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Reesearch Article

Making mixed soil appropriate for commercial planting helps young farmers gain knowledge and skills for a future in agriculture following the COVID-19 pandemic

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Abstract

Developing knowledge and skills in an agricultural career for young farmers by making mixed soil ready for commercial planting is the comprehensive learning management for developing a future agricultural career after the end of Covid-19 pandemic. This began with production, quality development, and marketing. It was the coordination with professional farmers and entrepreneurs in the community. According to this study, mixed soil ready for commercial planting was prepared by using local raw materials with 4 formulas. It was found that the best soil potting formula was the second formula. The group of young farmers had brought the results of the study to develop further to add value by making packing and distributing though a variety of channels. Finding also showed that learning achievement of the young farmers increased with a statistical significance level at 0.05. There was an assessment of skills in making mixed soil ready for commercial planting, value adding, and marketing which was found at a high level ($\bar{X}$=4.15, 3.85 and 3.56, respectively); Besides, the following were found at a highest level: the sample group was satisfied with product selling via online market ($\bar{X}$=4.56); comprehensive learning could promote learning and create skills/experience for developing a future career ($\bar{X}$=4.36); adoption of technology and online media could encourage learning ($\bar{X}$=4.32). In addition, the entrepreneurs agreed that creating a network of online selling directly to farmers and the general public would be a channel for selling agricultural inputs in the future. It was consistent with the era of digital marketing and they were satisfied with making mixed soil ready for commercial planting at a highest level ($\bar{X}$=4.73). There was more than one-half of them (56.92%) wish to develop it to be a supplementary career in the future most ($\bar{X}$=4.56).

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Introduction

The covid-19 pandemic started in 2019 in Wuhun city, Hubei province, China and it has spreaded throughout the world up to the present. It was caused by a new strain of coronavirus in December, 2019 and found for the first time in Wuhun city. The world Health Organization proclaims the covid-19 pandemic as international public health emergency (Wikipedia. 2022). The covid-19 pandemic has severe impacts on economy and all levels of education throughout the

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world. It makes almost all educational institutions have to close school unexpectedly and many students at home are affected. It is a lone-lasting and widespread impact on the educational system. Teaching and studying have been adjusted in many forms, which has forced educational institutions to deal with and solve problems in teaching. Teacher must work at home during severe covid-19 pandemic. Some teachers and many students cannot find modern teaching/learning media such as smartphone, tablet, computer or notebook and internet signal does not reach in some areas. Covid-19 pandemic makes economic system both inside and outside the country stop and many people lost their jobs. This is one factor making people be affected from it. Some parents are suffered from it due to not enough money to purchase modern learning media for their children.

Indeed, covid-19 pandemic is regarded as severe impact because it causes a lot of deaths, infection and the epidemic spreads in multiples. This crisis is a long-term impact which everyone must deal with and adapt to the current situation as well as prepare themselves for the future (Thongkeaw. 2020). Agricultural education facilitation is also affected by covid-19 pandemic like other subjects. However, who the situation has eased, the government has announced that teaching can be arranged in schools or onsite and online. Besides, the said impact makes saw student lock practice skills in agriculture (Saduak. 2022). Therefore, Agriculture teaching/learning facilitation needs to be developed to be consistent with changing situation after the happening of covid-19 pandemic. This includes earning a living which must be changed such as use of appropriate technology for effective production and new way of selling in multiple channels particularly on online media. Indeed, Agriculture is important fundamental for the country development. Agriculture teaching and learning aims to make learner has knowledge and skills in agricultural production, quality development and marketing. This is also objectives of this study.

Materials and Methods

This study employed qualitative and quantitative research in order to gain insight data from the sample group and concerned informants (Leekitwattana, 2012, Creswell, 2015 and Chulakbang, 2017) in comprehensive Agriculture teaching/learning facilitation the sample group consisted of 32 out of 156 student who were enrolled in Agriculture subject in academic year 2021 and they were obtained by purposive sampling (Academic affairs section. (2021). There were 5 entrepreneurs' informants and 32 guardians of the sample group. This study also employed One Group Pretest-posttest design, Agriculture learning activities set, learning achievement test, questionnaire, behavioral observation from, and in-depth interview (one semester), obtained data were analyzed by using descriptive statistics and t-test (dependent).

Research Period

Period 1. Preparation and development of an Agriculture learning activities set on "Making Mixed soil Ready for Commercial Planting: This was on the basis of participatory process in design of learning activities by farmer representatives who were guardians and entrepreneurs selling agricultural inputs. There was the preparation of needed teaching/learning media and learning achievement test before and after learning (50 multiple choice exams). Index of item objective congruence (IOC) was considered by 5 specialists. Determined the quality of the tool by evaluating it in term of discrimination, reliability and difficulty. Besides, there was the preparation of a questionnaire about satisfaction with teaching/learning facilitation (for the students and the guardians) and in-depth interview schedule (for the entrepreneurs).

