

# Teachers and Awareness: A case study of landslide hazard in Penang Island

Habibah Lateh, Vijaya Govindasamy

**Abstract**— A study of awareness of landslide hazards have been conducted among secondary school teachers. The survey focused on four schools which are located in landslide areas and questionnaire methodologies were adopted to collect data from each school. Guided and close-ended questionnaires were distributed to 60 teachers in four selected schools in Penang Island. From the survey, the results showed knowledge and awareness of landslide hazards among the teachers are average. The results of the survey of teachers indicate that more than 20 percent of teachers lacked of landslide knowledge and below 50 percents of the teachers' awareness of the landslide is average. Education is a basic tool to control the environment and well as landslide awareness among the students. Teachers are the person who can develop students with knowledgeable and aware of the landslide hazard awareness and can help future generations to control their lives and prosperity of the future. Commitment of teachers is very important in shaping the next generation of youth with disciplined and caring soul. So awareness of landslide hazards must be addressed early so that future generations do not face difficulties in dealing with the development of environmental technology.

**Keywords** - environmental issue, awareness, knowledge, teachers, landslide, hazard, education, Penang Island,

## 1 INTRODUCTION

The exposure of landslides has increased through time. The world continues to face landslides hazard since many years ago. One of the natural disasters that often people are fearful of landslides had destroyed thousands of lives and cost millions of dollars to recover. Many countries have fallen victim to a landslide whether developed or developing countries. The study found the cause of the landslide was caused by no awareness and knowledge of the destruction of heritage hills. Humans explore the hill for various purposes without concern for the safety and the destruction of flora and fauna. There has been an intensification of landslide activity. This could be related to the increasing human impact on the environment [4], [8] and climate change [1], [5] suggest that there is some kind of coupling between the economic development and the increase in losses caused by landslide disasters. Until recently, all over the world each year landslide disaster take a huge toll in deaths, property damage and economic loss. Landslides disasters have been part of human life. There were only isolated scholarly references that dealt with the impact of disaster on teacher by differentiating and characterizing natural disasters from human-made catastrophes and violence.

Education is considered the potential instrument for achieving people's participation in environmental management in general and disaster mitigation in particular [20]. Teachers learn that, for many people of low educational and socioeconomic status, the scarcity of land forces them to live in high risk zones, especially those exposed to river floods, as well as zones that have landslide hazards. Landslide disasters and other environmental problems have been recognized and acknowledged at the United Nations Conference held in Rio de Janeiro in 1992, which culminated in Agenda 21. It is understood that if the present trend of rapid growth in economic and population and the rapid exploration of hills continue, the landslide disaster will be increasingly stressed. Vulnerability is emphasized as teachers come to realize that disasters are not

produced by natural phenomena alone but also by human activities. The incidents of landslide hazards are increasing in Penang Island. In this case, the teachers need to provide a better sophisticated teaching tool to enhance knowledge and awareness on the environmental education which include the natural disasters as well as the enhancement knowledge and awareness on landslide disasters. Malaysia a developing country is at an intermediary stage of development, which is facing environmental stress due to the extensive exploration of hill land. Teachers perceptions of landslide disasters influenced by their experiences and knowledge, developmental abilities, and experiences. The incidents of landslide hazards are increasing in Penang Island. In this case, the teachers need to provide a better knowledge and awareness on the natural disaster which include the landslide. The teachers are the noble person in guiding students towards world peace. So they must have a very high knowledge and awareness in incorporating environmental education, especially the problem of landslide.

Teachers can build a caring soul generation of environmental destruction. Now the world is experiencing a terrible environmental destruction as a result of human greed in the pursuit of wealth without regard to nature that have a close relationship with humans. Teachers can make a change against the students if they want a secure environment and harmony. Teachers should not only guide students based on the book, but they need to bring students in depth approach to the environmental balance and protect the environment so as not to harm humans. Education is considered the potential instrument for achieving people's participation in environmental managements in general and disaster mitigation in particular [20]. Teachers need to be prepared with knowledges and awareness to inculcate students love the attitude of the environment from being destroyed by people who are not humane to the environment of this beautiful creation of God.

