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Organic farm learning and practical networks: facilitation for learning and sustainable agriculture innovation

Wattana Saduak[1], Pakkapong Poungsuk[2], Narong Kanchana[3] and Piyanard Junlek[4]

Praibueng Wittayakom School, Sisaket province, Thailand

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Abstract

This article examines the learning and practical networks and role of organic farmer networks in facilitating farmer innovations in complex agro-ecological farming systems through a study of a sample of organic farmers in the case of Praibueng district, Thailand. Forty-five representatives of 145 farmers were sampling. Building on a knowledge systems and social learning perspective related learning and practicing program in school together with their child, it illustrates how learning is triggered and agricultural innovations diffused among them using sustainable producers through an interactive, participatory style of problem-solving. Finally, the research links farmers' social learning processes thought integrated learning and practical networks to critical reflection on the potential niches in organic farmer management for extension practice together among farmer family and young generation.

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Introduction

Ministry of Agriculture and cooperatives has set a strategy of National Organic Farming Development (2017-2021) for increate outcomes - production process, standard certification and shield management. It aims to expand organic farming area to reach 600,000 rai. The operation of organic farming in the land reform area is assisted by using the mechanism creating a learning process through the form of a farmer school and the International Federation of Organic Agriculture Movement (IFOAM) (OTTD, 2017). and has reviewed the Organic Agriculture Action Plan 2017 – 2022 to be in line with the national strategy in the direction of driving the development of Thai organic agriculture throughout the supply chain. from production, processing and marketing to be successful and produce tangible results It is necessary to integrate work with all relevant sectors, including the government, the private sector, civil society, academia, farmers and consumers, to cooperate in promoting and developing research, technology and innovation in organic agriculture. from seeds, plant species, organic animal species inputs various biological substances, establishing an organic farming database, transfer knowledge to farmers Systematic development of production and management

[1] Corresponding Author, Expert Level Teachers, Praibueng Wittayakom School, Sisaket province, Thailand.E-mail: wattana_sk@hotmail.com Tel. +6689202952, ORCID: 0000-0003-4017-5051
[2] Prof., Department of Agricultural Education, Faculty of Industry Education and Technology, King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand. E-mail: poungsuk@gmail.com, Tel. +66851399116, ORCID: 0000-0002-6876-7318
[3] Assist. Prof., Faculty of Education, Songkhla Rajabhat University, Songkhla province, Thailand. E-mail: narong.backup@gmail.com Tel. +66862888558, ORCID: 0000-0003-1810-2534
[4] Assist. Prof., Department of Agricultural Education, Faculty of Industry Education and Technology, King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand. E-mail: piyanardkmitl@gmail.com Tel. +66933285987, ORCID: 0000-0002-1929-6310

Promote marketing and distribution channels as well as to create effective plans/projects to develop organic agriculture to drive the development of organic agriculture of the country to achieve goals and indicators according to the strategies and plans that have been set. both in terms of increasing the area and the number of farmers doing organic farming Increasing production value and export value Organic products and products. Also, there is the participatory audit system supporting the system development arch the production group/ community participates in auditing called Participatory Guarani tee system (PGS). It is the quality assurance system at the local level focusing on participation of concerned personnel which is on the basis of reliability, social network, and knowledge transformation (Piromkarn, 2019).

Furthermore, there is the operation and movement of organic farming in every region of Thailand which mainly aims to agricultural production and livelihoods method of farmers contributing to the rehabilitation and maintenance of the abundance of the ecology system as environmental condition. There are fair returns and promotion of quality-of-life development of farmers and general people. This is for the security of farmers, community, and the society as a common point under the international organic farming (ecology, health, fairness, and carefulness) (NOADC, 2017). Also, it aims to solve the problem in chemical substance using and contamination in agricultural yields. In fact, contaminated chemical substances have a creative impact on consumers, deteriorated production resources, particularly soil resource, Nowadays, the world is confronting adverse atmosphere and global warming e.g., drought, flood, water shortage, etc. All of these often occur and have an increase in violence having a negative impact on damaged yields and on inadequate amount of yields.

