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Research Article

A model of smart farm in the field of animal science at the college of agriculture and technology

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Abstract

The number of learning centers related to agriculture and environmental education is increasing in Thailand. However, there is little research on determining opinions about them. This study was carried out to determine student views about one of them. This study is a quantitative survey research. The students' views on Living Agricultural Learning Center (LALC) in Praibueng Wittayakom Sisaket Province are the characteristics sought to be determined in this research. Participants consisted of 391 students who were enrolled in Agriculture subject, second semester, school year 2021. Opinionnaire for LALC was used for data collection and analyzed by using descriptive statistics and t-test. As a whole, the students had a high level of opinions about the LALC ($\bar{x}$=3.61). In other words, there were 4 dimensions found at a high level and only one dimension found at a moderate level as follows: Instructional Climate ($\bar{x}$=3.95), Activity Facilities ($\bar{x}$=3.86), Gaining Knowledge ($\bar{x}$=3.80), Raising Awareness ($\bar{x}$ =3.66), and Relationships with the Community ($\bar{x}$ =2.77). It was determined that the students' views about LALC differ in favor of female students according to gender (t=-6.01, p<.01). In the OLALC sub-dimensions, it was determined that there was only a gender difference in the Instructional Climate and Relationships with the Community dimensions (p<.01), students' views about LALC do not differ according to educational attainment (p>.01), students' views about LALC do not differ according to achievement (p>.01). In the OLALC sub-dimensions, it was determined that there was a differentiation in favor of low success only in the Gaining Knowledge dimensions (p<.01). It was determined that the students' views about LALC do not differ according to their parents' occupation (p>.01). In this research, the opinions of the students were taken with opinionnaire, but it can be recommended to conduct qualitative research using observations and interviews to obtain more in-depth information.

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Introduction

The educational facilitation in agricultural is essential to the development of the country and agricultural careers. Indeed, agricultural education has been included in the curriculum of various levels of education facilitated by the Ministry of

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Education. This includes pre-compulsory education, compulsory education, basic education, vocational education, technical education, higher education, non-formal education and informal education. The level of concentration is different depending on the curriculum's goals (Siriwan, 2014 and Poungsuk and Junlek, 2021). In the case of educational management at the agricultural vocational level in the College of Agriculture and Technology, it aims to produce skilled manpower with expertise in professional skills and can be used in professional practice according to market demands. as well as social and economic conditions. Teaching and learning activities are therefore petting the importance on learning by doing in the actual situation. As a matter of fact, school farm work is essential in the management of education to achieve goals. In other words, it is a learning source to support teaching and learning practice. Aside from this, school farm work, is an income generating source for the school. Nevertheless, farm work in an agricultural vocational school faces problems about from management. Generally, the school farm does not truely play roles as a farming system demonstration center for future farmers as it should be. Besides, most school forms do not how profit in business running (Office of teacher competency and Vocational Education Personnel Development, 2011, Panyakom *et al*. 2014, Ermuthai. 2021, Sangkawasee, 2021). Changes in policy levels in support of farm work as well as frequent change of the school administrator cause lack of continuity Besides, most of the school farm supervisors are near retirement age whereas there are few new teachers who will replace them. This has impacts on students who are going to pursue their study at the College of Agriculture and Technology and a number of the applicants decreases continually. Meaner these graduates in agriculture lack of knowledge about modern/appropriate technology for farming (Animal Science Teacher Profession Club. 2013, Poungsuk, 2018).

Therefore, the development of farm work to be modern as a smart farm must be consistent with the context of the current change. This can make the teacher be able to effectively facilitate education and experience for the student to have knowledge and skills in animal husbandry. Hence, it can be said that the farm work system is like the key to the triumphal arch of success. of the educational facilitation in agricultural vocational education, Importantly, this study aims to develop an animal science smart farm model in the College of Agriculture and Technology. It involves problem conditions, needs for animal husbandry farm management, creating and evaluating a smart animal farm model that can be scaled up for agricultural education institutions.

Conceptual Framework

This study anchored on pragmatism putting the importance on individual differences of the learner. In other words, the learner must reason and learn with practicality (learning by doing). Meanwhile, the teacher must encourage, and support him through supervision. The arised characteristics of the learner as a result of the educational facilitation process (agricultural vocational education) and comparing farm work as a system. This means that various processes existing in the same network and having relationships to one another for working together to achieve the goals as set include man, resource, concept and process (Siriwan, 2013). Besides, a theory of Pressure's Sixteen Theorems C. A. Quigley, T. H. puts the importance on the facilitation of vocational education to be like an actual workplace in which input, process, output, outcome and impact are taken into consideration (Figure 1).

