

The Quest for a Community Learning Management Model for Informed Environmental Decisions

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The objective of this study was to develop the Learn to Make an Informed Environmental Decision Model (L-Informed ED Model) by means of action research with the participation of community-based tourism (CBT) in Thailand. Fifteen members from the CBT group from a community of Nong Mae Na (a province in Thailand) voluntarily engaged in two cycles of self-designed action to solve the socio-ecological problems that the community was encountering. Data collected through participant observation unveiled that the nature of the participants' learning to use information as a basis for their environmental decisions and actions that were incremental, associative and active, social and real-life oriented. A synthesis of the action study helped to develop the L-Informed ED Model, which comprised of five steps including synergizing cooperation to treat collective socio-ecological problems, assessing the actual environmental situations with newly acquired information, planning and implementing management guidelines for some selected problems, comprehensively appraising the local environmental carrying capacity and putting in use a proactive management plan. The model held efficacy in supporting the community to use empirical information in addressing local problems, and making it readily adaptive in coping with constant changes on its own.

Keywords: adaptation, community empowerment, environment, tourism

Community-based tourism (CBT) is an alternative approach that spawned from a vision that it was timely to boost the sustainability of tourism industries. CBT shifted the focus of the industries from the mainstream tourism which aimed for maximum monetary profits through the largest arrivals of tourists to an upgrade of the quality of life in host communities and distribution of income to community residents. For the shift, CBT placed high importance on learning and conservation by both the host communities and visiting tourists (Miller & Twining-Ward, 2005) and provided the communities with greater opportunities to take action on their own initiatives as resource owners (Sarobon, 2003). CBT has been practiced in Thailand since 1997 and a large number of CBT destinations have opened up. Despite its positive impacts on the economy of the host communities, a number of problems has called up attention regarding the local socio-ecological resources management that was not proactive enough to catch up with the blowing-up developments and problems. Extensive exploitation of local resources was reported in the CBT communities. Even though the number of tourists arriving in the communities was small in each arrival due to the limited capacity of local infrastructure, the overall arrivals led to an increase in the use of community resources. Worries increased whether the physical, biological, social and cultural environment in a number of CBT communities would be able to withstand losses of habitats and cultural heritages and increasing pollution and waste problems (Booranahiran, 2008; Chatkul, 2007; Virayakosol et al., 2005; Vongsureerat & Shiewsharn, 2007). CBT practitioners as well as general community residents were challenged with increased workload to maintain their communities. Several communities faced difficulty in dealing with the workload and

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encountered internal social conflicts. They were in need of a way to put their CBT back on a sustainable track.

Merely changing the pattern of tourism management as would be commonly suggested by external tourism management experts may not be sufficient in effectively handling the problems that the CBT communities were facing. Weil (2013) pointed out that doing so had resulted in a large number of the CBT communities missing their opportunities to learn to develop their own solutions to address their local environmental problems. The knowledge developed in other contexts and prescribed by external experts was at times incomprehensible and difficult for the recipient communities to apply. In addition, dependence on externalities for problem-solving was static and would make the recipient communities unable to keep pace with dynamic changes occurring in their environment (Coccossis & Mexa, 2004). Explicitly, the Thailand Research Fund (2011) emphasized that CBT communities in Thailand possessed limited capacity in learning as to how they could use local information to deal with their environmental problems. An encouragement for the communities to use information to address the problems on their own would contribute to their systematic thinking, reasoning and use of evidences to support their decision-making in the long-run (Prasertsan, 2011). An appropriate learning management for the communities was much needed.

Literature Review

In order to find out what kind of learning management would fill in the gap of CBT environmental management capacity, the quest under the study was premised on the philosophy of the environmental education and the theory of information processing. Environmental education focused on managing learning within the environment, about the environment and for the environment. The main objectives of environmental education were for learners to construct their knowledge and understanding about their ecosystems, develop an awareness and appreciation of the environment and attain a behavioral readiness to perform environmental conservation so that their environmental use was sustainable (Gough, 2013). Thus the learning themes for the CBT communities must be related to their local environmental issues and the impacts of their CBT industries. In addition, their learning activities must include local exploration and learning through self-construction of knowledge through their own practice.

