SOLUTIONS TO IMPROVING GOOGLE EARTH, EARTH PRO AND MAPS APPLICATION IN TEACHING PHYSICAL GEOGRAPHY TO GEOGRAPHY PEDAGOGY STUDENTS, DONG THAP UNIVERSITY

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Abstract

The project proposes solutions to improving the application of Google Earth, Earth Pro, and Maps in teaching Physical Geography to Geography Pedagogy students, Dong Thap University. On surveying and assessing the current situation, some solutions are proposed such as: For lecturer: Chossing software and integrated contents; Coordinating with other teaching software, forms and media; Practicing regularly; Promoting student autonom; For students: Raising awareness; Participating in thematic reporting sessions; Enhancing self-study and research; Frequently deloying software; Other solutions: Increasing investment in facilities, references; Sharing thematic reports. The survey results for lecturers, subject students and geography experts outside the school were mostly rated at Quite Agree (Important) and Totally Agree (Very important) for the solutions that we have implemented.

Keywords: *Apply Google Earth, Dong Thap University, Google Earth Pro and Google Maps in teaching, Geography Pedagogy student.*

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GIẢI PHÁP NÂNG CAO HIỆU QUẢ ỨNG DỤNG GOOGLE EARTH, GOOGLE EARTH PRO VÀ GOOGLE MAPS TRONG GIẢNG DẠY ĐỊA LÝ TỰ NHIÊN CHO SINH VIÊN NGÀNH SƯ PHẠM ĐỊA LÝ, TRƯỜNG ĐẠI HỌC ĐỒNG THÁP

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Tóm tắt

Nghiên cứu được thực hiện nhằm đề xuất giải pháp nâng cao hiệu quả ứng dụng Google Earth, Google Earth Pro và Google Maps trong giảng dạy Địa lý tự nhiên cho sinh viên ngành Sư phạm Địa lý, Trường Đại học Đồng Tháp. Trên cơ sở khảo sát, đánh giá thực trạng, một số giải pháp được đề xuất như: Đối với giảng viên (Lựa chọn phần mềm, công cụ tích hợp cho từng nội dung cần truyền đạt; Phối hợp với các phần mềm, hình thức, phương tiện dạy học khác; Triển khai thường xuyên; Phát huy vai trò chủ đạo của sinh viên); Đối với sinh viên (Nâng cao nhận thức; Tham gia các buổi báo cáo chuyên đề; Tăng cường khả năng tự học, tự nghiên cứu; Thường xuyên sử dụng và khai thác phần mềm); Giải pháp khác (Tăng cường đầu tư cơ sở vật chất, tài liệu tham khảo; Trao đổi chuyên môn, báo cáo chuyên đề). Kết quả khảo sát đối với giảng viên, sinh viên bộ môn, chuyên gia địa lý ngoài trường hầu hết đánh giá cao ở mức Khá đồng ý (Quan trọng) và Hoàn toàn đồng ý (Rất quan trọng) đối với các giải pháp mà chúng tôi đã thực hiện.

Từ khóa: *Google Earth Pro và Google Maps trong giảng dạy, sinh viên ngành Sư phạm Địa lý, Trường Đại học Đồng Tháp, ứng dụng Google Earth.*

1. Đặt vấn đề

In order to enhance the application of information technology (IT) and use of software to improve the education and training quality, the Ministry of Education and Training (MOET) has issued many relevant official documents such as: Decision No. 117/QD-TTg 2017, Circular No. 08/2010/TT-BGDDT, Plan No. 345/KH-BGDDT 2017, Official Document No. 5807/BGDDT-CNTT and Official Dispatch No. 4966/BGDDT-CNTT, etc. over past years, especially the MOET's official dispatches on guidance on implementing IT tasks at the beginning of the academic year (typically Official Dispatch No. 4096/BGDDT-CNTT issued at the early 2021-2022 academic year), stating an important content in application of IT and digital transformation when innovating curriculum, teaching methods and assessment methods.

The IT application requires to increase the investment in IT facilities and equipment to meet the needs of administrators, teachers and pupils, lecturers and students; use the IT equipment and software as tools to support the teaching and learning of courses and modules in the schools; utilize lesson design software effectively; increase the use of the internet to search information, references and develop good lesson plans and activities. In the IT application, the above requirements will be satisfied by using the software in general or Google products in particular in teaching.

