in 5 universities in the Southeast and Mekong Delta regions at the end of the second semester of the 2020-2021 school year. The survey was administered from July 13, 2021, to July 27, 2021. The author used SPSS 26 software to make descriptive statistics and test the proposed hypotheses. Researchers used descriptive statistics and deductive statistics methods to analyze the survey data. The data was descriptive statistics through concentration with the parameters Median and Mean; the dispersion expressed through the statistical parameter is the Standard Deviation. For inferential statistics, performing the Independent Sample T-Test on the achievement of the indicators in the 3 GEC components of students between the assessment of the lecture's student self-assessment; The agreement level of lecturers and students on the influencing factors to students' GEC. Simultaneously, the Paired Sample T-Test was performed on the average value of the pairs of GEC components. Tests were established at the significance level under 0.05 ($p < 0.05$). Using the significance level of the mean on the Interval Scale with a score of 5, specifically: 11.8: Strongly disagree; 1.812.6: Disagree; 2.613.4: Neither; 3.414.2: Agree; 4.215.0: Strongly agree.

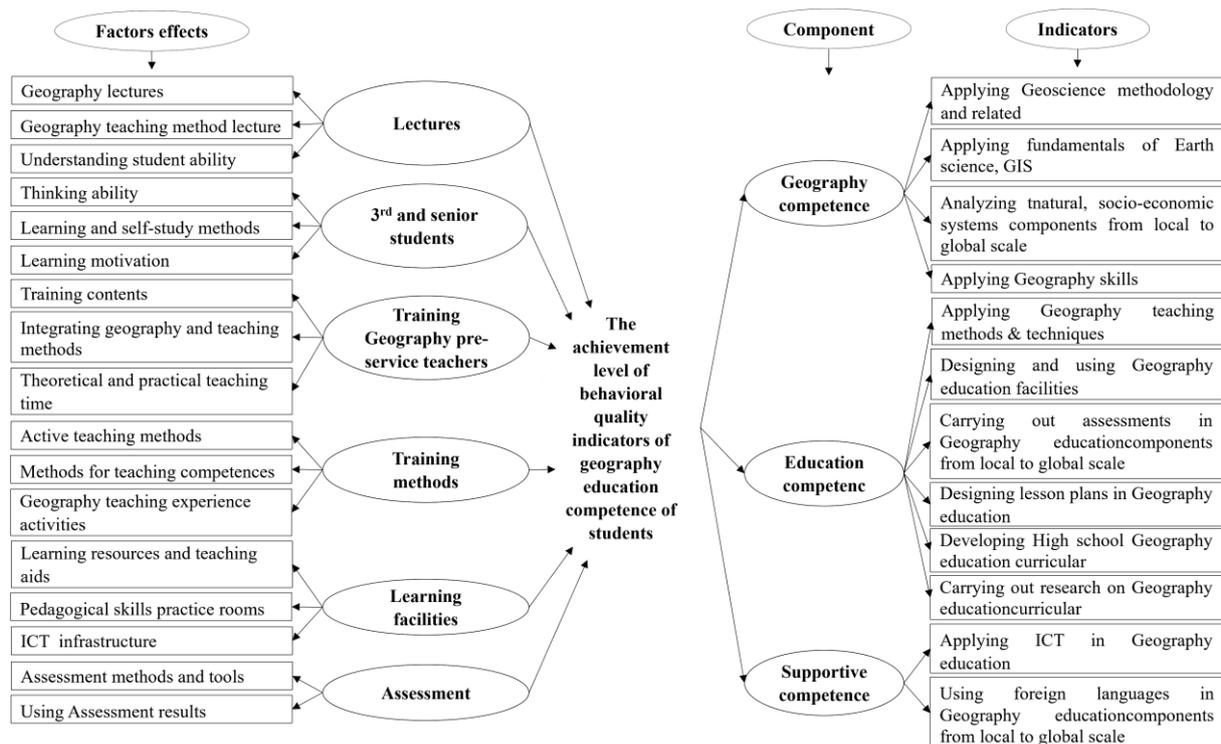


Figure 6. The observable variables and research data analysis procedures

4. RESULTS AND DISCUSSION

4.1. Perceptions of students and their lecturers about the level of GEC indicators of students

The mean value in the assessment of both the lecturers and the students was 3.43, ranging from 3.1 to 3.9 (Figure 7). The 3.0 level median value was repeated many times in the students' self-assessment and the 4 in the lecturers' assessment. The standard deviation (SD) of the assessments for all GEC indicators was less than 1.0, which was low for the 5-level scale. These results showed a high concentration of survey data around the mean value.

