Use of the Internet for Citizen's Participation in Air Quality Management in Bangkok
การประยุกต์ใช้อินเทอร์เน็ตสำหรับการมีส่วนร่วมของประชาชนในการจัดการคุณภาพอากาศของกรุงเทพมหานคร

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บทคัดย่อ

ปัญหาคุณภาพอากาศของกรุงเทพมหานคร มีสาเหตุหลักมาจากยานพาหนะโดยเฉพาะรถโดยสารประจำทางที่ปล่อยควันดำ ดังนั้นกองควบคุมสิ่งแวดล้อม กรุงเทพมหานคร จึงมีนโยบายเพื่อลดมลพิษอากาศ และขอความร่วมมือไปยังหน่วยงานต่างๆ ที่เกี่ยวข้อง อาทิ กรมควบคุมมลพิษ กรมการขนส่งทางบก รวมทั้งมหาวิทยาลัยหอการค้าไทย เพื่อร่วมพัฒนาระบบการติดตามคุณภาพอากาศของกรุงเทพมหานคร โดยมีอาสาสมัครเข้ามามีส่วนร่วมในฐานะผู้ใช้ระบบเพื่อรายงานยานพาหนะที่ปล่อยควันดำ ทั้งนี้กรมควบคุมมลพิษเป็นเจ้าภาพในการอบรมให้ความรู้เกี่ยวกับการติดตามคุณภาพอากาศของยานพาหนะ ในขณะที่กรมการขนส่งทางบก เป็นผู้มีอำนาจในการสั่งห้ามยานพาหนะที่ปล่อยมลพิษสูงให้วิ่งได้ ส่วนมหาวิทยาลัยหอการค้าไทยเป็นผู้พัฒนา Web Application ซึ่งผลการประยุกต์ใช้อินเทอร์เน็ตสำหรับการมีส่วนร่วมของอาสาสมัครในการจัดการคุณภาพอากาศของกรุงเทพมหานคร พบว่าอาสาสมัครร้อยละ 90 เข้ามาใช้ระบบนี้ในการรายงานรถโดยสารประจำทางที่ปล่อยควันดำ ในขณะที่มีอาสาสมัครที่เข้าใช้ระบบอย่างสม่ำเสมอร้อยละ 30 และกรมการขนส่งทางบกได้มีการออกจดหมายแจ้งเตือนแก่รถโดยสารประจำทางที่ปล่อยควันดำเพื่อทำการ

ปรับปรุงเครื่องยนต์คิดเป็นร้อยละ 1 ดังนั้นการศึกษานี้ช่วยสนับสนุนให้อาสาสมัครรายงานผลได้อย่างรวดเร็ว รวมทั้งเจ้าหน้าที่ที่รับผิดชอบก็สามารถติดตามคุณภาพอากาศ เพื่อใช้ในการวางแผนและควบคุมคุณภาพอากาศได้อย่างเป็นระบบ นับเป็นการพัฒนาคุณภาพชีวิตของประชาชนในกรุงเทพมหานครอีกด้วย นอกจากนั้นสามารถประยุกต์ใช้ระบบนี้กับจังหวัดอื่นๆ ได้ต่อไป

คำสำคัญ: Web Application อาสาสมัครติดตามคุณภาพอากาศ กรุงเทพมหานคร มหาวิทยาลัยหอการค้าไทย

Abstract

The main air pollution problem in Bangkok is generated from vehicles. Thus, Bangkok Metropolitan Administration (BMA) intends to reduce air pollution problems caused by vehicle exhaust. The strategy emphasises the importance of developing close cooperation among the Pollution Control Department (PCD), Land Transportation Department (LTD) and the University of the Thai Chamber of Commerce (UTCC) to use the Internet for citizen's participation in air quality management: a view from Bangkok. Following the strategy, and based on several contributions from technical working groups and stakeholders, BMA acts as a project manager and also manages the AMVs. PCD trains 100 volunteers to monitor air quality in the community. Air monitoring volunteers (AMVs) are involved in hands-on air quality surveys. LTD is involved in managing the smoky vehicles by testing and sending official letters to the vehicle owners. UTCC responds by developing the web application for program implementation. The first, demonstrative phase of the study has been successfully completed with the development and deployment of the web application. There are 90% AMVs to use this system as a tool to report the smoky vehicles. About 30% of AMVs login to this system at all time. The results from this study will lead to sending official letters to the vehicle owners 1% by LCD. It can be concluded that the results demonstrate that this system is very useful for not only air quality monitoring but also quality of life. Moreover, this system can be applied to other areas as well.