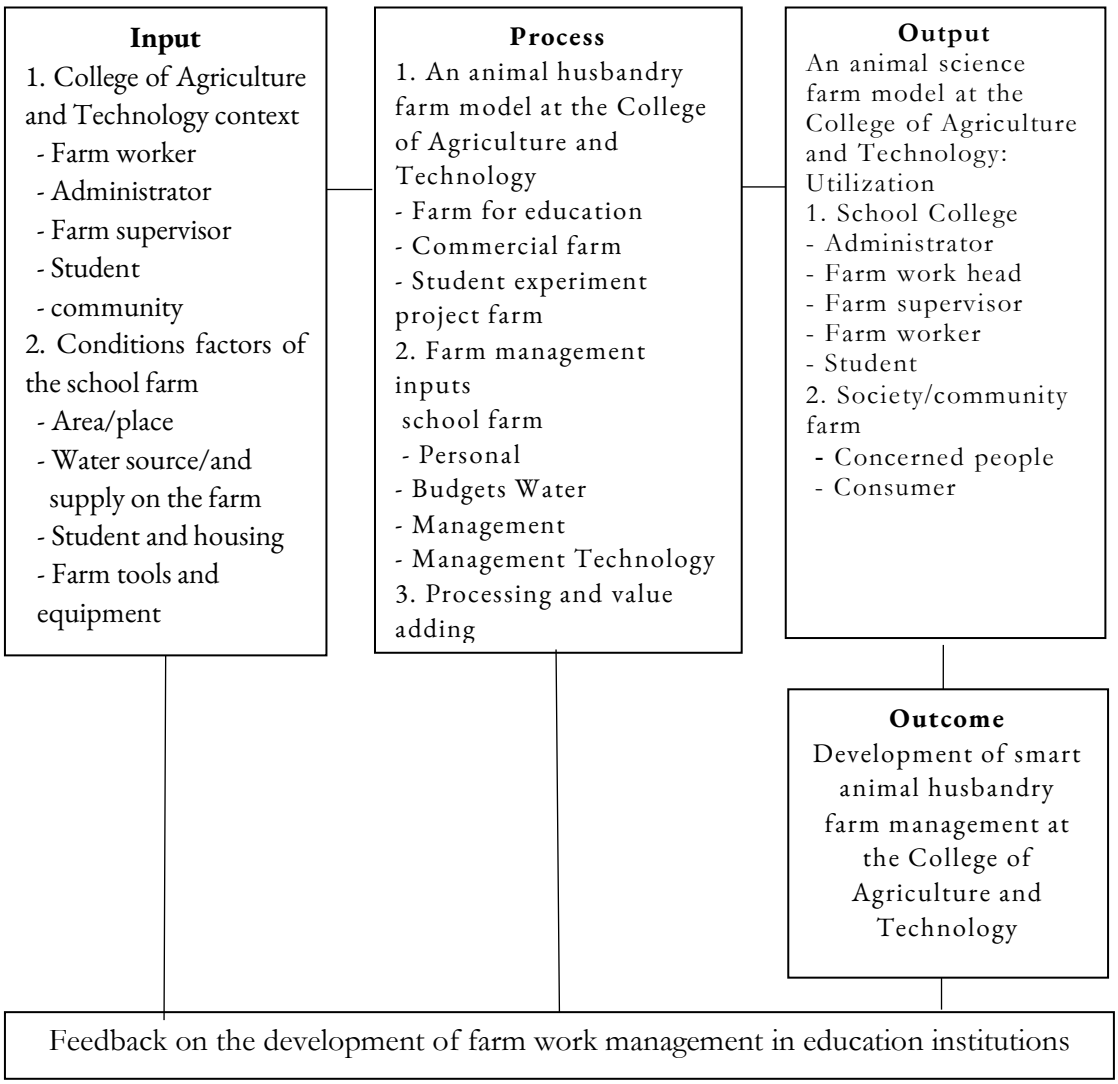

Figure 1. Conceptual framework of study

Materials and methods

This study employed research and development comprising 3 steps: 1) exploration of problems and needs for development of the smart animal husbandry farm management at the College of Agriculture and Technology, Northeastern Agriculture of Vocation Education Institutes 2; Development of the smart animal husbandry farm model; and 3) inspection and assessment of the smart animal husbandry farm. The sample group was from 10 College of Agriculture and Technology in northeastern Thailand and step of this study are show in Table 1.