## 2 LITERATURE REVIEW

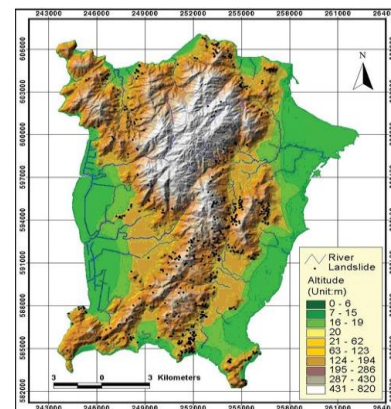
Teaching is a complex and demanding employment of teachers involved not only in terms of energy and thoughts but also feelings [3]. A survey of literature on landslide awareness attitude yielded average promising results. Research on teachers' landslide knowledge and awareness become vital if it is necessary to develop citizens who can take responsibility to protect and improve the environment. The Malaysian curriculum subjects in schools have no specific subject on risk mitigation and disaster preparedness, the social sciences (such history and geography) and the natural sciences enable teachers to study and gain knowledge about the relation between social reality and nature. In this way, disaster prevention education is underpinned with principles and attitudes that will benefit the teachers and they must have extensive knowledge to develop knowledgeable and dedicated people. Thus, the curriculum activities are the way of learning rather than the application of what has been learned. In this sense, the education is considered as a set of formative processes that lead the students to learn principles related to risk reduction coordinated with daily life.

If the teachers are aware of the risks from landslide hazards for the long-term procedures faced by the communities, they are more likely to take steps to reduce potential losses. Now the environmental problems have an adverse effect upon quality of life. In our era of abundant and widespread information one is tempted to believe that this kind of learning process may lead to similar preconceived ideas among different socio-cultural environments [18]. Although in the past a few environmental researchers employed specially composed questionnaires as a main device or as part of their measurement methodology [7], questionnaires of teacher's preconceptions about the natural environment is a relatively new area of research [12], [13]. Tragedy of natural disasters as well as landslide hazards due to extensive development on hill areas and hill slopes given rise to the public concern in recent years. Recently, development of hill areas and hill slopes had increased risks of landslides which caused substantial loss of human life and damages to the properties and infrastructures. The most important lesson from experiences is that prevention of disaster is better than trying to revenge the damage once it has occurred as stated in Agenda 21 of the United Nations Conference on Environment and Development 1992 [10]. Only teachers who are committed to nurture and preserve the values can help students to turn the value of environment [11]. The teachers with an inner strength, responsibility, diversity and challenges in their careers and external pressures can make the environment without the disaster become a reality.

Penang was one of hilly surrounding (Figure 1) with high growth in industry, construction, manufacture as well as population growth. Therefore, the demand for land has also increased rapidly. Flat lands were cleared out for development, as such, it is anticipated that developers will cast their eyes on the remaining hill land on the island. Many schools are located near the area of high ground, between the northeast and southwest of Penang Island, where many landslides occur frequently. As Penang is a small state, it is not surpris-

ing, that developers have targeted land on hills and hill slopes for all sorts of development ranging from housing to transportation, industries and recreation. More than 50 percent of the Penang island is made up of steep topography above 60 meters [2] (Figure 1). From the study and observation of the author, four schools were selected for the survey from the northeast and southwest of two important districts of Penang island which were located in the landslide zone. Therefore, it would be very interesting to examine whether the four schools of teachers are aware about the landslide hazards. Although there are many acts, regulations and laws to protect the hill land development, but though the landslide problems continue to worsen daily because humans (individuals, governments and private corporations) are the cause of the landslide problems occurring almost everywhere. A very effective program is needed to address the problems faced by the country due to rapid development. Hopefully this research will be very helpful to teachers to address the problem of landslides in this country and identify the most suitable ways or methods in assist the state in maintaining hill land. This study can be particular merit to Malaysian education ministries in their pursuit to integrate knowledge and develop strategies towards a common Malaysian natural hazard awareness program. Awareness programs against landslide hazard are very less implemented in developing countries, such as Malaysia, since those countries are fortunate in being in the position to learn from the experience of developed countries and avoid their worst mistakes.