Period 2. Teaching/learning facilitation process by using the learning activities set and learning station in the school Agricultural Learning Center. This included activities on making mixed soil ready for commercial planting, trial, packaging, and joint distribution among agricultural teachers. Guardians, and entrepreneurs. A learning network was created by applying learning management based on the theory of knowledge building by using teaching, observation and explanatory approaches (Predic Observe Explian: POE, Torpop, (2013. Blended learning was also employed in the step of teaching and learning activities (Wen. 2017 and iNACOL. (2009). Mean whiles, the student used smartphone

for mutual data communication with Line and Facebook (Garman, 2005). Learning achievement was assessed by using the organic agriculture learning activities set, in-depth interview and questionnaire.

Preparation of mixed soil ready for commercial planting. Raw materials suitable for planting were as follows: palm stalk, compost. Loam and burnt chaff. Determined the combination of various formula to experiment to find suitable formulae as follows:

Formula 1 was at a ratio of 1:1:1:1 (Chopped palm stalk 1 part, Compost 1 part, Loam 1 part and Black chaff 1 part)
Formula 2 was at a ratio of 2:1:1:1 (Chopped palm stalk 2 parts, Compost 1 part, Loam 1 part and Black chaff 1 part)
Formula 3 was at a ratio of 3:1:1:1 (Chopped palm stalk 3 parts, Compost 1 part, Loam 1 part and Black chaff 1 part)
Formula 4 was at a ratio of 4:1:1:1 (Chopped palm stalk 4 parts, Compost 1 part, Loam 1 part and Black chaff 1 part)
Formula 5 was at a ratio of 5:1:1:1 (Chopped palm stalk 5 parts, Compost 1 part, Loam 1 part and Black chaff 1 part)

Each formula is measured and mixed with a soil mixed according to the ratio of each formula.

Experiment

The term of researchers did the experiment to find appropriateness of growth performance with and ornamental plant in the school and measured its growth performance.

Select an appropriate formula. Produced according to the treed and tested formula. Packed in plastic, approximately 5 kg per bag. Sealed the bag with seller and stored it in the school planting soil storage.

Made a marketing plan with the entrepreneurs in the forms of direct sale with shops in the community, pre-ordering through online system and product presentation through online media. Besides, prepared a plan on production, packaging, delivery, accounting, and marketing model development during the study.

Period 3. Learning activities and making mixed soil ready for commercial planting under learning network. This emphasized on learning activities together with the entrepreneurs and the guardians. That was, holding learning activities among Agriculture teacher, student, entrepreneurs and guardians through online media system (Line and Facebook) for 1 semester, Monitoring was conducted every week (16 weeks) and there was a learning exchange seminar every mouth (4 times). The assessment was done by using observation form, in-depth interview schedule, questionnaire, satisfaction inquiry form, and in-depth interview conducted with the entrepreneurs. Obtained data were analyzed by using descriptive statistics and t-test (dependent). Also, data interpretation was conducted by using content analysis, five-rating-scale of Srisa-ard (2010) was employed as follows:

Scale limits		level of satisfaction
4.51-5.00	=	Highest
3.51-4.50	=	High
2.51-3.50	=	Moderate
1.51-2.50	=	Low
1.00-1.50	=	Lowest

Results

This study involved the development of agricultural knowledge and skills of Agriculture students or young farmers through comprehensive learning facilitation for preparing agricultural occupation in the future. The making mixed soil ready for commercial planting was used for training the agriculture students in terms of production, quality development and Marketing. This was carried out with the coordination with professional farmer in the community and entrepreneurs.

It was the period of the preparation to develop an agricultural learning activity set which was consistently needed and exited resources in the locality. It was found that the agricultural learning activities set (Making mixed soil ready for commercial planting) had been developed step by step and passed quality assessments from experts based on correctness and content consistency. Besides it was improved in accordance with suggestions of the experts. The agricultural learning

activities set comprised 7 parts as follows: 1) standards or indicators, 2) learning objectives, 3) essence or learning content, 4) learning activities, 5) teaching/learning media and learning sources, 6) measurement and evaluation, and 7) recording results after learning activities. Besides, there were 6 sub-activities: 1) procurement and selection of existing raw materials in the locality; 2) making mixed soil ready for commercial planting (5 formulae); 3) trying out the 5 formulae of mixed soil and comparison of its effectives; 4) distribution, public relations and collecting order; 5) mixed soil production, packing and production in advance (stock) and 6) making conclusions and an analysis of guidelines for future career (IOC range was 0.61-1.0). There was the preparation of learning achievement test and it was tried-out with 30 student who were not included in the sample group. It was found that the discrimination value (r) was 0.56-0. 94, the difficulty (p) was 0.32-0.75, and the reliability was 0.96 with the agricultural learning actives set was appropriated and able to use the teaching/learning facilitation.