Although newly introduced, Google Earth (2004) and Google Maps (2005) may, based on high-resolution remote sensing images, cover large spaces across the entire Earth or specific site contributing to providing visual and vivid images in order to convey information effectively leading the learning and teaching process simply and more attractive. In addition, Google Earth and Google Maps can also link some specific illustrations uploaded the users. With the outstanding advantages of 3D technology, geographical objects in general and Physical Geography in particular become vivid and close to reality; as a result, the students can form and connect knowledge into space quickly.

In this regard, researches by Le (2009), Dang and Phan (2012), Nguyen (2016) and Tran (2018) have focused on technical field. In the education, the researches and application of Google Earth, Google Maps are still very limited; integrating Google Earth, Google Earth Pro and Google Maps in teaching in general, Geography and Physical Geography in particular has not been investigated.

For the purpose of using and applying visual software in teaching and instructing future students in high schools, one of the necessary things of current students in pedagogical schools is given the opportunity to learn related contents and directly participate in using and applying the Google Earth and Google Maps software in geography course.

For universities, in addition to updating learning outcomes and curriculum, innovating teaching methods also should be paid attention. Although these applications have unique features and practical requirements, many lecturers and students have not been interested, so their uses in geography teaching-learning at the Department of Geography, Dong Thap University is still limited and their unique features have not been promoted. Therefore, necessity of research on the effective application of them is given with purpose to help Geography students meet the requirements of general education innovation in 2018 after they are graduated. Realizing such importance, in the 2022-2023 academic year, we conducted the research on application of some Google software in teaching Physical Geography for the students of Geography Education in Dong Thap University.

During investigating, surveying and evaluating the current status of lecturers' teaching and students' learning, solutions to effectively exploit Google Earth, Google Earth Pro and Google Maps in teaching the Physical Geography for the students of Geography Education in Dong Thap University have been applied. In addition, we also surveyed the geography lecturers and experts of the University and outside to validate the scientific nature of the applied solutions.

2. Current status of using the Google Earth, Google Earth Pro and Google Maps in lecturers' teaching and students' learning at the Department of Geography, Dong Thap University

2.1. Students' insufficient awareness and uses of the software set in studying the Physical Geography modules

By using a 5-point importance scale: 1.Not at all important, 2.Less important, 3.Unknown,

4.Important, 5.Very important (Tran, 2014; Nguyen, 2015) during the current situation assessment, we investigated with survey questionnaire method to determine the students' awareness of about the importance of using and exploiting the Google Earth, Google Earth Pro and Google Maps in learning the Physical Geography modules. With research population of 50 students in Geography Education, the survey findings are shown in Table 1. The findings showed that the majority of answers are at levels 1, 2 and 3. Accordingly, it can be initially seen that the students are not aware of the importance of using and exploiting the Google Earth, Google Earth Pro and Google Maps software in studying the Physical Geography modules. In particular, during the teaching process, we used Q&A questions and the findings were similar to the survey questionnaire; most students are at level 3. Unknown. The students have heard about such software but they do not know how to use and exploit the above software from Google in their study in general and Physical Geography in particular and their future career.

Table 1. Students' awareness of importance of using and exploiting the software in studying the Physical Geography modules

Survey item	Survey questionnaire				
	Awareness (%)				
	1	2	3	4	5
Awareness of importance of using and exploiting the Google Earth, Google Earth Pro and Google Maps software in studying the Physical Geography modules	24.0	14.0	52.0	6.0	4.0

Surveyed by investigation team in August 2022, n = 50

2.2. The students have not regularly used and exploited the software in studying the Physical Geography modules

With 5-point scale: 1.Never, 2.Rarely, 3.Unknown, 4.Frequently, 5.Very often, the survey questionnaire was used with the findings as shown in Table 2. The above findings showed that the use and exploitation in the level 1 is mainly, followed by level 2; no student have regularly or very often used and exploited the Google Earth, Google Earth Pro and Google Maps software in studying the Physical Geography modules.