The psychological learning theory of information processing described that learners could continually use information to refine or restructure their knowledge. In continually updating their information, the learners upgraded their thinking skills, formulated their learning strategies and enhanced their cognition (Child, 2007). As a result, they would gain both the procedural as well as declarative knowledge. Behavioral changes would gradually develop following the learners' engagement in repetitive and reinforcing information processing tasks that required them to evaluate, collect, think, decide and act.

In order to create an appropriate information processing learning management model for CBT communities, the study took environmental carrying capacity appraisal as the terminal learning theme. Such theme would create a learning environment for the learners to practice assessing the levels of environmental utilization for tourism (Coccossis & Mexa,

2004) and develop practical and comprehensive plans for addressing environmental issues arising in their CBT industries.

In order to innovate such a learning management model for CBT communities while influential factors could not be predetermined, the study opted to track the learners' natural learning approach through a participatory action research (PAR) process under which the learners were allowed to control their planning, action, observation and reflection activities as they found fit. PAR allowed innovative learners to bring in all factors they found relevant into their process. Thus, it was appropriate for using in this study because, as noted by Stringer (2007), the CBT communities' main concerns were the quality of life in their communities and the practicality of action that they would take to deal with local problems. In addition, PAR supported the innovative information processing learning process because it required the learners to engage in conversations, joint action, sharing of ideas and reflection throughout the process. PAR process would boost the learners' confidence in their knowledge and liberate them from a belief that they were incapable. The process would empower them and shape new characteristics that contributed to collaboration and tolerance to different opinions with respect (Creswell, 2012). As a result, the process would link individual with collective experiences. In addition, it would create a sense of co-ownership of the problem-solving guidelines and a readiness to accept benefits and be responsible for any damage arising from the guidelines that they jointly developed and implemented in their community (Harris, 2010). Hence, the effectiveness of the self-devised problem-solving guidelines above that of the guidelines recommended by external experts.

Keeping tracks of the CBT communities' learning would elucidate the nature of their learning and the process that they deemed fit for them. Such descriptive knowledge on learning could mirror a prescriptive knowledge on instruction, resulting in a learning management model that could be applied to transferable cases of CBT communities.

Research Objectives

In order to fill in the gap in CBT community learning to use information in coping with their environmental problems, this research aims to innovate a learning management model under which CBT communities could use information to decide how they would manage their local environment. The objectives of the research are (1) to clarify the participatory action cycles of CBT communities when they self-designed their process for learning to use information for environmental decision-making, (2) to describe the nature of the CBT communities' learning, and (3) to synthesize a learning management model to empower CBT communities in using information as the basis for their environmental decisions.

Methods

Research Participants

For innovation purpose, this study employed a participatory action research process under which praxis may reveal an interesting proposition about learning management to empower CBT communities in using information for environmental decisions and action. The study was based on the case of the Nong Mae Na Community in Phetchabun province of Thailand. The community was purposively selected based on its being a CBT community

where CBT had been practiced for 10 years. The community residents were aware of the impacts of CBT on their socio-ecological environments. They were concerned about risks being posed to the vulnerable and endemic species of freshwater jellyfish (*Crasapedacusta sowerbyi*) which could be found in only six places in the world (Ouithavon, 2012) and internal community conflicts induced by CBT workload.

