

DEVELOPMENT OF EXPERIENTIAL TEACHING COMPETENCE THROUGH SCIENCE RESEARCH FOR GEOGRAPHY PRE-SERVICE TEACHERS AT CAN THO UNIVERSITY

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Abstract. Experiential teaching competence (ETC) which has been giving positive supports for teachers in developing qualities and capacities of high school students. Scientific research is a potential resolutions to develop ETC for geography pre-service teachers during the training process. This report summarized some resolution experiences and results on developing ETC by promoting students take part in science researches at Can Tho University (CTU). Observation, interviewing student researchers and their advisers in the period of 2016 – 2019, group researchers had followed and measured the positive changing degree of the ETC of geography pre-service teachers. Orienting and choosing scientific research issues; fostering knowledge and skills in scientific research and education for geography pre-service teachers in teaching process; improve the competence and responsibilities of instructor; support and create encouraged environment to students who have been participating are some activities which have been used at CTU. Research results have given positive contribution to improve up their ETC.

Keywords: Competence, experiential education, experiential teaching competence, geography pre-service teachers, student scientific research.

1. Introduction

Scientific research is a practical proposal to help learners develop qualities and competencies, improve the quality of training, contribute to create or apply their knowledge in diverse real situations [1, 2]. It also positively supports to the learning process at the pedagogical university.

Experiential education (EE) is an educational theory which were developed in the second half of XX century and applied in many countries such as the United States, England, Australia (Kolb, 2015) [3]. Many studies have analyzed and sum up the concepts of EE clearly [4, 5] include the learners' experience levels [6, 7], characteristics and learning cycles through experience learning, applying experiential activities in some different subjects [8, 9, 10]. Teacher creat convenient environment for learners to connect and reflect personal experiences to solving problems, situations or many tasks and applying them to the new situations which are associated their lives. Learning through experience helps learners develop qualities and competencies effectively. EE was encouraged by many countries and organizations around the world. The renovation of Vietnam education in recent years has been interested in encouging experiential education activities in every subjects [1].

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Methods of educational and social science research is an integrated approach [11]. Scientific research experiencing carries a great potential for development of student' qualities and competencies. Development ETC through organizing for Geography pre-service teacher studied on how to apply EE theory in teaching process and its effectiveness would be presented in this report. Research result will contribute one more solution for developing experiential teaching competence of Geography pedagogy students.

2. Content

Research results are based on a combination of these methods: (1) analysis, synthesis of documents and statistics, (2) observations 14 students and (3) in-depth interviews 4 instructors and 7 students who have been participating in scientific research association with EE in the period of 2016-2019 at CTU. Observation has been used during the teaching and guiding scientific research process. The criteria' observation were the manifestations of experiential teaching capacity - how they assigned, supported and feedbacked, abstracted conceptualisation, resolved situations. Student researchers had participated in self-assessment ETC before and after participating in their researches. The lecturers always informed and explained clearly for their students about the assessment results. The interviews aimed to collect results of capacity development, difficulties and recommendations for developing experiential teaching capacity through scientific research. The results of developing ETC were also demonstrated through some academic products of these students.

2.1. Science research

2.1.1. The concept of science research

Scientific research is to discover laws and postulate theories that can explain natural or social phenomena that is acquired using the scientific method [12]. According to Vu Cao Dam (2016) [13], science research is finding things that science hasn't been know, either discovering the essence, developing scientific knowledge about the world, or creating new methods and techniques, transforming things or phenomena to service for human activity goals. In other words, this is the process of exploring and discovering new knowledge for humanity. The value of these activities often associate with reality, direct to support the human life and is implemented through scientific research methods which are reliability and validity.

2.1.2. Forms of scientific research in students

Students can research science through variety of forms: research assignments in subjects, essays, graduate theses, student scientific research topics, or join in cooperating project.

