

SURVEY RESULTS AND SUGGESTION OF CLIMATE CHANGE EDUCATION MODEL FOR STUDENTS IN URBAN AREAS OF DA NANG

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ABSTRACT

Vietnam is one of the countries most seriously affected by climate change. Climate change education at schools is of great significance for the prevention and mitigation of climate change impacts. It is also necessary to investigate carefully to identify suitable contents and methods for climate change education for different areas. According to the survey on teachers and students' knowledge and skills carried out in Cam Le district, Da Nang city, 100% of teachers and students consider it necessary to integrate climate change contents in education curricula. At primary level, climate change contents should be integrated into Geography and History, Nature – Society, and Science; at secondary and high school levels, they should be integrated into Geography, Biology and Civic Education. Integration measures should also be diverse and deal with both regular and extracurricular activities. In addition, integration contents should be flexible, and relevant to each level of education, each subject, and local condition.

KEY WORDS

Climate change

Integrative education

Urban

Cam Le district

Da Nang city

1. BACK GROUND

Climate change is affecting many countries in the world, and Vietnam is found among those facing heaviest impacts.

There are various measures—at both micro and macro levels—to adapt to climate change. Among them, education is considered the lowest-cost, most effective, most sustainable, but also the most time-consuming. On the other hand, at different education levels, subjects, and areas

will vary in education contents and approach; therefore, this needs to be investigated carefully.

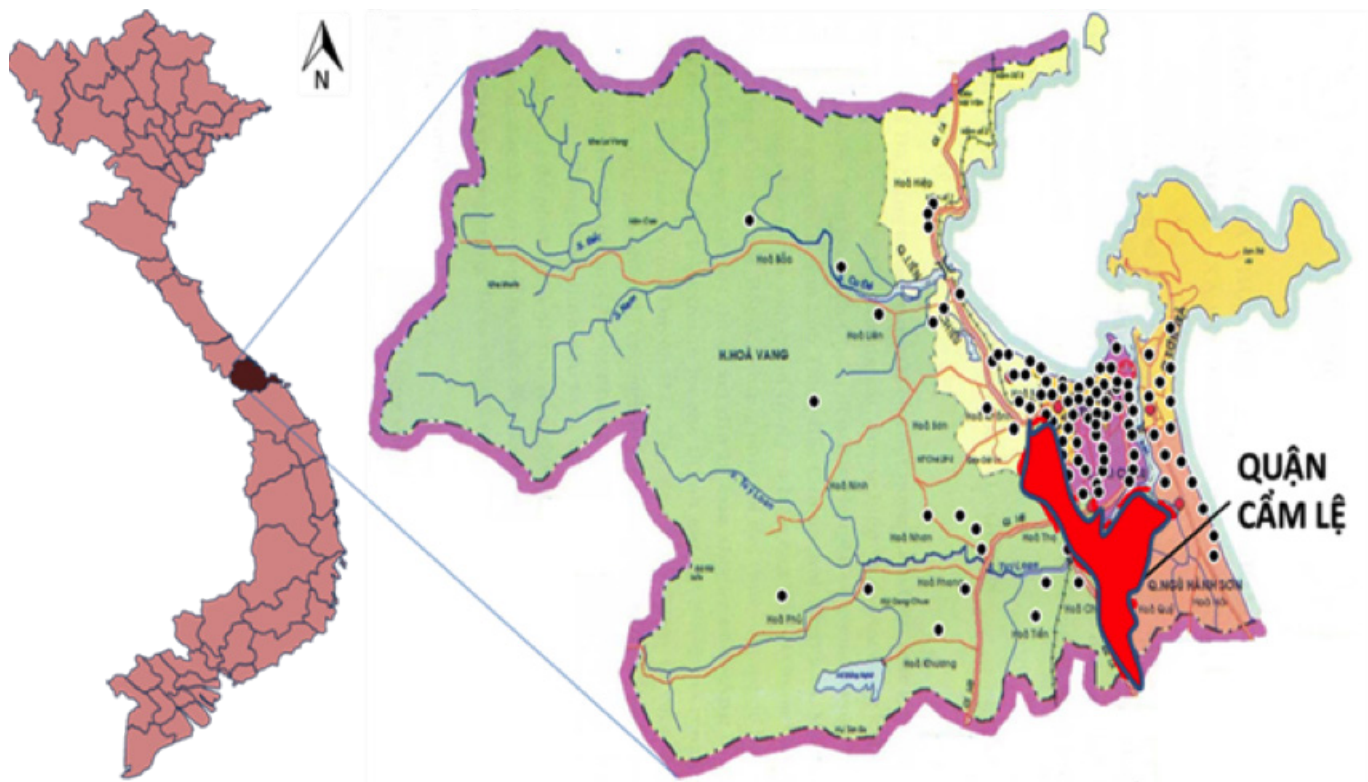
Da Nang is a city in the Central region of Vietnam – a region particularly vulnerable to impacts of climate change and extreme weather during the past years. At the same time, Da Nang is experiencing rapid urbanization, which together with climate change, is threatening the city with serious compounding impacts. Therefore, students, the future generations of Da Nang, need to be equipped with useful knowledge and skills related to climate change and urbanization in order to respond most effectively.

This article presents results from the case study in Cam Le district, based on the survey of teachers and students, to suggest a suitable climate change integrated education model for the urban Da Nang.