Results of the second period showed that the teaching/learning facilitation process of the agricultural learning activities set was held at the school of agricultural learning center. Practicing activities on distribution (planning on marketing, production and procurement of order in advance) was through online system. The facilitation of learning activities was in accordance with teaching approaches, prediction, observation, and explanation (predict observe explain: POE) as well as blended learning (Bl). The creation of learning network was through smartphone in which the student sample group used for data communication together with agriculture teacher/entrepreneur network (Line and Facebook) as shown in Table 1.

Table 1. A number of students, average mean source, standard deviation, pretest/posttest scores, t-test values and statistical significance level

Item	Number of student	$\bar{x}$	S.D.	t	Sig.
Before learning	32	26.31	6.472	16.093	0.000**
After learning	32	40.09	5.126		

** Statistical significance level at 0.01

There was statistically significant difference at 0.01 between learning achievement before and after learning ($\bar{x}$=26.31, S.D.=6.472 and ($\bar{x}$=40.09, S.D.=5.126) as shown in Table 1. Hence, it could be concluded that the agricultural learning activities set (making mixed soil ready for commercial planting) could develop learning achievement of the student sample group effectively.

Skill assessment of the student sample group was observed by using the behavioral observation form and by assessing the teacher, group members and student themselves. The assessment was conducted twelve time in accordance with learning activities of each week (Table 2).

Table 2. Behavioral assessment of the student sample group

Items	**Mean**	**Description**
Discussion and mutual planning on project implementation	15.23	Good
Duties are allocated appropriately and member perform their duties	20.34	Excellent
Perform tasks according to the established procedures	22.65	Excellent
Helping one another during the project implementation	26.35	Excellent
Respect rules/regulations and listen to opinions of others	24.56	Excellent
A good leader and follower	21.32	Excellent
Show opinions which are useful to work	19.45	Good
Share opinions and work together to solve problems	17.36	Good
Work together until succeed	27.82	Good
The results are correct as specified and the work is delivered in time	29.23	Excellent
Total average	24.63	Excellent

1 score = Seldom, 21-30 score = Excellent; 2 score = Sometime, 10-20 score = Good; 3 score = Often, 1-9-score = Need for improvement

The comprehensive practice of making mixed soil ready for commercial planting of the student sample group was excellent based on its details as "the results is collected as specified and the work is delivered in time" which had the highest average mean score of 29.23 (Table 2). It was followed by "work together until succeed" (27.82), "helping one another during the project implementation (26.35) and "respect rules/regulations and listen to opinions of other" (24.56).

According to the 5 formulae of mixed soil experiment was done by planting croton, an analysis of results was shown on Table 3.

Table 3. Result of the experiment of 5 formulae of the mixed soil

Formula	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Total average
1st	12.22	12.31	12.45	12.53	12.63	12.74	12.96	14	12.73 cm.
2nd	13.00	13.76	14.76	15.67	16.66	17.53	17.94	18	15.92 cm.
3rd	.1275	13.66	13.85	14.38	14.87	15.38	15.68	15.97	14.57 cm.
4th	.1242	12.65	12.87	13.01	13.39	13.63	13.85	14.34	13.27 cm.
5th	12.10	12.29	12.41	12.65	12.87	12.93	13.45	13.85	12.82 cm.

It was found that the second formula made the croton tree to be the highest average height (15.42 cm.). It was followed by the third formula (14.57 cm.), the fourth formula (13.27 cm.), the fifth formula (12.82) and the first formula (12.73 cm.) (Table3).

Results of the third period emphasized on learning activities and practicing of making mixed soil ready for commercial planting together with the student's guardians and the entrepreneurs. It was found that the sample group was interested and satisfied with the online product distribution for the most ($\bar{x}$=4.56; S.D.=0.289). Comprehensive learning of inputs (agricultural production factors) could promote learning and creating on the most skills/experience to be used for the development of future career ($\bar{x}$=4.36; S.D.=0.165). Besides, using technology and online media stimulated learning at a high level ($\bar{x}$= 4.32; S.D.=0.194). The entrepreneurs claimed that creating an online sales network directly to farmers and interested persons would be a sales channel for agricultural production factors in the future. It was consistent with the era of digital marketing besides; the sample was satisfied with making mixed soil ready for commercial planting in time for income generating at a highest level ($\bar{x}$=4.73; S.D.=0.852). There were more than one-half of the sample group (56.52%) wish it to be a future side-line job at a highest level ($\bar{x}$=4.56; S.D.=0.186). Results of the third period was learning activities and practiced for making mixed soil ready for commercial planting under learning network. It focused on learning activities with the entrepreneurs and the guardians of the student.