According to the statements as aforementioned, it must have a problem solving by the management of safe agricultural yield management. This includes correct chemical substance using Good Agricultural Practice as avoidance of chemical substance using (Organic farming) which will be future sustainable problem solving (Soythong, 2013). To solve the problem arising from impacts of chemical substance using in agricultural production, it must have wide promotion of organic production. This includes a learning youth group in the school coordinating with the surrounded community there disseminate outcomes to other schools and communities. This is the preparation of readiness to cope with situations which will happen, Schools and concerned agencies must facilitate content and activities which are consistent with interest and skills of the learner based on individual differences. Importantly, learning activities must be hold based on actual situations (experiences) and everywhere coordinated by parents or guardians and all concerned parties (Government Gazette, 2012).

The teaching / learning facilitation of Agriculture subject comprises crop growing, animal domestication, and yield Management. There is technology using for the production of increased yields and the instillation of responsibility, diligence, tolerance, and the conservation of energy/environment. This puts the importance on learning by doing since Agriculture subject needs students to truly practice in order to gain skills and experience which can be applied to daily life activities. Therefore, the teacher must facilitate learning activities based on theories together with diverse practices both in the school and at home taken care by guardians. Importantly, the teacher must have knowledge and understanding about teaching/ leasing styles before the design of learning or planning of good learning activity facilitation (Tanapanyaratchawong, 1988; Moonkham, and Moonkham, 2002). As aforementioned, it causes a study on networking of organic farming practice and learning for sustainability. This can be done with the coordination of the educational sector, the public sector, the independent organization and the public sector for networking of integrated organic farming learning facilitation.

Objective

This main objective of this study was to create networks on organic farming facilitation and learning of the school agricultural learning center and farmers doing integrated organic farming in the community with specifically study aimed to:

- develop an instructional on organic agriculture learning activity package.

- assess the academic achievement of participants who study with the learning package.
- find out of the opinions of the participants after using organic agriculture learning activity package.
- find out of the elements of networks of sustainable organic agriculture learning and practice.

Conceptual Framework of the Study

The study on networking of organic farming learning facilitation of the school agricultural learning center and integrated organic farmers in the community by means of the participation between the agricultural learning center of Praibueng willayakom school, Srisaket province and the organic farmer group of Praibueng district anchored on the creation of the knowledge / wisdom society as an important guideline of the National Education Plan (ONEC, 2009). There was the preparation of learning content and activities which were consistent with interest and skills of the learner, in this respect, the true wisdom and knowledge society should be on the basis of the society and integrated development. This was because the community was the root of the country which must be developed in terms of economy, spout, society, culture environment, health, education, and democracy and all of these could make the country be stable (Wasri, 2012).

There was a proposition on community-based education on management (CBEM) having wide goals and learning scope to enhance a stable rife, knowledge, virtue, and good practice (Skethra, 2012). In fact, it puts the importance on the school as a big production source as well as man/ the country development for lifelong learning and the development of quality of life. It also includes using knowledge for self-management and the school must not separate people from the community sense of belonging and code of conduct makes man to be perfect (Siritharangsri, 2012). The school must be the media for sustainable learning to the society regarding individual differences and actual practice for learner development based on their potential (Royal Thai Government Gazette, 2002). It could be said that the management of sustainable organic farming learning must have continual networking of the learning and practice facilitation. This was by means of the coordination among the following: higher education institution (KMITL), the school, the community and the organic farmer group.