Research participants were purposively recruited based on their association with the CBT industries and volunteering to engage themselves in the lengthy process of PAR. They were accessed through the leader of the Nong Mae Na CBT group. Fifteen CBT board members agreed to participate in the research, with six of them directly participating in the research activities while nine others would support when requested by the active participants. The research participants claimed this practice was a normal practice in their community, as noted by a member saying that *“We agreed to participate but we would rather let our leaders take action. This is our common practice. If our leaders need help, they will contact us.”*

Research Procedure

The PAR process that took place from October 2012 to May 2015 for a total of two years and eight months consisted of six stages:

- **Community entry and rapport-building.** The community was accessed through the leader of the Nong Mae Na CBT group to whom the researchers were introduced by other researchers who had previously worked in the community. Six months were spent on building relationship with the community through frequent visits and joining various kinds of community activities such as merit making activities, community festivals, social events like wedding parties and funerals.
- **Recruitment of research participants.** Upon gaining adequate relationship, the recruitment was made at a special meeting of the Nong Mae Na CBT Group convened by the group leader at the request of the researchers. The number and the level of participation of the research participants was voluntary.
- **Immersion into the community life.** With assistance from the research participants, the researchers familiarized themselves with the community. Basic data related to the community general characteristics, ways of living and environmental issues were collected to ensure the researchers' preparedness for PAR process facilitation.
- **Implementation of participatory action cycles.** Prior to embarking on the PAR process, the researchers clarified that the roles of the research participants would be highly self-assigned and the researchers were ready to support them at their requests. Two cycles of action were initiated and undertaken by the research participants in order to use information for environmental management. Each cycle of action consisted of planning, action, observation, and reflection stages. In actual implementation, the researchers were requested to provide knowledge about water quality testing and environmental carrying capacity appraisal.
- **Data collection and analysis.** Data related to the research participants' learning process was collected through a methodological triangulation of participant observation, after-action reflection and interviews. The data was organized

according to the order of action to illustrate the steps taken in the participatory action cycles and categorized to illustrate the nature of the research participants' learning. An instructional model for CBT communities' learning on information use for environmental decision-making was then synthesized.

- **Evaluation of the instructional model.** The authentic performance of the research participants in producing their environmental management plan served as proof of the realistic bearing of the instruction model. To gain understanding in the model efficacy from the professional epistemological point of view, five experts in education and environmental carrying capacity appraisal were requested to evaluate the research participants' process and output.

Results

The results are presented in three parts

Participatory Action Cycles

The research participants were involved in two participatory action cycles. In each cycle, they were encouraged to plan, take action, observe the results of their action and reflect on the entire cycle to evaluate whether their targets had satisfactorily led them to handle their local environmental problems or not. They were especially encouraged to consider the selection, collection, compilation, analysis and use of information in all stages of their action to treat their environmental problems. Details on each of their participatory action cycles are as follows:

Cycle 1: Information-based action on selected socio-ecological problems

In this cycle, the research participants engaged in the plan-act-observe-reflect stages of PAR as follows:

Planning: In the planning stage, the research participants organized a workshop under which they pooled, considered and organized information to clarify what their environmental problems were. The exchange of information among the participants as well as the addition of information obtained through inquiries with other community residents led them to recognize that the CBT-related problems within the community consisted of both environmental and social problems. The environmental problems consisted of a decrease in the number of the rare freshwater jellyfish, the contamination of the river water due to cattle raising in upstream areas and an improper management of increased solid waste. The social problems that they perceived were concerned with a lack of responsibility of the CBT Group members in CBT work, disturbances from CBT activities on the community's way of life, a lack of understanding of general community residents in CBT targets and a lack of number of youths to whom the CBT work could be passed on.

After identifying the socio-ecological problems, the research participants discussed and agreed that they would select some of them for treatment based on the significance of the problems and the research participants' knowledge and experience as well as their confidence in their problem-solving capabilities. At the end of the planning stage, the research

participants concluded that they were keen to treat the problems relating to river water quality due to cattle raising in upstream areas, community residents' understanding about the CBT Group's work and younger generation to take up the CBT work.