Table 4. Mean, Standard deviation and the interpretation of levels of guardian such faction with on Agriculture subject learning facilitation.

Item	Level of satisfaction (n=32)		
	$\bar{x}$	S.D.	Description
Interesting and Modern content which is easy to understand	4.02	0.752	High
Use of technology and online media can stimulate learning	4.32	0.194	Highest
The content is consistent with local development and beneficial to knowledge enhancement	4.05	0.253	High
Activities can to be done easily and it is actual practice	4.27	0.332	High
Acquired knowledge and skill can be utilized in daily life	3.98	0.263	High
Co-learning between the Agriculture teacher, student, guardian and entrepreneur	3.67	0.325	High
Diverse yield selling and online marketing	4.56	0.289	Highest
Comprehensive learning can promote learning and create skill/experience for future career	4.36	0.165	Highest

Item	Level of satisfaction (n=32)		
	$\bar{x}$	S.D.	Description
Average total	4.23	0.259	High

It was found that the sample group interested and satisfied with yield selling through online system of the most ($\bar{x}$=4.58; S.D.=0.289), Comprehensive learning about inputs promoted learning and create skill/experience for future career at a highest level ($\bar{x}$=4.36; S.D.=0.165) (Table 4). It was followed by using technology and media stimulated learning ($\bar{x}$=4.32; S.D.=0.194).

According to in-depth interview, it was found that the entrepreneurs agreed that creating an online sales network directly to farmers and people who were interested for a channel for selling agricultural production factor in the future. Besides, they were satisfied with making mixed soil ready for commercial planting in times for income at a highest level ($\bar{x}$=4.73; S.D.=0.852). Therec was more than one-half of the entrepreneurs (56.92%) satisfied with the student who interested in side-line job in the future at a highest level ($\bar{x}$=4.56; S.D.=0.186). It included teamwork and systematic planning and operation ($\bar{x}$=4.34; S.D.=0.253). In addition, the entrepreneurs were interested in the promotion of potting soil in the farm for turnkey business which will encourage the student to do this business in the future.

Discussion

The making mixed soil ready for commercial planting was a comprehensive learning facilitation for developing future agricultural occupation. It is conducted together with professional farmers in the community and entrepreneurs. Also, guardians of the student were coordinated to participate in this project for learning promotion (Setachandana *et al.* 2017). It is newly trended for agricultural teaching and learning facilitation. It is integrated the development of learning activity set which is consistent with the needs of learners. Interestingly, local resources are utilized to create educational and econoruc value. It is found that the learning activities set is developed systematically inspected by the experts and it improved learning achievement of the student with a statistical significance level at 0.01. It reached the effective learning activities set which can be extended. It confirmed by Puangsuk *et al.* (2022) which proposed guidelines for developing on agricultural learning activities set. Tt must be comprehensively and systematically developed to be consistent with need of learners and local exiting resources to reduce expenses of the teacher, student and guardian. In addition, it must be continually connected with the directing of social change to inspire the learner to expand knowledge in the future (Saduak *et al*. 2020)

Agricultural teaching and learning facilitation promoted agricultural occupation in an approach consistent with the direction of current world change particularly on the society in the digital era (Katchwattana *et al*. 2018 and Ministry of agriculture and cooperative. 2021). Thus, the blended teaching and learning is very important together with learning activities facilitation under the predict observe explain: POE (Torpop, 2013, Carman, 2005, Puangsuk, 2017, Phetseangsi, 2016). Student communication through smartphone together with the teacher and the entrepreneur network (Line and Facebook) resulted in continual enthusiasm in learning. It is found that most of the students mutualy made an operational plan of the project implementation at the beginning with local raw material selection as soil mixture in various formulae. An example was the second formulae (chopped palm stock: compost: loam: black husk 2:1:1:1) which found to be mostly appropriated the mixed soil for planting. Interestingly, the chopped palm stocks were used as raw material for mixing the soil organic compost (Yodput, 2017).

According to the assessment, the practical skill of the students was excellent and helped the another until successful in the project implementation. Also, the student is interested and satisfied with selling the product in the online market at a highest level. Comprehensive learning of agricultural production factors promoted learning and creating skill/experience used for developing agricultural occupation in the future at a highest level. The adaption of technology and online media can stimulate learning, this consistent with opinions of the entrepreneurs that created a network of online sales directly to farmers and would be a channel for selling agricultural inputs in the future. In addition, fending

the number of pre-order before production was in the line with modern or digital marketing. It also confirmed to characterize the farmers for the new age of the 21st century (Ministry of agriculture and cooperative, 2021).

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