2. TARGETS AND METHODOLOGIES

The case study was conducted at Cam Le district, Da Nang city, and focused on teachers and students from primary, secondary and high schools in the district (Figure 1). Separate questionnaires were designed for each of these two groups.

FIGURE 1. LOCATION OF SCHOOLS IN CAM LE DISTRICT (PERIOD FROM 15 MAY TO 25 MAY 2012)



3. RESULTS AND DISCUSSION

3.1. SURVEY OF TEACHERS FOR CLIMATE CHANGE EDUCATION IN CAM LE DISTRICT

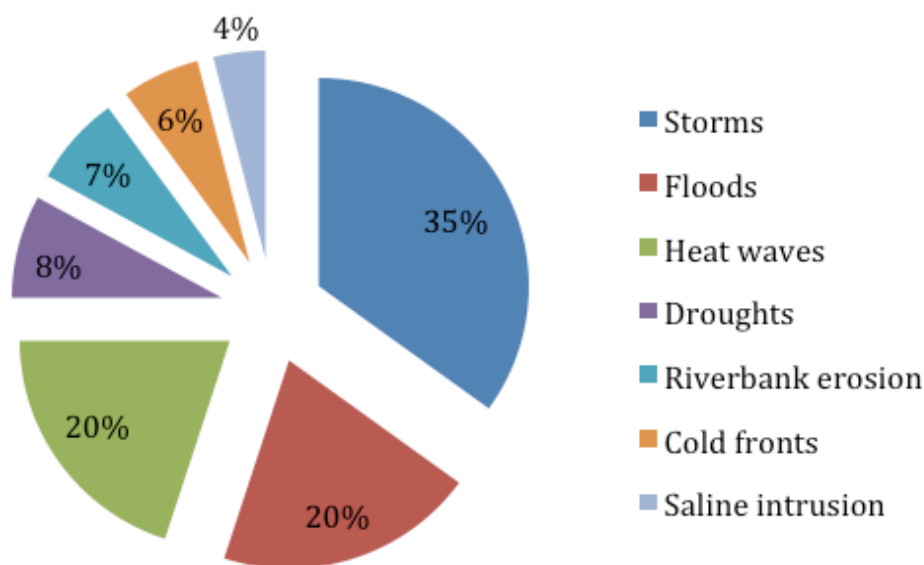
THE NEED FOR INTEGRATING CLIMATE CHANGE EDUCATION INTO SCHOOL CURRICULUM

According to the survey, 100% of schools and education institutions acknowledge the more and more serious impacts of climate change and urbanization on education sector in Cam Le district. These impacts are no longer obscure, instead, they already have direct and evident manifestations in three major areas: increased frequency and intensity of floods and storms, increased extreme heat waves, and more severe environment pollution. Cam Le district is vulnerable to natural disasters and extreme weather phenomena such as storms, floods, heat waves, droughts, riverbank erosion, extreme cold fronts, and saline intrusion, among which floods and storms occur every year with most severe damage (Figure 2). Besides, changes in intensity and duration of rain and storm events lead to riverbank erosion, especially at sections of Cam Le river in Khue Trung, Hoa Xuan, Hoa Tho Dong, and Hoa Tho Tay wards. Erosion has been happening for a long time, but at

a much higher rate during the last few years. Saline intrusion—caused by the direct impacts of changes in precipitation, sea level rise, and indirect impacts of increased temperature—also occurred in Cam Le district, especially in the area of Cau Do water station (which provide 90% of water supply in Da Nang city). The highest level of salinity recorded was over 500mg/liter, 15 times higher than the tolerated level of 35mg/liter in dry season months. In parallel with climate change impacts, the development of urban areas, industrial zones and tourist areas have led to pollution in areas surrounding schools, especially those close to the Hoa Cam Industrial Zone.

Climate change, in combination with urbanization in Cam Le district, directly affected its education sector in terms of facilities and human resource. Natural disasters damage schools, books, materials, teaching equipment and supplies, and break down trees, fences and panels. Increased temperature combined with pollution accelerates the spreading of outbreaks such as dengue fever, malaria, sore eye, encephalitis, which children are most vulnerable to. These have led to disruptions in school programs, and affect education quality. In short, climate change and urbanization have led to major and long-term impacts on many aspects of Cam Le district education sector.

FIGURE 2: TEACHERS' EVALUATION OF CLIMATE CHANGE RELATED DISASTERS AFFECTING CAM LE DISTRICT



EVALUATION OF TEACHERS ON CLIMATE CHANGE EDUCATION CAPACITY

According to the survey, climate change related knowledge and skills of teachers have been improved during the last few years thanks to training programs organized by Cam Le district DOET in collaboration with other agencies such as district Department of Health, city DONRE, Red Cross, Flood and Storm Prevention Centre and NGOs (Figure 3).

About 33% of interviewed teachers and education officers reported that they had at least once participated in training programs on climate change related issues.

The survey shows that the greatest obstacle to climate change training is the overwhelming workload and its implications on teachers' health, which affects the teaching quality of other subjects. Though teachers have actively participated in the integrative climate change

education for school subjects in Cam Le district, these activities did not produce very satisfactory outputs and did not satisfy the need for capacity of students to effectively respond to climate change impacts in rapid urbanization contexts. Though basic climate change terms and concepts (such as green house gases, vulnerability, natural disasters like floods and storms) and climate change response terms (reduction, resilience, adaptive capacity) have been introduced by teachers themselves in other subjects' sessions, they are only limited in chances when the lesson is related to climate change topic, or only happen a few times a year. The survey shows that about 43% of interviewed teacher has experience in teaching climate change contents.