Keywords: Citizen's Participation, Air Quality Management, BMA, PCD, DLT, UTCC, Web Application

Introduction

Air pollution is an environmental problem for almost all urban areas in the world, largely caused by smoky vehicles, including in Bangkok. There are many strategies to reduce this problem i.e. to use unleaded gasoline, to fine owners of smoky vehicles, to prevent smoky vehicles using the road and car free days, etc. However, air quality remains an actual problem. Furthermore, people have come to realize that information is a key to an enlightened citizenry, and, therefore, citizen participation. Information is also important in developing partnerships between citizens and the civil society at large (World Bank, 1994).

The Internet acts as a medium in fostering and aiding citizen's participation between urban residents and local governments regarding air quality management of urban areas in Bangkok. The Internet facilitates sharing of the key ingredient of participation—information—by assisting in developing a vision, promoting informed decision-making as well as scenario-building. Moreover, the Internet, the Web and its successors combined with the rapidly increasing digitization of information infrastructure for a community (Barraket, 2005; Dutta-Bergman, 2005).

Web application development of the Internet has become a growing body of knowledge emphasizing the importance of information itself, together with characteristics of good information. In fact, the key commodity that underlies effective online participation by citizens and local governments is, in fact, information. The critical aspect here is to provide the right information at the right time to the right user (Coleman, 2006).

The Internet highlights the critical role that information plays in this process. It is useful, therefore, to look at a quick overview of the Internet before its role in air quality management is discussed. This paper attempts to link the twin issues of citizen's participation and air quality management through the medium of the Internet. Thus, the main objective of this study is to empower citizens and governments with knowledge about air quality by using a network throughout an urban space (Fraser, 2006).

Methods and Materials

Research Design

The results of the research project will be used to evaluate and solve the air pollution problems, especially automotive air pollution. The cooperation between citizen's participation and air quality management through the medium of the Internet would

be beneficial if implemented in order to improve the air quality in Bangkok and any other large cities in Thailand. The conceptual framework of this study is shown in Figure 1.

From Figure 1, Bangkok Metropolitan Administration (BMA) acts as project manager and also manages the AMVs. The Pollution Control Department (PCD) trains the 100 volunteers from the Bangkok Metropolitan area to monitor air quality in the community. AMVs are involved in hands-on air quality surveys. Land Transportation Department (LTD) is involved in managing the smoky vehicles by testing and sending official letters to the vehicle owners. The University of the Thai Chamber of Commerce (UTCC) responds by developing the web application for program implementation.

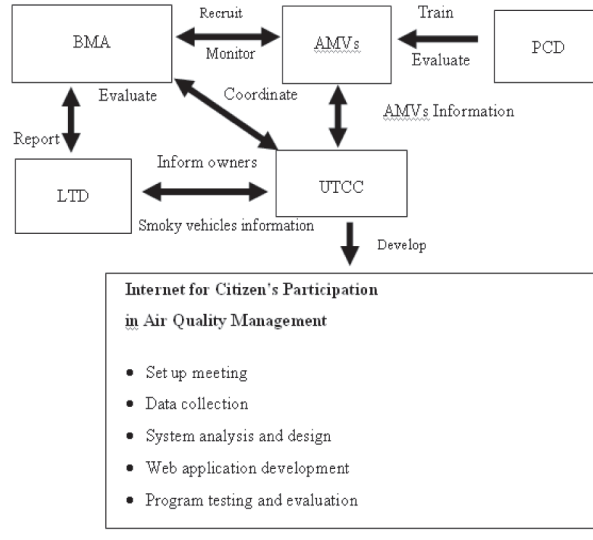


Figure 1 Conceptual Framework in this Study

Selection of Citizen's Participation

About one hundred Air Quality Monitoring Volunteers (AMVs) interested in recording smoky vehicles on the road were selected. Most AMVs have a lot of experiences in environmental monitoring in Bangkok. Past experiences with volunteer participation have clearly shown that participation cannot just happen; nor can it be taken for granted, either. In this study there are several preconditions to participation which have to be met before it can be undertaken and sustained in a particular situation. Thus, the Bangkok Metropolitan Administration collaborated with the Pollution Control Department, the Ministry of Natural Resources and Environment

to train the volunteers to monitor air quality from vehicle emissions.

Variable Parameters

• Training materials i.e. smoke level paper, manual, etc.

• AMVs information i.e. full name, address, age, telephone, etc.