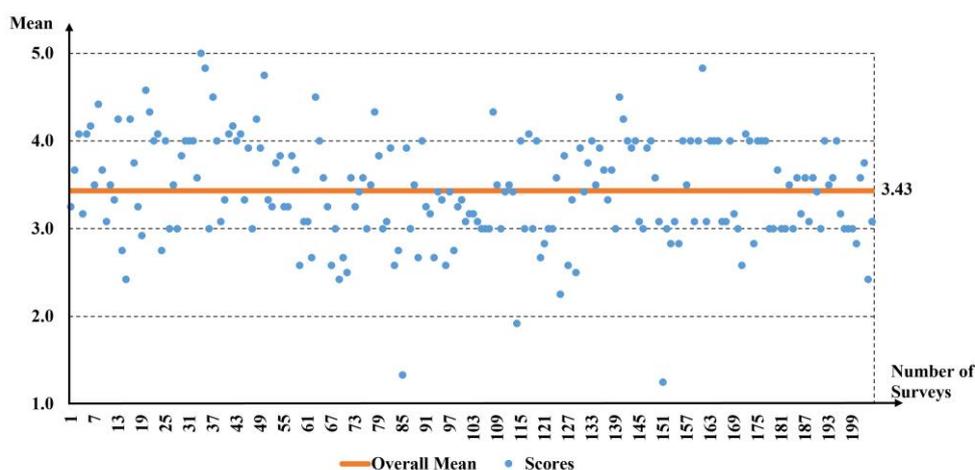


Figure 7. The concentration of survey data around the mean

For Geography competence indicators, lecturers assessed the students’ ability to “Apply Geoscience methodology and related” higher than the other indicators with a 4.0 mean score. Meanwhile, students thought that it is lower than “Applying Geography skills”, 3.37 compared to 3.62. Besides, lecturers assessed students’ achievement levels in “Applying Geography skills”, “Applying fundamentals of Earth science, GIS” and “Applying Geoscience methodology and related” at 3.9, 3.7, and 3.65, respectively. In contrast, students rated the lowest on their ability to achieve the “Applying Geoscience methodology and related” indicator (3.3) (Table 2).

Table 2. The perception of students and their lecturers about the level of the students’ Geography competence indicators

Geography competence Indicators	Students’ self-assessment			Lectures’ assessment		
	Mean	Median	SD	Mean	Median	SD
Applying Geoscience methodology and related	3.30	3.00	0.686	3.70	4	0.758
Applying fundamentals of Earth science, GIS	3.37	3.00	0.675	4.00	4	0.716
Analyzing natural, socio-economic systems components from local	3.37	3.00	0.702	3.65	4	0.893
Applying Geography skills	3.62	4.00	0.738	3.90	4	0.709

For the Educational competence component, both students and lecturers agreed that students showed a higher level of proficiency in “Applying Geography teaching methods & techniques”, “Designing and using Geography education facilities”, and “Designing lesson plans in Geography education” abilities, 3.48, 3.44, 3.49 in students’ self-assessment and 3.75, 3.83, 3.80 in teacher educators’ assessment, respectively. On the contrary, the following indicators such as “Carrying out research on Geography”, “Developing High school Geography education curricular”, and “Carrying out assessments in Geography” were assessed a lower level of proficiency, lecturers rated an average 3.3, 3.5 and 3.7; student self-assessment 3.1, 3.24, 3.29, in turn. These results (Table 3) indicated that students had more advantages in applying geography teaching methods and techniques, using learning facilities, and designing geography lesson plans compared to designing assessment plans, developing geography teaching curriculum, especially implementing scientific research on geography education.

