UNIVERSITY OF THE PHILIPPINES

Master of Arts in Communication (Communication Research)

Marikit Thea D. Castillo

Knowledge Integration among Training Alumni: The Case of the Agricultural Training Institute – International Training Center on Pig Husbandry (ATI-ITCPH)

Thesis Adviser:

Professor Elena E. Pernia, PhD
College of Mass Communication
University of the Philippines Diliman

Thesis Reader:

Professor Randy J. Solis, MA
College of Mass Communication
University of the Philippines Diliman

Date of Submission:
April 2013

Permission is given for the following people to have access to this thesis:

Circle one or more concerns: I, P, C	
Available to the general public	Yes
Available only after consultation with the author/adviser for thesis/dissertation	No
Available only to those bound by nondisclosure or confidentiality agreement	No

Signature of Author:

Signature of Thesis Adviser:

UNIVERSITY PERMISSION PAGE

I hereby grant University of the Philippines non-exclusive worldwide, royalty-free license to reproduce, publish, and publicly distribute copies of this thesis in whatever form subject to the provisions of the applicable laws, the provisions of the UP IPR policy and any contractual obligations, as well as more specific permission marking on the Title Page.

Specifically, I grant the following rights to the University:

(a) to upload a copy of the work in the theses database of the college/school/institute/department and in any other databases available on the public internet;
(b) to publish the work in the college/school/institute/department journal, both in print and electronic or digital format and online; and
(c) to give open access to above-mentioned work, thus allowing "fair-use" of the work in accordance with the provisions of the Intellectual Property Code of the Philippines (Republic Act No. 8923), especially for teaching, scholarly, and research purposes.

Marikit Thea D. Castillo
April 2013

KNOWLEDGE INTEGRATION AMONG TRAINING ALUMNI: THE CASE OF THE AGRICULTURAL TRAINING INSTITUTE - INTERNATIONAL TRAINING CENTER ON PIG HUSBANDRY (ATI-ITCPH)

MARIKIT THEA D. CASTILLO

Submitted to the

COLLEGE OF MASS COMMUNICATION

University of the Philippines Diliman

In partial fulfilment of the requirements

for the degree of

MASTER OF ARTS IN COMMUNICATION (COMMUNICATION RESEARCH)

April 2013

KNOWLEDGE INTEGRATION AMONG TRAINING ALUMNI:
THE CASE OF THE AGRICULTURAL TRAINING INSTITUTE -
INTERNATIONAL TRAINING CENTER ON PIG HUSBANDRY (ATI-ITCPH)

by

MARIKIT THEA DELA CRUZ CASTILLO

has been accepted for
the degree of MASTER OF ARTS IN COMMUNICATION
by

Professor Elena E. Pernia, PhD
Adviser

Professor Randy J. Solis, MA
Critic

Professor Jose R. Lacson, Jr., PhD
Reader

Professor Arminda V. Santiago, PhD
Member

and approved for the
University of the Philippines College of Mass Communication
by

Professor Roland B. Tolentino, PhD
Dean, College of Mass Communication

BIOGRAPHICAL DATA

PERSONAL DATA

Name	Marikit Thea D. Castillo
E-mail Address	kitcastillo@gmail.com
Date & Place of Birth	5 October 1983, Manila

EDUCATION

Tertiary Level	B.S. Development Communication (Development Journalism), College of Development Communication (CDC), University of the Philippines Los Banos, Laguna
Secondary Level	San Roque Catholic School, Alabang, Muntinlupa City
Primary Level	St. Rita College, Paranaque City

ORGANIZATIONS	Alumni, UP Alliance of Development Communication (UP-ADS), CDC- University of the Philippines Los Banos
	Member, Gamma Sigma Delta Honor Society of Agriculture, Los Banos, Laguna
WORK EXPERIENCE	National Social Marketing Officer, KALAHI-CIDSS Project, Department of Social Welfare and Development (2010)
	Communication Specialist, Department of Agriculture – Office of the Presidential Adviser for Job Creation (2006-2010)
	Communication Assistant, AusAID – UN-FAO Foot and Mouth Disease (FMD) Eradication Project (2004-2006)
ACHIEVEMENTS	University Scholar, UP Los Banos, AY 2003 – 2004
	College Scholar, UP Los Banos, AYs 2001 – 2003

ACKNOWLEDGMENTS

"The reality is more excellent than the report.
Here is no ruin, no discontinuity, no spent ball…
Every moment instructs, and every object: for wisdom is infused into every form.
It has been poured into us as blood; it convulsed us as pain; it slid into us as pleasure;
it enveloped us in dull, melancholy days, or in days of cheerful labor;
we did not guess its essence, until after a long time."
- *Ralph Waldo Emerson (Essays: Second Series, 1844)*

I would like to express my appreciation for the individuals and institutions that made this two-years-in-the-making research more than an academic exercise, but a fulfilling journey for both the mind and the heart:

To my panelists: Prof. Randy Solis, for his zest and for enriching my interpretations. To Dr. Joey Lacson, for keeping me in line with the research's communication focus and to Dr. Armi Santiago, for reminding me of its reciprocatory nature. And to my adviser, Dr. Elena Pernia, for lending me her brilliance, especially at times when I missed the forest for the trees and for giving me the encouragement I needed to pursue this topic.

To Dr. Ruth Miclat-Sonaco, for letting me run with this research; Ms. Mariquez Sison and Ms. Liberty Inciong, for all their help in the field work; Ms. Fe Nava for her administrative expertise; and the rest of the ATI-ITCPH's dedicated staff.

To the DA-ATI: Director Asterio Saliot and his staff from EGPD, Ms. Minda Razon and Ms. Myles Urbano, who deemed this topic worthy of grant support.

To all my alumni respondents, especially the 24 men and women who trusted me with their insights and experiences during the FGDs.

To the MA teachers I have had the blessed opportunity to learn from: Prof. Fernando Paragas, Prof. Almond Aguila, Dr. Malou De Ocampo, Dr. Lourdes Portus,

Dr. Claire David, Prof. Juno Parungao, Dr. Elizabeth Enriquez, Dr. Elena Pernia, Dr. Jose Lacson and Prof. Roehl Jamon.

To Ms. Vi, Ms. Nini and the rest of the helpful UP-CMC and Comm Res Department staff.

To all the friends I have gained in the MA program, especially to Iam, Dave and Anna: here's a toast to over-thinking.

To my friends from *way* back: Fifi, Aya, Jen, Pay, Shevs, Eps, Aly, Lorie, Ayie and Pia. To Doc, Edmund, Vincent and Duday. To Len.

To the DA-OPAJC team: Jenny, RJ and Marge for their encouragements.

To the best housemates a girl could ask for: Joy and Say.

To Mr. Patch, my furball stress-relief.

To my family, for their unwavering support.

To the Filipino farmers and to those who *see* them.

And to you, my reader.

DEDICATION

"You have brains in your head
You have feet in your shoes
You can steer yourself any direction you choose
You're on your own
And you know what you know
And YOU are the guy who'll decide where to go."
– Dr. Seuss (Oh, the Places You'll Go!, 1990)

For my Dad, Mom, Kuya and Bunso –

For believing in me, the places I could go, and

For the love that leads my heart back to home.

ABSTRACT

Castillo, M. D. (2013). *Knowledge integration among training alumni: The case of the Agricultural Training Institute - International Training Center on Pig Husbandry (ATI-ITCPH).* Unpublished Graduate Thesis, University of the Philippines College of Mass Communication.

This study focuses on how the knowledge gained from agriculture extension efforts, particularly the ATI-ITCPH training on pig production, were integrated in the field-setting. Using a cross-sectional, field research design, knowledge integration was investigated through the training alumni's knowledge change, plan implementation and knowledge sharing activities.

The complementation of quantitative and qualitative approaches surfaced positive changes in knowledge for the 13 basic pig raising aspects post-training with found instances of knowledge gained, replaced and reinforced.

Knowledge gain significantly differed for four participant characteristics. First, for course type, Intensive and Basic course alumni learned more about culling and breeding than the Trainors alumni. Second, those with advanced training gained more knowledge on feeding than those with minimal training exposure. Third, the type of enterprise mattered for the aspect of feeding with commercial farmers appreciating this aspect more than their backyard counterparts. Lastly, participants from the private sector and livestock entrepreneurs gained more knowledge on herd selection than the alumni from the academe and local government.

For plan implementation, the level of satisfaction derived from its outcomes differed between enterprise types. Commercial farmers felt more satisfied of their plans' results than backyard farmers. Generally, for every five alumni who drew a plan, one felt highly satisfied of its results. The support of top-management and staff, the inclusion of their plans in their institutions' priorities and the knowledge and skills gained from training facilitated implementation but was tempered by financial constraints, bureaucracy and changes in work assignment.

The alumni shared the knowledge gained from training often, with pig raisers, family and farm staff as beneficiaries. Majority perceived the knowledge shared, whether delivered in an interpersonal or mediated manner, as useful to their beneficiaries. Knowledge sharing activities were mostly facilitated by the nature of work, personal and ATI-ITCPH-related qualities. Conversely, it was limited by recipient-oriented factors, lack of time and other priorities. Hesitance also stemmed from the felt lack of knowledge or experience, particularly for technical aspects.

Other manifestations of integrated knowledge, such as the positive changes in confidence, openness to learning, pride and participation in the industry, were also found.

The evaluation study concluded that the ATI-ITCPH alumni fared well in knowledge integration.

Aside from legitimizing knowledge management as a strategic communication tool, the study also yielded actionable insights on the dynamic nature of learning, the needed shift from participation to innovation and the role of communication in agriculture development.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

I. INTRODUCTION

This section emphasizes the role of agriculture in development. It also illustrates the livestock farmer's context and knowledge needs. Concomitantly, it also explores the value and challenges encountered by extension, as it responds to the knowledge and capability-needs of both extension agents and farmers. The need for evaluation, particularly in the face of extension's diminishing resources and its struggle for relevance in the field-setting is also underscored. As its focus, the ATI-ITCPH of the Department of Agriculture, committed towards the provision of specialized training for livestock stakeholders is also introduced.

A. Background of the Study

1. The 'Agricultural Path' to Development

Indubitably, the state of a country's agriculture sector plays a part in the overall economic growth. Janvry and Sadoulet (Rivera, 2001) referred to it as the "agricultural path", and development experts hail it as one of the means out of poverty. Agriculture development is paramount to food security as it provides the natural resource base to cater to population needs. Agriculture also propels economic growth since it supplies the raw materials for aggregate industries. Put simply, it is both a food and a livelihood source. Hence, change in agriculture productivity also affects income even for non-farm related activities.

In the Philippines, about 70% of the population are in the rural areas while 38% of the labor force is engaged in agriculture activities (www.fas.usda.gov). In 2009 alone, 12 million of the 35 million employed belong in the agriculture sector (http://countrystat.bas.gov.ph).

Even with these statistics and despite of the efforts of several administrations, agricultural development in the country has been stifled, especially when taken against other Asian countries. Economists also predict that with the growth rate falling below the country's population rate, agricultural production increasingly would not be able to keep up with population demands (Habito and Briones, 2005).

Agriculture's stifled growth is due partly to the country's geographic location, which makes it vulnerable to typhoons and largely, to low public investments especially on technologies and infrastructures that would lend input and market access. There is also a lack of clear policy and market reforms and low capability-building initiatives, which hampers the implementation of programs.

a. Livestock Sector's Edge

Compared to other commodities however, the livestock sector experienced a bit of growth in the recent years (DA Annual Report, 2010). Making up about 12% of the country's gross value added, this sector contributes draft power, fuel, building materials, food and nutrition (http://countrystat.bas.gov.ph). It also accounts for 40% of the overall agriculture production globally and is valued for its support of over a billion people. Fifteen percent (15%) of this sector contributes to the total global food energy, with a quarter (25%) directly providing the population's protein requirement (Bondoc, 2010).

Here in the Philippines, raising livestock is beneficial for the small farmers since it augments income gained from crops and promotes cash-flow in rural areas. On a larger scale, animal feed is made of grain, and its increased demand boosts overall agriculture growth.

The pig industry in particular is 80% of the overall livestock industry and enjoys strong domestic consumption - pork being a staple in the Filipino diet, seconding only the rice commodity (USDA-FAS, 2004; Manantan and Callanta, 2008). In fact, a mid-90s study on the livestock sector's development in Asian countries namely India, Thailand, Taiwan, Korea, Japan and Mongolia reports that raising pigs has been declining *except* in the Philippines (Sugiyama et al., no date).

Still, the livestock sector contends with the challenge for agriculture as a whole - fill the demand for food in the face of population growth. But increasing livestock productivity is not an easy task with challenges on environment (i.e., biodiversity, climate change), health (i.e., disease prevention or treatment) and supply inputs (Bondoc, 2010; DA Annual Report, 2010).

Livestock development experts recommend the strengthening of the backyard sector since it makes up 75% of the hog industry suppliers (USDA-FAS, 2004). This is quite a challenge, as the discussion below illustrates.

b. Pig Farming: a Work-Life Endeavor

Farming whether focused on crops or livestock, is not an easy undertaking. Routine farm tasks involve risks to physical injuries and psychological stress. Yet, family cohesiveness, preservation of work and life values and increased self-worth were also attributed to it (Bolwerk, 2002). For better or worse, farming, at least for those engaged in it, is considered as both work and an integral part of life.

This is no different for pig farmers who depend on their animals as a source of nutrition and livelihood. They need to visit their herd daily for feeding and health inspection. Being observant is paramount in order to spot and treat ailments before it

affects the rest of the herd (UN-FAO, 2011). To ensure profit, it is not enough for the farmer to do routine pig raising tasks. He should also possess enough knowledge and understanding of the current market conditions.

This brings to attention the basic aspects of pig raising that well-rounded farmers should know and practice for better production, as enumerated below.

1. *Common pig breeds found in the country* - Because each breed has unique qualities, a farmer needs to be discerning about his choice of breed. In example, the Landrace is adaptable to any climate and has strong maternal abilities while the Duroc possesses good stamina and is quick to put up weight (Brown, 2010).

2. *Physical and performance basis herd selection* - The process of choosing appropriate sows and boars as production base is called herd selection. Only pigs of the highest quality should be included in the herd. Herd selection is broken down into two. *Physical selection* use appearance (i.e., weight, body width, lack of abnormalities) as basis while *performance selection* refers to the farm records to ascertain pig quality in terms of breeding, average weight gain and feed conversion (http://www.mixph.com/2006/04/swine-hog-raising.html).

3. *Culling* – This refers to the removal of sub-standard pigs in the herd due to age, reproductive capacity or physical abnormalities. The decision to cull should be based on physical manifestations and performance records (Sasaki, 2011).

4. *Breeding Methods* - There are two types of breeding methods available for increasing the herd. The natural method entails the introduction of an actual boar to the sow during its fertile phase. The Artificial Insemination (AI) method introduces only the boar's semen in an artificial manner commonly via catheter. AI offers distinct economic and practical advantages but proper knowledge, skills, facilities and equipment are needed for its effective conduct (ATI-ITCPH: *AI sa Barangay*).

5. *Heat detection and the estrus cycle of sows* - Heat detection and ascertaining a sow's estrus cycle is important in increasing the herd. The farmer should be aware of the external signs that a gilt or sow is "in-heat" since correct timing for both natural and AI is vital to a robust litter size and farrowing rate (ATI-ITCPH: *Walang Aray sa AI*).

6. *Farm Management* - Managing and administering a farm requires a quick eye and a discerning attitude and involves not only managing the pig herd but also manpower. Farm administrators should take note of production cycles and conduct constant planning and analysis

7. *Feeding scheme for different stages of pigs* - Contrary to the tradition of feeding pigs with just swill, there are specific feed formulations per life stage that should be adopted in order to raise pigs to their optimum weight and health (ATI-ITCPH, *Gabay sa Pag-aalaga ng Palakihing Baboy*).

8. *Common diseases and health problems for breeders* - Pigs could be susceptible to diseases like Hog Cholera, Foot and Mouth Disease (FMD), Parvo virus, Leptospirosis and some parasites. Knowing the symptoms of such common diseases enables the farmer to act immediately before it spreads in the herd (UNAHCO, 2008).

