



# SUMMARY REPORT OF QUESTIONNAIRE SURVEY FOR THE INTEGRATION OF ENVIRONMENTAL POLICY, MANAGEMENT, AND TECHNOLOGY TRAININGS IN DOCTORAL EDUCATION PROGRAMS IN VIETNAM

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## ABSTRACT

This survey initially investigates 16 doctoral education organizations (institutes) in Vietnam using expert surveys as research method with deans of different academic departments or selected leading environmental professors. The survey questionnaire consists of 11 questions divided into 4 categories, including: (1) characteristics of the existing doctoral education programs in Vietnam, (2) its limitations, (3) potential collaborations amongst surveyed academic institutes, and (4) proposed solutions to improve existing doctoral programs by integrating environmental policy, management, and technology trainings. The study is a component of the ERASMUS funding project on integration of environmental policy, management, and technology into doctor training program for decision making. The similar survey was also conducted in Mongo. The results of survey will orientate the improvement of doctoral training programs in the project countries. Even though there are some limitations e.g. time and number of interviewed doctoral education institutes some of the solutions due to survey results are proposed such as: improving quality and contents of education programs, enhancing the integration of environmental policy, management and technology training into decision-making, and implementing collaborative partnership between institutes. The establishment of educational network and certification system for required general electives among doctoral academic programs as well as the increase of application on e-learning and teleconferences via public media are the most important solutions that need to be implemented.

*Keyword: Doctoral program, support decision-making, education program improvement, education network*

## 1. INTRODUCTION

*Doctoral education program for environmental engineering plays an important role in development of the necessary human resources for leaderships in environmental protection and sustainability development in Vietnam. Environmental doctoral programs and trainings vary in both times and scales of study. The success of environmental doctoral programs will greatly contribute to economic and sustainable development [1]. However, nowadays, with rapid social and economic growth that*



severely strain current environmental quality, a comprehensive doctoral training, from which one can integrate knowledge of environmental policy, management and technology into his or her decision-making process, is an urgent demand.

According to the group of authors [2, 3], by the end of the 2016-2017 academic year, Vietnam has 235 universities and institutes (in which 170 are public, 60 are private, and 5 are 100% funded by foreign investors), as well as 37 scientific research institutes that are responsible for postgraduate training programs.

In terms of training scales, in 2016-2017, there are 1,767,879 university students (increases by 0.8% compared to 2015-2016). Most students pursue V-block majors, such as: Mathematics and Statistics; Computer and Information Technology; Technology; Engineering; Processing and Manufacturing; Architecture and Construction, Agriculture and Aquaculture; Veterinary, as well as some III-block majors as Business Management and Law.

In 2016-2017, the total enrollment for master's programs was 105,801 (increase by 12.8% compared to 2015-2016). The total enrollment for doctoral education at universities and institutes is 13,587 (a 25% increase compared to 2015-2016). The demand for post-graduate social education is very high [2, 3].

This study initially examines doctoral education entities in Vietnam to develop supportive solutions to improve doctorate programs for environmental and applied-environmental fields, as well as encouraging the integration of environmental knowledge, policy, technology, and management into trainings and decision-making processes.

## 2. RESEARCH METHODOLOGY

The research uses expert surveys as research method to connect with deans of different academic departments or selected leading environmental professors.

**Surveyees:** We begin by selecting a sample of 24 doctoral education entities related to environment in Vietnam. Responses are collected via sent survey questionnaires, interview, and exchanged information through telephone conversations. 16/24 individuals and entities (67%) have responded [4], including Institute of Environment and Resources in HCMC, Ho Chi Minh City International University, Office of Postgraduate Education – Ho Chi Minh City University of Science and Technology, Department of Postgraduate Education – Can Tho University, Ho Chi Minh City University of Technology, Institute of Tropical Environmental Sciences, Institute of Military Science and Technology, Ministry of National Defense, Center for Education Quality Assessment, Ha Noi National University, Institute of Climate Change, Can Tho University, Department of Environment, University of Sciences, Hue University, Asian Center for Water Research, Hanoi University of Science and Technology, Hanoi University of Science, Thuyloi University, Vietnam Academy of Science and Technology.