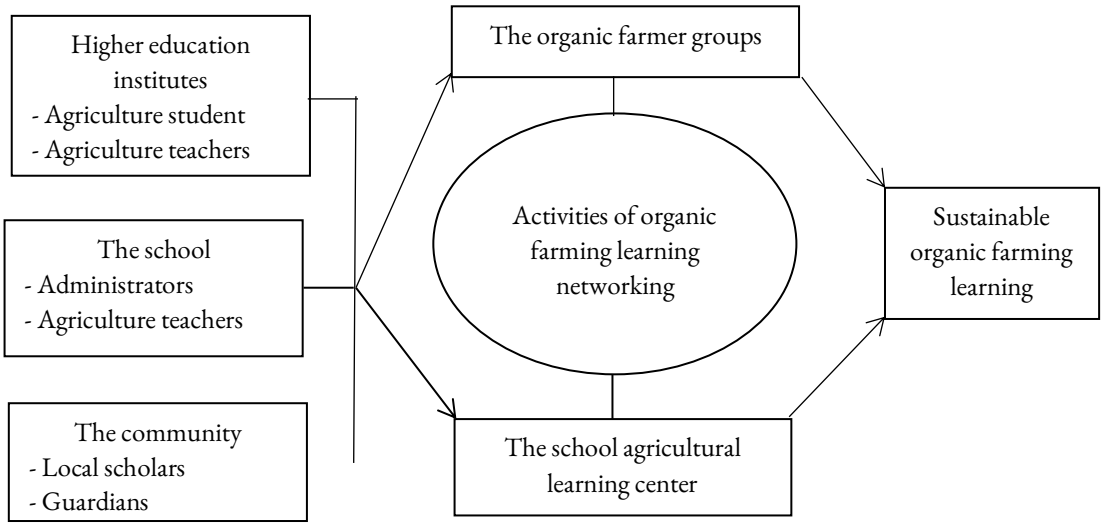

Figure 1. Conceptual framework of the study

Problem of Study

The research questions were follows:

- What are the instructional design components in an integrated agriculture education program based on meaningful learning?
- To what extent does the learning satisfaction of the participants change in the training program for integrated agricultural education?

- What are the opinions of the participants about the organized agricultural training program?
- What are Elements of networks of sustainable organic agriculture learning and practice?

Method

This study employed a mixed method and the sample group consisted of 45 student's guardians who were organic farmers and they were obtained through purposive sampling out of 145 persons. One Group Pre-test- Post-test Design was used. Research instruments were:

- a package of activities on the organic agriculture. This comprised 3 sub-activities as follows: an analysis of the cirri culture preparing course structure, content setting, and learning schedule
- a plan on the facilitation of learning and teaching/ learning activities; and setting a form of learning facilitation plan preparation based on Predict Observe Explain (POE) (Tortop, 2013), Blended hearing (BL) (Petsangsri, 2011) and Line and Facebook (Poungsuk, 2019). Five scholars checked correctness and consistency of the content
- a learning achievement test (4 multiple choices, 50 items). The difficulty value of the test (P) was 0.57
- a behavior observation form for an activity group; 1ertilizer pellets from animal dung; 2) organic fertilizer production from earthworm searing; making EM balls for water treatment; and making biological fermentation from animal during in the period of 8 weeks (56 days). Five aspects of behavior were observed: intention, punctuality, team work, operational outcomes report and operational skills.

A 5 rating – scale questionnaire on satisfaction with the learning activity package (7 aspects) and IOC of 0.60-1.00 which implied that this questionnaire had content consistency and was acceptable.

Obtained data were analyzed by using frequency, Percentage, Mean, Standard deviation, and t-test (Dependent samples), Content analysis was used for data interpretation and the criteria used for an assessment of opinions and satisfaction were as follows: (Srisa-ard, 2010).

Table 1. Scores and satisfaction levels

Score	Scale Limits	Descriptive Equivalents
5	4.51-5.00	Highest
4	3.51-4.50	High
3	2.51-3.50	Moderate
2	1.51-2.50	Low
1	1.00-1.50	Lowest

Results

Results of the Study in Phase 1

It was found that the developed organic agriculture learning activity package assessed by 5 scholars consisted of 8 parts: standard or an indicator, important essence, learning objectives, learning content, learning facilitation process, media or learning source, measurement and evaluation, and recording of results after the facilitation of learning activities. Also, there 6 sub-activities: home growth vegetable activities, organic compost making, soil improvement, growing crop in a container and a narrow area, packaging and yield selling, and yield processing and utilization (IOC = 0.60 - 1.0). A learning achievement test was design and tried-out with 30 students which the dissemination value was found at 0.24 - 0.93 (r) and the difficulty (p) of the test was at 0.05 – 0.73 with the reliability value of 0.96