Table 1. Step of this study (Research conducting)

Step	Research methodology	Result
Exploration of problems and needs for development of the smart animal husbandry farm management at the College of Agriculture and Technology	1. Interviewed 10 College administrators 2. Made a survey on opinion of farm head or manager taking care of farm work and agriculture teachers (42 person) 3. Thirty Animal science students	Received context, conditions, problems and need for school farm management at the College of Agriculture and Technology
Development of the smart animal husbandry farm model	Focus group discussion was conduct with 3 steps: 1. Sketched a smart animal husbandry farm model at the College of Agriculture and Technology	Draft of the smart animal husbandry farm model at the College of Agriculture and Technology

Step	Research methodology	Result
	2.Checked the draft of the smart animal husbandry farm model 3. Improve and presented the draft of the smart animal husbandry farm model	
Assessment of the smart animal husbandry farm model	1. Fifteen scholars criticized the smart animal husbandry farm model 2. The scholars assessed the smart animal husbandry farm model based on appropriateness, possibility and benefits 3. Making conclusion of the smart animal husbandry farm model in term of effectiveness	The smart animal husbandry farm model at the College of Agriculture and Technology
The smart animal husbandry farm experiment	Implementation the development of the smart animal husbandry farm model at Ubonratchathani College of Agriculture and Technology	Result of farm work - Educational facilitation - farm work performance - Cooperation of entrepreneurs

Research instruments in this study were in-depth interview, questionnaires (Check list rating scale) Data recording and checking from, observation and smart farm assessment form. Obtained data were analyzed by using content analysis and referral statistical analysis (Statistical program) and the appropriateness assessment form (5-rating scale) was used to consider the level of demand suitability, level of practice and level of opinion in the assessment as follow: (Punpinij, 2011; Leekitwattana, 2012).

Table 2. Scores and agreement/satisfaction levels

Score	Scale Limits	Description
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

Exploration of conditions, problems and needs for the management of the animal science farm at the College of Agriculture and Technology

It was found that the college administrator involving in the college farm expressed opinions as follows:

- Regarding vision, policy and guidelines for the management of the college farm, it must be consistent with the policy of the office of vocational Education Commission. In terms of the development of farm work in the college is concrete and uses modern Technology. This must be in the direction of farm work development so that such farm will be distinctive in accordance with Different area context. Importantly, learner is emphasized on acquired knowledge, experience and skills so as to be a good modern to the community. Besides, the problem in a decreased number of students must be solved by using farm work as policy driven.

- According to the management of farm work in the college, it was found that the managements of the animal science farm were under the structure and concerned rules regulations. The project implementation must be systematic and well planned. The coordination must be in accordance with the administrative structure. It must have a good data reporting system to reduce the government procedures increases convenience in college farm management with accountability.

- The current condition of the animal science farm in the college management needs to be developed urgently. Although it has a strong point on area and knowledgeable personnel, but they are near to the retirement age. The weak point includes inadequate budgets, lack of appropriate and more than equipment. lack of policy continuity and animal farms or not fully categorized according to the curriculum or general context. for problem solving, contract farming can be employed add new ads creating a modern market system to produce animal products and do processing of animal products.

- The policy and guidelines for management of animal science farm work off to college. Still relied on the central budget. Intense, decentralization could be a good way to promote successful farm work development.

- For successful management of animal science faros work in the college, the farm size must be fixed to be consistent with the teaching/learning facilitation in the digital and borderless communication age. The farm size must be clearly fixed (small, medium, big) for appropriate, integration of resources of all sectors, Also, it should have a data system on form management and adoption of appropriate technology of production cost reduction. This could be a smart form having comprehensive animal production together with coordination with external agencies for effective animal husbandry farm management production techno logy transfer and marketing agreement.

- Form and components of an animal science for promoting success must have an appropriate from and size with existing resources the farm must be able to managed comprehensively by using production technology and information technology data system it could have small/medium farm for education so that students could learn, practice and conduct a research project. Meanwhile the commercial farm should have a big size with returns that would be used for educational purpose and the development of other farms.

- The animal science form management was expected to be modern which meets standards and has profits. Students can learn and practice on the farm comprehensively. Besides, the farm management should see in the form of smart farm

- For successful animal science farm management, it should have clear determination of a policy or guideline on college farm work development, both policy from the central down to the college level. The success and progress of the farm project depended on potential and enthusiasm of the college administrator, Agriculture teaches, students and the surrounded community.

Conditions, factors, problems and needs for college farm work management based on opinions of teachers taking care of the animal production farm or animal science farm.

- According to personal data of the 42 respondents (farm head or manager taking care of farm work and agriculture teachers), it was found that most of the teachers taking care of the college farm were male (69.05%), 50 years old and above (42.86%) bachelor's degree graduates (54.14%), and majored in Animal Husbandry (71.43%). There years of service was more than 20 years (52.38%) and had experience in teaching Agriculture for more than 20 years (57.76%). They had teaching hours during office hours for 19.50 hours on average.

- As a whole, condition of factors in animal science farming in an aspect of the College of Agriculture and Technology was found at a moderate level ($\bar{x}$=2.91). Based on its details, the following found at a first 3 moderate level as follows: 1) water source and irrigational system on the farm ($\bar{x}$ =3.28); 2) farm administration/management ($\bar{x}$=3.18) and 3) land/area, and farm tools/equipment ($\bar{x}$=2.31) were found at a low level, respectively.