Table 3. The perception of students and their lecturers about the level of the students’ Education competence indicators

Education competence indicators	Students’ self-assessment			Lectures’ assessment		
	Mean	Median	SD	Mean	Median	SD
Applying Geography teaching methods & techniques	3.48	3.50	0.771	3.75	4	0.742
Designing and using Geography education facilities	3.44	3.00	0.736	3.83	4	0.636
Designing lesson plans in Geography education	3.49	4.00	0.763	3.80	4	0.823

Carrying out assessments in Geography	3.29	3.00	0.716	3.70	4	0.791
Developing High school Geography education curricula	3.24	3.00	0.682	3.50	3.5	0.784
Carrying out research on Geography	3.10	3.00	0.761	3.30	3	0.758

Table 4. The perception of students and their lecturers about the level of the students' Supportive competence indicators

Supportive competence indicators	Students' self-assessment			Lecturers' assessment		
	Mean	Median	SD	Median	Mean	SD
Applying ICT in Geography education	3.51	4.00	0.803	3.88	4	0.686
Using foreign languages in Geography	3.23	3.00	0.794	3.38	3.5	0.952

Regarding Supportive competence, students had strengths in the ability to apply ICT compared to using foreign languages in geography education. It was acknowledged by them and lecturers when the rating was 3.88 compared with 3.38 (student self-assessment) and 3.51 and 3.23 (lecturers' assessment) for each of these indicators, respectively. The results (Table 4) showed that using foreign languages in learning and research was often a difficulty for pedagogical students in Vietnam generally.

The results of the Independent Sample T-Test on the assessment of lecturers and students for 3 GEC components showed that the Sig index in Levene's Test of Geography competence, Education competence, and Supportive competence was higher than 0.05. Therefore, the variances of the two variables were identical, so the T-test results in the section Equal variances assumed: the Sig index was 0.000, 0.005, and 0.043 less than 0.05, respectively. Conclusion: there was a difference in the mean in the assessment of the two groups of respondents (Table 5), specifically:

Table 5. Independent Sample T-Test results of the mean value of lecturers and students' perception on 3 GEC components

Independent Sample T-Test		Equal variances assumed			
		Geography competence	Education competence	Supportive competence	
Levene's Test for Equality of Variances	F		0.247	0.408	0.650
	Sig.		0.620	0.524	0.421
	df		202	202	202
	Sig. (2-tailed)		0.000	0.005	0.043
	95% Confidence Interval of the Difference	Lower	-.60733	-.51965	-.50355
		Upper	-.18535	-.09518	-.00864

Students perceived that they achieved the GEC indicators at "partially proficient" when the overall average self-assessment score was 3.37, and their lecturers rated it as 3.7 out of 5. In which subject Geography was rated highest (students rated it 3.42; faculty rated 3.81), followed by Support Competence (3.37 and 3.63), respectively. Geography competence had the highest rating (students' self-assessed 3.42; lecturers rated 3.81), followed by Supportive competence (3.37 and 3.63, respectively). The Education competence component had a lower rating, 3.34 in the student's self-assessment and 3.65 in the lecturer's assessment. Thus, in the 3-component structure of the GEC, the achievement level of students' geography competence was still higher than that of the Education competence. This means that students felt more confident in their geography competence than in their education competence, which was also assessed by lecturers (Table 6).

Table 6. The perception of students and their lecturers of the level of the students' GEC components (mean)

GEC components	Objective	Number	Mean	Std. Deviation	Std. Error Mean
Geography competence	Students	164	3.4162	0.59153	0.04619
	Lectures	40	3.8125	0.66687	0.10544

Education competence	Students	164	3.3384	0.60907	0.04756
	Lectures	40	3.6458	0.61578	0.09736
Supportive competence	Students	164	3.3689	0.70464	0.05502
	Lectures	40	3.6250	0.74032	0.11706