9. *Proper cleaning and disinfection (C&D) of pens* - Implementing biosecurity measures is important to reduce the introduction of diseases in the farm which whether resulting in sickness or mortality would cut farm profit. Aside from pens, other farm equipments and vehicles should also be regularly cleaned and disinfected (UN-FAO, 2011).

10. *Prevention and treatment of pig diseases* - This aspect is closely linked to the common pig diseases and health problems as well as the practice of biosecurity. Disease prevention and treatment entails the crafting and implementation of a health program for the herd to boost their resistance to diseases and achieve optimum weight. Disease spread is also prevented by limiting farm visitors, eliminating pests and rodents, isolating sick pigs and avoiding stress (UN-FAO, 2011).

11. *Proper housing and equipment for different stages of pigs* - Like the aspect of feeding, the different stages of a pig's life also require differentiated housing concerns. The right location (i.e., accessible roads and market), right climate and stocking density as well as adequately measured pens, feeding and ventilation facilities should be ascertained (UNAHCO, 2008).

12. *Record keeping* - There are two types of farm record keeping. The first is economical, concerned with the financial side of the operation such as the prevailing price of meat, weanlings and inputs. The second, which is technical in nature, covers production and farm schedule like sow age, pigs weaned per sow per year (PWSY), farrowing dates and the average daily gain (ADG). Precise and simple record-keeping contributes greatly to a smooth farm operation and produce marketing, especially for large farms (Abaygar, no date).

13. *Cost and return analysis* - in order to be market-competitive, a pig farmer should be able to compare his capital investments against returns. Being aware of the operation's return on investments (ROI) aids future decisions such as expansion or opting for other investment alternatives (Dhuyvetter et al., 2012).

As stated in the earlier section, majority (75%) of the pig industry is composed of the backyard farmers. They are commonly classified as farmers who have less than 20 sows (female breeding pigs) in their farms (*LLDA Resolution no. 169, Series of 2001*). But even as they dominate in number, the country's backyard farmers need knowledge and skills on the abovementioned basic aspects. Given the influx of cheaper imported meat products, the rising feed costs, issues on stock availability and the threat of diseases, such knowledge would help small farmers hold on to their market share (Huynh et al., 2006).

The advancement of the backyard farmers also involves a change in mindset from treating pig raising as a 'piggy bank' (emergency fund source), into a regular enterprise. Also, while large-commercial farmers possess enough capital to respond to market-demands, small farmers do not have access even to the most basic of resources (i.e., housing, feeding and vaccination) to feasibly increase production. Rivera (2011) believes that aside from asset-constraints, small farmers also need to rise above context-constraints, be they natural (typhoons or droughts) or man-made (i.e., social, political, military strife).

These are current potential challenges to growth which agricultural extension work face in order to help farmers rise above their resource- and context-constraints. The next section discusses in more detail the developments in extension education and communication from its inception in the1850s to current times.

2. Agricultural Extension

a. History: From Linear to Pluralistic (1850 – 1990)

The concept of extension first came hand in hand with the development of the education system in England in the 1850s with the exploration of their population's information needs at the onset of industrialization (Anandajayasekeram, et al., 2008). A continent away in 1862, the US Congress mandated the academe to share knowledge from the university with the non-students. Both in England and the US, the focus of discussion evolved from lofty social and literary concepts to agricultural concerns, taught by transient lecturers from the rural areas (Swanson, Bentz and Sofranko, 1997).

By the 1900s, extension had evolved into a movement aimed to deliver relevant information to farmers. It expanded to the continents of Asia and Africa, communicating increased productivity as benefit of the then-advanced farming technologies. Extension by the 1950s was institutionalized within state departments or ministries and confidence was placed on western agricultural technologies, employing the hierarchical information transfer using the mass media. While the intention was good, the farmers were merely viewed as mere 'recipients', their needs and situations not given attention (Anandajayasekeram, et al., 2008; Del Castello and Braun, 2006).

By the 1980s, the declining support from funding agencies and criticisms of inefficient extension agents who were myopically focused on production called for new extension approaches (Anandajayasekeram, et al., 2008; Swanson and Rajalahti, 2010; and Del Castello and Braun, 2006).

The 1990s was also characterized by a more 'pluralistic' view of extension.

For example, the emergence of Farmer Field Schools (FFS) in Asia rested on the idea that learning is an evolutionary and participatory process where the experiences and knowledge of farmers become the base for knowledge giving, sharing and integration (Rivera, 2001 and Swanson and Rajalahti, 2010). The recognition of roles of not just the public but also the private agencies and organizations occurred. Joint efforts were forged to address extension system's reach and resource challenges (Swanson, Bentz and Sofranko, 1997).

b. Role: From Delivery to Facilitation (2000 to date)

From the 1990s, the succeeding decades continued to lean towards the participatory view of extension, with individual and collective knowledge and experiences treated as an important resource.

With this change in view came also a change in roles: the extension agent no longer the 'expert' dispensing needed information but a 'facilitator' and the farmer not just a 'recipient' but an 'active partner' (Del Castello and Braun, 2006).

Hence, rather than constraining its purpose strictly to enhance production performance through *'extending'* or *'delivering'* information, extension is now treated in a broader sense. Now, extension encompasses advancing knowledge not just to increase farm yield but also to usher an array of "agricultural development tasks" related to supply, credit and marketing (Rivera, 2001: 9). This makes extension a cornerstone of rural development, increasing the farmer's production and income towards uplifting their present disadvantaged conditions (Swanson and Claar, 1984). While hard inputs like roads, harvest and post-harvest technologies and access to credit is half the development solution, public spending should also be allotted for extension. Extension advocates

believe that extension funding is directly related to the socio-economic benefits (i.e., hunger and poverty alleviation) it will yield (Anderson and Feder, 2004; Baxter, Slade and Howell, 1989).

c. Current Challenge: Putting Communication in Extension

Despite the widening of its concerns, some argue that extension faces the issue of survival with the changing times. In the US, for example, it needs to contend with the decreasing rural population and, combined with the nation's increasing educational levels, it now treads a path of irrelevance (West, Drake and Londo, 2009). Thus, currently, there is a call for extension agents to start redefining itself - identify new demographic and economic niches and reprogram agent-clientele relationships.

Extension then should ground itself to the social sciences, such as theoretical and applied communication and learning (Kern in Donnellan and Montgomery, 2005). Extension needs communication experts who could effectively research, plan and execute communication strategies keeping in mind the intended audience and the best channels to achieve the set program goals. This engagement with communication should yield evidence of extension's effectiveness and bear the heightened scrutiny and expectations of both the public and private sectors.

Additionally, Del Castello and Braun (2006) insisted that extension's evolution into a demand-driven service in fact has clarified too its communication direction and roles. Applied communication research is needed to identify farmer needs and steer agriculture scientists toward more relevant, appropriate and understandable innovations and services. Conversely, the farmers' uptake of such innovations and services would

largely depend on the extension worker's communication skills and the channels employed.

Two local studies accentuate the importance of grounding extension in communication and the concept of evaluation.

Llarena's (2006) evaluation of Foot and Mouth Disease (FMD) risks uncovered knowledge gaps between the science and extension community (field agriculturists and veterinarians) and with the industry players (livestock raisers and traders). Results showed knowledge gaps for risks involved in animal and by-product trading, with the extension agents showing steep knowledge advantage over farmers and traders. Perception of risks also differed with the national government's classification of FMD incursion in Visayas and Mindanao as 'high-risk' but the local government and industry players viewed chances of incursion only as 'moderate' to 'fairly low'. These then demanded the re-orientation of the then nationally-crafted FMD messages for Visayas and Mindanao and the heightened involvement of the regional and local government.

Another example of a knowledge gap on animal health, this time with dire consequence to human health, is that of the Highly Pathogenic Avian Influenza (HPAI). A study of the HPAI knowledge of farmers, traders and agricultural technicians revealed that though majority (88%) were aware of the disease, only more than half (61%) were able to give at least one symptom (Caro, 2006) and only very few (11%) were confident of their knowledge. In terms of attitude, more than half of the respondents believed that the country will be likely to get an HPAI outbreak. The most pressing finding however was that 33% of the field agents were not confident of their ability to identify HPAI manifestations in a field situation. The study concluded that though the respondents were

aware of the possibility of an HPAI outbreak, it was not treated as a harmful threat. The study recommended future communication campaigns to highlight content about HPAI symptoms for both animals and humans as well as the greater call-to-action for the farmers and traders to report suspected cases.

The next chapter further expounds the importance and challenges of the field of agriculture extension-communication.

For now, the discussion turns to the case under study, the ATI-ITCPH.

3. The ATI-ITCPH

As the earlier discussion on Philippine agriculture implied, the government has a huge responsibility in boosting productivity. For the livestock sector, investments in the research, development and extension of genetics, nutrition and health are needed. The knowledge and capacity-building component for pig raisers that go hand-in-hand with the said investments is a niche that the Agricultural Training Institute-International Training Center on Pig Husbandry (ATI-ITCPH) fills under the Department of Agriculture.

The ATI-ITCPH located in Lipa City, Batangas evolved from a foreign-assisted project jointly established by the Government of the Philippines and the Netherlands in the 1990s. As one of the training centers of the DA dedicated to the empowerment of livestock stakeholders, it aims to equip training participants with appropriate knowledge and skills on pig production and management. The Center envisions the "emergence of dynamic and self sustaining rural communities of organized pig farmers doing profitable business in a globally competitive environment" (ATI-ITCPH Annual Report, 2008: 4).

As the only training center in Asia that specializes on pig husbandry, the ATI-ITCPH offers holistic and practice-oriented training, with course curricula crafted to suit

participant's work and business needs. Early on, it only offered four (4) courses, a broad stroke covering necessary aspects of pig production. With continuous reviews, the Center's training courses have been streamlined, now totalling 13.

Three of them, namely the Intensive, Basic and Trainors courses bear close attention for these are the main training courses that encompass the basic aspects of pig raising.

1. *Intensive Course* - Offered to private individuals, the course has seven (7) modules complementing theoretical and practical approaches to farm management. The course introduces different farm operations, factors and technical figures related to production.

2. *Trainors Course* – Offered to technical or extension workers from the government, non-government or academic sectors. The course aims to impart overall knowledge and skills on pig production and extension and requires its participants to undergo at least two hours of practicum in the pig farm.

3. *Basic Course* – Offered to private individuals who plan or are currently engaged in pig raising. Unlike the Intensive and Trainors', this course can be availed even by high school graduates. Participants learn basic knowledge and skills in production including the appropriate techniques involved pig farm management.

Aside from class lectures, the Center's training facilities include a farm which showcases different levels of sow production, an artificial insemination (AI) center, a feed laboratory, a feed-mill and biogas installations for practical instruction. These showcases also attract visitors from other local government units and state universities.

Currently, the Center has trained more than 3,000 individuals who came from various sectors, like livestock entrepreneurs, government extension workers, academicians and staff of private companies. Training fees are comparatively affordable with subsidy offered for the participants from the government and the academe.

a. Alumni Monitoring and Evaluation (M&E)

The Center's Alumni M&E activity recognizes that the usefulness of the topics covered need to be tested upon the participants' return to their areas of assignment. In this activity, ITCPH staff visit the alumni and through personal interviews, validate if the courses undertaken have been found beneficial. The Center's M&E Officer, Mariquez Sison said that the data gathered from the alumni were instrumental in the crafting of courses through the years, like waste management and meat processing courses (Phone interview, December 2010). In this aspect, the M&E activity complements the Center's training program, since evaluation results inform the design of new courses or the adjustments of the institutionalized ones.

Since 1992, the M&E activity has been conducted once or twice a year, depending on the number of confirmed respondents and funding availability. Areas to be visited are selected based on the pool of confirmed interviewees with each M&E activity lasting for five days with an average of 20 interviewees. The evaluators follow a voluntary selection process in respondent identification. Once an area with substantial alumni respondents is determined, invitations are sent and only those alumni who signified interest to participate are interviewed. In order to justify its cost, the evaluation activity, does not push through without half of the confirmed respondents in the identified locale.

The ATI-ITCPH's conduct of M&E in the recent years is appended to show the activity's coverage through the years (see Appendix A).

The evaluation's primary research instrument was a guided interview questionnaire composed mainly of open-ended questions. As such, the bulk of the alumni data gathered from the field are qualitative and mostly at the nominal level.

Two behavioral indicators of 'impact' seemingly guide the Center's conduct of M&E. First is the interest in the ways the knowledge learned has helped the alumni. Second is to ascertain whether the re-entry plans drawn during training have been implemented. The drafted plan gives the alumni the chance to envision which of the things learned would be beneficial to their areas. Planning with the end-users generates learning sustainability since it forces careful consideration of their capacity, values and environment (GTZ ed., 2006).

Feedback on the trainings received has been positive. In the first semester of 2008 for example, 19 out of its 22 respondents for Region VIII deemed the training 'useful' and majority shared what they have learned to farmers during seminars. However, only five out of the 22 alumni implemented their re-entry plans (ATI-ITCPH Annual Report, 2008: 18).

No evident change on the two 'impact' indicators occurred through the years. But, the M&E activity led also to the satisfaction of the Center's Development Support and Communication Program objective in the recent years. Through the M&E, alumni with interesting stories of success were identified. Their stories are expounded, written and published in their quarterly newsletter and uploaded in their website for the reference of livestock stakeholders.

B. Statement of the Problem and Objectives

The previous section outlined how agriculture has a vital role in national development and situated extension as one of the building blocks to its productivity. The need for agricultural extension to move from mere 'information delivery' towards a more audience-centered approach was also underscored.

In the face of the growing concern for the communicated agricultural knowledge's relevance and aptness to its recipients, coupled with the dwindling financial support, the evaluation of extension becomes paramount.

The ATI-ITCPH as the leading authority on pig raising, is a prime subject for extension evaluation. It offers an opportunity to learn how knowledge learned in a closed training environment fared in the field-setting. Hence, the following research problem and objectives:

The Research Problem:

How did the ITCPH Alumni fare in terms of knowledge integration upon return to their work-life setting?

Objectives of the Study:

Generally, this study intends to evaluate the impact of the ITCPH training course/s undertaken through the participants' integration of pig raising knowledge gained in their work and lives.

Specifically, it aims to:

1. Determine change in knowledge through the alumni's experienced
    a. Knowledge gain
    b. Knowledge replacement
    c. Knowledge reinforcement

2. Describe the field context in which the alumni sought to implement their re-entry plans.

3. Explore the aspect of knowledge sharing and other possible manifestations of knowledge integration

4. Identify participant characteristics that may influence knowledge integration

C. Significance of the Study

Though gaining its well-deserved popularity, evaluative studies on the impact of extension-communication initiatives have yet to gain enough foothold in the government sector for it to be considered at the onset of programs. In this regard the ATI-ITCPH's endeavours to validate the value of their courses in practice are commendable efforts that need to be strengthened in order to produce clearer and more detailed results.

The findings of this study about the alumni's knowledge integration inform the Center's course designs. Through pursuing if there were indeed different types of knowledge change experienced, this study was able to highlight aspects of the courses which were particularly new, lessons that were only complementary to previous knowledge and some lessons considered to be unfit in the alumni's contexts.

The exploration of the context in which the alumni strove to implement their re-entry plans meanwhile informs the DA and other government-led agencies of the still mainly unexplored factors that determine successful implementation. The identification of the contributing and inhibiting factors towards plan implementation for instance, inform the Center's course design and prepare participants of the current field realities.

Identifying these factors obtained from the experiences of the participants refocus implementation strategies relative to livestock extension providers.

By surfacing integration of knowledge through sharing, the factors that foster a healthy environment for the communication of pig raising information may be realized. Eliciting the preferred manners of knowledge sharing and the frequently shared topics inform not only the ATI-ITCPH's course, but also the future selection and use of communication materials.

The determination of possible participant characteristics that influence knowledge integration and the knowledge sharing beneficiaries would shed light on the knowledge learning network the Center is situated in. This in turn would help identify and address bottlenecks in knowledge sharing and push extension services to reach other stakeholders.

This study's approach of using complementary quantitative and qualitative approaches may be used as a pattern for evaluating the impact of programs under the DA-ATI. The indicators used to measure knowledge integration (knowledge change, plan implementation and knowledge sharing) provide a base from which service-oriented agencies with the same education-extension methodology may be evaluated.