Table 2. Students' regular use and exploitation of the software in studying the Physical Geography modules

Survey item	Survey questionnaire				
	Regular use frequency (%)				
	1	2	3	4	5
Regular use and exploitation of Google Earth, Google Earth Pro and Google Maps software in studying the Physical Geography modules	60.0	26.0	14.0	0.0	0.0

Surveyed by investigation team in August 2022, n = 50

2.3. The students' ability to use and exploit the software in studying the Physical Geography modules has been still weak

With 5-point proficiency scale: 1.Not proficient, 2.Less proficient, 3.Uncertain, 4.Proficient, 5.Very proficient to help the students self-assess their personal abilities in using and exploiting Google Earth, Google Earth Pro and Google Maps software in studying Physical Geography modules, the findings are shown in the Table below. In addition to the survey questionnaire, in order to accurately assess the students' abilities to offer appropriate solutions, in the first semester of the 2022-2023 academic year, before starting the module, 4 students were chosen randomly from each class (each course) and given the requirements to be completed. For example, for the Physical Geography of Continents 1, the students were required to design the opening lesson to introduce the teaching the Europe lesson. For Physical Geography of Vietnam 1, the students were required to design to consolidate lessons in the Mekong Delta region. For the Physical Geography in Field module, the students were required to design a 5-day, 4-night Nha Trang-Da Lat field trip. For the Ecogeography

module, the students were required to design the routes, sampling locations, etc. The lecturers observed the students while they were completing their assignments and guided them in class, then assessed the students by the 5-point proficiency scale: 1. Not proficient, 2. Less proficient, 3. Uncertain, 4. Proficient, 5. Very proficient. The assessment results showed that most students' abilities are at the not proficient or less proficient level. As a result, it is necessary to implement the solutions to improve the ability to use and exploit the Google Earth, Google Earth Pro and Google Maps software in studying the Physical Geography as well as applying the same in their future academic career.

Table 3. Students' self-assessment of ability in using and exploiting the software in studying the Physical Geography modules

Survey item	Survey questionnaire				
	Ability (%)				
	1	2	3	4	5
Students' ability in using and exploiting Google Earth, Google Earth Pro and Google Maps software in studying the Physical Geography modules	68.0	14.0	12.0	4.0	2.0

Surveyed by investigation team in August 2022, n = 50

Table 4. Lecturers' assessment of students' ability to use and exploit the software via exercises

Survey item	Exercises				
	Completion (%)				
	1	2	3	4	5
Students' ability in using and exploiting Google Earth, Google Earth Pro and Google Maps software in studying the Physical Geography modules	76.0	8.0	14.0	2.0	0.0

Surveyed by investigation team in August, September 2022, n = 12

2.4. The lecturers have not regularly used and exploited the Google Earth, Google Earth Pro and Google Maps software in teaching the Physical Geography modules

With 5-point scale: 1.Never, 2.Rarely, 3.Unknown, 4.Often, and 5.Always, the survey questionnaire was used to assess the frequency of lecturers' regular use and exploitation of Google Earth, Google Earth Pro and Google Maps software in teaching the Physical Geography modules with the findings as shown in Table 5. The survey findings showed that the first 3 levels were accounted for significantly, especially 3. Unknown in very high percentage. This may not be result from the students not clearly understanding in the homework assigned by the lecturers, whether the group assignments required the use and exploitation of Google Earth, Google Earth Pro and Google Maps software.

Table 5. Lecturers' frequency of use and exploitation of the software in teaching the Physical Geography modules

Survey item	Survey questionnaire				
	Frequency (%)				
	1	2	3	4	5
Lecturers' frequency of use and exploitation of Google Earth, Google Earth Pro and Google Maps software in teaching the Physical Geography modules	28.0	32.0	38.0	2.0	0.0

Surveyed by investigation team in August 2022, n = 50

2.5. The lecturers have not regularly assigned the homework related to the use and exploitation of the software in teaching the Physical Geography modules

To assess the frequency of assigning homework related to the use and exploitation of Google Earth, Google Earth Pro and Google Maps software in teaching the Physical Geography modules, in teaching the Physical Geography modules: With 5-point scale: 1.Never, 2.Rarely, 3.Unknown, 4.Often, and 5.Always, the survey questionnaire was used with the findings shown in Table 6.