The author performed the Paired Sample T-Test, the mean score of 3 GEC components, to answer the question: Whether there is a similarity in the perception of the achievement level of these components or not. The purpose was to show which competence component was more dominant in the students' and their lecturers' perceptions. The results showed that the Sig index (2-tailed) of the first pair (Geography competence and Education competence) was 0.00, and the second pair (Geography competence and Supportive competence) was $0.037 < 0.05$, which meant that there was a statistically significant difference between the two groups being compared. Specifically, Geography competence was rated higher than Education competence by 0.09518 and Supportive competence by 0.07457 average scores. Sig index (2-tailed) of the third pair (Education competence and Supportive competence) was $0.523 > 0.05$, so there was no statistically significant difference. However, considering the average value, the Supportive competence was still not significantly higher than the Education competence (0.02042). Therefore, students self-assessed and lecturers assessed them on the achievement level of Geography competence higher than Education competence and Supportive competence; Supportive competence was higher than Education competence in GEC structure (Table 7).

Table 7. Paired Samples T-Test 3 GEC components in the assessment of lecturers and students

Paired Samples Test	Mean	Std. Deviation	95% Confidence Interval of the Difference		df	Sig. (2-tailed)
			Lower	Upper		
Pair 1 Geography competence - Education competence	0.09518	0.33338	0.04916	0.14120	203	0.000
Pair 2 Geography competence - Supportive competence	0.07475	0.50757	0.00469	0.14482	203	0.037
Pair 3 Education competence - Supportive competence	0.02042	0.45605	0.08338	0.04253	203	0.523

4.2. Students and their lecturers' perceptions of the impact factors on the students' GEC development

Factors affecting the students' GEC development were surveyed on several components including lecturers, students, training programs, training methods, teaching facilities, and assessment through the researcher's specific observations. These factors were proposed based on the expected measures of GEC development that would be presented in the follow-up study of this. Lecturers and students answered the same question: "To what extent do you agree with the following statements about the factors affecting the formation and development of GEC for students at the faculty?" on 5 levels from "strongly disagree" to "strongly agree". Statistical results are described in Table 8.

Table 8. Agreement level of lecturers and students on the statements about factors affecting the formation and development of students' GEC

	Affecting factors	N	Mean	Std. Deviation
1	Lecturers (Geography and Geography teaching method)	204	4.24	0.61573
1	Geography lecturers have a professional geography background and teaching methods	204	4.25	0.66490
2	The Geography teaching method lectures have professional teaching methods and practical understanding of geography education in high school	204	4.27	0.66075

3	Lecturers can understand students and can inspire students with the teaching profession and Geography subject	204	4.21	0.69251
2	Students	204	3.95	0.64292
4	Students demonstrate a good cognitive and thinking ability	204	3.95	0.68195
5	Students have good learning methods and self-study methods	204	3.95	0.70329
6	Students demonstrate clear career and study motivations	204	3.95	0.72094
3	Training Curriculum	204	4.13	0.63735
7	The training content is basic, up-to-date, and suitable for the requirements of the Geography teachers' competencies in the 2018 high school curriculum	204	4.15	0.70042
8	The orientation of integrating geographical knowledge and geography teaching methods is reflected in the design of the training program and the modules' outline	204	4.11	0.72814
9	Theoretical and practical teaching periods are reasonably allocated in the overall training curriculum and each module	204	4.13	0.69277
4	Teaching methods	204	4.16	0.63424
10	The training methods promote students' positivity, independence, and creativity through learning practices and educational activities	204	4.18	0.65708
11	Teaching methods to develop the GEC for students such as micro-teaching, project-based learning, and problem-solving learning are effectively used	204	4.17	0.66708
12	The practical experiences in teaching geography in high schools such as attending geography lessons and extra-curricular activities are held regularly	204	4.14	0.73905
5	Learning facilities	204	4.01	0.73873
13	Training materials are fully equipped; students and lecturers have easy access	204	4.11	0.74816
14	The pedagogical practice room is invested to serve the practice of teaching skills	204	3.96	0.88391
15	ICT infrastructure, geography teaching facilities are equipped to modernize the training process and improve the quality of GEC	204	3.97	0.81797
6	Assessment	204	4.16	0.67496
16	Methods and tools to assess students' learning and practice are diverse and effective	204	4.18	0.69356
17	Assessment results are used to adjust students' learning, teachers' teaching to promote the process of improving students' GEC regularly	204	4.14	0.70939

In the research model of factors affecting the formation and development of students' GEC, the author built 6 independent variables with 17 observations. Analysis of Cronbach's Alpha coefficient for each variable gave the following results: The correlation coefficients of the total variables of the observed variables were all greater than 0.3, which meant that all 17 observed variables ensured the reliability coefficients and were used for the operation next analysis (Table 9).