The findings may guide future extension policies not only of the ATI-ITCPH, but the Department of Agriculture as a whole, with the evolving role of the extension worker in bringing appropriate knowledge and skills to its various stakeholders. The results may be used as evidence to influence the ATI's allocation of resources towards human capital development on communication and leadership, intensify the Center's training capacity, as well as determine points for expansion.

Finally, study findings substantiate the call for greater collaboration between the national government agencies, local government units and other non-government or private livestock groups to secure an enabling environment for the livestock farmers to work towards rural development.

II. REVIEW OF RELATED LITERATURE

This section describes the context and the challenges faced by the key agriculture partners in development: the extension worker and the farmer. These daunting personal, professional, political and social challenges are mitigated and managed through extension. However, due to its broadness and intervening factors involved, the evaluation of agriculture extension effects is a daunting activity. Previous studies revealed the use of differing indicators to determine extension's positive effects. One indicator, found to be consistent with extension aims, is the change in knowledge. Literature showed that focusing on knowledge – its gaps, the changes in previous beliefs and practices, its sourcing and sharing – has merit. Investigating knowledge integration and instituting management changes benefit both the extension worker and farmer. The end of this chapter broaches the possibility of uncovering knowledge change and its integration in the livestock sector context.

A. The Farmer

Farmers comprise "the single largest group of users and managers" of natural resources such as land, water and other biological matters in the world (Contado in Swanson, Bentz and Sofranko ed., 1997: 133). Men, women and even young farmers are the main actors in rural development and in sustaining the nation's agricultural productivity. In spite of this vital development role, half the world's poor live in rural areas (Rivera and Qamar, 2003). In the Philippines, the ratio is slightly higher with two out of three of the poor living in the rural areas (Balisacan, 2007). Indeed, farmers and fisher folks consistently come up as the poorest of the poor with basic necessities and

public services out of their reach. Consequently, their livelihood is fraught with risks and labor iniquities.

1. Physical and Mental Risks

The daily tasks involved in farming bring in health and safety risks. Villarejo's (2003) investigation of migrant farm workers, for one, uncovered high mortality due to injuries, respiratory and heart disease. Reports of diabetes, ulcer, infectious diseases and skin disorders also abounded. Such health problems led to early retirement and the inability to provide for the family, reinforcing the poverty cycle.

Aside from physical, farmers also suffer mental and emotional risks. In an investigation of their mental health, Gregoire (2002) found that in the United Kingdom, farmers have the highest number of suicide cases than any other occupational group. The tedious labor and stress due to finance, workload, weather and diseases compounded cases of mental instability and suicide. This dismal condition was also found in a Nigerian study (Meludu and Bajowa, 2008), with financial, particularly the rising cost of inputs and insufficient cash flow, as the highest stressor. This was followed by the lack of farm help and the long work hours. Occasional stressors meanwhile stemmed from weather (i.e., drought) and health risks (i.e., hazardous chemical use). There were also some people-related issues. Farmers bemoaned the inability to achieve a work-life balance and reported to have felt feelings of hopelessness and isolation (Gregoire, 2002; Meludu and Bajowa, 2008).

2. Knowledge Needs

It is evident from these physical and mental risks that the farmers need knowledge and skills to cope with their livelihood's harsh demands. Arcury et al.'s (2002) research

on pesticide exposure asserted that mere awareness of the risks involved did not guarantee action. The farmers reported feelings of having “no control" of their work situation in avoiding pesticide’s harmful effects (Arcury et. al, 2002: 239). The mere dissemination of information materials and trainings on safe pesticide use were found to be insufficient. Rather than just awareness, improving self-efficacy or the confidence an individual has to reduce risk should be done. The researchers opined that confidence is gained through changing the farmer’s personal knowledge and beliefs, leading to changes in practice.

In the same vein, a policy study in the UK (Parry et.al, 2005) also pointed out the need to train farmers on how to cope with stress. The said study pointed out that while trainings on farming skills abound, farm management and other business-related topics were sorely lacking in extension, thus diluting its overall positive effect. The need for an enterprising edge was also found in Hargrove and Jones’ (2004) US study. They discovered that African-American farmers needed technical assistance, especially on farm and financial planning, record-keeping and production. Both Parry et al. and Hargrove and Jones believe that agricultural extension, while providing knowledge, should also build confidence and management competencies.

In sum, this section outlined the disadvantaged position of farmers, given the physical and metal risks involved in agricultural work. Aside from providing hard investments such as infrastructure, technology and credit support, the farmers also need to be equipped with actionable knowledge. The knowledge and skills extended should not only be in the technical front – contained to farming activities. Knowledge should also be

extended on the social front – teaching farmers how to manage and how to lead in order to effectively face risks and stressors their livelihood entails.

The next section considers the extension worker's important role in filling the farmer's knowledge needs as well as how certain factors limit their work effectiveness.

B. The Extension Worker

The extension field worker is seen by most as agricultural extension's most important asset. They are the main link between the scientific community and the farmers, responsible for imparting agricultural knowledge, skills and technologies. Extension workers should be able to effectively communicate a broad range of services from the hard sciences (technology transfer) to social sciences (human development). Hence, it is paramount that they are capable of not only understanding, but also communicating both theoretical and practical information, without information loss or misconstruction. With these responsibilities, extension workers *are* communication practitioners who study, select and share relevant and timely agricultural knowledge and skills to various audiences.

However, extension workers also contend with personal and professional challenges, as the discussion below reveals.

1. Life-Work Issues

Extension workers face an adverse relationship between their work responsibilities and their personal and family's well-being. Thomson, et al.'s (1987) study found that more than half of the extension workers experienced personal and work issues.

A more recent study by Ensle (2005) also found tension in the staff's work-life balance. While extension workers indeed have flexible work hours, the job was judged to be exhausting and time consuming. The top reasons given during resignations include: family situation shifts (i.e., divorce or marriage), location shifts (spouse moving due to work) and neglecting family duties. Majority of the sample reported low morale, which affected work output. Some of the reported frustrations were attributed to the client's unresponsiveness or undetected changes in behaviour. The client's lack of positive feedback was perceived to be a reflection of the worker's and their agency's effectiveness. Another source of dissatisfaction was the salary compensation, with 81% who said that they were inadequately paid for the responsibilities they were given.

A Philippine study by Baconguis (2007) meanwhile discovered that local agriculture offices detract from the main mandate of extension, with half the staff's time allocated to regulatory functions like meat and environment inspections. Such time allocation should merit attention, especially when compared against the finding of an Albanian research, where workers only spent 26% of their time in *non-extension* activities (Harri, 1997).

2. Gaps in Knowledge, Skills and Experience

Aside from personal issues on morale, compensation and work-life balance, extension workers also contend with the challenge of constantly re-upping their knowledge, skills and experience in order to better serve the needs of their clientele.

Tladi's (2004) research about extension workers in Botswana discovered a dearth in expertise for pertinent skills to the job. With 25 skills (i.e., crop production, pest

management, machinery maintenance, and interpersonal communication) identified to be "vital" to their extension tasks, only 40% of the sample were confident of their mastery.

Erbaugh, Kibwaka and Donnermeyer (2007) also found knowledge gaps for half of the extension workers they investigated on the adverse effects of pesticide use. They observed that extension workers struggled to explain the concept of integrated pest management when asked to use their own words. In the end, the researchers found evidence that differing knowledge levels influenced the motivation to train and learn. Those with higher knowledge valued what they knew, more than those who had lesser knowledge. This finding has an impact to the extension agent's clientele. Without improving the value and relevance of the agriculture messages as it is received from the scientific community, extension workers would likely defer from understanding and sharing these messages during interaction with farmers.

Apart from the aforementioned need for knowledge, extension workers also need to have enough extension experience. In Iran, for example, 80% of the surveyed *experienced* veterinary workers were found to have a weak link with farmers (Rezvanfar et.al, 2009). Twenty percent (20%) of the extension staff had *never* conducted a field visit and 16% had *never* entertained a farmer in their local office. Dismally, almost half (45.7%) have not used print extension and educational materials in their work and very few (5%) have conducted seminars, workshops or trainings to impart livestock innovations (Rezvanfar et.al, 2009).

Even China, classified as the world's largest extension system, is confronted with challenges of extending agricultural information. The educational levels of their extension staff needs improvement since only seven percent (7%) finished college and

only 17% possessed technical degrees (Bartholomew, 1994). Another gap in the extension workers' education and training were seen in South Africa, where even the agriculture educators lacked the necessary practical and business-oriented knowledge and skills. As a result, the agriculture graduates lacked technical knowledge on production, engineering, economics and veterinary medicine (*DAFF Report*, no date).

Clearly, in spite of their important role in empowering the farmers and other agriculture stakeholders, extension workers are faced with personal and work-related challenges. To be more efficient in extending public services to the farmers and other stakeholders, extension agents also need appropriate knowledge, skills and experience.

As the first two sections in this chapter outlined, the farmers' and the extension workers' conditions need improvement. As with any other management perspective, the steps towards improvement should be guided by appropriate evaluation. However, evaluating extension, as the next section discloses, is not an easy undertaking.

C. Evaluating Extension

The evaluation activity is generally appreciated for its ability to underscore areas for management improvement and show the intervention's effects (Chapman-Novakofski et al., 1997). Demands for evaluation may arise from social, economic or institutional needs. For private firms, the interest to evaluate is driven by how the positive effect of the intervention such as an employee's training justifies the cost of spending. For development planners, evaluation is needed for clearer value judgments especially when deciding the change or cessation of a particular intervention (Dahiya and Jha, 2011: 11). Recently, especially among funding agencies, evaluation is paramount in its ability to

show transparency and accountability (Donnellan and Montgomery, 2005; Akyoo, 2008 and UN-FAO, 2012)

In pursuit of organizing extension evaluation aims, Okwu, Obinne and Agbulu (2006) in the *Journal of Social Science* enumerated seven major models of evaluation. All seemingly cater to the concerns of the extension offices and the farmers in varying degrees:

1. *Attainment of Objectives model* - Gathers data specifically to validate if the program goals and objectives have been met. This model is limited by the tendency of programs to set lowered goals and negates the intricacies of the processes involved in extension work.
2. *Goal-Free model* - Evaluators' task is to uncover the actual situation of the farmers reflecting their interests and extract from it the results brought by the extension program. The uncovered context serves as the starting point for program changes.
3. *Expert model* - As the name implies, requires the experts to come in, interview and analyze project documents and compare them to a set of predetermined standards. The experts judge the program's success and points for improvement.
4. *Experimental model* - Determines whether learning accomplishments can be attributed to the intervention itself. Causality is determined most often through observing experimental and control groups or sites.
5. *Management decision model* - Provides information for decision-makers at each particular stage of the program throughout its initiation, operation and termination or possible continuation.
6. *Participatory evaluation model* - Assumes local autonomy where both extension workers and farmers reflect on the merits of the program and their own activities.
7. *Naturalistic model* - Aims to understand how the program operates in situ or its natural setting where evaluation is treated as a "value-laden negotiation" (33). This model involves the diagnosis of what caused a particular behaviour for all actors involved in the program.

The authors pointed out that each model has its own strengths and weaknesses. As a guide however, evaluation should consider *how* the learners experienced the intervention, *what* they did actually learn, as well as the *attitudes* and *behaviour* changes that resulted.

In spite of its apparent rewards, evaluation still seems to be an option rather than a necessity in the field of extension.

In example, resistance towards the use of evaluation tools were found for nutrition extension agents, who were worried about their client's literacy and time constraints. Others mentioned the dearth of financial resources and manpower as reasons for non-evaluation (Chapman-Novakofski et al., 1997).

Evenson (in Swanson, Bentz and Sofranko, 1997) meanwhile admitted to the difficulty of measuring the effectiveness of extension programmes due to the diversity of contextually-specific factors. That is, the improved performance of farmers could also be due to his/her characteristics and the conditions they are situated in.

Nevertheless, some researchers have managed to identify a few indicators of extension's effects.

1. Yield and Profit

Increase in yield was one of the indicators researchers used to determine extension's impact. In the case of grape producers in Argentina, a 30% increase in productivity was attained for extension beneficiaries (Cerdan-Infantes, Maffioli and Ubfal, 2008). Meanwhile, cotton farmers in Turkey attributed a 56% production growth in a span of three years, due to extension services received (Amin and Stewart, 1994).

Evenson and Mwabu (1998) also used the concept of productivity. While reiterating the difficulty of measuring extension's effects, their study concluded that extension, as measured by the stationing of extension staff in a particular area, helped increased yield**.** This was consistent with Schultz's (1975) earlier hypothesis that

knowledge obtained from either formal or informal instruction enhanced farmer productivity.

Closely related to the productivity indicator is economic gain, but its use in evaluation is infrequent, due to the difficulty in measuring pre and post intervention conditions. One study that managed to incorporate an economic aspect is that of Noor and Dola's (2005). The study revealed that not only did the farmers judge the training received as "very suitable" (81%), and "effective" (80%), in making them "better" farmers; more than half (67%) also reported improved monthly revenues. Statistical testing confirmed a positive correlation between knowledge, skills and application, and the improved productivity post training. However, such finding, according to the authors, should not be confused with causality. Data gathered from field could not confirm if the training in itself caused the overall changes in knowledge, skills and application. In the end, what is commendable in Noor and Dola's study is their awareness that measuring extension effects in a 'uni-linear' fashion would not be enough to capture training outcomes.

Herdt and Capule (1983) are of the same opinion, saying that "getting the complete picture is more complex than simply comparing yield" (18).

Though economic returns from higher production have been felt by farmers, it was not evident *how much* of an increase could be credited to the particular technology extended, or if there were complementary factors, such as higher labor, fertilizer inputs or land improvement.

2. Change in Knowledge

Rather than focusing on yield or economic return, some extension evaluators opted to consider extension in the context of education and learning. This brought on the use of change in knowledge as a peg for extension effectiveness.

Three studies are noted for its evaluation of an agriculture-based curriculum.

First is the research of Boleman and Burell, Jr. (2003), where the students' knowledge levels on the role agriculture plays in their daily lives increased, after participating in a science fair. While teacher-respondents also adjudged the intervention as helpful, they also felt wary of sustaining awareness, as their school did not have a curriculum on basic agriculture.

The second study by Wagler et al. (2008), found significant improvements for eight out of nine items about pig production. Additionally, participant demographics somehow influenced the change in knowledge. Individuals with experience in farm work or pig raising and those who belonged to agricultural clubs, gained more knowledge, than those with no farm or club experience. Aside from these knowledge gain findings, the researchers also opined that long-term knowledge is more beneficial than short-term knowledge. Consequently, evaluation upon return to the area of assignment, rather than immediately post-intervention was recommended.

Third, an evaluation of a training program by Wortman et al. (2005) found that knowledge and skills (i.e., farm planning and implementation, map preparations and land estimations) increased after extension. On the other hand, despite participation, knowledge transfer for the more technical aspects (i.e., farm record and nutrient

management, projection and calculation) was frail, with the majority of livestock farmers admitting that they would still need continuous technical advice.

At this point, it should be emphasized that mere knowledge increase is not suffice for both extension workers and farmers. A desirable change in knowledge should involve "knowing what, knowing how and knowing with"; where *knowing with* denotes an individual's accumulated knowledge and experiences used to perceive, interpret and judge current and succeeding situations (Abbad, Borges-Andrade and Sallorenzo, 2004: 283).

Once the desired knowledge change is gained, it should be fostered. Towards this end, Grudens-Schuck, et.al (2003) expounded Wagler et al.'s assertion about long-term knowledge and suggested that sufficient time be given during teaching, so that the new knowledge imparted could be effectively integrated with the participant's prior knowledge. Grudens-Schuck, et.al posited that the farmers' knowledge base, which could be correct, incorrect or just incomplete, could hinder the desired knowledge change. Therefore, the authors recommended that extension recipients undergo an active unlearning process, so knowledge and behaviour change could occur.

Aside from the individual's knowledge base, certain conditions could also hinder or facilitate knowledge gain. Business management and education studies confirmed that physical conditions of noise, hotness or humidity, and social conditions like supervisor support and gender relations somehow influenced learning (Grudens-Schuck, et.al, 2003; Lim and Morris, 2006; and Perryer and McShane, 2008).

3. Change in Practice

Ideally, the imparting of knowledge through extension leads to a more favourable attitude and actual practice, referred to as adoption (Rogers, 1995).