Table 6. Lecturers' frequency of assigning homework to students related to the use and exploitation of the software in teaching the Physical Geography modules

Survey item	Survey questionnaire				
	Frequency (%)				
	1	2	3	4	5
Lecturer's frequency of assigning homework to students related to the use and exploitation of Google Earth, Google Earth Pro and Google Maps software in teaching the Physical Geography modules	38.0	26.0	34.0	2.0	0.0

Surveyed by investigation team in August 2022, n = 50

The survey findings showed that the first 3 levels were accounted for significantly. This means that the lecturers have not regularly assigned the homework related to the use and exploitation of Google Earth, Google Earth Pro and Google Maps software in teaching the Physical Geography modules to help the students improve their ability and apply it in the future teaching process at the high schools to promote the current students' positivity, initiative, and creativity.

2.6. Lack of facilities and materials for the use and exploitation of the software

With 5-point scale of facilities: 1.Very inadequate, 2.Inadequate 3.Relative, 4.Adequate, 5.Very adequate, the survey questionnaire was used to assess equipped facilities (network cable or wifi), reference materials (provided at the university library) for the use and exploitation of Google Earth, Google Earth Pro and Google Maps software during the learning/teaching process, the findings are as follows:

Table 7. Equipped facilities and reference materials serving the use and exploitation of the software

Survey item	Survey questionnaire				
	Satisfaction (%)				
	1	2	3	4	5
Facilities	54.0	44.0	2.0	0.0	0.0
Materials	46.0	48.0	6.0	0.0	0.0

Surveyed by investigation team in August 2022, n = 50

The survey findings showed that, as of August 2022, the equipped facilities (no network cables, very weak Wi-Fi), and materials for using and exploiting Google software. Earth, Google Earth Pro and Google Maps in the learning and teaching process were very lack (so the University has not provided in the university library). Especially when using and exploiting the above software, strong wifi network is required. However, in reality, the students mostly used the network from sharing 3G to many students, the network so were weak and unstable. It is therefore required to give a solution to upgrade the Ethernet or Wi-Fi in the Department of Geography and provide additional references, materials (if available on the market in the near future) to use and exploit well Good software Google Earth, Google Earth Pro and Google Maps in the learning and teaching process of students and lecturers.

3. Solutions to enhance the efficiency of applying the software in teaching the Physical Geography for the students of Geography Education, Dong Thap University

Based on the teaching process during the past time; the survey findings on current status of using Google Earth, Google Earth Pro and Google Maps in teaching by lecturers and studying by the students of Geography; facilities and policies of the University, 3 groups of solutions for lecturers, for students and other solutions are offered.

3.1. Solution groups for the lecturers

3.1.1. Selecting appropriate software and tools for each lesson item

The Google Earth, Google Earth pro and Google Maps include lots of tools. Each software and each

tool has its advantages and limitations and is suitable for different lesson item. So, it is hard for the lecturers to use and exploit all the tools during their teaching. The lectures should base on the objectives (Learning outcomes) and curriculum to select the appropriate software and tools. This will therefore help the lecturers to convey the lesson knowledge well and contribute to improving practical skills, positivity, initiative, and creativity of students in the current learning and applying it to their future career in high school after graduation.

For example: When the lectures want to design the content introducing the lesson, reinforce the lesson or Local Geography, we choose the Google Earth and the Create Project tool. Or when the lectures want to see changes in the Amazon forest, Historical Image Display tool should be selected.

By selecting appropriate software and tools as above, the process of introducing and consolidating lessons will attract the students and promote positivity, initiative, self-study and group work,... through assessment, the students learn about the causes of changes in the Amazon forest.

3.1.2. Combining with other software, forms, and teaching aids

It is necessary to coordinate the use and exploitation of Google Earth, Google Earth pro, Google Maps with teaching aids such as images, video clips and atlases, etc. In addition, it is also necessary to combine with other forms of experience by research, local surveys and other teaching methods (description, discussion…, etc.) to improve thinking ability, create specific, vivid symbols about geographical objects for students, thereby stimulating and promoting the students' interests, positivity, creativity, and self-study.

For example: For Physical Geography of Vietnam Module 2, Chapter 4. South Central and Southern Region, sec. 2.2.4. the Southwest region, in terms of the topography, hydrology, and soil, in addition using Google Earth and Google Earth pro, we can use and exploit the Google Maps to identify and build routes to mountains, seas and forests, ... Furthermore, it is also necessary to exploit regional maps in the Atlas of Vietnam, images on the Internet, textbooks and maps for the lectures,...etc. Where appropriate, it should be combined extracurricular activities, experience and practice with the classroom. Going to the riverbank to observe the riverbank, river terraces, mudflats, measuring silt particles and water chemical composition, etc. will help to develop practical knowledge and specific symbols to improve teaching quality and meet current educational innovation requirements.