Table 9. Testing the reliability of the scale through Cronbach's Alpha

6 Independent variables	17 observations	H Corrected item-total Correlation	Cronbach's Alpha
Lecturers	3	0.776	0.903
Students	3	0.797	0.903
Curriculum	3	0.743	0.884
Teaching methods	3	0.776	0.910

Learning facilities	3	0.698	0.886
Assessment	2	0.852	0.920

Performing Pearson Correlation analysis, the results of Sig values were all less than 0.05, so the pairs of variables were correlated and statistically significant. The Pearson Correlation coefficient of the independent variables (lecturer, student, curriculum, teaching methods, learning facilities, assessment) with the dependent variable (6 variables on average) was quite high, greater than 0.3 in all variables. The pairs of independent variables that interacted with each other were also quite large (all greater than 0.4).

The study performed multivariable linear regression with the one-pass inclusion method. The results of the regression model analysis showed that all factors reached the Sig value, which was 0.000 (<0.05) and enough to be eligible for regression analysis. Evaluation of the standardized coefficient beta of 6 independent variables all has positive values, through which the magnitude of beta represents a positive relationship value with the formation and development of students' geographic education capacity. The factors with the largest standardized coefficients were Learning facilities (0.221), Students (0.192), Teaching methods (0.190), Curriculum (0.189), Lecturers (0.185) and finally, Assessment (0.134). This proved that the Learning facilities factor and the Student themselves had a strong impact on the formation and development of students' higher education competences according to the perception of students and teachers (Table 10).

Table 10. The results of the analysis of the linear regression model

Independent variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
Lecturers	.177	.001	.185	329.414	.000	.294	3.401
Students	.177	.000	.192	364.136	.000	.332	3.013
Curriculum	.176	.001	.189	279.063	.000	.200	4.989
Teaching methods	.177	.001	.190	262.429	.000	.177	5.657
Learning facilities	.177	.000	.221	388.647	.000	.286	3.495
Assessment	.117	.001	.134	176.714	.000	.161	6.198

Performing the Independent Sample T-Test on the assessment of teachers and students on factors affecting the GEC formation, the results showed that: Sig index in Levene's Test of 5 factors was higher than 0.05, so using the results of the t-test in the section Equal variances assumed Sig. (2-tailed) of the factors Students, Training curriculum, Training methods, Learning facilities and Assessment, these figures were all higher than 0.05, concluding that: there was no meaningful difference in the level of lecturers and students agree with these factors. Meanwhile, the Lecturers factor had a Sig index (2-tailed) of 0.005, showing a significant difference in mean. The mean score of the Lecturers factor was 4.48, and students' score assessment was 4.18 for this factor, a difference of 0.3 points. Lecturers rated higher on the assessment of the Lecturers factor compared to the students' assessment.

Assessing the agreement level of lecturers and students for each factor by using the mean value for the interval scale (Trinh & Dang, 2020). Students "agree" with all statements about factors affecting their GEC with a mean ranging from 3.91 to 4.18 ("agree" was: 3.414.2). Meanwhile, lecturers "strongly agree" with most of the statements, including the Lecturer factor (4.48), Training curriculum (4.23), Training method (4.32), Assessment (4.32); they "agree" with the statements about Student and Learning facilities (4.07). In general, lecturers and students "agree" with the statements about factors affecting students' GEC.