Results of the Study in Phase 2

This involved the facilitation of learning activities under the Predict Observe Explain (PED) and Blended Learning (BL) as well as learning networking through smartphone in which the students communicated data together with Like and Facebook. It was found that there was statistically significant different at .01 of learning achievement scores before and

after the learning activities. That was, an average mean score and standard deviation of the pretest were 27.62 and 8.529, respectively whereas that of painted were 48.36 and 3.367, respectively (Table 1).

Table 1. A number of students, an average mean score, and standard deviation of the score begin and after learning avidities.

Item	A number of students (n=45)	$\bar{x}$	S.D.	t	sig
Begin learning	45	27.62	8.529	-8.974	0,00**
After learning	45	48.36	3.367		

**statistical significance level of 0.1

Results of the study showed that, as a whole, the students were satisfied with the organic agriculture learning and practice at a high level (μ = 4.12). Based on its details, it was found that the students had a highest level of satisfactions in terms of the following: learning through application and computer program (μ = 4.82); learning through actual practice (μ= 4.76); learning through actual media of each activity (μ = 4.73); and learning through self-practice (μ = 4.64) as shown in Table 2.

Table 2. Mean, standard deviation and interpretation of a satisfaction level of the students with the learning activity package on the utilization of waste on animal farms

Items	Satisfaction level (n=45)		
	Mean	S.D.	Description
1. Content	4.00	.266	High
1.1 Easy to understand	3.98	.583	High
1.2 Interesting	4.24	.712	High
1.3 Up – to – data	3.67	.829	High
1.4 Appropriate and consistent with teaching time	4.00	.603	High
1.5 Beneficial to top-up knowledge	4.16	.767	High
2. Facilitation of learning activities	4.08	.250	High
2.1 The facilitation of teaching/ learning activities was appropriate with time	3.60	.780	High
2.2 The teacher is friendly	4.31	.468	High
2.3 Learners participate in teaching / learning Activities	4.42	.499	High
2.4 The environment contributes to the facilitation of activities	3.92	.851	High
2.5 Learners practice by themselves	4.64	.484	Highest
3. Learning media	4.20	.235	High
3.1 Media are appropriate with content	4.02	.543	High
3.2 Media are appropriate with learning activities	4.44	.586	High
3.3 Media help understand the lesson	3.56	.784	High
3.4 Media are up-to-date	4.27	.447	High
3.5 Media are authentic	4.73	.447	Highest
4. Measurement and evaluation	3.97	.368	High
4.1 Appropriate evaluation method	3.75	.743	High
4.2 Evaluation criteria are appropriate	4.00	.603	High
4.3 Evaluation time span is appropriate	3.89	.647	High
4.4 Evaluation is based on actual conditions	4.33	.564	High
4.5 Learners participate in evaluation	3.82	.575	Highest
5. Benefits gained from the learning activity package	4.36	.270	High
5.1 Easy to learn and understand the content	4.02	.690	High
5.2 Learning through actual practice	4.76	.434	Highest
5.3 Learning through diverse processes	4.20	.587	High
5.4 Learning through application and compacter program	4.83	.386	Highest
5.5 Applicable to daily life activities	4.02	.690	High
Total	**4.12**	**1.49**	**High**

Results of the study in Phase 3

It involved organic agriculture learning and practice under organic agriculture learning networks for 16 weeks; monitoring was done every week and seminar was held every mouth (4 times). The practice was separated into 4 groups based on utilization of waste from animal farms: 1) making fertilizer pellets from animal dung; 2) organic fertilizer production from earthworm rearing; 3) EM ball making for water treatment; and 4) activities of each group were under the Predict Observe Explain (POE) and Blended Learning (BL) as could be concluded in Figure 2.