As an example, Tesfaye, Karippai and Tesfaye's (2010) study on the effects of an agriculture training program found that aside from adding to knowledge, it also increased the farmers' receptiveness towards the crop technologies introduced. Practice was also shifted from traditional to a more scientific approach to crop production.

Amin and Stewart's (1994) study also used adoption as a measure of effectiveness. Majority (91%) revealed that they have, in some form or manner, applied the recommended practices learned during training. All possessed a positive attitude towards the extension program received. Interestingly, an association between yield and application of knowledge learned was also found.

However, adoption is not always guaranteed. In example, profit-based factors discouraged technology adoption (Marsh, Pannel and Lindner, 2004). This means that extension agents should weight the profitability that the innovation promises *vis-a-vis* the investments needed to put it in place. In conjunction, Shahin's (2004) research on Egyptian dairy farmers described the small farmers as 'pragmatic' individuals, hesitant to adopt an innovation which required high capital but offered low utility.

Aside from profitability and pragmatics, the farmer's education, gender, farm/herd size, the availability of extension services, former training received and mass media exposure also influenced adoption (Shahin, 2004 and Bonabana-Wabbi, 2002). In example, an Australian study on farm and business practices found that individuals with post graduate degrees and those who received training within the last three years were

29% more likely to change current practices (Kilpatrick, no date). Their need for learning also increased, with 90% who signified the likelihood of participation in future trainings. Kilpatrick's study also uncovered links among knowledge, its practice and profitability. Those who trained and made appropriate changes contributed 64% to farm profit compared to only 6% of those who neither trained nor made changes. This study also pursued the reason behind the occurrence of *status quo*, and discovered that some individuals simply did not employ any change because such knowledge and practice extended merely 'reinforced' what they already know and do.

The timeliness of the evaluation activity would also play a part in the application of knowledge learned. Blume et al.'s (2009) robust review of 89 *transfer-of-training* studies found that the time lag post-training inversely influenced knowledge, self-efficacy and transfer. Over time, the lessons learned from training declined. Another important finding was that the nature of the skill being taught also affected knowledge integration. *Open* skills, or lessons with no strict wrong or right answers (such as leadership and management), had more likelihood of transfer than *closed* skills, or skills which required strict identical transfer (such as learning how operate a computer program).

In terms of building self-capacity and sustainability however, an individual's ability to recall content is "neither a necessary nor a sufficient condition" to the transfer of knowledge (Abbad, Borges-Andrade and Sallorenzo, 2004: 281). Successful knowledge integration should be judged in terms of how new knowledge and skills are applied in work and life, in differing conditions and task demands (Woods in Tladi, 2004). Barring outside influences, the lack of adoption may also be caused by the innovation's unsuitability to local conditions (Shahin, 2004).

4. Knowledge Sharing

Aside from using productivity, profit, change in knowledge and practice, some researchers also looked at the individual's knowledge communication activities as another indicator of extension effect.

While the act of communicating agriculture knowledge is seen as simpler and least costly (i.e., as opposed to the resources required for a change in farm practice) challenges, both at the individual and social level, still persist.

a. The Farmer's Knowledge Sources

Generally, farmers source agricultural knowledge from traditional broadcast (radio and TV) and print channels as well as interpersonal interactions (extension worker and family members). Small farmers in particular usually learn from their community, through the interactions with family members and neighbours. In some areas, church and community group meetings, as well as agriculture company events, have been venues of knowledge sharing (den Biggelaar, 1996; Rees et al., 2000 and Rola, Jamias and Quizon, 2002).

However, farmers do recognize and admit the need for professional and technical assistance received in a face-to-face context.

When made available to them, farmers preferred personal interactions and trainings together with other farmers as avenues for learning. In fact, trainings have been proven to instigate changes in farming practice (Kilpatrick, no date). Also, Kenyan farmers ranked extension workers as the ideal or 'most important' information source but just a quarter reported to have joined an extension activity (Rees et al., 2000). In Egypt, a mix of knowledge coming from agriculture technicians and the mass media were found to

have a significant relationship with the practice of artificial insemination and parasite treatment (Shahin, 2004).

Over-dependence on one knowledge source though should be a cause for concern. Eissawy, Hagras and Radi (2007) found that farmers ranked the television as their top source of information about avian influenza, followed by the government, newspapers, the extension agent and training. This merits attention since risk information, especially those technical in nature, are understood better in a personal or localized manner.

Farmers experience limitations to obtaining knowledge. For instance, there is a weak communication link between the extension worker and the farmer (Rees et al., 2000 and Rezvanfar et.al, 2009). For small farmers, their financial and educational limitations further inhibit them from actively looking for information (Obidike, 2011and Aker, 2010).

In the same vein, Garforth and Lawrence (1997) believed that the farmer's tendency to obtain information from informal sources reinforced their resource-poor situation: that small farmers who are in dire need of information and technological inputs were the least likely to have access to such. This poverty-reinforcing supposition has merit, given that the informal communication networks the farmers belong to generally and logically do not transcend socio-economic boundaries.

b. Sharing Approaches and Limitations

Extension workers consider teaching farmers as their most important responsibility. Hence, they should be able to design, produce and communicate understandable, relevant and useful content with the farmer's resource-poor context in mind.

The farmers found it easier to share tangible resources (i.e., seeds) than to share technical knowledge and principles. Farmers sometimes perceived the knowledge and innovation being extended as complicated and abstract (Kiptot, et al.). Farmers also lacked the confidence to share what they know. They perceive what they know as inferior, compared to the extension agent's knowledge (Millar and Curtis, 1997).

It is in this light that alternative approaches to knowledge sharing were crafted. These extension approaches include: empowering peer farmers as resource speakers, fostering a laid-back/informal learning environment, avoiding the use of jargons and engaging the sharing of experiences and emotions (Grudens-Schuck et al., 2003; Millar and Curtis, 1997 and Barao, 1992). If possible, extension lessons then should be adjusted to allow actual application; not just depend on lecture and memorization. Finally, aside from imparting technical knowledge, receivers of extension activities should be emotionally prepared to face challenges in their work-life setting. Upon return to their own areas, they should be flexible and resolute in putting what was learned into practice (Carr, 1995 and Bonifacio, 1987).

While the aforementioned alternative approaches do enhance learning, extension workers also need to surmount personal and agency limitations to sharing. For one, the public sector's lack of funding for communication-education resources (i.e., projectors, laptops, printers, cameras) put the field extension agent at a disadvantage (Margono and Sugimoto, 2011). The dearth in resources also limited the acquirement of timely information that local farmers needed to enhance production and marketing. Rees et al. (2000) discovered that extension workers consciously limited their knowledge sharing activities for fear of distorting information from the scientific community. Related to this

extension agents, who take knowledge and innovation from a multitude of sources, were sometimes tasked to communicate competing practices (i.e., organic farming and pesticide use), thus creating confusion, misuse and ultimately, rejection (Sturdy, Jewitt and Lorentz, 2008).

In areas where struggle for political dominance exists, the extension agent is also put in a difficult position. They have to maintain good relations with the two opposing parties. At worst, they are overpowered, and their noble development agenda become politicized, with local chiefs taking the helm of selecting beneficiaries and overseeing tasks (Bartholomew, 1994 and Anderson and Feder, 2004).

c. ICT: Expectation and Reality

Because of their popularity and proliferation, Information Communication Technologies (ICTs) were envisioned to fulfil extension's goals. ICTs would not just aid the acquirement of information, but also its production and sharing (Kobusinge, 2009). The new media allows proactive information use, reduces the time, effort and distance of information sharing and to a larger scale, upends the 'top-down' mentality of knowledge spread. In the Philippines, India and Thailand, ICTs' potential to connect farming communities are being studied by way of e-learning centers, with low-cost internet connectivity combined with mobile phone technology (Singh, 2006).

However, ICTs so far have fallen short of such grand expectations. Extension agents found constraints in applying ICTs to their designated areas of service. A main hindrance was the low, if not the absence of, technical knowledge for its proper use and maximization. There was also a lack of funding for infrastructure building and maintenance (Ovwigho et al., 2009). Since a good number of extension agents have

limited access to ICTs, they tend to not use this channel in their extension and knowledge sharing to farmers.

Each communication medium has its own strengths and limitations. While previously cited studies revealed a certain preference for traditional and interpersonal communication, extension agents should recognize that these have limited audience reach. On the other hand, ICT systems require preparation, both in the extension worker's capacity to use it and in the provision of equipments. Depending on its goals and audience then, a good mix of traditional and new media should be employed for extension activities (Singh, 2006 and Dilworth, 2010).

d. Occurrence of Non-Sharing

Aside from the lack of technical knowledge and resources, an important yet confounding scenario is the knowledge 'non-sharing' or 'non-transfer' of extension participants. This goes against the assumption that farmers, who had not participated directly in an extension program, could still gain needed knowledge through their peers (Tesfaye, Karippai and Tesfaye, 2010).

Intriguingly, 'non-sharing' of learned knowledge do occur. In the case of Rola, Jamias and Quizon's (2002) study of knowledge retention and sharing of Farmer Field School (FFS) participants in Iloilo, 'non-sharing' were attributed to the abstractedness of the lessons learned. The farmer's context could also account for the 'non-sharing'. While the closed-setting of the FFS afforded both theoretical and practical learning, the participant's farm situations did not. Additionally, the participants themselves could have been situated outside the farmer's network within their community, since most were women. Given their disempowered status (i.e., not house hold or farm decision-makers),

they were less likely to be valued as credible sources of technical information by fellow farmers. Lastly, the researchers speculated that the knowledge learned still needed more time to seep through in the field-setting, from the actual participants, to other farmers and informal channels. These findings led to the conclusion that the FFS approach could not be solely relied on to communicate new knowledge to local communities.

Citing earlier studies, Blume et al. (2009) pointed out that the choice not to transfer – whether through on-the-job practice or through sharing – would be a probable move for individuals who encountered uncertain outcomes. Radical perspectives in knowledge and learning beg the recognition of the idea that knowledge integration is a conscious individual choice (Carr, 1995 and Bonifacio, 1987). If this is the case, extension programs follow a 'dialectic' process, where "knowledge and meanings are created through interactions" (Carr, 1995: 202). Considering this, the extension-participant's reasons and choices, in the process of directly adapting or customizing what was learned, merit future study.

D. Synthesis

Both farmers and extension workers have a critical role in advancing rural development. Despite these roles, farmers continue to be one of the most disadvantaged sectors in our society. In order to make better farming decisions and manage work risks, their knowledge, skills and capabilities need to be enhanced. Farmers also need to be equipped with an enterprising spirit in order to be an active market player.

At the core of extension is the desire to fulfill these imperative farmer needs. As communication practitioners, extension agents should be proficient in imparting relevant

knowledge and innovations, through approaches that are considerate of their audience's situation (Arcury et al., 2002; Hargrove and Jones, 2004 and Parry et.al, 2005).

Yet, field extension workers also face personal and professional challenges. As found in previous studies, extension workers feel dissatisfaction with their competing task assignments, low salary compensation, unresponsive clientele and the lack of work-life balance (Thomson, et al., 1987 and Ensle 2005).

The formal education system, from which extension workers acquire their competencies, cannot be the sole source of agriculture information. Its graduates lament this system's lack of timely, practical and relevant lessons, with some courses judged to be too theoretical. This resulted in knowledge gaps, as well as the inability to cope when faced with practical and enterprise-related issues in the field-setting (DAFF Report, no date; Tladi, 2004; Erbaugh, Kibwaka and Donnermeyer, 2007; and Rezvanfar et.al, 2009).

With these challenges, both the extension workers and the farmers stand to gain more from alternative learning opportunities that extension programs offer. In the livestock sector context, both extension staff and farmers stand to benefit from the training courses on pig raising that the ATI-ITCPH offers.

The research literature as cited above clearly highlights the merits of evaluation to determine effectiveness of agriculture extension interactions. Moreover, lessons learned by various studies point out that evaluating extension is not an easy undertaking, given myriad recipient, source and environmental factors.

Consequently, this study focuses on five indicators of effectiveness from the research literature which are most relevant to the case of the ATI-ITCPH. These are: yield, profit, knowledge change, change in practice, and knowledge sharing.

Yield and profit have been used to adjudge extension's effectiveness. Schultz, (1975), Noor and Dola (2005), among others, confirm that participation in extension activities contributed to the participants' increased productivity and income. Nevertheless, caution needs to be exercised in using this quantitative indicator. Intervening factors like cost of inputs, marketability and farm improvements made outside of the intervention could as easily account for the received profit and produce.

Since extension goals involve the communication of new knowledge, researchers gravitated towards the occurrence of knowledge change post-intervention, as a peg for success. This study highlighted one research (Grudens-Schuck, et al., 2003) that accounted for the possibility that the recipient's knowledge base pre-training has affected the way new knowledge was accepted. The timeliness of the evaluation and the importance of long-term knowledge gain were also mentioned.

Closely related to knowledge change is the change in practice. Previous studies found a positive relationship between knowledge gain and its application but this was considered as an individual's option and not a guarantee (Marsh, Pannel and Lindner, 2004; Shahin, 2004, Tladi, 2004 and Tesfaye, Karippai and Tesfaye, 2010). Not only was adoption influenced by the nature and cost of the innovation espoused, it was also dictated by the recipient's socio-demographics (Kilpatrick, no date; Shahin, 2004; Bonabana-Wabbi, 2000).

Lastly, knowledge sharing was also an indicator of an extension's success. This was based from the assumption that agriculture knowledge gained was exchanged over time, as extension workers and farmers took part in agriculture knowledge exchanges in the field setting (den Biggelaar, 1996; Rees et al., 2000 and Rola, Jamias and Quizon, 2002).

However, sharing knowledge, whether in the traditional or new media format, was hindered by various personal and environmental constraints (Rezvanfar et.al, 2009; Obidike, 2011and Aker, 2010).

This research perceived the difficulty of assessing agricultural extension in general, and training in particular, as a knowledge gap that should be reasonably addressed.

With its decreasing budget trend, increasing world population and the continuous marginalization of rural folks, the refinement of extension programs through evaluation is crucial. The ATI-ITCPH's initiative to monitor and evaluate their courses is an admirable government effort. It should be enhanced, in order to provide a clearer picture of their participant's gained knowledge and how it fared against field realities.

This evaluation study took cues from the previous studies of learning integration, as exemplified in the changes in knowledge, its practice and sharing. This research brought the essentiality of relevant agriculture knowledge at the forefront, through its audience-centered approach. It determined the current pig raising knowledge base of participants and how knowledge gained from training were taken, adjusted, used and shared towards finding solutions and making better decisions (Millar and Curtis, 1997 and Del Castello and Braun, 2006).

Considering the various recipient and environment factors present, this research took into account participant traits to be measured against knowledge integration concepts. The factors that precipitated or inhibited the integration of the lessons learned have also been given attention.

Because knowledge – its gain, practice and sharing – is this study's focus, the employment of Knowledge Management as a framework for strategic communication evaluation is justified, as expounded on the next chapter.

III. FRAMEWORK OF THE STUDY

This chapter discusses Knowledge Management, its theoretical and conceptual underpinnings related to its production, validation and integration. It aims to emphasize the fact that KM is more than a current "buzz word", but rather a legitimate field of study which evolved from an amalgamation of theories from the field of the sciences and the humanities. As a growing field of study, there are only few studies so far that linked KM with the field of communication. But, as the discussion below underscores, considering KM within the field of communication is crucial, particularly in determining the ways knowledge change and how knowledge is put into use and shared to others.

A. Theoretical and Conceptual Roots

As mentioned earlier, this research study utilized a Knowledge Management framework to assess how the knowledge learned during training fared in the field setting. While KM is a relatively new field in organizational learning, some researchers realized that it possessed theoretical underpinnings in the established fields of sociology and biology. Two of these KM underpinnings which helped this study are covered below.

1. Complexity Adaptive Systems (CAS) Theory

Scientifically, KM is influenced by the Complexity or Complexity Adaptive Systems (CAS) Theory under the domain of biology. Its assertion is simple: given time, all living systems "self-organize" and adjust individually or collectively to the changing conditions of their environment. The CAS theory distinguishes the capacity of organisms to maintain, process and produce new forms of behaviour based on a stimuli (Cleveland,

1994). As a highly-evolved living organism, human beings, through conscious and unconscious knowledge and actions, successfully adapt and prevail.