In planning for action, the research participants concluded that two activities would solve the selected problems. The activities included a detailed investigation into the impacts of upstream cattle raising and filming of a community documentary in which the CBT targets and work were integrated. Their intensive preparation talks resulted in (1) an identification of the types and qualities of the information that they should use, (2) a recognition of the necessity to expand their knowledge and capacity in order to perform the self-assigned missions, (3) a conclusion on the procedure of their action, and (4) a division of work among themselves.

Action and observation: With regard to the river water quality problem, in the action stage, the research participants obtained new knowledge on how to use a simple water quality test kit before venturing out to test the quality of river water near the cattle raising areas. They presented the information about their tests to the village meeting and inform the meeting of the impacts of cattle raising on the quality of the river water. The meeting decided that the cattle raising grounds must be moved away from the river.

For the production of the community documentary, the research participants received new knowledge about film-making and invited 27 local youths to participate. Related activities included writing a plot for which intensive consideration was given to what kind of information should be included, shooting the film, producing a documentary CD, and distributing their copies to school children and their parents and schools, the Community Tourism Data Center, the Tambon Administrative Organization of Nong Mae Na and any interested community residents.

Reflection: The research participants' reflection on their first action cycle unveiled their satisfaction with the results of their action. Cattle were moved out of the upstream areas as resolved by the village meeting. They further considered that a continued monitoring of local cattle raising was necessary. They planned to propose to the next village meeting to have community residents taken turns to monitor the situations and reported the current information to the village meeting.

Regarding the production of the film, the research participants were gratified to learn that the activities had stimulated eight youths to become interested in working with the CBT Group. Community residents who had previously misunderstood about the CBT Group gained new perspectives after watching the film and improved relations and interactions with the group. The improvement was reflected by a research participant saying that

"The situation has improved. Those who previously shunned us have now resumed talking with us again. Some of them even asked for a copy of the CD. Talking with many people, I can feel that the community atmosphere is better."

The research participants planned to disseminate their information in the form of the community documentary to a wider public.

The reflection session at the end of Action Cycle 1 made the research participants realized the power of information use in solving socio-ecological problems. However, they noted that their action in Cycle 1 was but reactive to some problems. They started to aspire using information to pre-empt problems in a more proactive way. Hence, their decision to engage in another cycle of action.

Cycle 2: Information-based action for systematic socio-ecological problem-solving

As with Cycle 1, the research participants involved in the four PAR stages as follows:

Planning: In furtherance of their action in Cycle 1, the research participants became geared to work more systematically. Their discussion on the new cycle of action indicated their aspiration to treat all the problems related to their CBT work including the environmental problems that they had never dealt with earlier. They expressed strong intention to create a systematic and comprehensive environmental management plan that would keep them abreast with developments in their CBT at all time. In taking up this new planning challenge, the research participants agreed to seek additional knowledge about environmental carrying capacity appraisal by exchanging ideas with an experienced community in Trat province.

Action and Observation: In this stage, the research participants met with community leaders from Ban Salak Khok Community of Ko Chang district, Trat province. In the meeting, they gained knowledge regarding environmental carrying capacity appraisal. With higher confidence, they developed 13 indicators of the carrying capacity of the local natural resources and environment for which their management must address. The research participants then collected local information and appraised the local carrying capacity. Taking into account the capacity, the research participants formulated their management guidelines to proactively handle the environmental issues that might be caused by their CBT industries. Before announcing the guidelines as a community agreement, the research participants tried to perform as stipulated in the guidelines, opened up for comments from community residents and used the feedback to adjust their guidelines.

Reflection: The research participants as well as community residents reflected their satisfaction in the management guidelines. They thought that the guidelines were concrete and could reduce conflicts because clear information was provided with regard to the situations, practical procedures and responsible persons. A member of the CBT Group said

“This makes things much easier. To receive or not to receive a tourist arrival, we don’t need to argue anymore. We don’t need to find out who are or aren’t responsible for their job for each arrival any longer. I think the situation is much better.”