- As a whole, there was a high level of needs for the animal science farm development so as to be a quality and modern business form ($\bar{x}$=4.45). The farm for education should be clearly separated from the farm for

commerce ($\bar{x}$=4.42). The farm for education should be small in size but modern and easy to manage in the form of a smart farm ($\bar{x}$=4.38). Farm flowcharts should be appropriate and quality in teaching/learning ($\bar{x}$=4.38). As a whole, all aspects of animal science farm problems were found at a high level ($\bar{x}$=3.42). Based on its details the following were found at a first 3 high level as follows: 1) form tools and equipment ($\bar{x}$ =3.78); 2) structure/housing ($\bar{x}$=3.58); and 3) capital/budget ($\bar{x}$=3.58), respectively.

- The following reasons of needs for the animal science farm development found at a highest level: 1) beneficial to teaching/learning activities ($\bar{x}$=4.88) and 2) to be a male for students to practice in the future ($\bar{x}$=4.88). Factors affecting farm work development were responsibility of the teacher taking care of farm ($\bar{x}$=4.61) and support of the college administration ($\bar{x}$=4.50)

- As a whole, there was a highest level of the animal science farm development. ($\bar{x}$=4.29). Based on it details, the following were found at a highest and high levels: 1) farm tools/equipment ($\bar{x}$=4.51); 2) animal breed/fodder ($\bar{x}$ =4.45); 3) personally workforce($\bar{x}$ =4.45); 4) farm administration/management ($\bar{x}$ =4.35); 5) water source/irrigation ($\bar{x}$ =4.19); 6) structure/ housing ($\bar{x}$ =4.33); 7) farm drugs/chemical ($\bar{x}$ =4.33); 8) Marketing/distribution ($\bar{x}$=4.25); 9) capital/budget ($\bar{x}$=4.22); and 10) area/land ($\bar{x}$=3.84), respectively.

Conditions, factors, problems and needs for the college farm work management based on opinions of the 30 students.

- Regarding general data of the student respondents, it was found that about one-half of them (50.91%) were male and 18.44 years old on average. The student respondents were majoring in Agro-industry most (31.82%), followed by Animal Science (22.73%), Fisheries (22.73%), Fisheries (22.73%), Plant Science (12.73%), and Agricultural Technician (10%.). Their grade point Average was 3.04 on average. Father and mother of most of the student respondents were engaged in agricultural careers Most (66.36 and 77.55%). More than one-half of the student. respondents (67.27%) stayed at the college's dormitory.

- Most of the student respondents had experience in fish rearing (78.18%), swine farming (60%), vegetable production (46.46%), beef cattle farming (46.36%) and dairy cattle farming (45.45%), respectively. As a whole, they had a highest level of opinions about conditions of the college farm. Five aspects were found at a highest level: 1) water source and irrigation system used for farming ($\bar{x}$=3.80); 2) area/land ($\bar{x}$=3.72); 3) personnel and workforce ($\bar{x}$=3.72); 4) animal breed, fodder and material ($\bar{x}$=3.56); and 5) farm management ($\bar{x}$=3.48), respectively.

- For suggestions, the college animal science farm should be reduced in side to be easy to practice during learning in the course most (31.81%). Housing should be repaired and farm tools/equipment should be enough and modern (20.90%). Besides, supporting funding sources for students to undertake business farming projects during the school year (16.36%), respectively.

Developing a smart farm, model on animal husbanding at the College of Agriculture and Technology.

This consisted of 3 steps: draft a model from the data analysis, review the draft animal science farm management model; and improve and present a model for animal science farm management in the at the College of Agriculture and Technology. There was the conclusion of the following components: context, input, process, product, outcome and feedback. For the model assessment, the schoolers gave suggestions for improvement in terms of appropriateness, possibility, consistency and benefits as a whole it was found that there was a highest level of the management of a smart farm in animal science ($\bar{x}$=4.40). This was followed by possibility ($\bar{x}$=4.35), appropriateness ($\bar{x}$=4.33), and benefits ($\bar{x}$=4.32), respectively (Table 2).

Table 2. An assessment of are animal sciences smart farm medal in the College of Agriculture and Technology

Item	$\bar{x}$ (n=42)	S.D.	Description
The model is appropriate with learning development and academic service.	4.33	0.59	Highest
The model is possible to be applied and expanded.	4.35	0.65	Highest
The model is consistent with the components and goals of college farm management.	4.40	0.73	Highest
The model animal science farm work management beneficial to the facilitation of agricultural vocational education and academic service.	4.32	0.66	Highest
Average	4.35	0.66	Highest