This theory's recognition of one's ability to learn and exchange information attracted KM advocates because it encouraged a *naturalistic* approach to studying the ways people act. Rather than viewing human beings as machine-like, the CAS theory valued *autonomy*. An individual interacts with others, but also could opt to leave their individual functions intact. People as free agents can also propagate "groups within groups", each group capable of developing their own set of rules and behaviour (McElroy, 1999a: 8).

Such assertions were found to be applicable with the study of human communication. Management practitioners used the *adaption* concept to view knowledge and learning within organizations. Like biologists, social scientists sought to understand how knowledge is formed at the individual level and how it rises to the collective level through its communication. With CAS theory, insights on "how knowledge happens" in human systems were generated (8).

2. Structuration Theory

Another theoretical underpinning of KM, this time in the field of sociology, is the Structuration theory espoused by Anthony Giddens during the late 1970s. This theory asserts that there are structures present in social life. Human agents in turn are influenced by the structure of the system they belong to. As a result, people "recursively reproduce" these structures. That is, structure is produced and reproduced simultaneously into social dealings and at times, it constrains actions. Recurring social practices comprise social

systems and an individual's actions are interdependent of another's (in Timbrell et al., 2005).

Giddens' Structuration theory appealed to KM researchers since at its heart, it espouses the *duality of structure*: rules and resources constrain human actions but, at the same time, these structures are also maintained or altered by human actions.

This theory also asserted that communication, power and sanction factors characterize social interactions. The concept of communication is guided by the structural properties of signification, power is enhanced or limited by the concept of domination, while sanction is guided by legitimation. Solomon (2000) expounded that human beings use interpretive schemes in the transfer of meaning during communicative acts (signification). Humans also exercise power in their actions and resources (domination) but, they also present deference to norms (legitimation).

It is vital to understand that knowledge as a concept is differentiated by many KM theorists from information. The latter refers to what is found in awareness or educational materials while the former is more personal and beneficial. Knowledge is information that "has been seen through the human looking glass" (Trushinki, 2010: 2). KM scholars described knowledge as the summation of human experiences, interpretations, reflections and contexts.

3. The Concept of Communication in Knowledge Management

Aside from discussing the theoretical underpinnings of KM, it is also important to mention that this study's approach of applying a KM framework into an extension initiative was inspired conceptually by the K-AgriNet's evaluation conducted by Pernia and San Pascual for the DOST-PCARRD.

The authors in the said study asserted that KM in fact *is* strategic communication. As a KM tool, it sheds light to the distinct advantages of ICTs in its faster and far-reaching information delivery capacity. At the same time, K-AgriNet is a communication strategy in its development of agriculture information packages and consequent capability building outcomes.

Pernia and San Pascual also used the concepts of old and new KM, with partiality to the new KM where knowledge is a user-oriented concept. That is, the stakeholder's use of K-AgriNet gives importance to the *intentionality* aspect of communication, where there is a deliberate and interactive conveyance of insights, experiences and skills. The authors also saw the ICT tool they were investigating as engaged in a "multi-loop" process, where knowledge integration was extended to second and tertiary beneficiaries.

In essence, what was unique in the study of Pernia and San Pascual was the way communication took its rightful place in the knowledge cycle process that it is through communication that knowledge is linked with individual development. Surprisingly, there are only a few KM studies (Alavi, 2000; Davenport and Prusak, 1997 and Remigio and Saubon, 2011) which incorporated the concept of communication, let alone studies which attempted to move communication from the fringes to the center, as done by Pernia and San Pascual.

Robins, through his observation of KM literature for two years, lamented that communication is a "lost child" that had no identity in the KM sphere. He said that both communication and KM should be seen in a new light, where they not only learn "from each other" but "learn together" in encouraging horizontal, more democratic knowledge interactions (www.kwork.org). Communication, whether informal or formal, is vital in

how knowledge is integrated and shared within a particular group (Mengis and Eppler, 2005). Seen from a macroscopic perspective, communication supports agricultural growth through the effective management of knowledge and capacities of farmers, extension workers and other livestock stakeholders (FAO/GTZ, 2007). Management expert Peter Drucker was able to put it succinctly: "Management is Communication" (in Lurati and Eppler, 2006).

4. The KM Generations and Knowledge as a Process

a. First Generation KM

Early KM advocates focused on knowledge production's capture, codification and sharing. This first generation KM subscribes to the idea that the effective capture and documentation of knowledge "lead to superior performance: organizational creativity, operational effectiveness and quality of products and services" (Wiig, 1993: xv). It is KM that is concerned with "all about getting the right information to the right people at the right time" (Firestone and McElroy, 2003: 12).

Critics however denounced this KM generation for being too *technology-centric*, just another buzz-word for document or information mining and management. With such focus on distributing existing knowledge throughout the organization, it could not be helped that the first generation KM heavily relied on technology to search, retrieve and transfer knowledge in order to increase performance.

One of the critics of this technological turn for KM is Probst, who said that KM "must integrate human beings, and human beings do not externalize their knowledge in computer systems, but need personal contacts and discussions" (in Little, 1998: 22).

Koloskov (2010), also a critic of first generation KM, said that there should be "knowing in practice" (7). KM should have a social-constructivist view. Knowledge and practice are intertwined concepts and that an individual's capabilities cannot just be treated as 'fixed stocks' that can be readily deployed at command. Eschewing the complicated knowledge management tools (i.e., computer programs) touted by the industry, Koloskov asserted that since knowledge and practice reconstitute each other in a constant manner, all information materials, even something as simple as a post-it, could be considered as a KM system. Instead of standing out, Koloskov believes that KM tools should seamlessly blend into human interactions.

Another criticism on first generation KM is in its presumptuous treatment of knowledge. Early KM assumed the existence of knowledge or practice but do not endeavour to understand and consider the circumstances with which knowledge came about (Cavaleri and Reed, 2001).

b. Second Generation KM

Aware of such techno-centric KM view and the negligence of the humanistic aspects of knowledge transfer, Mark McElroy (1999b) presented a new KM approach dubbed as the second generation KM. In contrast to its predecessor, this KM is demand-driven. It aims to enhance the capacity of individuals to not only transfer knowledge, but also to recognize that “knowledge is not only something we share, but also something we make” (Firestone and McElroy, 2002: 2). Second generation KM strives to accelerate the production of new knowledge, actively look for opportunities to enhance creativity and innovation. This type of KM is concerned with broadening learning capabilities and not just prescriptive knowledge transfer.

McElroy (1999a) adapted the concept of *double-loop learning*, coined by Chris Argyris in 1991, to further distinguish first and second generation KM. *Single-loop learning*, as per Argyris, is concerned with the maintenance of *status quo*, advocating actions through self-reference or performing "codified procedural knowledge". In contrast, *double-loop learning* invokes knowledge through "active constructions of alternative scenarios" where knowledge is validated in practice (2). This means that an individual has the agency to decide whether the learned knowledge could replace existing knowledge or choose to hold onto what they previously knew.

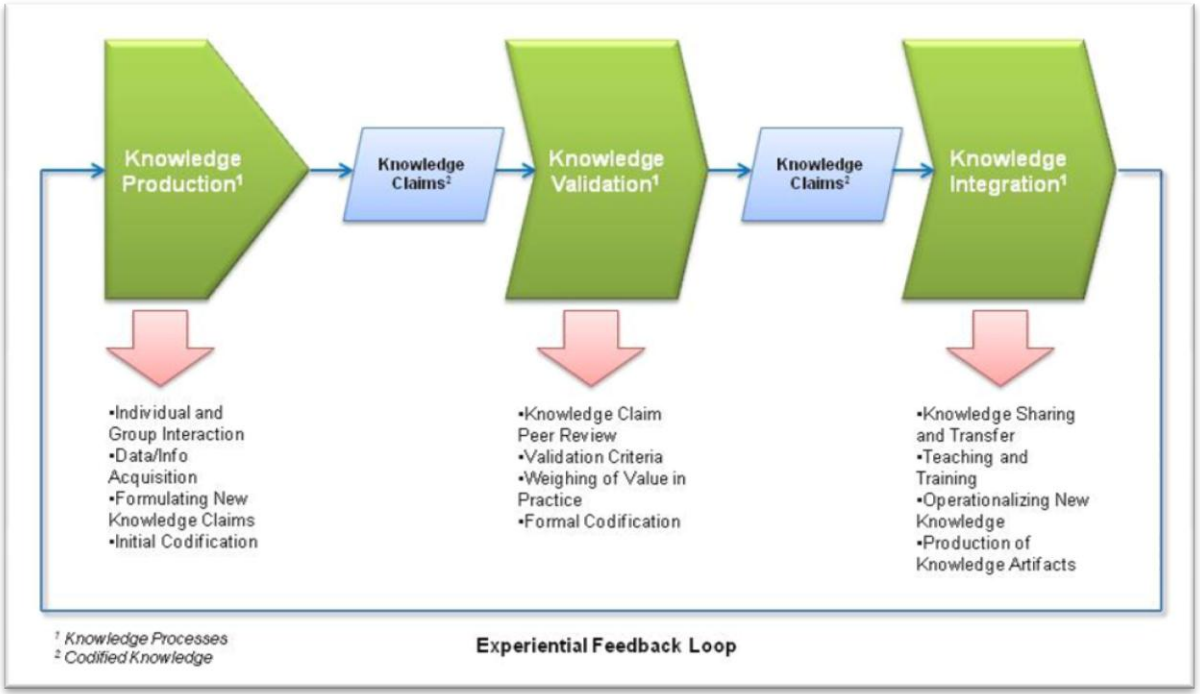
In essence, double-loop learning occurs in either the acceptance or challenging of the knowledge learned. McElroy was able to bring back KM to its theoretical roots with his use of the concepts of adaptation and agency. Human beings actively maintain knowledge. When the situation calls for it, individuals employ a new set of knowledge. Through practicing agency, old or inferior knowledge gives way to newer, more successful thoughts and actions (McElroy, 1999b).

c. Knowledge as a Process

Second generation KM advocates value knowledge as a process that has three phases. The first phase, *Knowledge Production*, refers to the process of creating new knowledge, ideas, insights or innovations as obtained from people and other sources. *Knowledge Validation*, the second phase, refers to the process of testing, whether formal or informal, the knowledge claims and deciding if such claims are true and valuable. The last phase, *Knowledge Integration*, is concerned with the introduction of new knowledge claims and the replacement of old ones.

Figure 1 in the next page shows the Knowledge Life Cycle of McElroy.

Figure 1. *The Knowledge Life Cycle*



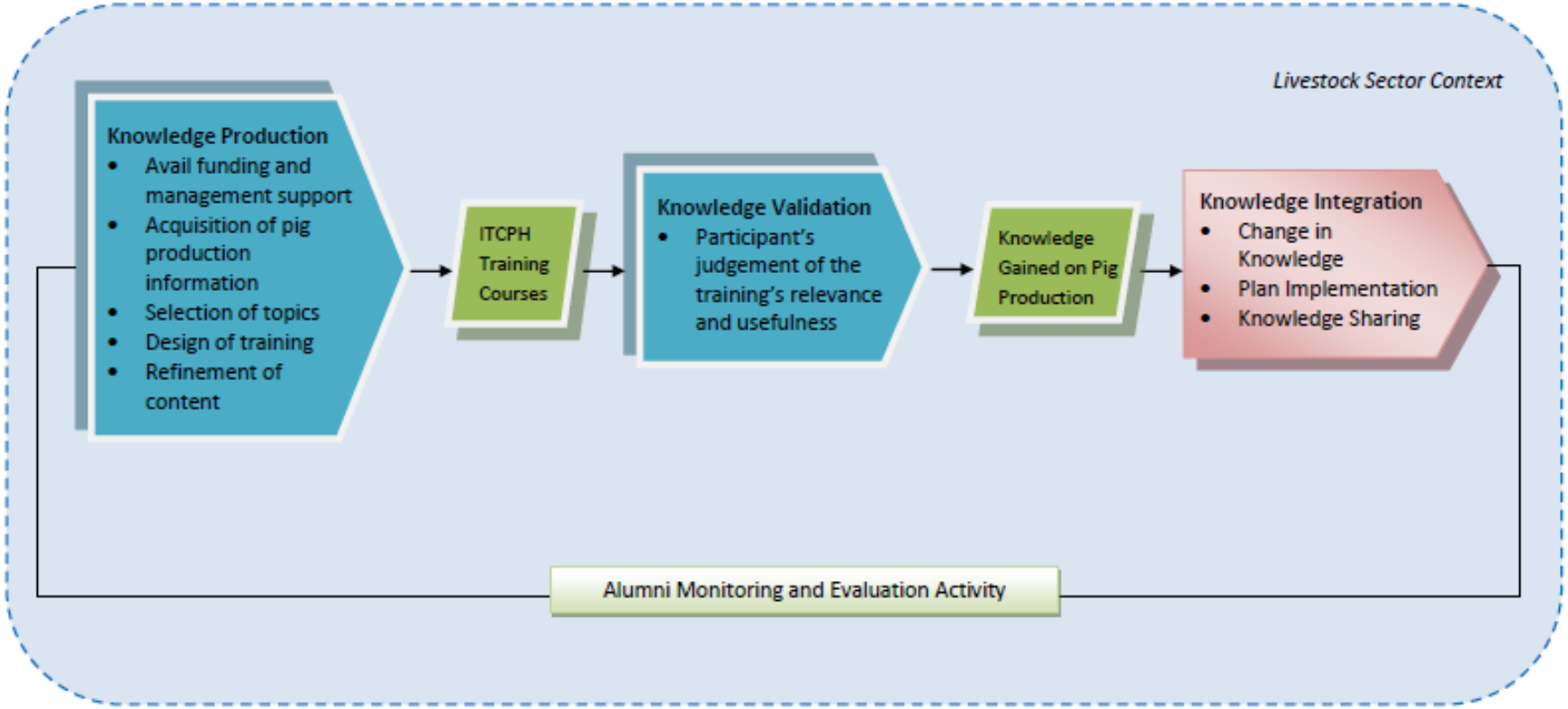
Source: *McElroy, M. 1999a. Double-Loop Knowledge Management. IBM Knowledge Management Consulting Practice.*

The Knowledge Life Cycle asserts that new knowledge is *produced* through the process of interactions of individuals and groups. Knowledge claims undergo *validation,* and when deemed as advantageous, are *integrated* in an individual's beliefs and actions. Further, integrated knowledge claims reflexively inform the production of new knowledge. These three phases, according to McElroy, occur simultaneously within a specific KM system.

d. The ATI-ITCPH Knowledge Life Cycle

The tenet that knowledge be treated as a process and the three integral phases of production, validation and integration fit seamlessly into the ATI-ITCPH's context and how the Center and the participants play their parts in the Knowledge Life Cycle, as illustrated in Figure 2.

Figure 2. *The ATI-ITCPH Knowledge Life Cycle*



Applying the three phases of the knowledge life cycle discussed above, the ATI-ITCPH's *Knowledge Production* phase (1st pentagon) comprises the acquisition of knowledge from various educational and research institutions (i.e., University of the Philippines Los Banos (UPLB), Barneveld College of the Netherlands). The country's pig production data meanwhile are obtained from pig raisers, extension workers and other practitioners. From these sources, pig production knowledge are considered and collated as inputs in the Center's training courses. The ITCPH staff *codifies* such pig production knowledge in the form of training modules and other teaching aids.

The *Knowledge Validation* phase (2nd pentagon) occurs when the course participants learn the codified pig production knowledge through the lectures and exercises administered by the ATI-ITCPH staff. The participants consider the knowledge imparted to them in terms of its value in their work or enterprise.

The last phase, *Knowledge Integration* (3rd pentagon), underscores how the training participants facilitate double-loop learning.

First, it encompasses the change in pig production knowledge. As mentioned in the previous chapter, extension efforts have been evaluated through an array of concepts. But, given that extension is closely tied with the concept of learning, noting the change in knowledge is a good measure of impact.

Second, it involves changes in practice, particularly in enacting the re-entry/action plans drafted during training.

Third, aside from changes in knowledge and practice, knowledge integration is also indicated by the participants' sharing of pig production information with others.