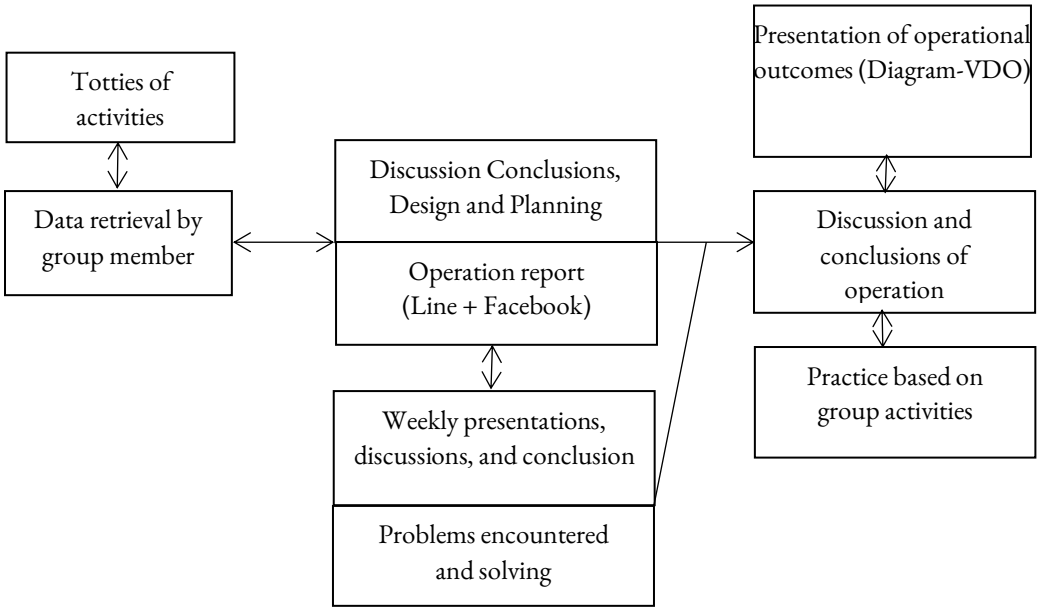

Figure 2. Learning activities on the utilization of waste from animal farms

According to the facilitation of learning activities, it was found that the 4 four groups of agriculture teacher training students had agreed to select activities which group members were interested, and studied data for mutual discussion, making conclusions, setting goals, and operational planning. There was discussion with the teacher for problem solving when there is a problem encountered. This was done through Line and Facebook which the 4 groups of students could access data and learn at the same time. Besides, there was the presentation of operational outcomes, problems encountered and solving in each week for 8 weeks. The last week was the presentation of operational outcomes with pictures and VDO.

Regarding the behavioral observation in practice of the 4 groups of students, the following were found: 1) almost all of the students kept attention in the practice of assigned tasks; 2) members of all groups were punctual and they monitored task. Operation made a report and informed it through the channel as set; 3) members of all groups could work together well which could be observed from weekly reports, result discussions, and opinion expressions; 4) members of each group reported operational outcomes through Line and Facebook on time; and 5) all of the students could do all assigned activities well. Learning activities in the family and the community were practiced among the agriculture teacher, Agriculture teacher training students, students, and farriers through Line and Facebook for one semester. Motoring was done every week for 16 weeks and seminar was held every month (4 months). Observation form, in-depth interview and questionnaire were used for the assessment.

Results of the study in Phase 3 It involved learning activities and organic agriculture practice under organic agriculture learning networks for 16 weeks. There was monitoring every week and a seminar was held every month (4 months) and this mutual learning activities was done through live and Facebook. According to the behavioral observation and in-depth interviews, it was found that key elements of learning and organic farming practice for sustainability included knowledge generating, enhancement of experiments and practice, creating management skills,

using appropriate technology for production process, discipline habit creating, collective learning, creating the learning society through online social media, value adding of yields, and social/economic exchange (Figure 3).