2.1.3. The meaning of scientific research for students

Scientific research is an important activity to develop students' qualities and competencies. Nguyen Trung Kien (2018) [14] has pointed out some important roles when students participate in scientific research:

- Deepen their knowledge and professional skills related to their work
- Develop quality and capacity of a science researcher
- Develop lifelong self-study capacity
- Foster their motivation and career love

Scientific research is not only meaningful to individual students, but also contributes to improving training quality and lecturer' competences. Promoting student scientific research is a potential resolution to promote ETC.

2.2. Experiential teaching competence

2.2.1. Teaching competence

Competency, according to Deakin Crick (2008), is “*a complex combination of knowledge, skills, understanding, values, attitudes and desire which lead to effective, embodied human action in the world, in a particular domain*” [15]. Meier and Cuong (2014) [16] empassed it is the ability to perform tasks successfully and responsibly, solve problems in diversity situations with the combination of knowledge, skills and other psychological attributes (such as motivation, values, thorough thought and willingness to act). Personal competence is an attribute which is innate or result of practice [14]. For teachers, competence is the ability to perform their duties in working process [17]. In summary, teaching competence is complex combinations of knowledge, skills, understanding, values and attitudes, leading to effective action in variety situations [18].

2.2.2. Experiential teaching competence

Boud D., Cohen, R. and Walker D. (1993) [6] analyzed the defination of experience clearly. Experience is not only sensing, knowing but aslo emphasizing that participants must evaluate, think and connect with other experiences. This is the process contain both of experiencing and what is experienced. Experiential learning is a “process of transforming experiences” through experiential activitiy that requires two factors simultaneously: (1) the direct participation of individuals in the action and (2) drawing experience and applying into a new situation.

Experimental teaching competence (ETC) is the capacity of teachers to organize students to participate in sucessful experience activities. ETC includes the following main components: knowledge of experiential teaching and professional practice; competence to develop experiential teaching plans; implementation organization, assessment and adjustment orientation after experience teaching organization. Experiential teaching in the new general Vietnam education program (apply after 2021) includes experiential activities that is educational activities and experiential activities in each subject. Geography is both associated with nature and associated with the socio-economy, there are many opportunities for future teacher to organize experiential activities.

2.3. How to develop ETC for geography pre-service teachers through scientific research?

2.3.1. Orienting and choosing scientific research issues

EE has been focused in our country since the early years of the 21st century with diverse approaches. Therefore, research directions on teaching experience in geography are still wide open. The role of lecturers and scientific advisers is directing related research issues:

- Distinguishing experiential teaching from other teaching perspectives and the relationship between this theory and the direction of educational innovation in our country.
- Forms and methods of experiential teaching at high school in general and in geography.
- Applying EE in each subjects and experiential education activities; experiential activities in teaching geography (for the current and the new general education program).
- Experiment results and what has been experienced.

Students who have been oriented will have a good basis for selecting research issues. Lecturers can make a direction through the process of teaching modules, guide students in internships and dissertations or in a scientific research adviser role. For example, in the Geography Teaching module, GGS students were oriented to conduct fieldwork and write a report on the reality of organizing experiential activities in high school.

2.3.2. Fostering knowledge and skills in scientific research and education for geography pre-service teachers in teaching process

To participate in scientific research, students need the basic knowledge and skills to support. Firstly, students need knowledge and skills in scientific research - tools to implement social science research methods such as questionnaire surveys, interviews, pedagogical experiments. Second, students must have teaching geography skills, organizing educational and vocational activities. Third, students need to equip professional science knowledge and skills. Fostering these above requirements can be done through the content of specialized modules, integrated into the others relative modules; when a student are participating as a researcher for scientific research projects or training courses.

2.3.3. Improve the competence and responsibilities of instructors

Students have limit experience in scientific research and instructors take important role to effect on research result. Firstly, instructors organize and give right orientation for students or research groups. Second, they support, motivate enthusiastically and responsibly, limit mistakes and help students carry out research plan. Adviser competence can improve by training, sharing and learning experience during the process.

2.3.4. Policies to support and create encouraged environment to students who have been participating

To attract students to participate effectively, they need to be support for researching process and product publication by: create convenient conditions for students to publish research results (report to scientific councils, publish journals); introduce scientific research awards to students; select valuable products to recommend to appropriate users; support about the finance for project; reward for students,... Beside that, the universities can introduce excellent studiers to the best employers.