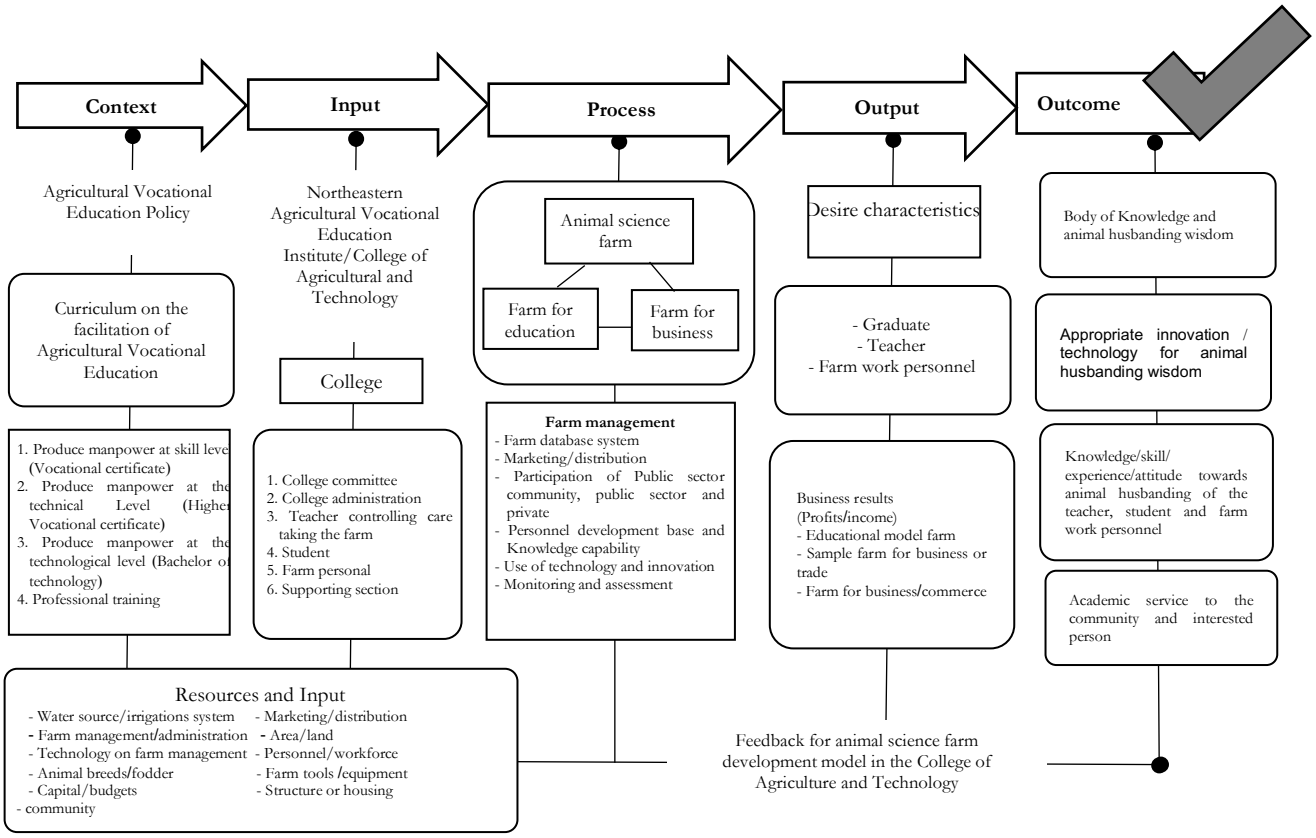

Figure 2. Component of animal smart farm model in the College of Agriculture and Technology

Application of the animal science smart farm model to teaching/learning activities and academic service of the College of Agriculture and Technology

This was done for one academic year at Ubonratchathani College of Agriculture and Technology. It began with the investigation and exploration of animal science farm work in the college inputs, coordination with the society/entrepreneur places, fair work output, learning facilitation process and academic Interview awes used for data collection and conducted with 45 Animal Science students, 12 teachers/personnel and to entrepreneurs/service users. Results were as follows:

Overviews of the application of the animal science smart farm model to teaching/ learning activities and academic service

This began with the investigation and exploration of animal science from work in the college. Then, improvement and technology available in the college averse conducted and installed. This was done with the college buffalo and beef cattle farm by applying technology to manage farm work through IT database system. This was in order to manage production from the upstream on input management to the midstream focusing on organizing the farm work system to make the animal husbandry be systematic. This included innovation development to reduce production costs. Meanwhile the

downstream focused on local distribution and pre–order market management. This was so as to be data used form determining production and providing experiences for students/public service. After that, there was the develop of poultry smart farm, swine smart farm, sheep/gout smart farm and management of grazing plats. by using appropriate water/growing/harvest systems. Not only this, innovation was developed to replace limited workforce and the and the production system was adapted to be relevant to a number of animals, such as fodder and fermented feed. It was found that in one academic year (2021), the overall performance of animal science farming increased by 25 percentage.