Regarding Lecturers factors, the respondents "strongly agree" with the statements when the mean was the highest (4.24). In which "The Geography teaching method lectures have professional teaching methods and practical understanding of geography education in high school" and "Geography lecturers have a professional geography background and teaching methods" were 4.27 and 4.25, respectively. Besides, "Lecturers can understand students and can inspire students about the teaching profession and Geography subject" scored lower in this factor (4.21). This result showed that both lecturers and students highly appreciate the qualifications of the pedagogical lectures in the leading role in the formation and development of GEC for students. On the contrary, students' self-assessment

was not high, but judgments related to “good cognitive and thinking ability”, “good learning methods and self-study methods” and “clear career and study motivation cognitive ability”. This was also the lecturer’s point of view. The level of agreement reached 3.95 and was the lowest mean among the 6 groups of factors surveyed.

The comments about the student teachers’ geography training curriculum were rated at 4.13 in general. In which “the training content is basic, up-to-date and suitable for the requirements of the Geography teachers competencies in the 2018 high school curriculum” was more appreciated than the “Theoretical and practical teaching periods are reasonably allocated in the overall training curriculum and each module” and “The orientation of integrating geographical knowledge and geography teaching methods is reflected in the design of the training program and the modules’ outline”, 4.15 compared with 4.13 and 4.11. This result reflected the fact that the integration of geographical knowledge and teaching methods, as well as solving the relationship between theoretical teaching and practice were always improved slower than content improvement in the training curriculum.

Regarding teaching methods, the survey results showed that lecturers used the methods to promote the initiative, activeness, and creativity of students through organizing learning and educational activities effectively. Teaching methods to develop the GEC for students such as micro-teaching, project-based learning, and problem-solving learning are effectively used, reaching 4.18 and 4.17 in the assessment of both lecturers and students, respectively. Besides, “the practical experiences in teaching geography in high schools such as attending geography lessons and extra-curricular activities” was somewhat more limited than the above approaches (4.14). On the other hand, “methods and tools to assess students’ learning and practice are diverse and effective” were rated higher “assessment results are used to adjust students’ learning, teachers’ teaching to promote the process of improving students’ GEC regularly”, 4.18 compared with 4.14. In general, the assessment innovation had been carried out in parallel with the process of reforming training methods. The improvement of training methods had focused more on methodological innovation in the direction of developing students’ competence than on experiential activities.

The statements about learning facilities had an agreement level of 4.1. Lecturers and students said that “Training materials are fully equipped; students and lecturers have easy access”, 4.11. However, “The pedagogical practice room is invested to serve the practice of teaching skills” and “ICT infrastructure, geography teaching facilities are equipped to modernize the training process and improve the quality of GEC” had not met the requirements, 3.96 and 3.97, respectively. Thus, it was necessary to improve learning facilities and technology infrastructure to improve the quality of training geography student teachers.

4.3. Limitation of the study

This study only examined the lecturers and students’ perceptions of the students’ GEC and factors affecting their development, which could be subjective. The results were objective, however, as there were not enough grounds to make accurate conclusions about the learner’s ability as well as the influencing degree of each factor on their development. Therefore, further studies will need to establish a more convincing and evidence-based framework of geography education competencies to assess Geography pre-service teachers’ competence levels at different stages of the training process. In addition, the results of this study are the basis for proposing measures and processes to develop the GEC for pedagogical students which will be presented in another study.

5. CONCLUSION

The research shows findings of students and their lecturers’ perception of GEC’s pre-service teachers at 5 universities in the Southeast and Mekong Delta. In general, they assumed that pre-service teachers were “partially proficient” in GEC, as students felt more confident in their Geography competence than in their Education competence and Supportive competence, which was also confirmed by their lecturers. There were six factors that affected the development of students’ competences, with the biggest impact being the Learning facilities, followed by the Students and Teaching methods, then Training curriculum and Instructors, and the last being the Assessment. This conclusion was based on the level of “agree” to “strongly agree” of both lecturers and students. The study thus far has presented important results based on an initial survey of GEC’s pre-service teachers and teacher educators to examine the impact of specific factors on the formation and development of their GEC. Program designers and pedagogical lecturers need to improve the content, teaching methods, and assessment so that students can reach a higher level of competence when they complete training.

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