2.4. Results of developing ETC for geography pre-service teachers through scientific research at CTU (2016-2019 period)

Developing ETC for geography pre-service teachers has been implemented at CTU through many activities (Table 1).

Table 1. Some activities to develop the ETC of geography student teachers at CTU associated with scientific research tasks in the period of 2016-2019

Activities	Object and time	Products
1. Organize students to research the actual situation of teaching experience in high school	3rd year student, in 2018-2019	37 analysis reports of students
2. Orientation of students to conduct bachelor thesis which related to EE	4th year student, every year	07 bachelor theses; 11 experimental lesson plans on experiential teaching, 02 related scientific researches
3. Group of students have been researched and supported university-level scientific research projects	3rd and 4th year student, every year	

In activity 1, there was 67.6% of students analyzed all of the organized experiential activities, 32.4% of them only identified and described the educational experience activities. All of them have analyzed the effectiveness of observing experience activities and answered “what should we do to improve experiential activities in high school effectively?” Through reality research, 83.8% of students have felt more motivated to organize experiential activities in their

career. Students said that «learning through experience helped to change the atmosphere of the classroom, developed many student' qualities and competencies».

In activity 2 and 3, the instructors' evaluation showed that the components of ETC have improved significantly with sig <0.05 (Table 2). The development of ETC components were measured with 95% reliability and Cronbach's Alpha was 0.861. All students also self-assessed that they improved their ETC with comparative resemblance result.

Table 2. T-Test in pairs result of instructor assessment on the development of ETC for geography pre-service teachers at CTU

<i>Components of ETC</i>	<i>Evaluation result before</i>	<i>Evaluation result after</i>	<i>Level of significance (2 tailed)</i>
Knowledge	2.21	3.57	.000
Design experience activities	2.92	3.78	.000
Organize experience activities	2.85	3.78	.000
Evaluate experience activities	2.57	3.36	.000
Reflection and adjustment orientation	2.85	3.36	.003

Source: results of interviewing lecturers 2017-2019 (average of 14 students, 5 levels of scale: (1) Basic; (2) Imitate; (3) Apply; (4) Advance (performing proficiency) and (5) Expert)

The table showed that student researchers increased positively about the knowlege of EE theory and it' applying in geography. Designing experience activities and organizing experience activities had also changed significantly with more than 60% students had gotten performing proficiency level. Student' capacity of evaluating experience activities, reflection and adjustment orientation had had lower average changing, with more than 40% students had developed). The majority of self-assessment students after joining to science research achieved at levels between 3 and 4 on the scale.

2.5. Discussion

2.5.1. Participation in scientific research has helped geography pedagogy students develop their ETC

Evaluated results of instructors and self-assessment results of students showed the development of students' ETC through specific practical actions. First, students have identified the forms and methods of organizing experiential activities and analyzed its role in teaching process, specifically for geography. Next, students could design clear, feasible experiential activities with many different content, by a lot of methods which could be implemented. Example, puplis were role-played servicers and pointed out “what are elements of the market and its rule?” (T.T.H.L – 4th year student, lesson about “Trade geography”) or a group of 03 students implemented the experimental activity to be named «To learn about environmental change in Phong Dien district, Can Tho city” for about 30 pupils at Phan Van Tri high school successfully. Pupils had been divided in 4 groups to study about environmental change at their local, made a video or brochure and presented before the class. There were fourteen students finished their bachelor theses expressed indeep understanding about EE theory and result in applying. Almost experiential activities that these students organized were quite successful and appreciated with high school object. In addition, there were a lot evidents of good experiece in assessment from these students. They could designed many situation questions, duties conect

with the real world, student's concrete experiences and assessment tools appropriately. For example, after studied and presented the poster about the benefits and drawbacks of transport means individually (train, car and river...) in the lesson "Some kind of transport means", all students were given in a situation that "Role-play a transportation adviser and give suitable advices for the customers in some different cases". Finally, students learned through experience, reflected strengths and weaknesses about themselves and their friends in organized experiential activities. Besides that, student studies organized, managed, instructed, solved almost research situations. They surveyed, interviewed, observed and made an academic report. It helped them improve guiding research skills – a good experiential activity for almost pupils. It is easy to see that, through scientific research, student's ETC has been grown up with a little support from their instructors.