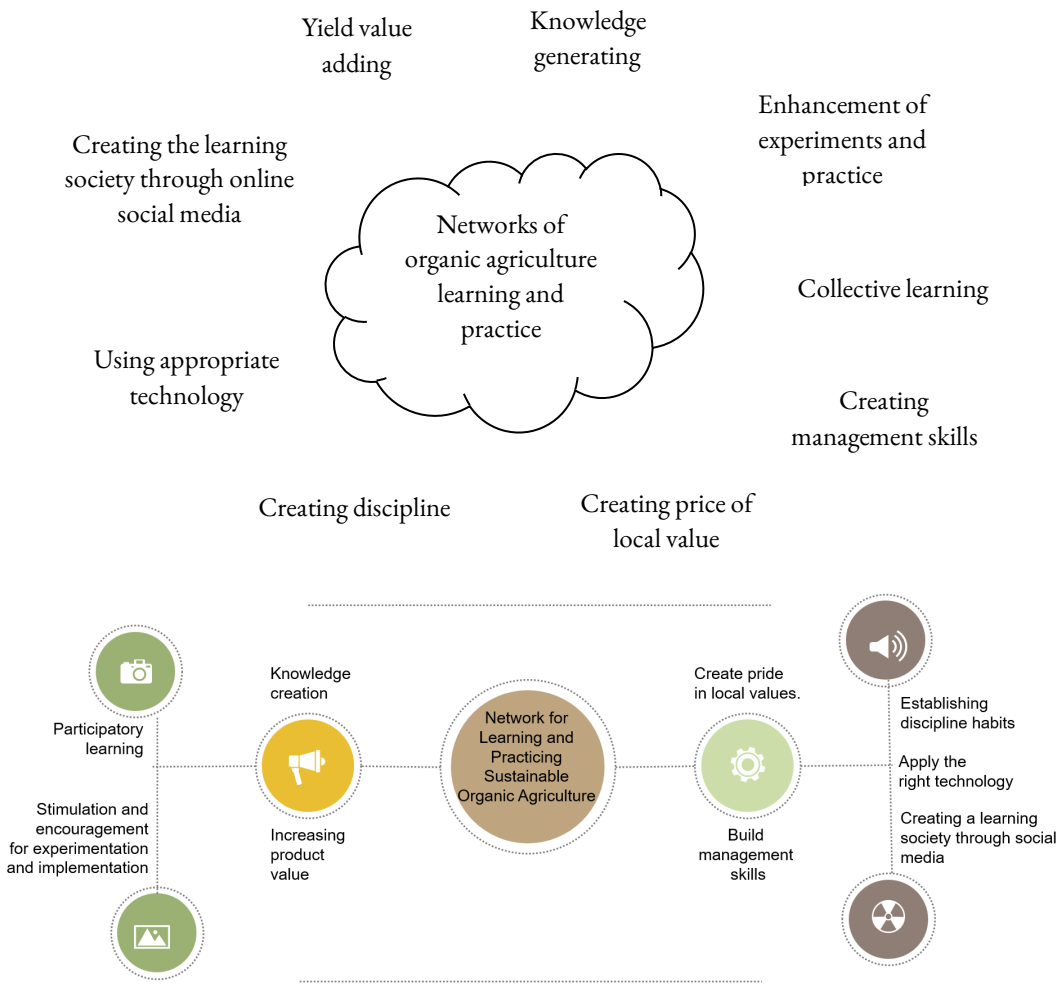

Figure 3. Elements of networks of sustainable organic agriculture learning and practice

Discussion and Conclusion

Results of the study showed that the facilitation of learning activities under the Predict Observe Explain (POE) and Blended Learning (BL) and the creation of learning networks through Smartphone could make learners be active to learn by themselves and work together. Importantly, members of each group joined data retrieval and participated in discussions, goal setting, and operational planning. This conformed to a study of Robaoo and Waltananarong (2010) which found that the learning achievement score after learning of students significantly increased at 01. This implied that the organic agriculture learning and practice package could effectively promote learners to learn. Also, it was found that the students had a highest level of satisfaction with the smartphone application and computer program. This also conformed to a study of Strother (2003) which claimed that diverse learning activities and principles could encourage students to learn through many channels with high learning achievement. Not only this, Litsongmuang et al. (2018) found that blended learning through online communication system could develop Agriculture teacher training students to have increased knowledge and skills and be able to solve problems happening during their practice. Besides, the teacher and the teacher assistance could supervise and explain through the online communication system. It was found that students had learned through actual practice and media. This conformed to Siriwan (2014) and Tanapanyaratchawong (1988) who cited that the facilitation of agricultural teaching / learning activities anchored on the agricultural education philosophy which focuses on actual practice (Learning by doing). According to results of the study, it was also found that important elements for the success and sustainability of organic agriculture learning and practice included