In addition, there was coordination in the development with the college animal science smart form for 8 with & agencies. There were s teaching activities for 8 Subjects: Animal Husbandry Principles, Raising Buffaloes and Beef Cattle, Raising Goats and Shop, Service Production, Egg-Laying Chicken Production, Broiler Production and Forage Group Growing. There were 80 vocation certificate higher vocational certificate and bachelor's degree students as well as to informal students taking up these subjects. Also, there were 6 times of academic service on animal science. The presentation of the animal science smart farm model for the application is shown in Figure 2.

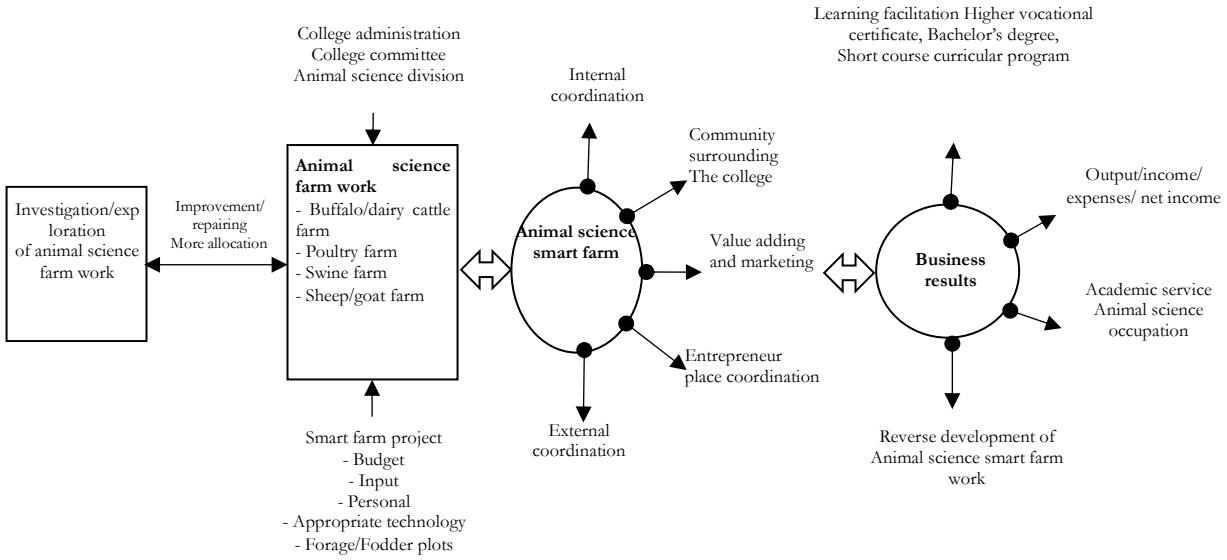

Figure 2. Application of Animal science smart farm work at Ubonratchathani College of Agriculture and Technology

An assessment of animal science smart farm practice of Animal Science students at Ubonratchathani College of Agriculture and Technology. The assessment was done after the practice and obtained data are shown in Table 3 and 4.

Table 3. An assessment of animal science smart farm practice of Animal Science students

Items	$\bar{x}$	S.D.	Description
Area/place- appropriate and convenient for farm work experience	3.54	1.051	High
Water source/irrigation-adequate, clean and convenient	3.73	0.895	High
Structure/housing-adequate, modern, and hygienic	3.80	1.030	High
Farm tools/equipment- adequate, modern, and convenient	4.12	0.953	High
Animal breed/fodder/materials- adequate, appropriate/good	3.12	1.004	Moderate
Personnel/workforce- knowledgeable/responsible supervision, personnel and workforce	3.73	0.949	High
Farm management- good, accountable and having data record	4.17	0.833	High
Farm practice- practice system, supervision, monitoring and assessment	4.46	0.963	Highest
Average	3.88	0.237	High

According to the assessment of animal science smart whole, it farms practice of the Animal Science students, was found at a high level ($\bar{x}$ =3.88). Top three aspects. found at a high level were: 1) farm management, 2) farm tools and equipment, and 3) structure and housing ($\bar{x}$ =4.17, 4.12 and 3.80, respectively). Animal breed/fodder material was only found aspect found at a moderate level ($\bar{x}$ =3.12).

Table 4. Outcome gained from learning and animal science Smart farm practice of the Animal Science students

Items	$\bar{x}$	S.D.	Description
Increased knowledge gained from Animal Science Course	4.268	0.708	Highest
Increased skills in Animal Science after farm Course practice	4.120	0.771	Highest
Adoption of acquired knowledge for future career	3.780	0.822	Highest
Adoption of experience for future career	3.975	0.821	Highest
Average	4.048	0.388	Highest

According to the practice and learning achievement of the Animal Science students, as a whole, it was. found at a high level ($\bar{x}$ =4.048). The sample group perceived that they acquired knowledge from learning Animal Science courses at high level ($\bar{x}$ =4.268). This was followed by skills in Animal Science after farm practice ($\bar{x}$ =4.120) and adoption of experience/knowledge for future career ($\bar{x}$ =3.975 and 3.780, respectively. Increased).