Two phenomena confirmed their working within the socio-ecological carrying capacity were their rejection of a big group of tourists and their monitoring of the CBT and other environmental problems.

Nature of the Community Learning in Information Processing

Based on the participant observation and additional interviews of the research participants, it could be noticed that the learning in information processing of the research participants who represented a CBT community had a distinct nature as explained further.

Incremental learning

In the initial learning process, the research participants opted to carry out less complex information processing activities by treating the selected problems individually. It was after they had accumulated experience and developed expertise in information processing that they challenged themselves to integrate more diverse pieces of information in conducting environmental carrying capacity appraisal and formulate a comprehensive and proactive management guidelines.

The incremental learning had an impact on the research participants' patterns of information use. They shifted from making decisions based on personal beliefs or presumptions to using empirical, concrete and explicable information to support their decisions. In order to gather information, they learned to consider what kinds of information should be used and how such information could be accessed. They learned to use a variety of procedures to access the information. In addition to observation, they enquired and numerated the information. In the process, they brought into consideration the situational limitations and their own limitations in achieving their goals. Thus, they decided to take up only achievable goals in the initial learning process. Some learning activities such as the use of river water quality information affirmed them the power of information in resolving the community conflicts regarding cattle raising in upstream areas. Achievement in small tasks stimulated their' interest in applying information as concrete evidences to support their reasoning and decision-making regarding larger tasks like environmental carrying capacity appraisal and formulation of the community environmental management guidelines.

Associative and active learning

The research participants could easily process the information that they already knew or had experience about. However, in learning new knowledge, an association between the new knowledge and what they already knew and the learning-by-doing in a group evidently supported their learning. As observed in their learning about the water quality tests, when the water qualities and test procedures were explained separately, the research participants had difficulty in grasping the new knowledge. However, when the declarative knowledge on water qualities was explained during their practice, they could follow better. Linking explanation with what they already knew, such as aliasing nitrogen as agricultural fertilizers or phosphorus as detergents, made it easier for them to comprehend. Their associative and active learning nature was well illustrated by a research participant saying:

"I think listening and doing at the same time made it easier. Listening first and doing later did not work because I would already forgot what I had listened. Sometimes, I could not figure out what was what. It was easier to learn by doing. Doing at the same time with seeing demonstration and receiving explanation was easy to follow. When I had questions, I could ask then and there."

In addition, the research participants could learn well through active repetitions. The clarity of their procedural knowledge accelerated a consolidation of their declarative knowledge. Each time they performed repetitive practices, the research participants recalled, retrieved and remembered information linked to the procedural knowledge. The more frequently they processed the information they already knew or experienced, the chance was greater for them to think and form their declarative knowledge. However, it was cautioned that an imbalance between the difficulty of tasks and the sufficiency of background knowledge might render repetitive practices inappropriate. A phenomenon in which the research participants were unable to edit the community documentary film despite repeated attempts showed that repetitive practices could not reinforce learning if some basic but complex background knowledge was insufficient.

Social learning

During the participatory action process, the research participants not only engaged in verbal discussions but also joint activities with their fellows. The social learning process contributed considerably on their learning achievement. Their arguments on the differences or discrepancies in their knowledge and understanding made them realized that what they knew or understood might not be consistent with the reality and both sides needed a proof of evidence. The social learning process pushed all of them to find the needed evidences and reasons to support their ideas. The use of water quality information was an example of their social learning process that helped to enhance and correct their knowledge and understanding about river water quality. In addition to verifying their knowledge, group learning process also made some active practices much easier as noted by a research participant saying *“Helping each other made it easier than doing it alone. Checking water quality involved the skills that I did not have. My friend told me how to do it.”*

Learning in real life

As the research participants experienced CBT socio-ecological problems in their real life, their interest in solving the problems was naturally high. Their immediate and constant access to real life situations and information to confirm the causes of the problems and to devise solutions, if not to pre-empt the problems, provided them with a good learning environment. Learning in real life situations also made them aware of the inter-relationship of all hordes of problems that required collective action. A research participant reflected

“There are a lot of problems, so we need to help each other. One can’t deal with environmental matters alone. If we don’t help, what will be left for our children? I’m willing to help even though it requires a lot of my time.”