With restrictions in time and resources, extra-curriculum activities related to climate change response are mainly in flag salutation sessions, or class and lead teacher meeting sessions (Figure 4).

FIGURE 3: EVALUATION OF TEACHERS ON ORGANIZATION OF CLIMATE CHANGE TRAINING WORKSHOPS

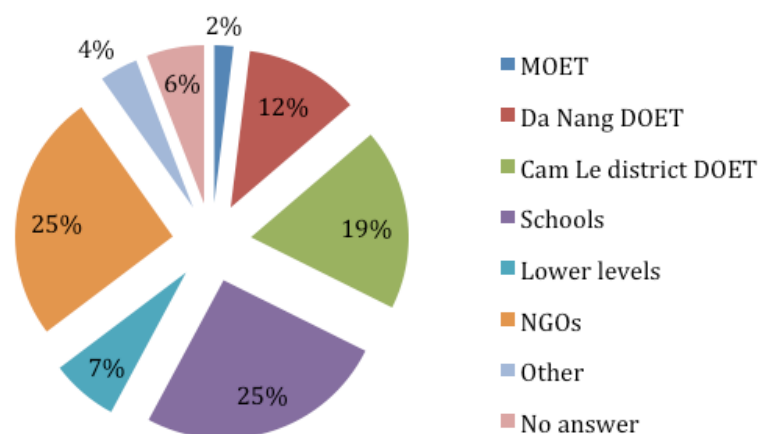
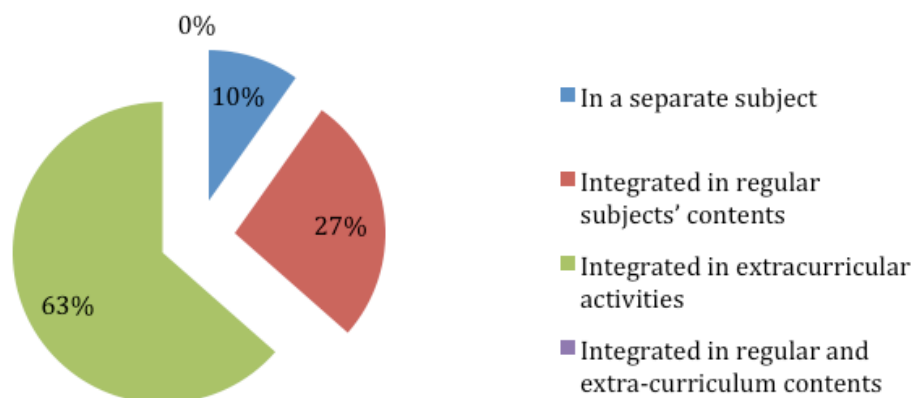


FIGURE 4: TEACHERS' REPLIES ON EXPERIENCE WITH CLIMATE CHANGE INTEGRATIVE EDUCATION



TEACHERS' NEED FOR KNOWLEDGE, INFORMATION AND SKILLS FOR URBAN CLIMATE RESILIENCE EDUCATION

According to the survey on climate change training demand, up to 97% of teachers interviewed think that the integration of climate change response education into relevant subjects is necessary.

In order to integrate climate change into school programs, teachers should be equipped with

knowledge on climate change and climate change response, especially on measures to respond to climate change (14%), types of natural disasters (13%), climate change related concepts (11%), natural disaster risk prevention measures (11%), teaching material compilation methods (10%). (Figure 6).

For the integrative education of climate change resilience to be effective, apart from knowledge and skills related to climate change response, teachers also need practical understanding of local experience.