Discussion

The development of an animal science smart farm model in the College of Agriculture and Technology can be discussed. As a whole, factor condition of the animal science farm in the College of Agriculture and Technology at a moderate level based on 7 aspects: water so irrigational system, farm management/administration, area/landplane), Marketing/distribution, source/personnel/workforce, structure/housing, Materials. This conforms to and animal breeds/fadder a study of Siriwan *et al.* (2000) and Puangsuk, P. (2017) which revealed that readiness of various factors supporting a demonstration farm is found at a moderate level. This is because most of the College of Agriculture and Technology has a big area enough for farming. Besides, existing concerned resources in the college can be utilized in farm work (Panyakom, 2014). However, appropriate structure/housing is found at a low level, which might be because it has been using for a long time. This also conforms to: to the Animal Science Teacher Profession Club (2013) which stated that housing and equipment of the College of Agriculture and Technology damaged because it is inadequate due to limited budgets are old and cannot compare with that of private farms, Panyakom *et al*. (2014) found that students are satisfied with an amount and quality of farm Tools/equipment of the College of Agriculture and Technology at a moderate level.

Therefore, improvement in all aspects should be taken into consideration. It is also found that problem of is at a moderate the college animal science farm level. This conforms to the Animal Science Teacher Profession Club. (2013). which reported that the college animal science farm operation throughout the country has a rather big problem. This includes old, damaged housing, inadequate housing and animal breeds, lack of supporting budgets, management lacks flexibility and unstable market system. It also conforms with a study of Panyakom *et al*. (2016) which found that the problem of the college farm is at a moderate level and it should be solved by improving equate and modern farm tools. Regarding the animal science smart development, it is necessary to develop the educational facilitation at the agricultural vocational education level. with the world rapid change. the educational facilitation of this level is to produce manpower at the vocational certificate, higher vocational certificate and bachelor's degree levels skill technic and technology, respectively). Hence, this educational facilitation emphasizes on learning by doing or practice in the actual situation to acquire skills and direct experience. (Siriwan, 1989). In this respect, there is a relationship of various factors making the occurrence of farm work learning, both Agricultural/vocational curricular program and socio-economic conditions of the student, the teacher and the college administrator. In fact, the animal science smart farm model has appropriate components with the learning facilitation and academic service. There is coordination between the college, community and entrepreneur. Hence, the animal science smart farm must be well planned to attain a highest efficiency. Puangsuk *et al.* (2019) found conclusions about college farm work that it must be considered that market promotion leads production and the development of a college farm for education focuses on use of innovation to reduce production costs but at also adds value of products.

In addition, the animal science smart farm. may clearly focus on quality and modern commercial farming which is suitable for teaching /learning facilitation. Indeed, a smart farm is consistent with a policy of the Secretary General of the Vocational Board of Education (Kaengsanthia (2020) aimed to make the Agricultural Vocational Education college to develop a farm work to be excellent in a particular field of study (Asai, 2021, Uamsri, 2013, Chailert. 2019). This is order to create business farm of each college of Agriculture and College of Fisheries (One Farming Business, One Agricultural and Fisheries College). It can and educational source for students to learn and practice for professional experience. This can also generate incomes to the college for agricultural education development. Besides, it can be one student to be trained as young smart farmers in the future and continuing as professional a smart agriculture career in the future (Pitak and Rungkunakorn. 2021). Assessment and adoption of the animal science smart farm to the teaching and learning activities as well as academic service of the college. It is found that the following are at a highest level; appropriateness, application and expansion, consistency of components and benefits. The model creating procedures are systematic and consistent with the development of farm network management the said procedure conforms to Bown and Moberg's concept (Brown and Moberg (1980) which synthesizes the model based on systematic thinking and situational management principles (Kojuantiaw. 2018 and Homsuwan *et al* (2013) made conclusion that the model construction does not have on what to do. Generally, however, fixed requirements it must begin with finding the body of body of knowledge intensive knowledge) related to a model. Interestingly, there is a step-by-step development process. Besides, results of the study show that students learning and practicing activities of the animal science smart farm have a highest level of learning and practicing performance on the basis of Animal Science course implies the success of the model adoption of the College Agriculture and Technology.

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References

Animal Science Teacher Profession Club. (2013). *A report on an increase in animal rearing potential in colleges of agriculture and technology to be consistent with learner competency and entrepreneurs*. Bangkok: Division of Vocational Teacher and Personnel Development, Office of Vocational Committee, Ministry of Education.