3.1.3. Regularly implementing the use and exploitation of the software in the teaching and learning process

- Integrate the content of using and exploiting the software into the activities of lecturers and students in the syllabus

In order to regularly apply such software in the teaching-learning process, the use and exploitation of Google Earth, Google Earth Pro and Google Maps software should be integrated in the activities of lecturers and students in the syllabus in general and the Physical Geography modules in particular. This is a core to develop the new knowledge, improve skills to use and exploit during the learning process and apply to teaching related contents in high schools in students' future academic career. During the implementation, attention should be paid to the combination of software and tools and diversity of teaching forms and methods to avoid abuse of using and exploiting the Google Earth, Google Earth Pro and Google Maps causing boredom among students. In the 2022-2023 academic year, we have updated the content of using and exploiting Google Earth, Google Earth Pro and Google Maps software in the lecturers' teaching and students' learning in the syllabus of the Physical Geography (Department of Geography, 2022).

- Increase the homework for the students related to the use and exploitation of the software

In addition to integrate the mentioned content into the activities of lecturers and students in the syllabus, it is necessary to increase the homework to the students with the contents related to the use and exploitation of Google Earth, Google Earth Pro and Google Maps. In the 2022-2023 academic year, in all courses related to the Physical Geography, we assigned the homework to the students. The students must learn, research related contents and prepare their reports. The findings showed that Geography students knew how to use and exploit Google Earth, Google

Earth Pro and Google Maps software well in almost all individual and group reports.

- Integrate the content of using and exploiting the software into thematic reports and extracurricular activities

In order to regularly implement the use and exploitation of such software in the teaching-learning process, in addition to integrate the activities of lecturers and students, increase the homework to the students...etc. it is very necessary to require the thematic reports and extracurricular activities with the content related to the use and exploitation of Google Earth, Google Earth Pro and Google Maps for the lecturers and students. During the 2022 - 2023 academic year, we required 01 round of thematic reports for the lecturers, 04 thematic reports and extracurricular activities for the students of all classes.

3.1.4. Promoting the students' leading role in using and exploiting the software in the teaching-learning process

In the teaching-learning process, the thematic reports, and extracurricular activities must promote the leading role of students. Regularly implementing and promoting the leading role in the tasks given by the lecturers will help the students both absorb new knowledge well and improve their skills in using and exploiting Google Earth, Google Earth Pro and Google Maps to serve their current study and future career. Currently, in all Physical Geography modules: Physical Geography in Field, Ecogeography, Physical Geography Introduction, Physical Geography of Continents, Physical Geography of Vietnam...etc. the leading role is one of the very important bases for assessing the students' regular test scores.

During promoting the leading role of students, it is also necessary to pay attention to their abilities. Depending on the level of each student, providing additional training and assigning specific content area suitable accordingly. When making a request, it is required to give direction and explanation to make it easier in the process of completing assignments and reports.

3.2. Solution groups for the students

3.2.1. Enhancing the awareness of the importance of using and exploiting the software

The students' awareness of the importance of using and exploiting Google Earth, Google Earth Pro and Google Maps software is increasingly enhanced by regular implementation given by the lecturers during teaching the Physical Geography, thematic reports, extracurricular activities, fieldwork and Geography student meetings...etc.

3.2.2. Participating in reporting sessions related to using and exploiting the software

Students need to participate in reporting sessions related to using and exploiting Google Earth, Google Earth Pro and Google Maps software. By participating the reporting sessions, the students not only learn from the lecturers and obtain the answers for their questions during the process of self-study and self-research, but also learn and share with friends. During the reporting sessions of lecturers-students, students-students, the Geography students participated fully and actively exchanged and discussed with the lecturers and peers to clarify the use and exploitation of Google Earth, Google Earth Pro and Google Maps software.