The L-Informed ED Model

An understanding of the learning process and nature of the research participants made it possible to synthesize a learning management model that would trigger the interest of CBT communities in using information to address environmental problems on their own. The model would not only upgrade their skills in evaluating situation, collecting information, critically thinking about the information and making informed decisions but also lead to their action. Once empowered by the learning management model, CBT communities could use

their skills and knowledge to cope with the constantly changing situations. The L-Informed ED Model comprised five stages as follows:

1. *Synergizing cooperation to treat collective environmental problems.* This stage focuses on encouraging learners to feel interested in their common environmental problems and use the information which may not be so complex but based on their experience to identify the environmental problems. Via group discussions, they brainstorm, share information and describe situations or environmental issues that they know of in order to get an image of the local environment situations based on their experience and prior knowledge.

2. *Assessing the actual environmental situations with newly acquired information.* This stage aims to enable the learners to search for new information and to apply a variety of information gathering methods, including surveys, observations, inquiries and trials. The goal is to use empirical information to verify their image of the local environmental situations and consider what problems should be treated first.

3. *Planning and implementing management guidelines for selected environmental problems.* This stage allows the learners to choose the environmental problems that they are confident that they can address. Activities in this stage allow the learners to accumulate knowledge and skills through actions. They have to provide an explanation to justify their problem selection and consider what information they need and how they can obtain, analyze and use it in preparing a management guidelines. The learning in this stage will make them confident that they can address environmental problems on their own. At the same time, in treating only selected problems, they will realize the complexities of socio-ecological problems and aware of the necessity for working towards a more comprehensive and proactive management guidelines.

4. *Comprehensively appraising the local environmental carrying capacity.* This stage aims to encourage the learners to use information in addressing local environmental problems in a more systematic and proactive manner. In this stage, the learners design how they would appraise the local environmental carrying capacity and manage their environment. Activities in this stage comprise, but are not limited to, the following: (1) Expanding knowledge about environmental carrying capacity appraisal. The learners can learn from the more experienced or other sources. (2) Selecting the types of information to be used in treating the existing and imminent local problems. The learners would have to define what environmental carrying capacity means in lines with their local conditions and needs. They then formulate their own guidelines on the qualities of necessary information such as parameters and indicators. The guidelines that are prepared in their own terms make it easy for all the learners to understand and clear what they have to perform, how to access the information, and how to measure and interpret the information. (3) Acting according to the guidelines that they have jointly developed. In information gathering, they use diverse methods including counting, trial, inquiry and brainstorming. (4) Preparing guidelines for their local environmental management based on the appraisal results. They have to make certain that the guidelines are feasible. For example, the frequency of environmental monitoring or the people in charge of related work should be specified.

5. *Putting the environmental management guidelines in use.* In this stage, the learners put their environmental management guidelines on a trial use to test its suitability with the actual situations. They adapt the guidelines to suit the local condition. They can also

establish a participation process to allow community residents to comment on the management guidelines. Increased participation may lead to the institutionalization of a community rule for community environmental management and stimulate community residents' interest in joint monitoring of the local environment.

Learners involved in an application of the L-Informed ED Model should be allowed to perform the learning activities by stages. It is important that they move to the next learning stage only after they have completed the previous stage. Details of the actual learning process for each group of learners may vary and learning managers need to be on alert of their learning direction and know how to facilitate or make use of actual developments for the fullest benefits of their learning and local environmental management. The managers need to support the learners in extending from their previous experience and providing them with chances to choose the levels of knowledge and methods on their own. Of primary importance, the managers need to create opportunities for information processing in all stages and activities. This should be done by taking into account the learners' morale; hence starting with something simple before moving on to something more complicated step-by-step is advisable even though it may take time.