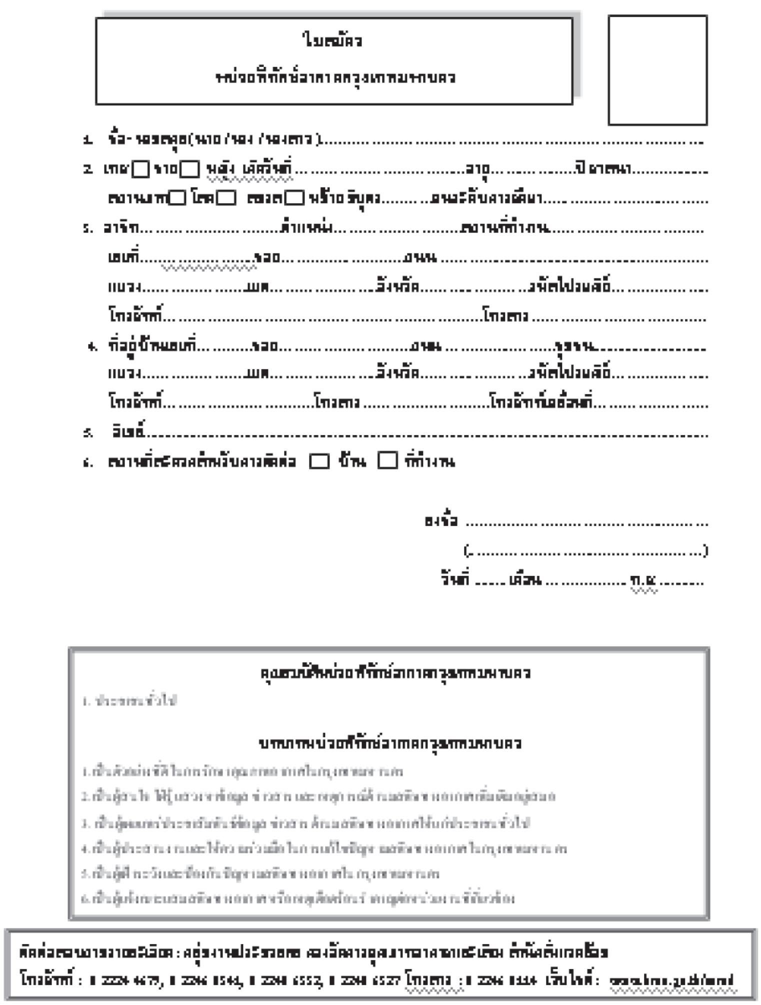
• Smoky vehicles i.e. license number, colour, type of vehicle, etc.

• Smoke level i.e. more than 50%, etc.

• Location i.e. road name, intersection of road, etc.

• Date and time

Bangkok Metropolitan Administration set up the recruitment form for AMVs as shown in Figure 2.


ใบสมัคร
หน่วยพิทักษ์อากาศกรุงเทพมหานคร

1. ชื่อ-นามสกุล (นาย/นาง/นางสาว)..
2. เพศ ☐ ชาย ☐ หญิง เกิดวันที่..................... อายุ.............ปี ศาสนา..............
สถานภาพ ☐ โสด ☐ สมรส ☐ หย่าร้าง อื่นๆ........ ระดับการศึกษา..............
3. อาชีพ.................. ตำแหน่ง.................. สถานที่ทำงาน..................
เลขที่.............. ซอย.................. ถนน..................................
แขวง.............. เขต.................. จังหวัด.............. รหัสไปรษณีย์.............
โทรศัพท์.. โทรสาร..................
4. ที่อยู่บ้านเลขที่.......... ซอย.................. ถนน.............. ชุมชน..............
แขวง.............. เขต.................. จังหวัด.............. รหัสไปรษณีย์.............
โทรศัพท์.................. โทรสาร.................. โทรศัพท์มือถือ..................
5. อีเมล์..
6. สถานที่สะดวกสำหรับการติดต่อ ☐ บ้าน ☐ ที่ทำงาน

ลงชื่อ ....
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คุณสมบัติหน่วยพิทักษ์อากาศกรุงเทพมหานคร

บทบาทหน่วยพิทักษ์อากาศกรุงเทพมหานคร

Figure 2 Recruitment Form for AMVs

AMVs report form for smoky vehicles is shown in Figure 3.