FIGURE 5: TEACHERS' EVALUATION OF SCHOOL ACTIVITIES FOR CLIMATE CHANGE INTEGRATION

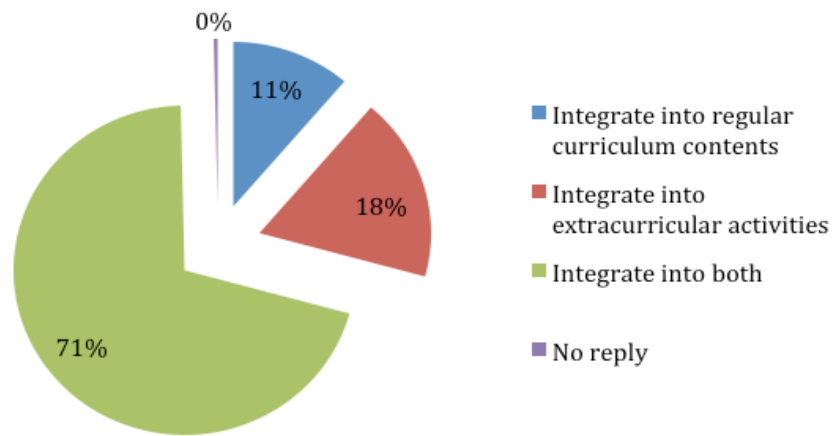
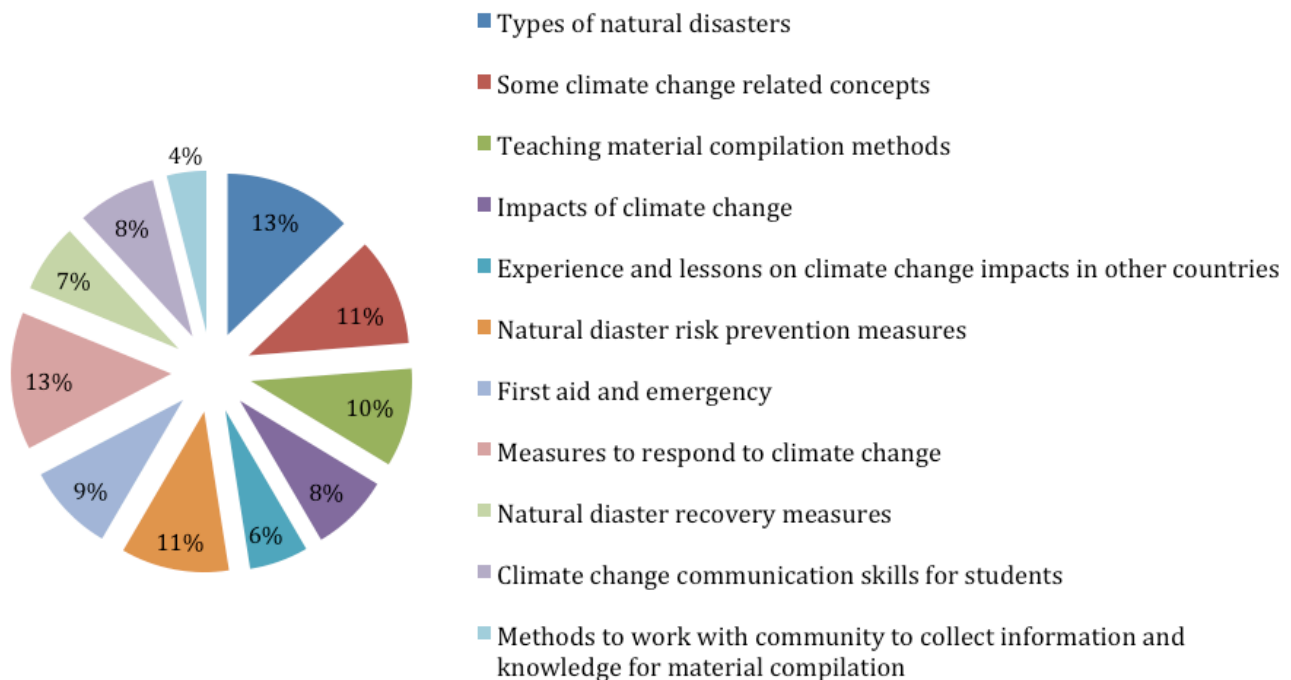


FIGURE 6: TEACHERS' EVALUATION OF KNOWLEDGE AND SKILLS NEEDED FOR CLIMATE CHANGE INTEGRATED EDUCATION



According to survey results, local community related contents needed for teachers include geographic characteristics of the local area (17%), local awareness on climate change (15%), demographic characteristics (12%), and local community experience in climate change responses (12%) (Figure 7).

Regarding methods of climate change education, the survey shows that material provision (82.04%) and training (69.37%) are two best methods to provide teachers with knowledge and skills for integrative climate change education. (Figure 8).