The Knowledge Integration phase is linked to the Knowledge Production phase through a *Feedback Loop Mechanism.*

For the ATI-ITCPH, this takes form of their *Monitoring and Evaluation activity* where the alumni's feedback and the observations of their technical staff further inform and refine the design and conduct of training.

The Center's Knowledge Life Cycle exists within the *context* of the livestock sector. The broken lines used as the border for the said context suggests permeability, that the ATI-ITCPH Knowledge Cycle is an open system. As such system, changes in the agriculture environment it belongs to may influence its phases of production, validation, integration and feedback.

e. Knowledge Integration as Focus of Evaluation Study

While the three phases of the ATI-ITCPH knowledge life cycle are equally important, this research's aim to evaluate the impact of training necessitates that special focus be given on knowledge integration.

The knowledge integration phase is the venue where the learned knowledge and skills are tested. This is where the individual transforms from being a mere knowledge *recipient* to a knowledge *manager*. Knowledge integration is where the "take-away' from the extension intervention – the cognitive, attitudinal and behavioral changes – meet with *structure*, in this case, the social, political or market forces present within the field context.

Given that the ATI-ITCPH is the premier pig production extension arm of the Department of Agriculture, the Center's knowledge integration phase is a mature venue

for measuring how the training-extension efforts changed the alumni's knowledge, how it has been adapted, enacted and shared in their own situations.

The next section details the measures used in investigating knowledge integration.

B. Operational Measures

Three general operational measures of the ATI-ITCPH alumni's knowledge integration of pig production knowledge learned from training are investigated and expounded in the next three sub-sections.

1. Knowledge Change

Cavaleri and Reed (2001) opined that an individual's knowledge moves from something doubtful into something that has been "widely understood as have been proven, some in the process of being proven and others are relatively unproven or discredited" over time (45).

This research modified such knowledge change concept, together with the observations of Boleman and Burell, Jr. (2003), Wortman et al. (2005) and Wagler et al. (2008) into knowledge gain, replacement or reinforcement.

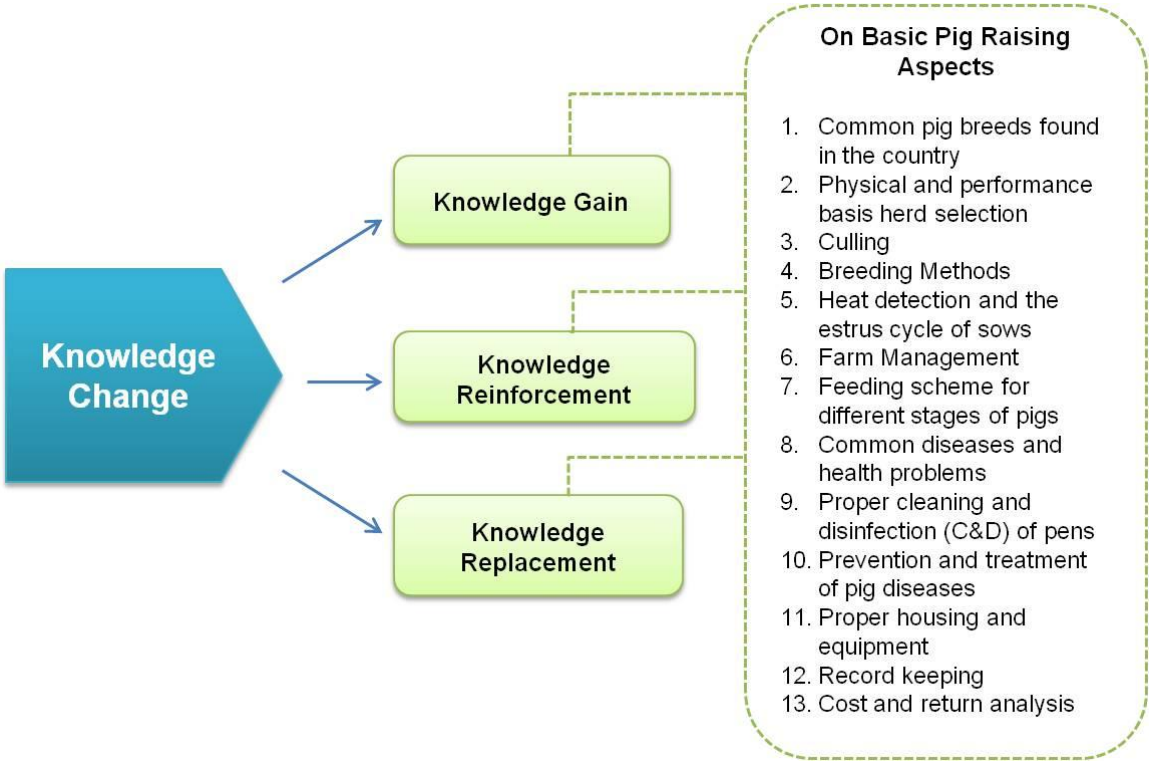
Knowledge *gain* was observed through the computation, ranking and comparison of the mean differences between the alumni knowledge *before* and *after* training for the 13 basic aspects of pig production. It should be noted that these aspects, covered during training, are essential in the establishment and maintenance of a successful pig enterprise.

These knowledge ranks and differences were also explored qualitatively, through looking at the experiences and insights of the alumni. Aside from its ranking, *gain* was also classified as knowledge that was unfamiliar to the participants prior their training experience and *replacement* accounts for instances when the participants opted to let go

of their previous pig raising knowledge in favour of the knowledge learned from training. *Reinforcement* on the other hand accounts for the possibility that the participant may already possess prior knowledge and that the course lessons merely complemented what they already knew.

Figure 3 presents the operational measures of knowledge change, as the first concept investigated for the alumni's knowledge integration post-training.

Figure 3. *Operational Measures of Knowledge Change in the ATI-ITCPH Case*



This figure guided the determination of which type of knowledge change (gain, reinforcement or replacement) had been experienced for the 13 aspects considered after the ATI-ITCPH training.

2. Plan Implementation

A change in knowledge for the learner ideally entails a change in practice. Hence, aside from its change, Knowledge Integration was also observed through the alumni's *Plan Implementation.*

Investigating implementation and the context in which it occurred is vital since knowing something does not guarantee its manifestation in practice (Estabrooks in Sudsawad, 2007). As Probst (1998) remarked, "the ultimate test of ideas is their usefulness in practice" (18).

Operationally, plan implementation was investigated quantitatively in terms of its occurrence, duration and degree.

Occurrence denoted whether the alumni drafted their re-entry prior to finishing the ATI-ITCPH course. Since the act of implementation is "not a static event but a process that enfolds over time" (Durlak and DuPre, 2008: 343), the period that elapsed between the plan's drafting and its realization was also determined (*duration).*

The *degree of implementation* indicated by how much of the re-entry plan had been actualized up until the study's data collection was measured quantitatively. Another quantitative measure is the *Degree of Satisfaction* which pertained to whether the alumni derived a positive or negative affective response from their plan outcomes.

Qualitatively, plan implementation was explored through the responses garnered from the group discussions. With the trends observed from the quantitative data, the alumni's experiences, insights and feelings were probed.

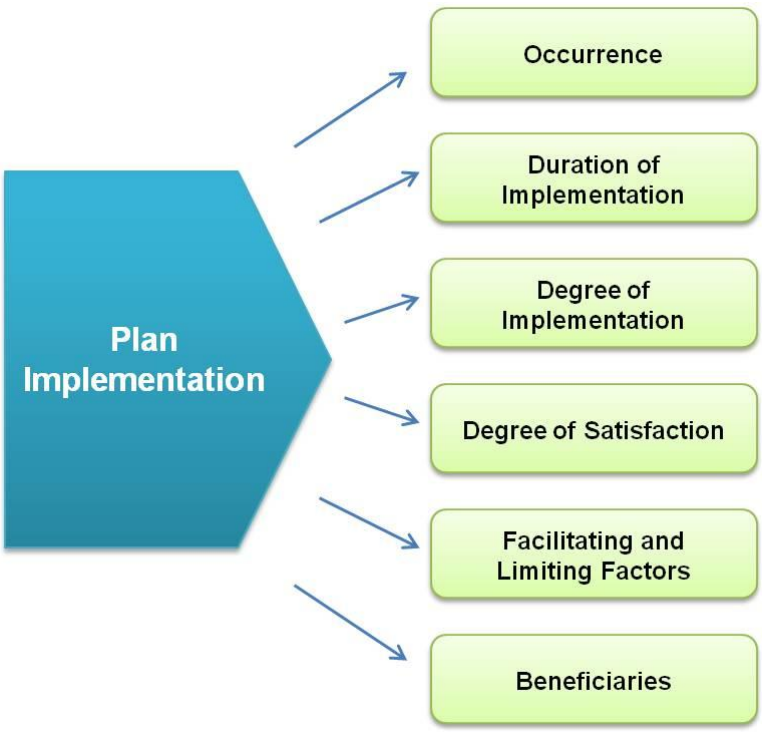
Since past researches (Shahin, 2004; Marsh, Pannel and Lindner, 2004 and Tladi, 2004) suggest that a plan's success or failure may be affected by the qualities the alumni

possesses and environmental or institutional systems present, attention was also given to implementation's *facilitating and limiting factors*. It was also noted if the aspects implemented yielded positive effects to other individuals and groups (*beneficiaries).*

While the quantitative method surfaced the trends for the abovementioned measures of plan implementation, the qualitative method allowed the deeper probing of the alumni's psyche. It yielded the causes and circumstances behind the degree and satisfaction derived from implementation. It also allowed the exploration of *what* and *how* the alumni's initiatives helped others.

To end this section, Figure 4 presents the operational measures of plan implementation as the second concept investigated for knowledge integration.

Figure 4. *Operational Measures of Plan Implementation in the ATI-ITCPH Case*



3. Knowledge Sharing

Communication is crucial in the KM process as it cultivates social capital and trust (Joshi, Sarker and Sarker, 2004). It encourages a dynamic relationship between individuals alternately functioning as the source and the receiver.

Communicating with others facilitate knowledge internalization and application. Hence, this study also considered the instances the alumni *shared* the pig production knowledge gained from training, as guided by past researches (den Biggelaar, 1994; Rees et al., 2000; Rola, Jamias and Quizon, 2002 and Ovwigho et al., 2009).

Likewise with the first concept under plan implementation, the *occurrence* of knowledge sharing was checked. Ideally, an increase in knowledge would also indicate an increase in communication exchange. However, previous studies discovered evidences of "non-sharing", necessitating this concept's verification.

The related concepts of the *frequency* and *manner of sharing* were also explored. The former pertains to the number of times one shares the pig production aspects learned from the course. The latter focuses on the preferred manners of imparting knowledge, whether interpersonal or media-based.

This study's approach follow second generation KM's valuation of the concept of communication. It not only explored *to whom* the alumni shared their knowledge (*beneficiaries*) but also *how useful* they perceived such actions were to others.

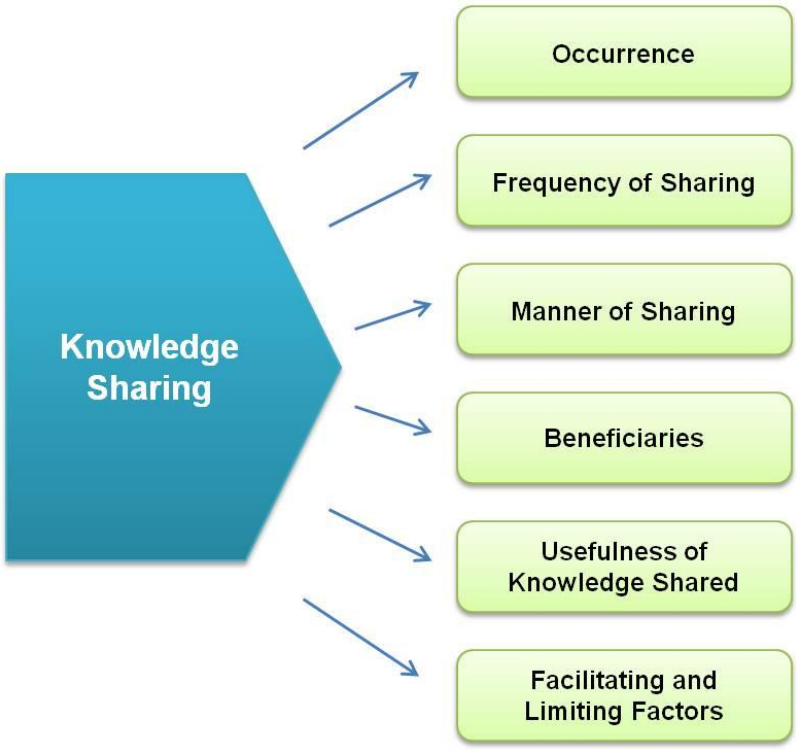
The operational measures discussed above were first investigated through the quantitative method via a survey instrument. With the garnered trends on the knowledge sharing concepts of occurrence, frequency and manner of sharing, the usefulness of

information shared and the beneficiaries, the study employed the qualitative approach through focus group discussions.

The qualitative approach was most useful in the exploration of the contexts where knowledge sharing occurred, particularly the determination of some factors that encouraged or deterred knowledge sharing to others. It also substantiated the quantitative data collected through the accounts of knowledge sharing experiences, insights and actions.

Figure 5 summarizes the operational measures of knowledge sharing as the third concept investigated for knowledge integration post-training.

Figure 5. *Operational Measures of Knowledge Sharing in the ATI-ITCPH Case*



4. Other Manifestations of Knowledge Integration

Previous M&E studies (Okwu, Obinne and Agbulu, 2006; SEDL in Sudsawad, 2007) recognized that effective knowledge integration also occurs in alternative, unexpected ways. Hence, this study pursued other ways that pig production knowledge have been integrated into the participants' work and lives.

The term *Other Manifestations* was used to classify changes in the ATI-ITCPH alumni's attitudes and actions, outside the concepts of plan implementation and knowledge sharing.

5. Participant Characteristics

Literature brought into focus the possibility of recipient-oriented factors influencing knowledge change and application.

Since the ATI-ITCPH caters to a segmented group of livestock farmers, extension workers, the academe (agriculture teachers and students) and private companies, it was also deemed important to consider six *Participant Characteristics* which could influence knowledge integration.

These characteristics include the alumni demographics like *sex, level of experience in pig raising*, the *sector* they belong to and, if applicable, the type of *farm enterprise* they are or have been engaged in. This last trait is classified either as backyard (20 sows or less) or commercial (more than 20 sows) following government specifications (*LLDA Resolution no. 169, Series of 2001*).

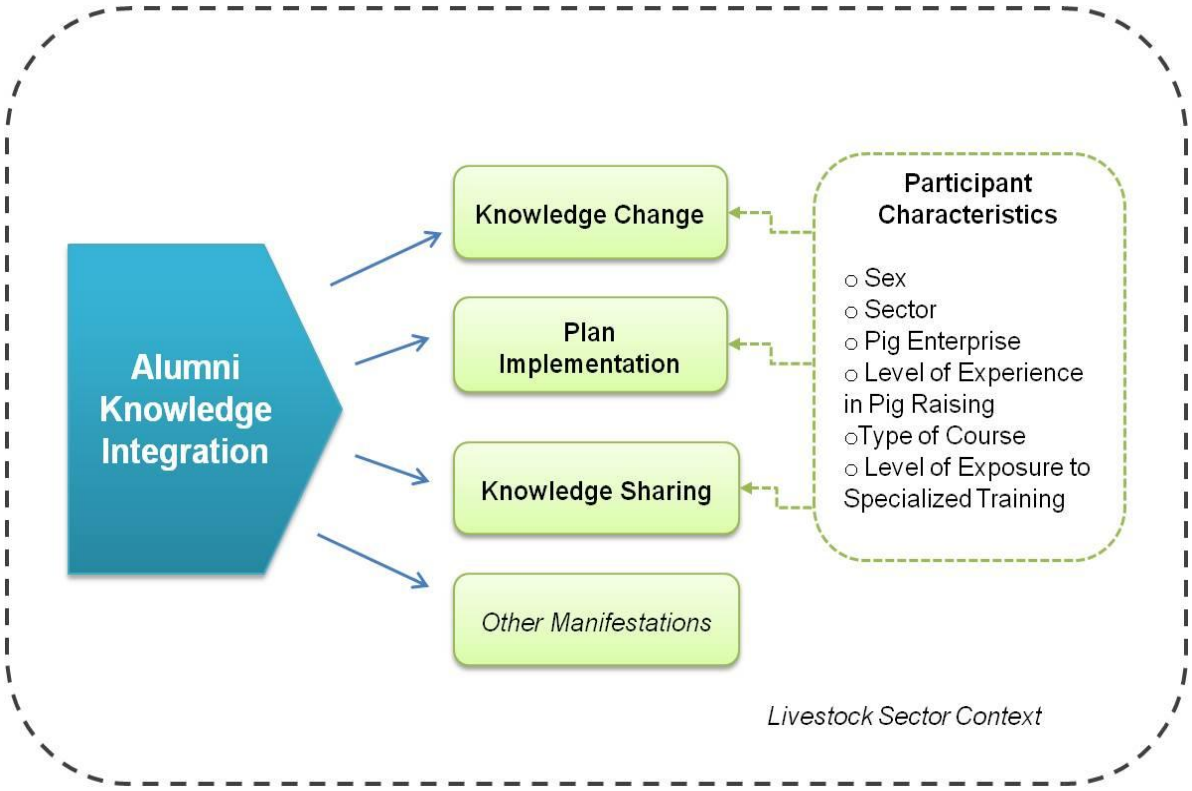
Aside from these four demographics, two training-related characteristics were also considered. The first is the *type of course* received which ranged from Basic, Intensive and Trainors course. As stated, these courses are the focus of this knowledge

integration study as it aptly covers the subject-matters required for a successful pig production enterprise.