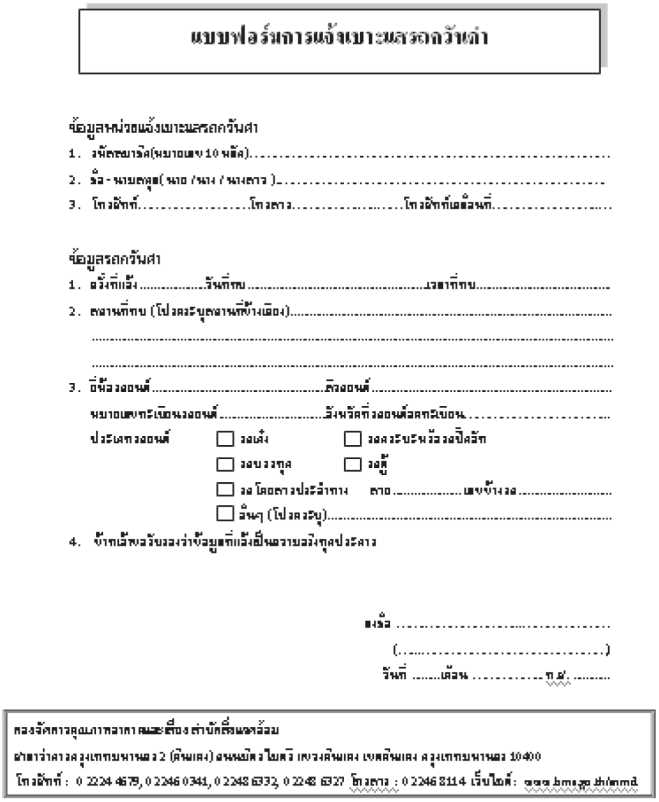

Figure 3 Smoky Vehicles Input Form

Web Application

With the focus being on information as a key ingredient to initiate effective participation, how can the above qualities of information be developed and instilled using the Internet? In this study, PHP and MySQL are the tools used for web application. This application is composed of 2 subsystems: (1) Data Acquisition System (DAS) and (2) Data Collation System (DCS). This study seeks to collect data based on the following concerns:

Quality — the Internet enables large amounts of information to be made available to end users, properly and sufficiently packaged so as to be useful.

Suitability, Scope, and Relevance — with feedback loops and communication possibilities widely incorporated in websites and 'homepages'; it is also possible to tailor sites to the specific information needs of users. This also includes dynamic information that is packaged on-the-fly to suit different needs.

Accuracy — while fraudulent information is indeed made available on the Internet, there is a larger question of information processing and management that has to be kept in mind when disseminating information online.

Timeliness — Unlike a book or a brochure that cannot be easily modified after it has been printed, online information can be modified, edited, added to and updated easily and frequently. This ensures that the information can be kept current and timely. Compatibility — Easy access and updating of online information as well as the simplicity and cross-platform compatibility of Internet information enables data and information to be disseminated, analyzed and compared (thereby, also avoiding duplication).

Presentation — As mentioned earlier, common information formatting standards across computer platforms and operating systems enables appropriate presentation styles to be used.

Results and Discussion

Based on the preliminary results of an ongoing survey of websites set up by local governments in Bangkok, this study looks at the specific role that the Internet plays as a medium for fostering and aiding citizen's participation between AMVs and local governments in management of air quality. Whenever any volunteers (AMVs) log onto the Internet, the Data Acquisition System (DAS) sends smoky vehicle data to the Data Collation System (DCS) at the central server for storage and collection. The AMVs' website is http://utcc2.utcc.ac.th/www/research/amv/ as shown in Figure 4.

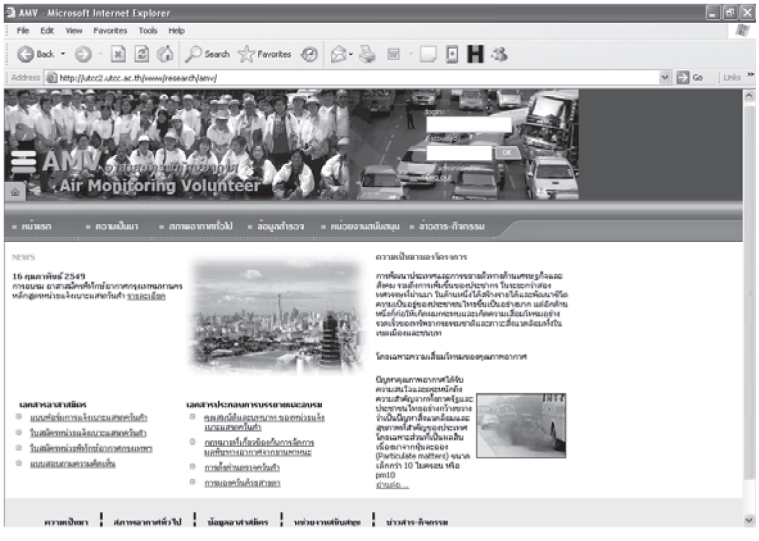

Figure 4 Air Quality Monitoring Volunteers Website

The top ten Air Quality Monitoring Volunteers to record smoky vehicles is shown in the following website http://utcc2.utcc.ac.th/www/research/amv/report/reportfrequentsurveyperson. php in Figure 5. This way, a regular and comprehensive source of air pollution data is established, and it can be determined how polluted a given area in Bangkok is. Anyone on the Internet can access data from the central server for a comprehensive pollution analysis. Participation has to be a gradually-developed response to an actual and pressing collective need for AMVs.