knowledge generating, encouragement and promotion of experiment and practice, creation of management skills, creation of pride of local value, and collective learning. This conformed to a study of Kroma (2006) which found that these components arere important to sustainable agriculture of farmer networks. In addition, it conformed to a study of Matthewson, Fery and Powell, (2013) which revealed that using appropriate technology for production, discipline, and creating the learning society through online social media were important elements to facilitate convenience in organic agriculture hearing and practice of the sample group Besides, the sample group put the importance on yield value adding and social/ economic exchange. This might be because it was important to income generating to elevate quality of life and result in the sustainability of organic agriculture learning and practice of family members and network community.

The creation of organic agriculture learning and practice networks of the school agricultural learning center as well as integrated organic farming begin with organic agriculture learning and practice in the school. This was under the Predict Observe Explain (POE), and Blended Learning (BL), and creation of learning networks through smartphone. This makes collective learning through online media system which results in an increase in learning achievement. Therefore, it can be concluded that the following are important elements facilitating convenience in the occurrence of sustainable organic agriculture: knowledge generating, encouragement and promotion of experiment and practice, creation of management skills, using appropriate technology for production process, creation of discipline, creation of pride of local value, collective learning, creation of the learning society through online social media, yield value adding and social/economic exchange as shone in conclusion picture.

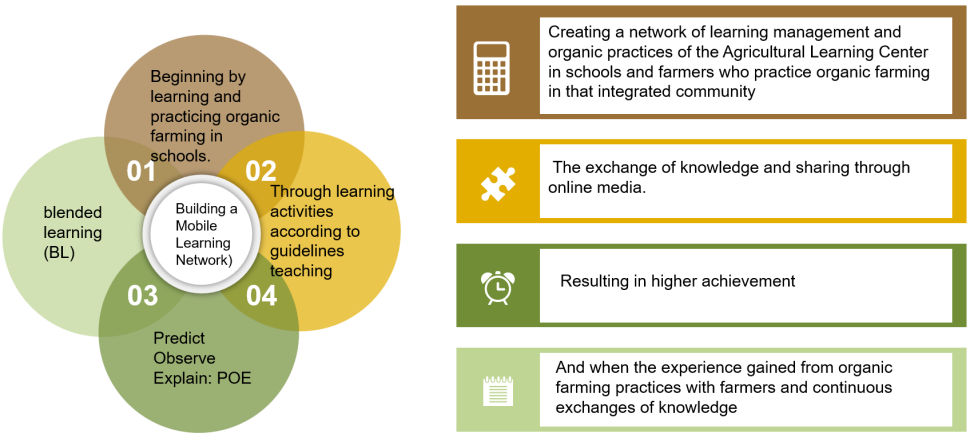

Figure 4. The concussion of organic farm learning and practical networks facilitation for learning and sustainable agriculture innovation

Recommendations

For further research

In order to create a body of knowledge that covers sustainable development, it is important to study the factors affecting student learning, including monitoring the persistence of knowledge and skills that arise among learners at different stages. The research results use to develop teaching and learning management in agriculture in the future.

There should be a study on expanding the results of the model of teaching and learning using an online network that integrates with farmers, schools, colleges of agriculture and technology and university in order to be a suitable format and can be applied in many areas.

For Applicants

The application of research results can be applied to teaching and learning in agriculture or other subjects with similar characteristics by emphasizing on learning with real practices.

The application of research findings in the form of a learning network can be linked to relevant occupational agencies in order to create learning and have a vision in the learner's future career.

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