Discussion & Conclusions

The Nong Mae Na CBT group was able to develop its own active learning process and demonstrated their ability to systematically address their environmental problems. Their performance and nature of learning reflected the features of an appropriate learning model for them and transferable CBT communities. The L-Informed ED Model that resulted from this participatory action research is consistent with a synthesis by Kaewthep (2010), which indicated that instruction that created a good, systematic cognitive process through actual problem-solving action would enable local communities to address problems on their own. The use of the learners' prior experience as a basis for learning new information and knowledge in the model was very beneficial and is consistent with the research by Shava (2013) that explained that encouraging communities to use local wisdom as the basis for learning universal or academic principles would result in application of the principles with true understanding and would help to maintain their identity. The use of prior experience in the model is also in line with a study by Knowles, Holton and Swanson (1998) which signified the importance of prior experience and knowledge in learning of adults. Prior experience and knowledge had high influence on adults' interest in learning, especially about issues they deemed significant or related to their life. Using the communities where the learners came from as the learning environment in the model made the learning real. Such learning environment arrangement coincides with the philosophy of environmental education as described by Veeravatnanond and Siphanphong (1996). Learning in the local environment leads to the learners' recognition of local environmental problems and their greater readiness to take action to conserve their environment.

The L-Informed ED Model shared some similarities with most cognitive instruction models. They focused on the cognitive knowledge of the learners and placed emphasis on the step-by-step learning. However, in contrast to some cognitive instructional models such as the Advance Organizer Model (Joyce & Weil, 1996), Graphic Organizer Instructional Model (Ellis & Rock, 2001) and Memory Model (Khammani, 2011), the model does not concentrate on strictly following pedagogical prescriptions of a particular instructional theory nor

knowledge transfers from instructors to learners. Nor does it aspire for an immediate entirety of topical declarative knowledge. On the contrary, the L-Informed ED Model gives equal importance to continuing and simultaneous accumulation of declarative and procedural knowledge. It accepts the reality that adult learners do not want topical knowledge in its entirety but only the practical parts.

Applying the information processing theory which is a psychological learning theory as the basis for facilitating the participatory and active learning process of the Nong Mae Na CBT Group bore positive results in stimulating their thinking. While they were performing information processing, the research participants were regularly required by the circumstances to practice systematic thinking and sharpen their skills in effective decision-making as noted by Minkler and Wallerstein (2003). However, there were some cautions to be given. Levels of literacy especially writing literacy could have influences on the success and speed of learning. In this regard, arrangements for group learning had positive contribution to the learning of individuals. The speed of learning in information processing was not as tantalizing as the success in crossing over knowledge barriers to formulate an environmental management guidelines.

In this research, it was found that the mechanisms that the research participants used in information processing were hard to follow and clouded by multiple factors in the fields. This difficulty was recognized by Mayer (1996) who noted that actual information processing in human minds was difficult to track. In addition, an explanation on the characteristics of each mechanism in mental processing of information may not bring about a better understanding about human performance in reality. Instead of focusing on mental processes, the L-Informed ED Model was geared towards creating a learning environment that supported the learners in improving their information processing skills and orienting their thinking towards careful and adaptive environmental management. The orientation of the model was similar to the stance taken by Santrock (2011) who believed that such orientation would not only help the learners to build/enlarge/restructure their knowledge and accumulate experience but also enhance their capacity in developing strategies based on the results of their action. As a result, the learners could continuously transfer their knowledge, experience and skills in coping with the changing situations in the future.

To employ the L-Informed ED Model in transferable communities, it is recommended that learning managers apply it in principle and methodological terms but allow learners to choose the learning contents and processes that are congruent with their interests and capacities. The results of such applications should be compared and synthesized for further improvements of the model for the learning benefits of other CBT communities.

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