FIGURE 7: TEACHERS' EVALUATION INFORMATION NEEDED

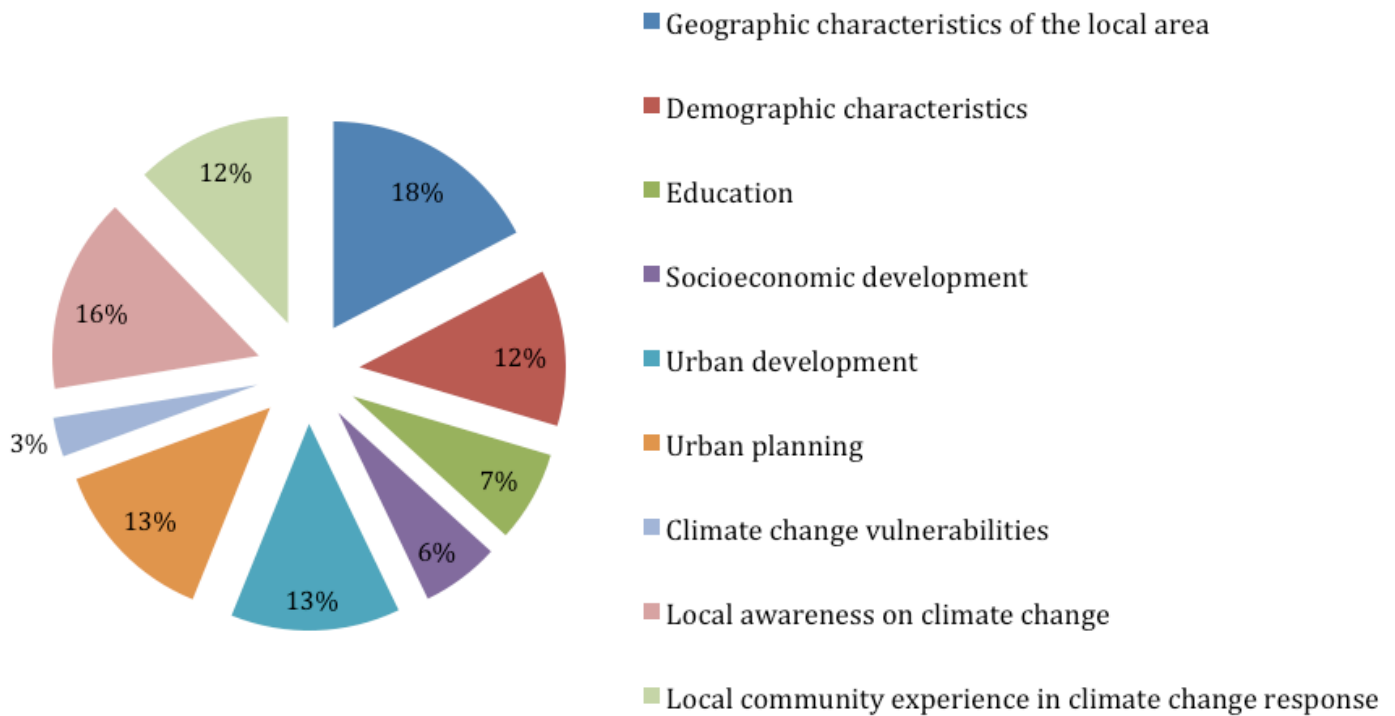
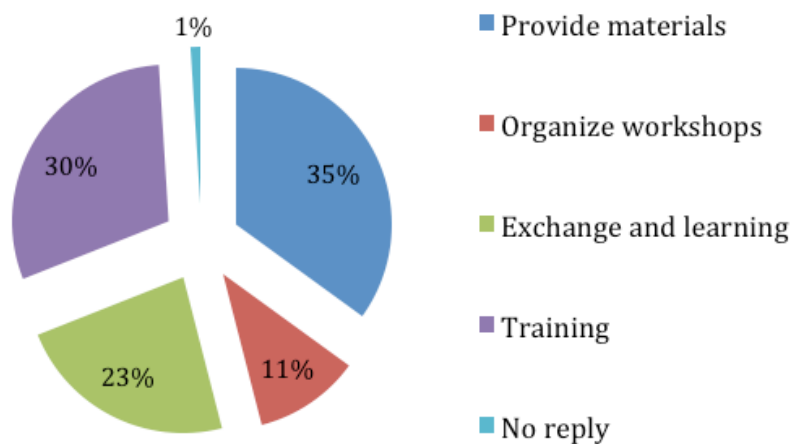


FIGURE 8: TEACHERS' EVALUATION ON EFFECT METHODS FOR PROVIDING INFORMATION



3.2. SURVEY OF STUDENTS FOR CLIMATE CHANGE INTEGRATED EDUCATION

STUDENTS' OPINIONS ON SUBJECTS RELATED TO CLIMATE CHANGE

It was suggested by students that climate change related concepts and terminologies occurs most frequently in Geography, Science, and Nature and Society at primary level, Geography, Biology and Civic Education at secondary and high school levels. (Figure 9).

STUDENTS' DEMAND FOR INTEGRATIVE EDUCATION ON URBAN CLIMATE RESILIENCE

Well aware of climate change impacts on their life and study, 100% of students interviewed expressed demand for and interest in learning about climate change in their regular and extracurricular programs. (Figure 10).