The second training-related characteristic considered is the *level of exposure to specialized training* received from the Center.

The investigation of the influence exerted by these six characteristics on knowledge integration called for the comparison between these traits with the quantitative data obtained for knowledge gain, degree and duration of plan implementation and the frequency and perceived usefulness of shared knowledge to others. Figure 6 operationally sums up this study's exploration of the measures of alumni knowledge integration post-training within the livestock sector context.

Figure 6. *Operational Measures of the ATI-ITCPH Alumni Knowledge Integration*



The concept of *Knowledge Integration* was investigated through three general concepts: *Knowledge Change*, *Plan Implementation* and *Knowledge Sharing.* Each concept had appropriate measures surfaced the complementation of quantitative and qualitative approaches.

This study placed importance on six *Participant Characteristics* that significantly influence the three knowledge integration. It also considered the possibility of *Other Manifestations* of integrating knowledge, such as affective and behavioural changes outside plan implementation and knowledge communication.

The ATI-ITCPH alumni's Knowledge Integration occurred within the *livestock sector context.* As such, it was open to the changes within this sub-system and the agriculture sector in general. Hence, any social, organizational, economical or political issues and structures that somehow influenced the alumni's knowledge integration were also investigated.

C. Operational Definition of Terms

Below are the terms that are used in this research on the participant's knowledge integration post-training.

1. Alumni – individuals who participated in any of the three ATI-ITCPH training courses considered, namely Basic, Intensive and Trainors within the years 2005 to 2010
2. Aspect of pig raising – any of the 13 topics covered in the ATI-ITCPH training and investigated under the knowledge change concept, enumerated below:
    a. Common pig breeds found in the country
    b. Physical and performance basis herd selection
    c. Culling
    d. Breeding Methods

e. Heat detection and the estrus cycle of sows
f. Farm Management
g. Feeding scheme for different stages of pigs
h. Common diseases and health problems for breeders
i. Proper cleaning and disinfection (C&D) of pens
j. Prevention and treatment of pig diseases
k. Proper housing and equipment for different stages of pigs
l. Record keeping
m. Cost and return analysis

All of these topics are essential to a successful pig production enterprise. The importance of each aspect towards increasing production was described in detail in the Introduction section (p. 4-5).

3. Center – alternatively used to refer to the Agricultural Training Institute-International Training Center on Pig Husbandry, the case under study
4. Experience in Pig Raising - one of the participant characteristics considered to have an influence to knowledge integration. It refers to the number of years a respondent spent on pig production, classified into two: Low, refers to the alumni who had five years or less of experience and High, for those who have spent more than five years.
5. Exposure to Specialized Training – one of the participant characteristics considered in this study. Refers to the number of ATI-ITCPH courses a respondent participated in categorized into two: basic, for those who only took one course and advanced, for those who had two or more courses
6. Knowledge Integration – the main concept under study which refers to the knowledge from training the alumni have put into practice within the context he/she belongs to. Investigated through the alumni's change in knowledge, plan implementation and knowledge sharing activities

7. Informant – an information-rich survey respondent who participated in any of the four focus group discussions conducted
8. Other Manifestation – any indicator of integrated knowledge post-training outside that of plan implementation and knowledge sharing. In this study, these are the changes in the alumni's self-confidence, openness to learning, perceptions about the industry and participation
9. Respondent – alumni who participated in the online survey uploaded at www.surveymonkey.com

The next chapter discusses the methodology of this knowledge integration research and details the variables and measures employed in its analysis. It also reveals the sampling and unit under study, together with the instruments used in data collection.

IV. METHODOLOGY

This section discusses the complementation of quantitative and qualitative approaches which guided this study's audience-centered design and conduct. It also expounds on the concepts, indicators, variables and measures used to determine the actualizations of the alumni's knowledge integration (knowledge change, plan implementation, knowledge sharing and other manifestations). Further, it explores the measures for determining the participant characteristics' influence over knowledge integration. This chapter also elaborates the rationale behind the research instruments used and the sample-selection process. It also explains how the quantitative and qualitative data acquired were coded and analyzed to reflect how the alumni fared in integrating the pig production knowledge learned from training. The chapter concludes with an exposition of the researcher's background as it relates to agriculture and communication.

A. Research Design and Methods

This evaluative study employed a cross-sectional, field research design in investigating the alumni's knowledge integration. The field research approach, as opposed to immediate post-training evaluation, was used to achieve this study's aim to uncover how the pig production knowledge gained during training played a part in the work and lives of its participants.

Moreover, as both fields of knowledge management and extension are progressing towards pluralism, this research work pursued an audience-centered evaluation of training impact, through a complementation of quantitative and qualitative approaches.

The quantitative approach through the survey method collected the respondents' pertinent demographics and training information. It also extracted data for the determination of knowledge integration trends, particularly the knowledge change post training, as well as the indicators of plan implementation and knowledge sharing.

The survey aided in the per aspect determination of the pig production knowledge changes experienced after training. In terms of plan implementation, the survey was most useful in capturing the prevailing degree and duration of implementation, the satisfaction derived from its enactment and its beneficiaries. The survey also enabled the identification of the frequency and manners of knowledge sharing as well as its perceived usefulness to others.

Aside from these advantages, the quantitative approach also provided initial clues to the factors that encouraged or curtailed the alumni's plan implementation and knowledge sharing activities. It also allowed the determination of the significant differences among the participants' demographics and training background in relation to the measures of knowledge integration.

The surfaced trends for the three main concepts of knowledge integration informed the qualitative approach. Focus group discussion (FGD), as the main method of inquiry, allowed the researcher to probe on the alumni's beliefs, experiences, insights, attitudes and actions.

For knowledge change, the FGDs surfaced the type of change experienced for the 13 pig raising aspects. The discussions allowed a deeper perspective on the factors that encouraged or inhibited plan implementation and sharing. This method also revealed the alumni's rationalizations behind their plan implementation and knowledge sharing

decisions. It allowed the pursuit of the aspects of the plan implemented, the preferred ways of communicating knowledge with others and the value attached to their implementation and sharing efforts.

A non-participant stance was used for the data collection and analysis. However, as a communication practitioner in the field of agriculture, the researcher admits that possessing such background helped in terms of establishing rapport with the respondents which in turn facilitated insightful data analysis and interpretation.

B. Variables and Measures

As differentiated in the framework chapter, this study adopted the Knowledge Management framework. Specifically, it focused on knowledge integration as it encapsulates how knowledge changed and how it was applied in the field context.

The knowledge integration concepts and the corresponding variables and measures used are detailed in the next three sub-sections.

1. *Knowledge Change*

Knowledge Change was quantitatively determined through the comparison of the alumni's self-assessed knowledge for 13 aspects pre and post-training. Qualitatively, knowledge change was classified into three (gain, replacement and reinforcement) through the thematic analysis of the alumni's narrated experiences and realizations.

Table 1 shown in the next page, shows the Knowledge Change variables and the measures used in determining knowledge integration. These indicators and measures provided a cohesive look of how the ATI-ITCPH course prompted knowledge change for each basic pig raising aspect investigated.

Table 1. *Knowledge Change Variables and Measures*

Variables	Measures
Knowledge Change	General knowledge initially measured on a six-point scale (i.e., never heard, poor, fair, good, very good, excellent) and subsequently categorized into three levels (high, moderate and low). Obtained through comparing the self-assessed knowledge scores before and after training for 13 basic pig raising aspects: 1. Common pig breeds found in the country 2. Physical and performance basis herd selection 3. Culling 4. Breeding Methods 5. Heat detection and the estrus cycle of sows 6. Farm Management 7. Feeding scheme for different stages of pigs 8. Common diseases and health problems for breeders 9. Proper cleaning and disinfection (C&D) of pens 10. Prevention and treatment of pig diseases 11. Proper housing and equipment for different stages of pigs 12. Record keeping 13. Cost and return analysis Qualitative per aspect distinctions of the three types of knowledge change (gain, replacement and reinforcement) experienced post-training.
Knowledge Gain	The mean score difference between knowledge before and after training for the 13 aspects considered. Also measured through the alumni's agreement to statements about their training experience in a five-point scale (i.e., strongly disagree, disagree, undecided, agree, strongly agree). Qualitatively, classified as 'new' or 'never-heard-of' aspects prior the training as inferred from the readings of alumni experiences and insights.
Knowledge Replacement	Measured through the alumni's agreement to statements about their training experience in a five-point scale (i.e., strongly disagree, disagree, undecided, agree, strongly agree). Qualitatively, classified as aspects that were deemed as more advantageous or proved previously-held knowledge as 'wrong' as inferred from the readings of alumni experiences and insights.
Knowledge Reinforcement	Measured through the alumni's agreement to statements about their training experience in a five-point scale (i.e., strongly disagree, disagree, undecided, agree, strongly agree). Qualitatively classified as knowledge imparted that only complemented what was previously known prior training as inferred from the readings of alumni experiences and insights.

2. *Plan Implementation*

The second concept investigated is the alumni's *Plan Implementation*.

Aside from checking for the plan's *occurrence* and the enumeration of *beneficiaries*, the quantitative approach allowed the determination of the plan's degree and duration of implementation, as well as the satisfaction derived from it.

The *degree of implementation* and the *level of satisfaction* were both measured in a three-point scale. The *duration* of implementation was also measured, carefully considering this study's five-year (2005 to 2010) period of coverage. The *facilitating* and *limiting* factors to implementation were surveyed through item-choices pertaining to management priorities, financial support and plan feasibility.

Table 2 presents plan implementation's variables and measures.

Table 2. *Plan Implementation Variables and Measures*

Variables	**Measures**
Plan Implementation	Indicated by the plan implementation particulars of occurrence, duration and degree of implementation, level of satisfaction, beneficiaries and encountered facilitating and limiting factors.
Occurrence	Agreement or non-agreement to whether a re-entry plan was crafted during training
Duration of Implementation	Item-choices from 'a year or less' to 'more than three years'
Degree of Implementation	Derived from a three-point scale with the following item-choices: mostly not/fully not implemented, somewhat implemented, fully implemented. Also, the thematic readings of the reported aspects of the plan that came into fruition.
Satisfaction on Plan Results	Derived from a three-point scale with the following item-choices: dissatisfied, mostly or somewhat satisfied, very satisfied. Thematic readings of alumni experiences, feelings and insights behind the plan implementation outcomes.

Table 2. *(Continued)*

Variables	Measures
Plan Beneficiaries	Pertains to: livestock raisers, farm staff, family, neighbors, extension workers, non-livestock people within community, local government, academe and others Thematic readings of alumni experiences and insights on the ways the implemented plan helped the beneficiaries
Facilitating and Limiting Factors	Pertains to: staff and management, budget, prioritization, plan feasibility and others Thematic readings of alumni experiences, feelings and insights centered on the factors that aided and challenged plan implementation

The qualitative approach through the FGDs allowed a deeper look of the alumni's experiences and emotions behind their plan implementation processes and outcomes. The FGDs also allowed the exploration of the survey trends garnered for the factors that facilitated and limited implementation. The group discussions surfaced the experiences and affective responses attached to the plan's success or failure.

Ultimately, this complementation of quantitative and qualitative methods informed the determination of how the ATI-ITCPH alumni fared in integrating the knowledge learned from training through their crafted re-entry plans.

3. *Knowledge Sharing*

The third indicator of Knowledge Integration is the concept of *Knowledge Sharing.*

Occurrence was determined through a dichotomous 'yes'/'no' response. The *frequency* of sharing and the *usefulness* of the shared knowledge to others were determined using a three-point scale. Multiple responses were utilized to surface the preferred *manners of sharing* and its *beneficiaries*. Open-ended responses were 'read'

and categorized in order to determine the *facilitating* and *limiting* factors encountered as they shared pig production knowledge to others after training.

As with plan implementation, the investigation of knowledge sharing also benefitted from the qualitative approach. It was observed the most in the ways it substantiated claims of recipient, work, training, or management-oriented factors that positively or negatively affected knowledge sharing. The FGDs also allowed the deeper exploration of the rationale behind the chosen manners of sharing and the pig production aspects shared to others. This complementation of quantitative-qualitative approaches sustained the determination of how the alumni fared in double-loop KM – how knowledge was re-purposed and shared to other livestock stakeholders.

The table below presents the variables and measures of the Knowledge Sharing indicators used to analyze the obtained quantitative and qualitative alumni data.

Table 3. *Knowledge Sharing Variables and Measures*

Variables	**Measures**
Knowledge Sharing	Indicated by the knowledge sharing particulars of occurrence, frequency, perceived usefulness of shared knowledge, beneficiaries, manners of sharing and encountered facilitating and limiting factors Also, the thematic readings of alumni experiences, insights and affective responses on sharing pig production knowledge to others after training.
Occurrence	Agreement or non-agreement to the whether knowledge learned from training was shared to others or not
Frequency of Sharing	Derived from the following item-choices: often to always, seldom/sometimes, rarely to never
Usefulness of Shared Knowledge	Derived from the following item-choices: very useful, somewhat useful, useless Also, thematic readings of alumni experiences, feelings and valuations behind the pig raising aspects shared to beneficiaries

Table 3. *(Continued)*

Variables	Measures
Sharing Beneficiaries	Pertains to: livestock raisers, farm staff, family, neighbors, clients, colleagues, students, superiors, extension workers and others Thematic readings of alumni experiences and insights on the ways the shared knowledge helped their beneficiaries
Manners of Sharing	Refers to: face-to-face interaction, seminars/lectures/classes, radio or TV program, contributing/being interviewed in print, producing own material, online and others Readings of alumni experiences and preferences in choosing the communication channels in conveying the pig raising knowledge to others
Facilitating and Limiting Factors	Thematically categorized open-ended responses from the survey and readings of the informants' experiences, feelings and insights centered on the factors that helped and hampered sharing of knowledge to others

4. *Other Manifestations*

As another concept of Knowledge Integration, *Other Manifestations* accounted for the affective or behavioral changes the alumni encountered after training which fall outside the plan implementation and knowledge sharing particulars.

This concept was measured through the alumni's agreements on a series of statements about their training experiences. The said statements focused on the felt changes in confidence, pride, accountability, entrepreneurship and practice.

Additionally, open-ended responses about their training experience, the value they attach to their training and the ATI-ITCPH were also 'read' and categorized in order to determine other ways knowledge was integrated in alumni's work and lives.

5. Participant Characteristics

As described in the operational framework, six participant characteristics were considered to exert some influence in the ways pig production knowledge were integrated.

In order to determine the extent of influence of these characteristics towards knowledge integration, each characteristic was quantitatively tested against the measures of:

a. Knowledge Change: Mean difference of self-assessed knowledge before and after training (gain) for the 13 aspects of pig raising.
b. Plan Implementation: The degree of implementation and the level of satisfaction from plan results
c. Knowledge Sharing: The frequency of sharing and the perceived usefulness of knowledge shared to beneficiaries after training.