**Contents of Survey:** The questionnaire consists of 11 major questions divided into 4 categories as follows [4]: 1) Limitations of doctoral program in Vietnam; 2) Important measures that can be implemented, under existing training framework conditions, to improve the organization and content of doctoral programs; 3) Proposed curriculums and focuses to ensure the quality of doctoral program and training; and 4) Potential collaboration for doctoral education in the future.

Of 16 surveyees, 5 are Insitutes and 11 are Universities. Only 6% interviewer is female and 94% is male.

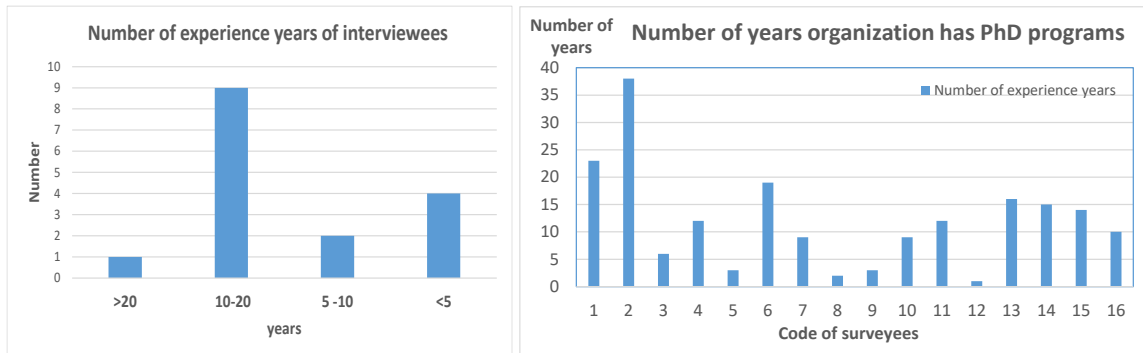


Figure 1. Number of experience years of interviewees and surveyees.

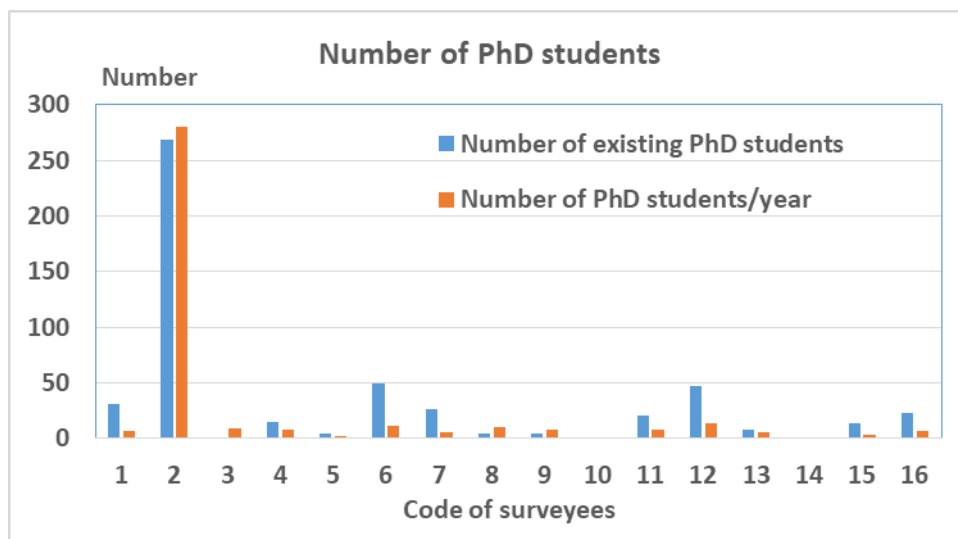


Figure 2. Number of PhD students enrolled per year and on-going.