Figure 1 Geological map of Penang island



Positioned as a professional teacher in the landslide hazard of knowledge is used to find the two terms will always be relevant, the status (position) and the social role in society. Status as a teacher can be as high in view or low, depending on where it is located. While the role a position as an educator should show eligible appropriate behavior expectations of society, and teachers expected to act as a role model and reference in the community and especially the students who they taught. Teachers do not only have a role, it can act as a person who adults, as an instructor and as an educator, as a model example and so on. When viewed with care, the actual

status and role of teachers is not always uniform and consistent as is implied in on. This is in accordance with such standards and which are used in determining them. In the community industrial and material status and the role of a teacher is not only on the medium or an agricultural society. One of the teachers' role is as a professional and those who qualified professionals, for example, teachers who knew in detail about the environmental problem, teachers whom are strong personal integrity and proficiency need to educate students in addressing landslide problems by applying environmental factors in detail in students' life so that they can appreciate the importance of safeguarding and protecting the environment from destruction. Education has been accepted as a basic tool to control the environment and well as sustainable development since the Tbilisi conference in 1977. Schools are the only way of addressing the problems associated with environmental [15]. Education (related) is important to raise landslide awareness of maintaining environmental quality. Environmental education can help future generations control their lives and prosperity of the future [17]. One way to carry out landslide awareness is to integrate environmental education in teaching in the classroom. In the Malaysian context, this matter has not been introduced in official cross the curriculum for secondary schools by the Malaysian Ministry of Education. In this case, [8] stressed that although environmental issue to teach the subjects listed by the resolution made by the Ministry of Education, but the quality is highly dependent on the implementation of awareness and interest of individual teachers. Teachers should use the environmental education book as a guidance in implementing the teaching and learning related to landslide awareness. Teachers should also use all the opportunities available to sow, nurture and sustain environmental education such as landslide hazard through activities in school either within or outside the classroom. In this case, the commitments of teachers are very important to instill the spirit of love in the environment among students.

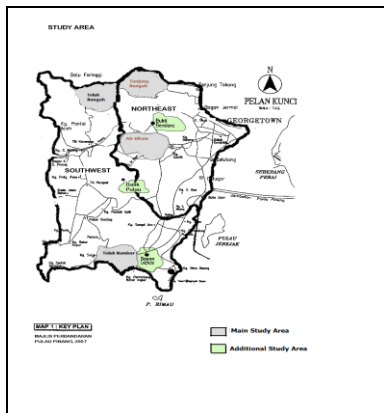
Teachers' feelings of environmental damage can be shown through the teaching systems in schools towards the environmentally safe. Without a sense of commitment high on the terms of reference, teachers will be faced with workload more challenging [16]. This is because at the same time teachers are also required personal commitment and family. Therefore, teachers must be smart to manage between personal commitments at home and a commitment to teaching in schools. Landslide awareness across the curriculum needs of all subjects involved and contributes to environmental education. Teaching landslide awareness closely linked with the nation to build a society that is sensitive and have the right knowledge, skills and values on landslide issues and ability to contribute to the solution of environmental problems. Integrate environmental education element and clearly taught in the subjects such as Moral Education, Geography, Languages, Religious Education and also in the subjects of Civics and Citizenship Education to be introduced in 2005 [14]. Apart from formal education in the classroom, landslide awareness can also be made not informally through extra-curricular activities in the form of programs/projects such as the Nature Club 3K projects (Safety, Fun and Beauty), quiz competitions, campaign

3R (recycle, reduce and reuse), talks and tours. In the success of landslide awareness across the curriculum, the school requires high teacher quality and commitment to prepare and implement the tasks. The main purpose of this program is to educate future generations love the green environment without destroying it. Awareness of landslide is difficult to achieve without the sincere efforts of a dedicated and committed teachers. Only teachers can help the students aware of landslide hazard and other disasters that occurred on this earth to lead them to better live. The commitment is an inner strength that comes from teachers who can guide the students to save the world from degraded due to human greed.