3.2.3. Enhancing the ability to self-study and research

The world is not static, and if we don't keep up, then we fall behind. In addition to the time of instructions, teaching, thematic reports, extracurricular activities, practical fieldwork, and student meetings of the lecturers, it is necessary for the students to equip themselves with the ability to self-study and research. In the era of information technology, the knowledge and software are always updated and changed continuously over time; so the ability to self-study is very necessary. In general, the Geography students initially develop the ability to self-study and research in using and exploiting the Google Earth, Google Earth Pro and Google Maps software in their study such as: self-exploration, self-study on more functions and tools of Google Earth, Google Earth Pro and Google Maps; receive, process, and synthesize relevant information; determine the content to be applied; develop the objectives of the report and make overall thinking (consistency and completeness);…

3.2.4. Regularly using and exploiting the software during the learning process

During the learning process, with the homework, assignments given the lecturers, the students should regularly use and exploit the Google Earth, Google Earth Pro and Google Maps software. Our brains

tend to forget memories of things that happened to recall and then forget if not exposed regularly. In the thematic reports, the Geography students often use and exploit the Google Earth, Google Earth Pro and Google Maps software. This helps them to recall for a long time, memorize functions and tools well, thereby effectively exploit the Google Earth, Google Earth Pro and Google Maps software in the current learning and future academic career after graduating to teach related contents.

3.3. Other solution groups

3.3.1. Increasingly investing the facilities to serve the use and exploitation of the software

In order to ensure the good use and exploitation of functions in Google Earth, Google Earth Pro and Google Maps, the Internet connection is extremely important. Depending on actual conditions, the increase and investments are provided appropriately. We have equipped Wi-Fi routers. When the number of students is increased, 4G network can be used to ensure strong connection. Up to now, the University has invested in a relatively strong Wi-Fi system, covering everywhere in the campus and classrooms. This way will improve the efficiency of using and exploiting the Google Earth, Google Earth Pro and Google Maps software in the students' learning process.

3.3.2. Increasingly investing the materials for the use and exploitation of Google Earth, Google Earth Pro and Google Maps software

In order to meet the reference needs of students, in the context of limited textbooks and books in this field, we provided files, introduced website addresses and YouTube links to serve the use and exploitation of Google Earth, Google Earth Pro and Google Maps software. In addition to the materials provided by the lecturers, the students are also required to regularly search and update new materials to promote their positivity, initiative, and self-study ability.

3.3.3. Enhancing professional exchange and thematic reports on the use and exploitation of the software in the teaching process

In order to improve the efficiency of using and exploiting the Google Earth, Google Earth Pro and Google Maps software in the teaching and learning, the lecturers must be the pioneers. During department meetings, the lecturers should make professional exchanges through thematic reports on the use and exploitation of Google Earth, Google Earth Pro and Google Maps software in teaching. In addition to thematic reports within the department, the lecturers also participate in professional exchanges and specialized reports related to Google Earth, Google Earth Pro and Google Maps with outside entities. Accordingly, the lecturers will pay more attention and use Google Earth, Google Earth Pro and Google Maps in the process of teaching and assigning the homework to the students.

3.4. Findings

3.4.1. Surveying to assess the efficiency of proposed solutions

To assess the efficiency of the given solution, with a 5-point scale: 1. Not important (Not necessary, Never and Not proficient), 2. Less important (Less necessary, Rarely and Less proficient), 3. Unknown (Relatively necessary, Unknown and Uncertain), 4. Important (Necessary, Often and Proficient), 5. Very important (Very necessary, Always and Very proficient), the survey method was conducted for the students of Geography Education (Dong Thap University); after implementing the solutions and findings in Table 8. It can be seen that the percentile at Level 4. Important (Necessary, Often and Proficient) and level 5. Very important (Very necessary, Always and Very proficient) is accounted for mostly; this means the significance of implementing solutions to improve the efficiency of Google Earth, Google Earth Pro and Google Maps applications in teaching the Physical Geography for the students of Geography Education, Dong Thap University.