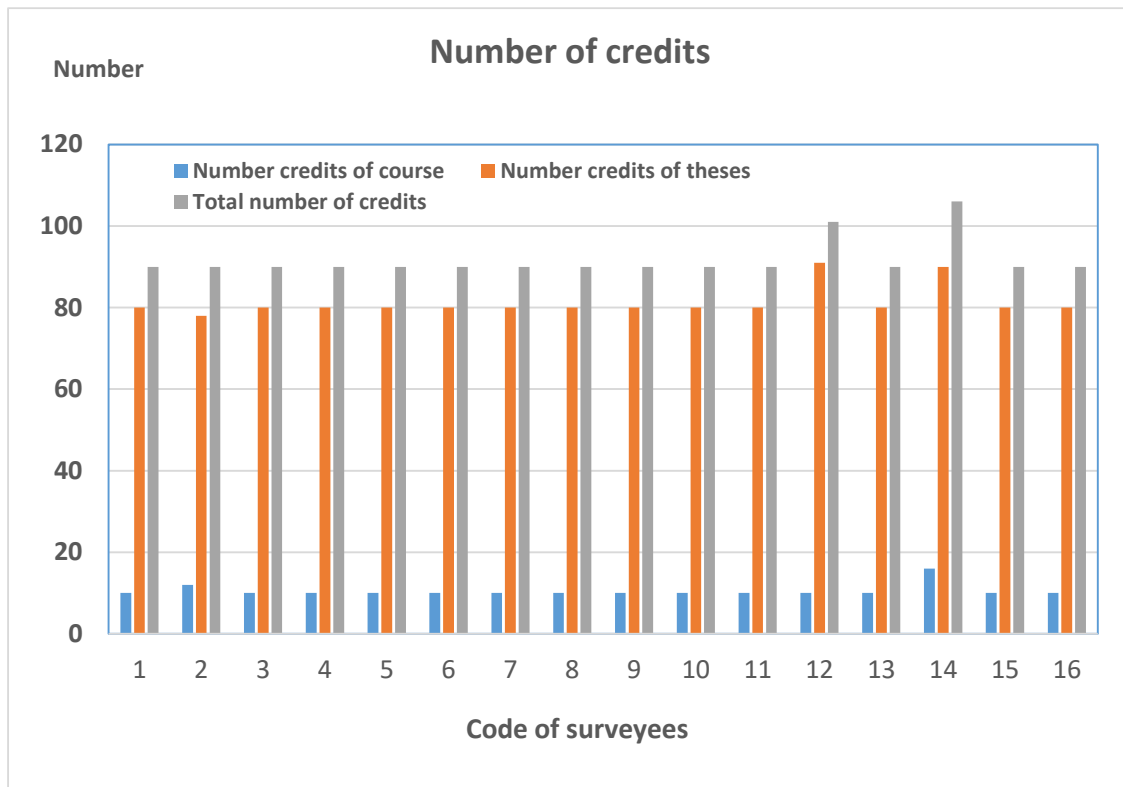


Figure 3. Number of credits of PhD program.

### 3. RESULTS AND DISCUSSIONS

#### 1. Characteristics of Current Doctoral Programs and Trainings in Vietnam

In 2017, The Ministry of Education and Training issued the circular No. 08/2017 of *Regulation on the enrollment of doctoral students and management of doctoral training programs* [5] and the circular No. 09/2017 of *Regulation on the conditions, orders, and procedures for establishing new major or specialized training, suspending new student recruitments, and revoking the decisions to establishing new major or specialized training for graduate and doctoral degrees in Vietnam* [6].

According to the above regulations, duration of doctoral training will last for 3 or 4 years depending on the individual's qualifications (having a master's degree or being a university graduate) in accordance with the Laws of Higher Education. However, candidates could be allowed to extend by a maximum of 2 years. Under new regulations, the total time for doctoral education is from 5 to 6 years counting from one's PhD acknowledgement. New regulations [5, 6] require PhD researchers to publish their dissertations and results in at least two articles, in which at least one article has ISI/Scopus, or two reports published in the collections of international symposiums with peer reviews, or two articles published in other international peer-reviewed scientific journals.

Upon completing the program, doctoral students will: master the latest up-to-dated knowledge in their areas of expertise; identify and directly solve scientific issues in their research fields; apply different essential research methodologies; master independent research skills and collaborative teamworks; and be able to provide training, guidance, and teaching for undergraduate and graduate levels [5, 6].

#### 2. Limitations in Environmental Doctoral Education Systems in Vietnam.



The results from the survey on the current limitations of the doctoral education programs in Vietnam mainly identify the following issues in Table 1. It should be noted that the limitations identified by the interviewers could be also considered as the challenges for the others. In Vietnam, the doctoral education framework is issued by Ministry of education and Training (MOET), each education organizations will implement the framework following their own practical conditions, but must meet the standard requirements. However, the different limitations could be resulted from the implementation process of different organizations based on their resources capacity (such as human resources, facilities, finance and policies, etc).