### 3 METHODOLOGY

The present study is to examine the landslide awareness of secondary school teachers in relation to experiences of teaching. Four schools from two districts (northeast and southwest) of Penang were selected which were situated on the prone areas and non-prone areas of landslide hazards. Therefore, it would be very interesting to examine whether the four schools of teachers are aware about the landslide hazards. The research was a guided close-ended questionnaire type of study utilizing survey method. Four secondary schools in the state of Penang (one of the 13 states in Malaysia) were randomly selected for the study. Four districts were chosen randomly from northeast (2 districts) and southwest (2 districts). Figure 2 shows the study areas of research. Teachers from four secondary schools were chosen in each of the selected area whom teaches variety of subjects in schools. The sample size of the study was 15 teachers randomly selected for each school from the total of 60 teachers. A return rate of 100% was obtained. Prior to data collection, permission was sought from the State Education Department of Penang island. Chi Square Test was employed to find out the significance of difference between the level of knowledge and awareness among the teachers in the selected areas. SPSS was used for the analysis the data to find out the significance of difference between the level of knowledge and awareness among the secondary school teachers in the selected schools. It consists two dimensions ranging from knowledge and awareness to landslide hazard. There were divided into three parts, firstly about teacher's background, secondly contained 15 questions with two choices 'A' and 'B' for each was given. The third part consists of questionnaires measured the awareness level of landslide issues, which contained 50 questions which consisted of general awareness of landslide hazards with the response format of a five points Likert scale ranging from strongly agree (5) to distrongly agree (1). Each question is given a choice of (1) most not agreed (2) not agreed (3) less agreed (4) agreed (5) most agreed to the questions asked. Specifically, 60 teachers completed the guided questionnaires. The responses of the teachers on answering the questionnaires were good indeed. Pilot studies were conducted and the wording of questionnaire was amended accordingly.

Figure 2 Study areas



## 4 RESULT

Study of teachers' awareness of landslide disasters was made in four national secondary schools in Penang island. 60 teachers involved in this study consisting of 15 teachers from each school. Based on the measurement formula chi square test analysis, there is a significant relationship between the questions surveyed on the level of teachers' awareness of the landslide hazard. Of those surveyed, found 44 (73.3%) of the teachers agreed to teach students to plot the landslide area and 47 (78.3%) of them agreed to teach students about the flow of underground, while 37 (61.7%) of the teachers are agree that human need to be concerned about the highland development activities that occurred over the years that have claimed many lives and property. This means that teachers have a moderately high awareness of the landslide hazard although there are quite numbers of them still are not sure with the teaching of landslide issues as these issues have not been introduced in schools by the Ministry of Education.

56 (93.3%) of them agreed to require environmental education in the context of a landslide in all levels of schools and higher education, and 31 (51.7%) of the teachers did not agree to stay on high ground, while 52 (86.7%) of them agree to teach students about plant science, while 55 (91.7%) of them agree to teach students about the flora and fauna. This shows that teachers have high awareness of the dangers of landslides in applying the spirit of love for the environment among students as well as understand the green plants can reduce the occurrence of landslides in the country which became a trend and put pressure on people living on and near the hills. 46 (76.7%) of the teachers did not agree with landslide in Malaysia has not yet reached the level of concern and does not need to control the activities on the hill, and 56 (93.3%) of them agreed that the Ministry of Education requires each school to plant more green plants in order to preserve the land surrounding the school area is not eroded by rain, while 50 (83.3%) of the teachers did not agree that the problem of landslides is the major problem of industrial countries only

and do not need to be concerned about it. This means that teachers have a high awareness of the dangers of landslides because landslide is a natural disaster became more serious in the country and overseas, in addition, teachers understand the importance of roots that hold the soil can reduce the occurrence of landslides and soil erosion during the monsoon seasons in the state this.