3.4.2. Surveying on agreement and importance of proposed solutions

To assess the agreement and importance of proposed solutions, with 5-point scale: 1.Strongly disagree (Not important), 2.Relatively agree (Less important), 3.Uncertain (Unknown), 4.Somewhat agree (Important), 5.Completely agree (Very important), the survey method was conducted for the students of Geography Education (Dong Thap University) and the lecturers of Geography (Dong Thap University, An Giang University - Vietnam National University, Ho Chi Minh City, Can Tho University, Ho Chi Minh City University of Education, Saigon University, University of Science and Education - University of Da Nang) and the specific findings are shown in Table 9 and Table

Table 8. Findings of survey to assess the efficiency of proposed solutions

Survey item	Survey questionnaire				
	Findings (%)				
	1	2	3	4	5
Students' awareness of importance of using and exploiting the Google Earth, Google Earth Pro and Google Maps software in studying the Physical Geography modules	0.0	0.0	0.0	50.0	50.0
Necessity of using and exploiting the Google Earth, Google Earth Pro and Google Maps software in studying the Physical Geography modules	0.0	0.0	9.6	48.1	42.3
Frequency of using and exploiting the Google Earth, Google Earth Pro and Google Maps software in studying the Physical Geography modules	0.0	11.5	7.7	55.8	25.0
Students' ability in using and exploiting the Google Earth, Google Earth Pro and Google Maps software in studying the Physical Geography modules	3.8	13.5	25.0	46.2	11.5
Lecturers' frequency of using and exploiting the Google Earth, Google Earth Pro and Google Maps software in teaching the Physical Geography modules	0.0	0.0	13.5	67.3	19.2
Lecturers' frequency of assigning homework to students related to the use and exploitation of Google Earth, Google Earth Pro and Google Maps software in teaching the Physical Geography modules	0.0	7.7	13.5	59.6	19.2
Satisfaction of facilities to serve the use and exploitation of software Google Earth, Google Earth Pro and Google Maps	0.0	1.9	23.1	55.8	19.2
Satisfaction of materials for the use and exploitation of Google Earth, Google Earth Pro and Google Maps software	1.9	5.8	23.1	51.9	17.3

Source: Surveyed by investigation team in September 2023, n = 52

10. From the survey findings, it can be seen that the students and lecturers mostly somewhat agreed and completely agreed with the proposed solutions. In addition, the students and lecturers also rated the solutions as important and very important to use and exploit the Google Earth, Google Earth Pro and Google Maps software in teaching the Physical Geography modules for the students of Geography Education, Dong Thap University. As a result, it can be confirmed that the solutions are scientific and can be applied to other course and disciplines inside and outside the University.

Table 9. Students' agreement and importance of solutions to enhance the efficiency of using and exploiting the software

No.	Survey items	Agreement (%)					Importance (%)				
		1	2	3	4	5	1	2	3	4	5
1	**Solution groups for the lecturers**										
1.1	Selecting appropriate software and tools for each lesson item	0.0	0.0	0.0	23.3	76.7	0.0	0.0	0.0	30.2	69.8
1.2	Combining with other software, forms, and teaching aids	0.0	0.0	0.0	20.9	79.1	0.0	0.0	0.0	39.5	60.5
1.3	Regularly implementing the use and exploitation of Google Earth, Google Earth Pro and Google Maps software in the teaching and learning process	0.0	0.0	2.3	25.5	72.2	0.0	0.0	2.3	30.2	67.5
1.4	Promoting the students' leading role in using and exploiting the Google Earth, Google Earth Pro and Google Maps software in the teaching-learning process	0.0	0.0	0.0	25.6	74.4	0.0	0.0	0.0	32.5	67.5

2	**Solution groups for the students**										
2.1	Enhancing the awareness of the importance of using and exploiting the Google Earth, Google Earth Pro and Google Maps software	0.0	0.0	2.3	20.9	76.8	0.0	0.0	0.0	32.5	67.5
2.2	Participating in reporting sessions related to using and exploiting the Google Earth, Google Earth Pro and Google Maps software	0.0	2.3	0.0	23.2	74.5	0.0	0.0	0.0	27.9	72.1
2.3	Enhancing the ability to self-study and research	0.0	0.0	2.3	20.9	76.8	0.0	0.0	0.0	23.2	76.8
2.4	Regularly using and exploiting the Google Earth, Google Earth Pro and Google Maps software during the learning process	0.0	2.3	0.0	18.6	79.1	0.0	0.0	0.0	25.5	74.5
3	**Other solution groups**										
3.1	Increasingly investing the facilities to serve the use and exploitation of Google Earth, Google Earth Pro and Google Maps software	0.0	0.0	2.3	25.5	72.2	0.0	0.0	4.6	20.9	74.5
3.2	Increasingly investing the materials for the use and exploitation of Google Earth, Google Earth Pro and Google Maps software	0.0	0.0	0.0	20.9	79.1	0.0	0.0	6.9	23.2	69.9
3.3	Enhancing professional exchange and thematic reports on the use and exploitation of Google Earth, Google Earth Pro and Google Maps software in the teaching-learning process	0.0	2.3	0.0	20.9	76.8	0.0	0.0	4.6	20.9	74.5