FIGURE 9: STUDENTS' OPINIONS ON SUBJECTS RELATED TO CLIMATE CHANGE

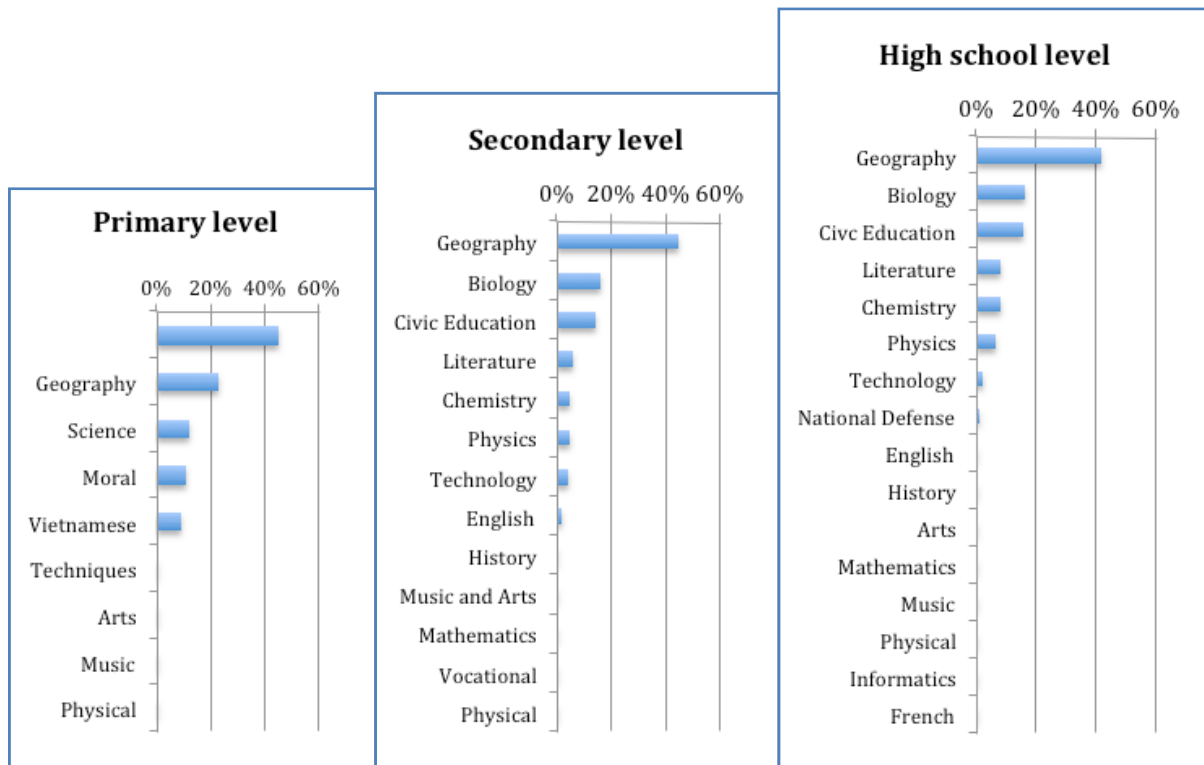
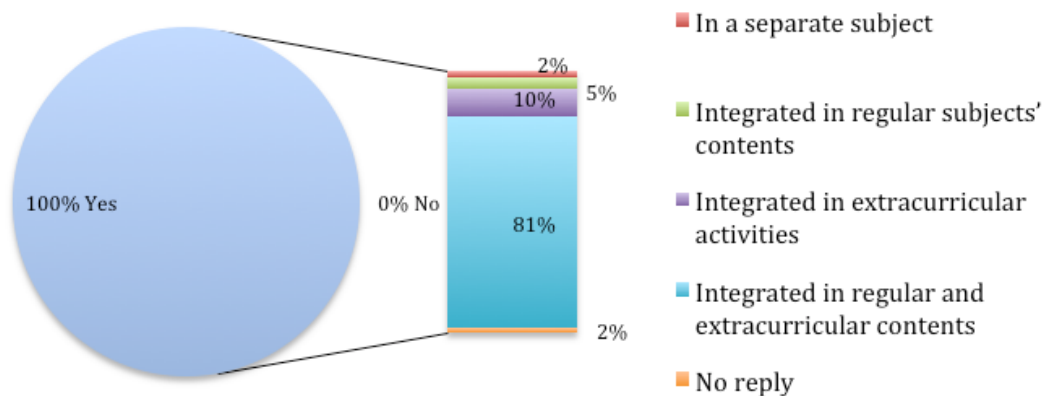


FIGURE 10: STUDENTS' DEMAND FOR INTEGRATIVE EDUCATION ON URBAN CLIMATE RESILIENCE



It was suggested by students that climate change related contents should be integrated into Nature and Society, Geography and History, Science at primary level, and Geography, Civic Education, and Biology at secondary and high school levels (Figure 11).

When asked about demand for climate change contents in extracurricular activities, most suggested activities are field visits (e.g. picnicking, camping), presentations in contests (e.g. video clip making, drawing, argument and speech delivering, presenting thematic reports) and club activities on climate change. (Figure 12).