54 (90%) of the teachers are worried that if their house near the high ground and 55 (91.7%) of them are agreed that hill farming activities enhanced the hill in order to reduce soil erosion while 31 (51.7%) of the teachers did not agree to the development hill land area suitable for our country despite the likelihood of landslides. This means that teachers' awareness of the landslide hazard is high because many of them stated that Penang is still in the zone of landslides as many hills explored for various economic purposes and realize the importance of intensifying agricultural activities on the slopes of the hill in order to reduce debris landslide. 45 (75%) of the teachers agreed to create an anti-development attitude among students due to high land development destroy the various species of flora and fauna whereas 39 (65%) of them loves to see green forests besides of seeing the skyscrapers, while 49 (81.7%) of the teachers agree to make the issue of landslides as a side subject in the school curriculum. This shows the awareness of teachers is high because they believe that the involvement of students in environmental activities can keep the balance of the ecosystem without destroying it.

55 (91.7%) of the teachers agree to apply the issue of landslides in certain subjects only, while 42 (70%) of the teachers and strongly agreed that human indiscretion involved in operating the environment causes various natural disasters such as landslides, floods and so on. This shows the awareness of teachers is high as they can assess the importance of education in implementing landslide issues in biological subjects, and other specific subjects related to nature and man and get to know the student's ability to develop students' awareness and acceptance of land collapsing issues. While most teachers are aware of the landslide hazards, but there are a few of those who are still shallow knowledge and low awareness of the landslide hazards.

## 5 DISCUSSION

These researches show the significant differences between the mean knowledge and awareness scores of the teachers in the selected schools in Penang island of Malaysia. The present study highlighted that in total there is an influence of Ministries of Education on levels of teachers' landslide hazard knowledge and awareness. Majorities of the teachers had moderate levels of landslide awareness. Teachers in the teaching experience groups of 30 to 50 years had higher levels of awareness as compared to other teaching experience groups of under 30 years. The overall analysis revealed though majorities of the teachers had moderate awareness, only few of them had high levels of awareness. This calls for changes in the curricula designed at foundation levels of environmental educa-

tion. Our globe being highly prone to destruction due to human interference, there is an urgent need to educate the public regarding the phenomena like natural disasters, environmental degradation, and etc. This can be very well initiated at school level by giving advanced training to teachers on environment related aspects. If students at their early age learn about these negative effects, as they grow at least they can make some effort for safety environment especially in developing the hill lands. The results obtained in the present study are more or less in accordance with some of the studies mentioned here. The emphasis would be given to recent developments, encouragement in participations on various programs on environment related issues, which is not so pronounced in schools. It is found that the system of education has impact on landslide knowledge and awareness of teachers in both Penang island or in Malaysia overall. This study provides further evidence to support the necessity of key interventions in the design of school curriculum in order to make landslides issues more effective. Since majority of teachers in these two districts of Penang island (northeast and southwest) identified more or less understand and aware of landslide hazards, while they seem to ignore some other feature of the hill development, the Ministry of Education should adopt a landslide hazard issue as well as civic and moral practice in the secondary school level or even primary schools too.

## 6 RECOMMENDATION

The Ministry of Education and the school departments need to play a big role in enhancing knowledge and awareness of landslide hazards to teachers. This can only be successfully implemented by ministries of education and government intervention itself. Free intensive training courses and activities outside of school can create awareness among teachers about the importance of the environment which includes all natural disasters on earth. In this sense, teachers can attend the conference or seminars organized by the neighboring countries or among the states in the country in promoting public awareness about the importance of protecting the environment with safe. By doing this the teachers would be able to understand more closely about the landslide issues and be more alert on developing the hill lands in the future. Generally disaster education in schools is one of the most effective strategies for increasing teachers' knowledge and awareness. If all the teachers know about landslides, how they feel about it, and what steps they should take, may help them be more conscious on the landslide issues. This will create a strong national environmental movement that will conserve the environment by solving landslide problem and in the same time to create caring and responsible students for the nature development in future. Natural disasters as a threat to human strict, the education ministry and other government agencies should play an important role in community awareness about the importance of protecting the environment as a result of hu-

man actions on nature itself is fabulous.