Source: Surveyed by investigation team in September 2023, n = 43

Table 10. Agreement and importance of lecturers and experts on solutions to enhance the efficiency of using and exploiting the software

No.	Survey items	Agreement (%)					Importance (%)				
		1	2	3	4	5	1	2	3	4	5
1	**Solution groups for the lecturers**										
1.1	Selecting appropriate software and tools for each lesson item	0.0	0.0	0.0	8.3	91.7	0.0	0.0	0.0	6.9	93.1
1.2	Combining with other software, forms, and teaching aids	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	25.0	75.0
1.3	Regularly implementing the use and exploitation of Google Earth, Google Earth Pro and Google Maps software in the teaching and learning process	0.0	0.0	8.3	50.0	41.7	0.0	0.0	8.3	33.3	58.4
1.4	Promoting the students' leading role in using and exploiting the Google Earth, Google Earth Pro and Google Maps software in the teaching-learning process	0.0	0.0	16.7	33.3	50.0	0.0	0.0	0.0	41.7	58.3

2	**Solution groups for the students**										
2.1	Enhancing the awareness of the importance of using and exploiting the Google Earth, Google Earth Pro and Google Maps software	0.0	0.0	8.3	8.3	83.4	0.0	0.0	0.0	16.7	83.3
2.2	Participating in reporting sessions related to using and exploiting the Google Earth, Google Earth Pro and Google Maps software	0.0	0.0	0.0	8.3	91.7	0.0	0.0	15.0	25.0	60.0
2.3	Enhancing the ability to self-study and research	0.0	0.0	0.0	16.7	83.3	0.0	0.0	8.3	16.7	75.0
2.4	Regularly using and exploiting the Google Earth, Google Earth Pro and Google Maps software during the learning process	0.0	0.0	16.7	8.3	75.0	0.0	0.0	0.0	16.7	83.3
3	**Other solution groups**										
3.1	Increasingly investing the facilities to serve the use and exploitation of Google Earth, Google Earth Pro and Google Maps software	0.0	0.0	8.3	8.3	83.4	0.0	0.0	16.7	25.0	58.3
3.2	Increasingly investing the materials for the use and exploitation of Google Earth, Google Earth Pro and Google Maps software	0.0	0.0	8.3	8.3	83.4	0.0	0.0	8.3	33.3	58.4
3.3	Enhancing professional exchange and thematic reports on the use and exploitation of Google Earth, Google Earth Pro and Google Maps software in the teaching – learning process	0.0	0.0	0.0	8.3	91.7	0.0	0.0	16.7	25.0	58.3

Source: Surveyed by investigation team in September 2023, n = 12

4. Conclusions

Before implementing the proposed solutions, the students of Geography Education at Dong Thap University have had many difficulties on the use and exploitation of Google Earth, Google Earth Pro, and Google Maps software; the students have still had not awareness of the importance of using and exploiting the Google Earth, Google Earth Pro and Google Maps software; they have not regularly used and exploited the Google Earth, Google Earth Pro and Google Maps software; Students' ability to use and exploit Google Earth, Google Earth Pro and Google Maps software has been weak; the lecturers have not regularly used and exploited the Google Earth, Google Earth Pro and Google Maps software during teaching; the lecturers have not regularly assigned the homework to the students related to the use and exploitation of Google Earth, Google Earth Pro and Google Maps software; there has been the lack of facilities and materials for the use and exploitation of Google Earth, Google Earth Pro and Google Maps software.

Based on the survey findings, analysis of current situation, the appropriate solutions were proposed. As a result, most students and lecturers Somewhat Agreed and Completely Agreed to the proposed solutions. During implementing the proposed solutions, the efficiency of Google Earth, Google Earth Pro, and Google Maps applications to the lecturers and students of Geography Education at Dong Thap University is increasingly improved. Accordingly, the students not only master the theory but also have the ability to use and exploit such software, applications well in their leaning. The proposed solutions have been implemented, they can be therefore referenced and applied to other modules, inside and outside the University.

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