### 2.1 Doctoral education program in Vietnam

Strength	Main limitations
<ul style="list-style-type: none"> <li>▪ Clear instruction and requirement from government and MOET (e.g. Law No. 08/2012/QH13 and Amended Higher education law No. 34/2018/QH14, and Circular No. 08/2017/TT-BGDĐT, dated April 4, 2017)</li> <li>▪ Subjects are very diverse and some started from 1981</li> </ul>	<ul style="list-style-type: none"> <li>▪ Lack of advanced research conditions, sofawares, facilities (10)</li> <li>▪ Government did not support for PhD scholarship or research fund (5)</li> <li>▪ Study-based more than research-based, Theory-based and lack practical applications (5)</li> <li>▪ Apply not-full time study (5)</li> <li>▪ Evaluation procedures for PhD disseratation is comprehensive (4)</li> <li>▪ Instruction/regulation for dissertation contents requirements is unclear (4), therefore sometime over demands</li> <li>▪ Course studies are less flexible (3)</li> <li>▪ Lack of required activities related to teaching or educting assistant (2)</li> </ul>

Almost interviewers (13/16) agreed that PhD dissertation quality in environmental studies is increasing, two have no answer and one stated that it is light decrease because of less innovation.

*What are the most important measures that can be taken, under the existing framework conditions, in order to improve the organisation and contents of doctoral studies?*

- Committee to publish research results in ISI, Scopus and reputational academic journals (6)
- Cooperative education, share experimental laboratories, research facilities, invited professional professors (4)
- Conduct forum for PhD candicates and students for knowledge and research exchanges (4)
- Enhance update the global and new knowledge and pratical application for curriculum, program for teachers and doctoral students (4)
- Main supervisor should have research projects and funds to support doctoral students (as researcher salary or technical assistant (3)



- Clearly identify requirements for doctoral thesis contents.e.g. just help to solve one scientific problems not too broad which will be approved by the Professional Professors Committee (3)
- Apply full-time research for doctoral students (3).
- Need more specific requirements on the outputs of doctoral seminars

## 2.2 Limitation of implementation of doctoral education program in Vietnam

*Do you recognise any issues with the organisation, quality and/or contents of training currently offered to PhD students?*

- Research topics need to provide particular scientific outputs approved by evaluation committees (7)
  - Increase of new contents, innovation and practices in dissertation (7)
  - Management of study process and research activities of doctoral students in some organizations are not strict enough (6)
    - Research topics should in line with practical condition and trends of global development (5)
      - Apply centralized and fulltime doctoral program (4)
      - Lack of advanced equipments, facilities, softwares for researching (3), Lack of investments in facilities to achieve qualified ISI articles, lack or resources (3)
        - Doctoral education organization should declare their doctoral education capacity regularly and programs should be qualification audited (2)
          - Selection of doctoral entrances sometimes is not proper (2)
          - Lack of proper entrance Lack of financial supports for doctoral students, especially in implementation researches
            - Lack of scientific, high-quality, and practical applications in research

*Any subject-related or general skills the PhD students and graduates are missing in order to make successful research careers and/or to complete their theses?*

PhD students in Vietnam have some constraints as following

- Limited independent research ability and active creativity (9)
- Limited ability to write scientific reports, present, and give public speech (9)
- Lack of scientific research characteristics and less concentration (8)
- Limited English ability amongst doctoral students (7)
- Lack of differentiation and breakthrough in research mindsets (3), Students lack enthusiasm in learning and researching, are motivated to learn only for the degree
- Lack of participation in teaching activities (2)

To complete doctoral course students must have appropriate plan of study and invest sufficient efforts and time to professional development and research. Research doctoral should require full-time education

### 3. Potential Collaborations Between Participating Institutes:



*What forms of cooperation between PhD awarding (or providing doctoral training) institutions would improve the quality of doctoral studies at your institution and nationwide?*

Survey participants are willing to collaborate in the following activities: lecturer exchange program (10), laboratory sharing (4), collaborative research, sharing staffs and lecturers as well as providing doctoral guidance for students from other entities (10), joint-organize workshop (6), develop syllabus (4), participate on doctoral program setting or auditing (4), teaching and guiding advanced selective courses or topics (10), and participating in peer-reviewed panels for doctoral theses (8), sharing education program framework (2).