Teachers need to have the knowledge, skills, cognitive and affective attributes such as sensitivity to landslides and indoor environmental problems are expected to form the students. If teachers do not have the knowledge, skills or commitment to 'environmentalism their curriculum' is difficult for them to produce students with literacy of environmental involving landslides. Teachers can take students to places where landslides occurred to make them aware of the importance of preserving environmental destruction. In addition, teachers can provide inter-school quiz or debate among the students for their talent in acting to protect the environment. In addition, teachers should be immoral to high and deep faith, the entire behavior in relating to the landslide problems motivated by noble and godly values. The teachers expressed must act in good faith, discipline, fairness, loyalty, decency and appreciate the faith that is alive. Teachers do also need to acquire skills and work well with high maturity because teachers think as acting professionally is a position that is strategically in life and community development. They should also continue to strengthen the position and efforts to develop the ability to maximize personal and continuity in learning more about the environmental problem or issues.

One of the spiritual importance of teachers is that they should continue to expand self-education until their end of life. It is to apply themselves and students in an effort to achieve the safe environment. "All teachers do good things some of the time, and all good teachers do bad things some of the time. The differences among teachers lie not only in the proportions of the good and the bad, but also in their awareness of the effects of what they are doing and their readiness to share this awareness with their students" [19]. So, it has become customary to teachers with knowledge and awareness of landslides on the application of this issue to the students at school. Fried [4] had mentioned that the example we set as passionate adults allows us to connect to young people's minds and spirits that can have a lasting positive impact on their lives. This is in line with inculcating the spirit of a safe and harmonious environment, especially in the highlands invaded rich in natural treasures. Teachers should improve themselves through self-access and be open-minded and willing to enhance professionalism through talks, workshops, seminars or courses related environmental issues. A teacher who is passionate about the teaching process should be creative and constant in seeking new ways of engaging and challenging the students. It can increase knowledge and awareness of landslides among students and the community at large.

## 7 CONCLUSION

To protect and conserve the hill land, emphasis should be given to landslide awareness program in both formal and non-formal system of education. In the formal system of education, teachers play a very significant role in developing a greater awareness about landslide disaster among students. The successful implementation of landslide awareness



in school curricula is highly dependent on the commitment of teachers as an implementer. Teachers' attitudes and subsequent behavior will impact student learning. The ultimate goal of landslide awareness to produce individuals who are responsible behavior on the environment easily achieved if teachers take responsibility to educate seriously. This calls for a radical change in the way we think, live and work. It therefore goes without saying that landslide awareness calls for a paradigm shift in our educational system right from school levels to university level. In fact, it cannot be thought of achieving a peaceful environment way of life without an appropriate educational system designed to internalize the principles of peacefully in the life and work of the students.

The government's initiative in making landslide awareness program an integral part of formal education through its national curriculum framework and considerable work is important in the direction of integrating landslide concepts into the existing curriculum, developing new strategies, preparing instructional material for effective implementation of landslide awareness programs in the formal system. Big effort is required among the teachers to address the current landslide problem and steer the state of Penang towards safe environment. Since environmental and development are intertwined they must be integrated into educational activities to ensure the education system produces environmentally responsible citizens. Finally, to implement educational strategy landslide awareness at the highest level, commitment and collaboration between teachers and the Ministry of Education should be organized to create a safe environment. Briefly be said that the high awareness and knowledge of teachers about landslide disaster can prevent untoward incidents occurred in the state, especially in the future.