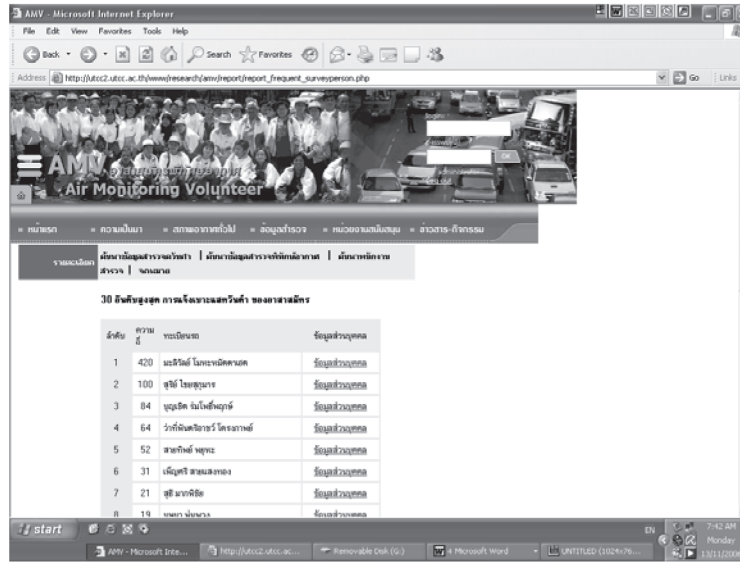

Figure 5 The Top Ten Air Quality Monitoring Volunteers (AMVs)

This is, in fact, needed as a rallying point for to bring the community together. The benefiting target group of a participative action has to be clearly defined, in order to utilize the common interest and awareness for better air quality. It is of critical importance to inform the selected target groups, in a comprehensive manner, of all the relevant features of the program. The local leader and other members should be trained in and made aware of the air quality management process. Management, for example of monitoring and evaluation, or making responsible decisions in financial matters, is an important tool for reaching the desired aim of a collaborative project.

It can be concluded that this program provides comprehensive air pollution information to communities and governments in order to keep a check of the levels of pollution in local environments. Also, this program is a flexible system, to be deployed

in several locations, allowing communities and interested people to share experiences as it grows. The study is an ongoing research to produce an air pollution distribution map using the Geographic Information System.

Conclusion

The study has completed its first milestone over the past year. The first, demonstrative version of the study was successfully completed and deployed. The communications infrastructure that the project relies on is the Internet and the scope of the project is relevant to all of humanity. It is hoped that BMA is able to grasp the use and potential of this mechanism and provide for its growth. There are several challenges that BMA faces in extending the use of Internet facilities for greater participation of AMVs in air quality management processes.

The features of the Internet have facilitated wider participation: the volume of information that can be provided is huge, a wide number of users can be targeted, different types and formats of information can be used, dissemination can be made at a very low cost, the latest and current information can be provided, ease and convenience of use, and space and time independence are also a great feature. However, problems or shortcomings in using the Internet include resistance to computers and online technology within local governments and by citizens themselves, appropriate software and peripheral hardware to access and utilise the Internet, and shortcomings of Internet technology: low bandwidth, limitations of the hypertext mark-up language (HTML),to name a few.

The main challenges cover firstly the critical issues of information management and communication processes that are the linking organizational and operational framework for the information dissemination processes. Secondly, a clear information strategy on issues such as goals, means/ modes, time-space, evaluation, needs to be put in place for effective communication and partnership. Lastly, a strong political support for an effective information management system needs to be developed.

The challenges further extend themselves to using the Internet per se more creatively to foster and deepen citizen's participation. Efforts of local governments in information dissemination itself need to be highlighted and explained to the citizens so as to increase participation. The need for citizens to form organizations and groups to increase their representation in local development affairs needs to be facilitated by using collaborative means enabled by the Internet. Access to

knowledge resources for understanding the wider issues of urban management and their implications also needs be improved.

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