*In particular, for the below forms of cooperation doctoral program, the priority orders of descending priority are following: (minimum scores = most importance = 16; and maximum scores = less importance = 80)*

1. Joint research, supervision, publications and/or use of equipment and/or experimental facilities (22)
2. Practical capacity, solution solve capacity and mobility of PhD students (30)
3. Expert networking and knowledge and data exchange (30)
4. Quality of provision, contents and relevance of PhD courses (33)
5. Quality assurance and peer review (36)

Selective courses proposed for doctoral education programs are: Environmental Statistics and Data Analysis; Resolution for Socio-Economic and Social Conflicts; Methodology for Environmental Policy and Resource Analysis in Vietnam and around the world; Environmental Management Tools; Evaluation of Environmental Degradation; Adaptation to Climate Change in Ecosystems; Algorithmic Modeling for Pollution Prediction; Environmental Sciences and Technology Foundation; Advanced Modern Scientific Methodology with Current Development Trends of Science and Technology; Scientific Publication Skills (writing scientific papers, technical reports, dissertations,...); Applications of Reference, Citation, and Presentation Supportive Softwares for Scientific Publications; Integrating Methodology of Climate Change Impacts and Challenges on Natural Resources and Environment (water, land, health, and energy) into Protection Policy and Technology; Sustainable Energy Policy for Sustainable Development in Global Climate Change; Urban Resolutions (smart and sustainable City) for Transportation, Energy, Water, and Green Materials.

*Table 1: Current focuses and selective courses for environmental doctorate education*

<b>Professional Fields</b>	<b>Fundamental/Selective Courses (electives)</b>
Environmental Sciences	Contemporary Environmental Issues; Climate Change and Adaptation; Environmental Strategic Planning; Sustainable Uses of Energy; Ecosystem Analysis and Assessment; Solutions to Sustain and Improve Air Quality
Soil and Water Chemistry	Land Ecology; Environmental Soil and Water Quality; Biotransportation and Bioaccumulation of Toxic Substances in Ecosystems; Ecological Development Mechanisms



Land Management	Land Uses and Urban Planning; Integrated GIS and Remote Sensing Technology for Land Management; System of Trading and Real Estate Development; Integrated System of Land Administrations
Management of Natural Resources and Environment	Methodology of Scientific Research + 3 Electives from the following selections Selection 1- Ecology engineer: Ecological Application for Sustainable Environmental Protection; Industrial Environmental Protection in Vietnam; Management of Resources and Environment in Agricultures and Rural Areas Section 2 - Environmental Toxicology: Soil Pollution and Degradation; Advanced Hazardous Waste Management; Advanced Wastewater Treatment Technology; Integrated Water Resources Management; Environmental Risk Assessment and Management Section 3 - Economics: Advanced Environment; Methods of Analyzing Tools; Environmental Biological Indicators; Statistical Analysis of Environmental Data; Assessment of Climate Change Impacts, Renewable energy
Environmental Engineering and Technology	Principles of Environmental Science and Technology; Integrated Air Quality Management; Physical and Chemical Processes in Water and Wastewater Treatment; Integrated Solid Waste Management; Indoor Air Pollution Control; Air Pollution Modeling and Application; Biochemical Processes in Organic Wastewater Treatment; Membrane Technology and Application in Water Technology; Persisting Pollutants Management; Heat Processes in Solid Waste Treatment; Biochemical Processes in Organic Solid Waste Treatment; Renewable energy; Natural Resources and Environment Management
Environment and Sustainable Development	Advanced Sustainability Sciences; Policy Analysis; Contemporary Issues in Sustainable Development; Conservation Biology, Renewable energy

- **Intense Curriculum development**

- For the basic general courses: Methodology and scientific research (4), Global environmental policy analysis (3).
- For the selective courses: There are 4 approaches for curriculum development suggested as followings:
  - Urban Environmental Management and Planning;
  - Environmental Management in Agricultures and Rural Areas for Sustainable Development;
  - Economical Environmental Treatment Technology;
  - Approaches for Policy Changes in Environmental Management and Pollution Treatment at local and national levels such as:
    - Data analysis,
    - Monitoring and sampling,
    - Sustainability science,
    - Renewable energy, etc.