Animal Science Teacher Profession Club. (2013). *A report on an increase in animal rearing potential in colleges of agriculture and technology to be consistent with learner competency and entrepreneurs*. Bangkok: Division of Vocational Teacher and Personnel Development, Office of Vocational Committee, Ministry of Education.

Asai, N. (2021). A Model of Smart Agricultural College Administration to Drive Student Quality at Sukhothai College of Agriculture and Technology. *Technology Vocational Education Training*, *5*(9),122-137.

Brown, W. B. and Moberg, D. J. (1980). Organization theory and management: A macro approach. New York: John Wiley & Sons.

Chailert, C. (2019). *Guidelines for educational management of the College of Agriculture and Technology. Institute of Agricultural Vocational Education in the North to be effective*. Doctorate of Education Thesis, Educational Administration Chiang Rai Rajabhat University.

Ermuthai, S. (2021). Guidelines for the development of vocational personnel on the year 2022 in order to drive the education policy for career and the country's competitiveness. *Institute of Vocational Education Southern Region 1 Journa,* 6(2), 3-12.

Homsuwan, C., Meejang, S., Jansila, C., and Pupat, P. (2013). The Development of Participatory Management Model for Colleges in the Vocational Education Commission. *Journal Of Education Naresuan University*, *15*(5), 34-42.

Kaengsantia, S. (2020). The report of the meeting of the Future Farmers Organization of Thailand (FFT) to prepare and develop the format of the *42nd National Academic Conference of the National Council for Peace and Order (ACT*) at Sakaeo College of Agriculture and Technology Sakaeo Province.

Kojuantiaw, S. (2018). Management model of vocational educational institutes in the category of industrial technicians under the policy of Thailand 4.0. *Journal of Technical Education Development, 30*(105), 54-62.

Leekitwattana, P. (2012). Educational Research Methodology. 8th edition. Faculty of Industrial Education and Technology, King Mongkut's Institute of Technology Ladkrabang, Bangkok: Mean Service Supply Ltd. Partnership.

Office of Teacher Competency and Vocational Education Personnel Development. (2011). *Practice guidelines for personnel development on farm management services in agricultural vocational institutions.* Office of the Vocational Education Commission, Ministry of Education.

Panyakom, R. Puangsuk, P. and Puapan, N. 2014. *A research report on school farm problems based on opinions of higher vocational certificate students*, Ubonratchathani College of Agriculture and Technology.

Panyakom, R., Poungsuk, P., Intorrathed, S., and Hongmaneerat, K. (2016). Problem Conditions of Animal Science Farms in Institutes of Vocation in Agriculture, Northeastern Thailand. *International Journal of Agricultural Technology*, *12*(72), 2037-2047.

Pitak, A. and Rungkunakorn, P. (2021). The Guidelines for Farmer Development towards the Smart Agripreneurship. *ARU Research Journal*, *8*(1), 17-23.

Poungsuk, P. (2018). *School farm management. bangkok: department of agricultural education*, King Mongkut's Institute of Technology Ladkrabang.

Poungsuk, P. and Junlek, P. (2021). Agricultural Education System in Thailand: Policy and Direction towards Sustainable Development Goals. *FFTC Agricultural Policy Platform (FFTC-AP)*. www.https://ap.fftc.org.tw/article/2762.

Puangsuk, P. (2017). *Agricultural Education*. Bangkok: Mean Service Supplies. 652 p.

Punpinij, S. (2011). *Research techniques in social science*. 2nd Edition. Bangkok: Witthayaphat.

Sangkawasee, A., Pha Agsonsua, and Sirisuthi, C. (2021). The Scenario of Thai Vocational Education in the Next Decade (2022-2031). *Dhammathas Academic Journal*, *21*(4), 221-233.

Siriwan, N. (1989). *Farm work: key strategies of education in agriculture*. Bangkok: Ponchai Printing Center.

Siriwan, N. (2014). *Miscellaneous that education in agriculture: important issues to be revised*, 2nd edition. Bangkok: Mean Service Supply Ltd. Partnership.

Siriwan, N., Disyaboot, D., Klum-klin, S., Chotisakul W. and Jarusombuti, S. (2000). Desired school demonstration farm development of teachers who were responsible for school demonstration farm managers of the vocational and technical agriculture levels in the Educational Institutions, Ministry of Education. *Kasetsart Educational Review*, *15*(1), 79-95.

Siriwan, N., Disyaboot, D., Somchit Klum-Klin, S., Chotisakul, w. and Jarusombuti, S. (2000). Desired school demonstration farm development of teachers who were responsible for school demonstration farm managers of the vocational and technical agriculture levels in the Educational Institutions, Ministry of Education. *Kasetsart Educational Review*, *15*(1), 79-95.

Uamsri, W. (2013). *Factors for success in the development of agricultural vocational schools to the ASEAN Economic Community*. Bangkok: Office of the Vocational Education Commission. Ministry of Education.