FIGURE 11: STUDENTS' SUGGESTIONS OF SUBJECTS FOR CLIMATE CHANGE INTEGRATION

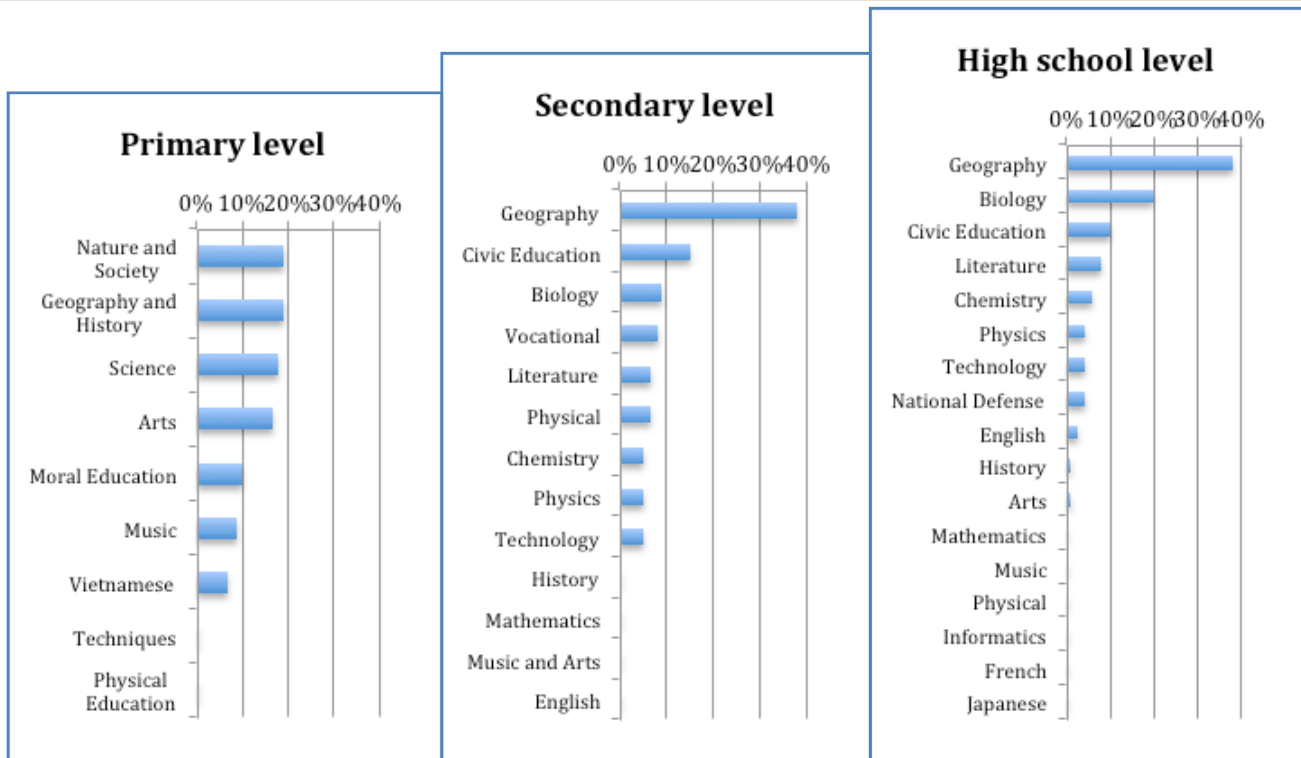
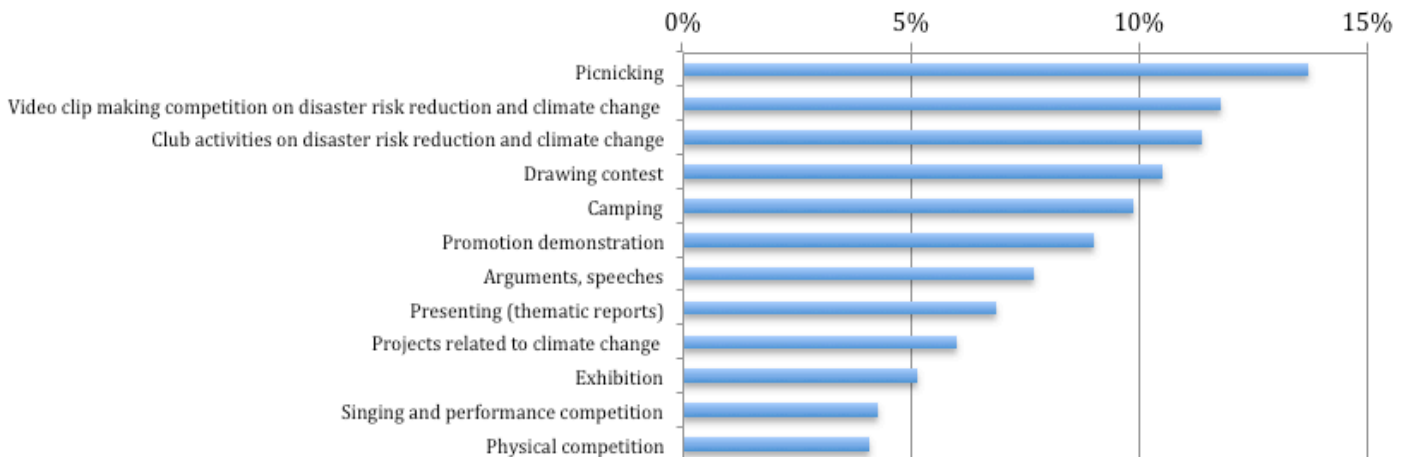


FIGURE 12: STUDENTS' SUGGESTIONS OF EXTRA CURRICULUM ACTIVITIES FOR CLIMATE CHANGE EDUCATION



3.3. PROPOSED MODEL FOR URBAN CLIMATE INTEGRATED EDUCATION IN DA NANG

PROPOSED SUBJECT FOR INTEGRATION

Based on results of survey on teachers and students' knowledge, skills and demands for climate change and climate change response education, the project suggests to select 3 subjects for each level of education: (1) Primary level: Geography and History, Nature and Society; and Science; (2)&(3) Secondary and High school level: Geography, Biology and Civic Education.

CONTENTS OF URBAN CLIMATE RESILIENCE INTEGRATIVE EDUCATION

From research results on awareness and demand of teachers and students, the project proposes some contents for the integration as follows:

(1)- Concept, definition, terminology of issues related to climate change and urban development.

For primary level, these can be very simple and easy to understand concepts such as climate change, rainfall, and temperature.

For secondary and high school levels, more attention should be paid to technical concepts, in relation with prevalent phenomena or events in the area such as storms, floods, heat waves, droughts, riverbank erosion, etc.

(2)- Climate change is affecting human life in the setting of urbanization process around the world, in every country, every region and every locality. According to survey results, Cam Le district is affected mainly by 3 types of hazards: storms, floods and heat waves. Therefore, in the integration process, it's necessary to pay attention to direct and indirect impacts of these hazards on the life of people living in the district, especially vulnerable groups like children and old people.

(3)- Causes of climate change, with emphasis on human related causes under the rapid urban planning and urban development process of the area.

(4)- Measures to limit the impacts of climate change (policy measures and technical measures including both structural and nonstructural).