#### 4. Proposed Solutions to Improve Doctoral Education Programs Related to Environmental Policy, Management, and Technology:

##### 4.1 Proposal for enhancing the integration of environmental policy, management and technology in doctoral curriculum

Through the survey, we have obtained the following specific integration proposals as solutions to improve education programs, such as: Urban Environmental Management and Planning; Environmental Management in Agricultures and Rural Areas for Sustainable Development; Economical Environmental Treatment Technology; Approaches for Policy Changes in Environmental Management and Treatment at local and national levels to address pollution issues, including: monitoring data, analyzing linear and non-linear environmental parameters, sampling at "environmentally sensitive" locations, as well as difficulties and limitations in applying technology and using advanced environmental management tools, sustainability science, renewable energy, etc.

##### 4.2 Proposal for enhancing the collaboration between domestic and international doctoral education institutes

To strengthen the capability of doctoral education institutes in Vietnam, the following cooperation forms are proposed in order of descending priority:

**Priority 1:** Collaborate on researches, supervisions, publications, and/or uses of lab equipments and facilities.

**Priority 2:** Collaborate in diversifying the dynamics of doctoral students and enhancing their abilities to apply theoretical knowledge as well as problem-solving skills.

**Priority 3:** Establish expert networks to exchange data, knowledge, and expertise in specific fields.

**Priority 4:** Provide support in addressing quality, curriculum content, and issue related to doctoral education programs and courses.

**Priority 5:** Collaborate in ensuring education quality and independent peer review.

##### 4.3 Proposal for improving the quality and contents

➤ Improve the quality of graduating doctoral student outputs, specifically: (i) Have research fundings and budgets for doctoral students' researches; (ii) Require on scientific publications for international ISI; (iii) Doctoral theses must demonstrate creativity, contribute to scientific knowledge; (iv) All findings in doctoral researches must be supported by scientific evidences and be compared with other published results; (v) Results of dissertations should be publicly available on websites of their education institutes and accessible; (vi) Doctoral students must invest full time in research; and (vii) Improve the criteria and methods to evaluate doctoral theses.

➤ Improve teaching and researching methods, specifically: (i) Reconstruct the learning objectives and teaching methods of doctoral selective courses using practical approaches and up-to-dated international scenarios; (ii) Increase the uses of English in teaching selective courses to 30-50% of the learning frameworks; (iii) Increase time for conducting researches and reduce required lecture hours; (iv) Increase the uses of virtual teaching methods, seminars, and online group discussions via



other media platforms; (v) increase contents of skill developments; and (vi) Enhance collaborations with research institutes to utilize existing available research facilities more efficiently.

#### *4.4 Proposals for enhancing inter-organizational collaborations and implementations of doctoral education programs*

Doctoral education institutes and entities in Vietnam and abroad can sign collaboration agreements, forming a global network of doctoral colleges and institutes.

Fundamental courses may be reconstructed to be learned altogether and can be assigned to one representative organization who will administrate, invite lecturers, and certify students of completion certificates upon completing these courses. Fundamental and general courses may be selected from the list proposed above in Section 3.

Facilitate collaborations between local institutes in nearby regions to efficiently utilize qualified teaching faculties and facilities for education and research. To associate education materials with socio-economic developments and enterprises, doctoral theses must follow closely with demands and issues of realistic (practical) production that need to be resolved.

*Last but not least, 13 of 16 interviewers confirmed their willingness to cooperate with the INTENSE school depending on forms and services provided by the cooperation.*

## **4. CONCLUSIONS AND RECOMMENDATIONS**

To ensure the qualification of doctoral education, one must need three important following factors including: capacity and resources of doctoral education organization, study dynamic and study capacity of PhD applicants.

The survey results of 16 currently active doctoral education entities in Vietnam have initially summarized the contemporary limitations in doctoral program curricula, learning times, student capacities, doctoral education organizations' resources, in practical implementation, and in doctoral dissertations, etc. They are an essential foundations to develop specific solutions that can effectively improve the quality of doctoral education in Vietnam.

There are four proposed groups of solutions to improve doctoral education programs related to environmental policy, management, and technology mentioned in section 4 of this report. They are: (i) enhance the integration of environmental policy, management and technology in doctoral curriculum, (ii) enhance the collaboration between domestic and international doctoral education organizations, (iii) improve on quality and contents of doctoral programs, and (iv) enhance inter-organizational collaborations and efficiency implementations of doctoral education programs

The establishment of expertise network, collaboration in education and accreditation of fundamental and general courses, enhance applications of virtual learning tools, forum and seminars through diverse media platforms are solutions that should be considered and implemented timely.

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