2.5.2. The result of developing ETC through scientific research aren't steady, it's depending on many factors

Participating in scientific research, but the level of development of student's ETC is not the same. Students develop well in knowledge (100%), organizational skills (78.6%). Students' planning skills are becoming more and more complete, however, the ability to create ideas in teaching experience plan is still limited (only about 30% of all students). In other words, students could implement well the proposed plan but the ability to create new ideas has been limited. After each activity, students have almost realized what is imperfect. The problem is that ability to transfer these experiences, some students are still weak. Example, among 9 students who participated in scientific research in 2018-2019 about organizing experience teaching in geography, 05 students developed proficient organizational skills (level 4) and 2 students had ability to organize and orient in the research team, to act as a young expert for colleagues (level 5), others could apply the theory with some mistake. All 9 students developed research motivation but only 03 students had new applying ideas during the research process.

The result in developing students' ETC were different because of some reasons. Firstly, experienced time was limited in a few months (students only had a few weeks for 2 months for practice). Secondly, degree of experience (students who have experienced many times will be able to develop their skills better). *«Thanks to previous projects, it helped me to learn from experience better»* – Trinh, a fourth year student, who had supported a research project before studied her thesis shared. Thirdly, the result involved in the beginning point of a student – all individual competences which supported for them in the research process (with the same lesson plan but every student expresses their competence differently).

2.5.3. Development ETC for geography pre-service teacher through scientific research had some difficulties

Interviewing the lecturer and student researchers show that the development of ETC through scientific research had some difficulties. The first, students are afraid to carry out research projects on teaching method field. According to many student researchers, these research projects are more difficult and strenuous because they had to experiment with a lot of steps or teachers and students in high schools sometimes don't cooperate. The second, student's participating promotion in scientific research is restricted. Many students chose alternative modules instead of making a bachelor thesis. Despite many announcements and encouragement from the university and department, the number of research students is very low. The third, basic capacity of students isn't strong enough. *«The lack of students' skills, especially self-searching skills has been affecting on output quality research»* – a lecturer said. The final difficulty for lecturers and students was the finance for scientific research is limited. In some studies, students must spend too much of their own money to purchase equipment, remuneration, gifts....

2.5.4. Developing the student capacity of teaching experience through scientific research should be maintained, pervaded and inherited

Developing ETC for future geography teachers through scientific research is an effective measure that needs to be maintained in the future. However, in order to develop ETC through scientific research effectively, the training program need to spread and enhance inheritance. Firstly, it is necessary to spread the spirit and research results to students. Usually, only students who participated in research had just developed their competencies clearly. The author must be organized to report their research results in front of the group or publish them in the scientific journals. A very small percentage of research results was published at the present. Secondly, research projects should be inherited. Students must understand previous studies and continue to add new approaches and results to avoid duplication, waste of time. In, addition, the group of authors could introduce their lesson model which were experimented successfully for many other geography teachers and schools.

3. Conclusions

With the achieved results, it could be affirmed that the scientific research direction is appropriate and needs to help geography pedagogy students develop ETC. Through the above-mentioned scientific research activities, students not only develop ETC but also improve the qualities and other professional competencies (career development, organizing environment development, self-study, communication and cooperation,...). In order to enhance number of participating students, quality and effectiveness of developing ETC through scientific research, it is necessary to pay attention to create motivation from the university, department and each lecturer and student. In particular, we should continue to integrate theory of EE in the necessary modules; improve teaching skills and scientific research skills for students and researchers; taking measures to foster and encourage lecturers and students. Developing experiential teaching capacity through scientific research is an effective model that needs to be utilized, maintained and developed.

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