(5)- Required methods and skills to respond to climate change and environment pollution.

METHODS FOR INTEGRATING URBAN CLIMATE CHANGE RESILIENCE INTO SCHOOL PROGRAMS

According to the survey at education institutions in Cam Le district, more than 90% of education managers, teachers and students suggest integrating climate change into both regular and extracurricular programs in order to provide students with basic and mainstream knowledge, at the same time facilitate them to apply this knowledge, form and develop skills for urban climate change resilience.

Integrating climate change into regular curriculum contents:

The integration of urban climate resilience contents into specific lessons can be done at three different degrees:

- Full integration: for textbook lessons or programs with all contents in common with objectives and contents of urban climate resilience education
- Partial integration: for textbook lessons or programs with part of the contents in common with objectives and contents of urban climate resilience education
- Relation: for textbook lessons or programs with contents that relate to climate change issues, based on which to directly or indirectly refer to contents of urban climate resilience education

Integrating climate change into extracurricular programs:

Extracurricular programs are activities outside classrooms hours, aimed at improving teaching and learning quality. This method creates a collaborative learning environment in which students can access practical knowledge and develop relevant skills for climate change adaptation. Through extracurricular activities, schools can collaborate with other social actors and offer a chance for them to contribute more actively to educating young generations; at the same time school education quality is also enhanced. Item 24.2 in Education Law of Vietnam states clearly that *extracurricular programs are considered an important teaching approach, and one of the ways to innovate teaching methods towards promoting students' active participation, willingness, initiative and creativity, in accordance with characteristics of each class and subject, encourage students' self-study, train them how to apply knowledge into practice, raise their emotions, bring them joy and interest in learning.*

(1)- Presentation method: for example, preparing reports on natural disasters, making presentations on climate change related issues, organizing climate change knowledge contests or climate change clubs. These activities help student to actively engage, share, argue and express their opinions in each topic or lesson. With report writing or situation analysis in individual or group exercises, students' knowledge can be strengthened, together with their awareness and sense of responsibility in climate change response actions.

(2)- Site visits and surveys: For example: visits to storm resistant houses by local builders, surveys to identify high-risk locations, evacuation sites and routes. This method helps expand students' practical knowledge and develop their skills in observing, recognizing and identifying climate change impacts on people's life, based on which to develop their own responsive measures.

(3)- Development of living skills: For example: practicing first aid and emergency skills, organizing evacuation drills. Climate change

response skills are ability to actively and properly respond to climate induced natural disasters and pollution. Some skills that need developing in this area include: (1) Skills to recognize and identify climate change impacts on people's life (2) Skills to implement activities to respond to climate induced natural disasters and pollution.

(4)- Community problem solving skills: For example, working with the community to develop plans to respond to floods and storms, making a list of elderly people the areas who need help in case of evacuation. Each local community may suffer different impacts of climate change. Cam Le district is a low-lying river plain area that often suffers from storms, floods and hot air masses. Therefore, teachers should explore actual local situations and use the information in their teaching for practicality and effectiveness. However, this method requires teachers to collect data, investigate events and situations, organize activities for children to learn about these facts and learn how to properly respond based on local conditions. This method explores student's knowledge and experience on climate change related events that affected the area, helps them develop skills and habits, develops and forms their attitudes and opinions on climate change related issues.

4. CONCLUSION

Teaching and learning about climate change and climate change response is in fact a very abstract and complicated job, it is posing a major challenge to the education sector, especially in the current context of rapid urban planning, infrastructure development and socioeconomic development. Therefore, in order to effectively implement the integrative climate change education, it's necessary to have a flexible approach, not one imposed by anyone, but one originated from schools and other education institutions, from the demand, expectations and capacity of teachers and students. Based on the survey assessing capacity and demand of

managers, teachers and students, the project proposes an education program with climate change integration for both regular and extracurricular contents of three subjects of two grades each education level. Specifically, Geography and History, Nature and Society, and Science for primary level, and Geography, Biology and Civic Education for secondary and high school levels.

Currently, the integration of too many different topics is being implemented and in a rather random way, making them overlapping and going beyond the capacity of teachers and students. Besides, integration is done in different ways for different subjects, leading to cases when one concept is defined and understood in several different ways. Very limited time is provided for teaching subjects while they are integrated with many different topics, so in class, teachers only try to cover all contents within the time provided, not focusing on analyzing, expanding or relating the knowledge to practical experience to strengthen it or help student apply in their life. Therefore, integrative teaching and learning has not satisfied the requirements and is dominantly procedural.

To deal with students' program overload, we should not include too many climate change contents into the curriculum at the same time, but rather make some selection and prioritization of essential contents/ areas relevant to local conditions and choose the right time. Classroom lessons and extracurricular activities are two organic components fitting into an integral whole of the education and training process. Thus, for the climate change teaching and learning to be effective, teachers need to combine harmoniously curricular and extracurricular activities, so as on one hand, to ensure basic knowledge and the coherence of subject contents without overwhelming the students or extend subject time, and on the other hand to bring students the opportunities to develop skills for active and proper response to climate change issues.

Besides, to improve effectiveness of integrative climate change education approach, there needs to be a combination of many methods including shared learning dialogues and the participation of families and local communities, a critical factor to ensure sustainability of integrative climate change education.

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