## ACKNOWLEDGMENT

The author(s) would like to thank the Penang State Education Department for permission to conduct the questionnaire survey of teachers in schools and to all the teachers involved in answering the questionnaires.

## REFERENCES

- [1] Cendrero, A., Remondo, J., Bonachea, J., Rivas, V., Soto, J. "Seinsitivity of landscape evolution and geomorphic processes to direct and indirect human influence", 2006.
- [2] Chan, N.W. "Environmental hazards associated with hill land development in Penang Island, Malaysia: Some recommendations on effective management". Emerald Disaster Prevention and Management 7(4): 305-318. 1998.
- [3] Day, C. *A Passion for Teaching*. London: RoutledgeFalmer. 2004.

- [4] Fried, R. L. *The passionate teacher*. Boston: Beacon Press. 1995.
- [5] Geertsema, M., Clague, J.J., Schwab, J.W., Evans, S.G. "An overview of recent large catastrophic landslides in northern British Columbia, Canada". Engineering Geology 83, 120-143. 2006.
- [6] Glade, T. "Landslide occurrence as a response to land use change: a review of evidence from New Zealand". Catena 51, 297-314. 2003.
- [7] Gump, P. "School and classroom environments". In Altman, I. And Wohlwill, J.F. (Eds). Handbook of environmental psychology. New York: Plenum Press, 131-174. 1987.
- [8] Hotinli, Gulru.. Environmental education in Turkey. Dlm. MIO-ECSDE. *The status of environmental education in the mediterranean countries within the formal & nonformal educational systems*. Dec, Issue No. 34. 2004.
- [9] Sidle, R.C., Taylor, D., Lu, X.X., Adger, W.N., Lowe, D.J., de Lange, W.P., Newnham, R.M., Dodson, J.R. "Interactions of natural hazards and society in Austral-Asia: evidence in past and recent records". Quaternary International 118, 181-203. 2004.
- [10] Keating M.: *Agenda for Change : A Plain Language Version of Agenda 21 and Other Rio agreements*, Centre for our Common Future, Geveve, Switzerland, 70 p. 1993
- [11] Maheswari, A. *Professional Commitment of Teachers*. Delhi, Gandeeep Pub. 2005.
- [12] Membiela, P., Nogueiras, E. and Suarez, M.. "Students' preconceptions about urban environmental problems and solid waste", Journal of Environmental Education, 24(2), pp. 30± 34. 1993
- [13] Membiela, P., Nogueiras, E. and Suarez, M. "Preconceptions of students about the natural urban environment in a small Spanish city", The Environmentalist, 14(2), pp. 131± 138. 1994.
- [14] Ministry of Education Malaysia.. *The development of education: national report of Malaysia*. 2004.
- [15] Moroye, C.M. Common ground: an ecological perspective on teaching and learning. *Curriculum and Teaching Dialogue* 7(1/2): 123-139. 2005.
- [16] Nias, J. Thinking about Feeling: The emotions in Teaching. *Cambridge Journal of Education*, Vol.26, 3, pp. 293-306. 1996
- [17] Perikleous, E. The Status of Environmental Education in Cyprus Today. Dlm. MIO-ECSDE. *The status of environmental education in the mediterranean countries within the formal & non-formal educational systems*. Dec, Issue No. 34. 2004.
- [18] Pfundt, H., and Duit, R. Bibliography: "Students' alternative frameworks and science education (2<sup>nd</sup> ed). Keil", Germany: Institute for Science Education. 1988.
- [19] Smith, J. A. Semi-structured interviewing and qualitative analysis. In J. A. Smith, R. Harre, & L. van Langenhove (Eds.), *Rethinking methods in psychology*(pp. 9-26). London: Sage. 1995.
- [20] The Hindu. March 24. "India prone to natural disasters". The Hindu. Retrieved August 28, 2003, from the World Wide Web: <http://www.hinduonnet.com/thehindu/2002/03>. 2002.