The said tests bore significant findings on how knowledge integration differed among the alumni's demographic traits and training background. Table 4 details these measures.

Table 4. *Participant Characteristics Variables and Measures*

Variables	Measures
Participant Characteristics	Refers to the alumni's: sex, level of experience in pig raising, type of ATI-ITCPH course received, level of participation in specialized training, sector they belong to and pig farm enterprise type
Sex	The alumni's sex, categorized as male or female
Sector	Pertains to: national government, local government, private, academe, livestock entrepreneur, or Cooperative/NGO.
Level of Experience in Pig Raising	Pertains to the total years spent in the pig industry. Further categorized as *Low*, for those with five years or less or *High*, for those with more than five years of experience

Table 4. *(Continued)*

Variables	Measures
Type of Course	Pertains to the three ATI-ITCPH courses under study: Basic, Trainors and Intensive
Level of Exposure to Specialized Training	The total number of ATI-ITCPH courses the alumni participated in. Further categorized as *Basic*, for those with only one course or *Advanced*, for those who participated in two or more courses
Pig Enterprise	The type of pig enterprise the alumni have, distinguished per sow-level. *Backyard* refers to those who have 20 sows or less and *Commercial* refers to those who have more than 20 sows

C. Research Instruments

This study utilized two main research instruments to investigate the ways knowledge learned from the training courses were integrated in the participants' work and lives.

The first instrument used, in consonance with the quantitative approach, was a self-administered questionnaire uploaded online through the survey hosting site *www.surveymonkey.com.* This survey tool (see Appendix B) was designed to collect the highest level of measurement possible for data analysis. It was mostly composed of close-ended questions, with some open-ended queries that allowed elaborations (i.e., facilitating and limiting factors, other manifestations of knowledge integration).

The first part covered Knowledge Change, particularly the determination of knowledge levels pre- and post-training for 13 basic pig raising aspects crucial to success. In addition, the first part included statements on the types of knowledge change encountered during training, in a five-point agreement scale.

The second part tackled the concept of Plan Implementation. Respondents were first asked to confirm if they indeed have drafted a plan during training. Answering in

affirmative directed respondents to succeeding questions on plan implementation particulars, such as the degree and duration of implementation, the satisfaction felt towards plan results, beneficiaries and the factors that influenced implementation. In cases when plan implementation did not occur, the skip-logic application that the online survey afforded let the respondents proceed to the third part of the survey. This application minimized confusion, faulty responses and the overall time spent to complete the survey.

The third part of the survey covered the concept of alumni knowledge sharing. Again, utilizing the skip-logic application, an affirmative response on sharing the knowledge learned from training directed respondents to the rest of the knowledge sharing questions. These included queries regarding the beneficiaries of their knowledge sharing and the preferred manners of sharing, both allowed for multiple responses. It also included close-ended questions on the frequency of sharing and its perceived usefulness to others. Open-ended responses were also asked for the factors that helped or hindered the sharing of knowledge to others.

The last part extricated pertinent background information on the respondent's sex, present occupation, sector they belong to, years of experience in pig raising, the number and type of course received from the Center and, if applicable, the type of pig enterprise they currently have.

Before it was coded and uploaded, the survey tool was pre-tested with some ATI-ITCPH alumni and other practitioners in the field of livestock. The pre-test had been most useful in terms of refining the 13 aspects of pig raising enumerated in investigating knowledge change before and after training. The pre-test participants pointed out that

some aspects needed to be expounded so that the alumni respondents recall such concepts effectively. Hence, the inclusion of the elaborations under parentheses, especially for the aspects of culling, common pig breeds, breeding, common diseases and record-keeping. The pre-test had also been helpful in adding choices for the multiple-response questions on plan implementation and knowledge sharing beneficiaries. It also confirmed the need for an open-response format especially on queries about the encountered facilitating and limiting factors.

After incorporating the received pre-test inputs, the instrument was further refined through the review of two ATI-ITCPH technical staff to check for simplicity and understandability.

Meanwhile, the main qualitative data gathering method for this knowledge integration study is the Focus Group Discussion (FGD). FGD was preferred for it enabled spontaneity and provided a comfortable environment for the alumni to speak out and build on each other's responses. It also enabled the alumni to reach generalizations about the main concepts considered under knowledge integration as well as their training experience.

The discussion guide's format and content were guided by the survey results. The said results have been especially crucial in the identification of the facilitating and limiting factors encountered in plan implementation and knowledge sharing. The survey trends also served as jump-off points during discussions, as the researcher pursued other manifestations of integrating pig production knowledge.

Like the survey tool, the discussion guide was also pre-tested, this time by a small group of livestock practitioners. Among the inputs garnered during the pre-test were the

need to make the discussion as shorter as possible and the provision of visual prompts to aid the informants in identifying the knowledge changes experienced.

After adjusting the FGD guide using the pre-test comments, it was also reviewed by two ATI-ITCPH technical staff for understandability and consistency in the use of terms. The discussion guide used in this study's qualitative approach can be found in Appendix C.

While the discussion guide was the main data gathering tool used for the qualitative approach, a *Screener* was also used prior the FGD proper (Appendix D). This tool, administered one-on-one, aimed to contextualize the activity in the minds of the alumni. The administration of the Screener allowed the researcher to check for articulateness, as well as prompt the informants' recall of their training and integration experiences. Through it, the alumni's pertinent background details, as obtained from the survey, were also verified. It had also been useful in informing the researcher of the buzz words or phrases that could be used to relate better with the informants. Lastly, the screener's inclusion of projective techniques, particularly visualizations and spontaneous associations, allowed the extrication of beliefs and feelings which, had direct questioning been employed, would have caused informants discomfort and disinclined to respond.

D. Unit of Analysis and Sampling

As an audience-oriented study, this research focused on the integration of knowledge learned from training and as such, used individuals, particularly the ATI-ITCPH course alumni, as its unit of analysis.

To get the sample of respondents, the names and contact details (mobile or phone numbers and electronic mail addresses) of the individuals who underwent the Center's

regular offering of trainings, namely the Trainors, Basic and Intensive courses, from year 2005 to 2010 were extracted from the M&E records. An additional selection criterion was adapted for the Intensive course alumni. Only those who finished more than two modules were included in the sample, to ensure that respondents were equipped with enough training experience to yield valid inputs.

All alumni with valid (correct and functional) contact details composed the survey sample. Such validity check meant that out of the 673 individuals who took any of the three ATI-ITCPH courses for the past five years, 74% (503) were considered possible survey respondents. Of this sample, a big majority (81.31%) took the Basic course, 9.7% took the Trainors course and only 8.9% were valid Intensive course participants. These individuals were contacted via texts and e-mails of the survey's onset.

As explained earlier, only those who took the ATI-ITCPH courses within the specified five-year period (2005 to 2010) were included. This decision was made in consideration of the time lag, which could affect an individual's capability to effectively recall the training experience. The option to consider only those who took the three abovementioned courses was done to make the measurement of knowledge change for the 13 aspects of pig production possible. Other courses offered by the Center such as on Artificial Insemination or Feed Milling Technology were deemed to be highly specialized and would have considerably limited the exploration of the alumni's knowledge integration.

As for the qualitative approach, the FGD informants were chosen out of the alumni who participated in the survey. They were carefully considered on two-levels. The

first consideration is the provision of responses to all the items in the survey. The second more stringent condition, rested on the richness responses provided.

After the information-rich alumni have been identified, the location of the discussion groups were determined based on the number of alumni concentrated in a particular region. Aside from the regional clustering, the availability of resources (venue and support staff) in consultation with the ATI-ITCPH technical staff was also considered.

E. Data Collection and Analysis

Quantitative data collection was initiated through sending text messages and e-mail alerts for the alumni sample. The initial text message contained an introduction about the study's purpose and instructions to log-in to the e-mail account the alumni volunteered at the onset of their ATI-ITCPH training. The e-mail alert meanwhile contained the web link, which when clicked, directs them to the online survey web page.

In order to address the low response rate commonly encountered for self-administered surveys via post or electronic medium and since the quality of the FGD informants also depended on the survey respondents, an incentivized scheme was used. The incentives, made available only to those who have fully answered the survey, were in the form of mobile phone loads or credits. These were given in decreasing amounts, depending on response rate and quality of answers provided. This scheme was complemented by weekly text messages, e-mail alerts and occasional phone calls made for the least responsive individuals. The data collection for the survey phase was exhaustive, that is, only until an alumna has failed to take the survey in the last week of the quantitative phase will he/she be dropped from the sample.

Data obtained from the survey were encoded and analyzed with the aid of the Statistical Product and Service Solutions (SPSS) package software. Descriptive statistics (frequencies, percentages and means) showed trends and variations in the three main concepts of knowledge integration. Paired-samples T-Test allowed the comparison of means, used to measure the gained knowledge after training. Independent-samples T-Test and Analysis of Variance (ANOVA) allowed the tracing of significant differences on knowledge change, sharing and plan implementation according to the six participant characteristics considered. Open-ended responses from the survey were also coded, analyzed and categorized thematically.

As mentioned, data collected from the survey informed the conduct of the qualitative phase. Data from the screening and group discussions conducted in four Regions: IV-A (CALABARZON), IV-B (MIMAROPA), V (Bicol) and VI (Western Visayas) were recorded and transcribed. From the transcripts, dominant themes were carefully noted and compared with the survey results. Narrated experiences regarding changes in knowledge for each of the pig raising aspects, the plan implementation and knowledge sharing successes and challenges, provided invaluable data. The qualitative results outlined the alumni's knowledge integration insights, attitudes, motivations and actions.

This evaluation study's mix of quantitative and qualitative data collection and analysis optimized each of its strengths. The survey provided the breadth, enabling the generalization of responses and surfacing of trends in knowledge integration. Meanwhile, the discussions provided depth of insight. It allowed the surfacing of experiences, opinions, motivations, attitudes and practices through animated recounting in a group

setting. Together, the two approaches provided a clearer picture of how the training course changed pig production knowledge, its sharing made possible the planning and implementation of improvements in the alumni's work and lives.

F. The Researcher

The researcher is the daughter of an agriculturist and a teacher and a sister to a veterinarian and a plant breeder. These pillars aided her appreciation for the field of agriculture and, coupled with her interest in the field of communication, inspired her to pursue an undergraduate degree on Development Communication major in Development Journalism at the University of the Philippines Los Banos (UPLB).

Her career track, thus far, reflects the merging of communication with social change and development efforts. She was a communication assistant for a livestock disease eradication project under the Food and Agriculture Organization of the United Nations (UN-FAO), a communication specialist for the concurrent offices of the Department of Agriculture and the Office of the Presidential Adviser for Job Creation (DA-OPAJC), and a national social marketing officer for a community driven-development project under the Department of Social Welfare and Development (DSWD) and the World Bank (WB).

The knowledge gained from pursuing her communication degree influenced her conviction that development initiatives work best when complemented with a communication aspect. Reflexively, her experiences in conceptualizing and implementing communication campaigns in the fields of agriculture, job creation and social welfare made her realize that communication as a field maximizes its potential when it is oriented towards salient social development agenda. For her, such combination is a good

representation of the field's growing sophistication – theory and practice informing each other to bring in positive social change.

This evaluation study was made possible through a research grant from the Extension Governance and Policy Division (EGPD) of the Agricultural Training Institute under the Department of Agriculture (DA-ATI).

V. RESULTS AND DISCUSSION

This chapter meshes the data from the quantitative and qualitative approaches in pursuing the three indicators of Knowledge Integration. Sectioned into four parts, it begins with a presentation of the alumni sample's profile. The three types of knowledge change experienced after training meanwhile comprises the second section. The third section discusses the alumni's plan implementation processes and outcomes and the last part covers the alumni's knowledge sharing experiences. As this evaluative study also aimed to uncover the influence that select participant characteristics exert over knowledge integration, the last three parts present the findings for the six participant traits considered.

A. Profile of Respondents

There were 132 ATI-ITCPH alumni who took the online survey. Of those who disclosed their personal information, majority (59.8%) were male and from Luzon (59.9%).

Slightly more than a third (36.4%) took the Trainors course, closely followed by the Basic course alumni (35.6%) while the Intensive course had the least number of course participants (6.8%).

In terms of their level of experience in pig raising, 32.6% have *low* experience, with five years or less, while 31.8% have spent more than five years in the field (*high*). Out of the total sample, 60 or 45.5% had or currently are involved in a pig raising enterprise with 28% engaged in backyard farming and 17.4% in a commercial enterprise.

Ninety-eight (98) alumni volunteered information on the sectors they belong to and the majority equally work in the local government and the private sector (17.4%),

followed by those from the academe (16.7%) and 14.4% with livestock enterprises. The national government and the cooperatives or NGOs were represented the least, making up 5.3% and 2.3%, respectively. Appendix E details the respondents' profiles according to the participant characteristics considered for this evaluation study.

Following the data collection procedure, only those who satisfactorily completed the survey were considered to participate in the qualitative phase. Strategically grouping the information-rich alumni according to their areas of origin allowed the design and conduct of four focus groups in Regions IV-A, IV-B, V and VI.

A total of 24 informants (Appendix F) participated in the said focus groups.Male (20) greatly outnumbered the female (4) informants. Majority (13) are from the academe and are currently working as professors or instructors in agriculture state universities and colleges. Four work in a technical capacity for the local government (LGUs) and three work for the national government, specifically the Department of Agriculture - Regional Field Units (DA-RFUs). Three are engaged full time in a pig raising enterprise and one worked for a private corporation.

The occupational profile of informants is consistent with their attendance of the ATI-ITCPH courses. The Basic and Trainors courses were represented with 3 and 21 alumni who took it, respectively. The limited number of Intensive course alumni and their scattered location did not permit representation in the focus groups. Overall, seven informants came from Region IV-A, majority from Quezon province. Eight alumni participated for Region V, half of them from Albay province and six came from Region VI (Iloilo). Lastly, the mini-FGD conducted for IV-B had three informants, two of them full time livestock entrepreneurs.

While these informants consented to reveal their names, job titles, offices and areas of origin, their individual inputs during the group discussions have been masked, in adherence to the confidentiality agreements made during the qualitative approach's coordinative phase.

With these expositions on the alumni samples, the next discussion highlights the informants' awareness and associations of the ATI-ITCPH and the pig industry.

1. Awareness of the Center

This section presents how the informants came to know the ATI-ITCPH as a source of training.

Nine out of the 24 informants have come to know and avail of the ATI-ITCPH training course/s through the Center's invitations, extended to the institutions they work in. Such invitations were sent annually by the Center as mandated by the Department of Agriculture, specifically for the government staff and school faculty concerned with livestock production. Aside from by-invitation, word of mouth through friends, colleagues and family members also helped introduce the Center and its offered courses to the alumni. Six had friends and colleagues who were former course participants, and three have been encouraged to undergo training by a family member or relative.

Personal exposure to the ATI-ITCPH was also another awareness trigger. Four participants were made aware through their participation in exposure trips, some had been introduced through agricultural fairs/exhibits and from incidental encounters (i.e., passing by the Center). Three meanwhile were drawn to train upon seeing the Center's print (course calendar) and new media (web link found with keywords related to pig raising) materials.

2. Attitude towards Pig Raising

In order to contextualize the FGDs, the informants were asked of their spontaneous associations on raising pigs. Categorized thematically, there were a majority of positive evaluations and some negative and neutral attitudes gathered (see Appendix G).

The informants' *positive* evaluations were categorized into three: *business, emotional* and *activity-related*. The informants saw pig raising as a source of income and related it to business and profit terms. For some, it was a source of emergency fund. The informants also attributed *emotional* aspects to pig raising. It was perceived as 'hard' or 'challenging', but also a 'rewarding' activity. Others saw it as an activity which entailed a lot of responsibility and required leadership. Pig raising was also seen as a 'skill' and as an aspect of extension.

Meanwhile, some *negative* associations were also found and centered on pig raising risks. It was seen as a laborious endeavor under disadvantageous market conditions, subjected to volatile pricing and high input costs.

It should be noted that though negative associations were present, the positive associations took precedence in the minds of the alumni, based on the frequency of spontaneous associations they provided.

There were also *neutral* associations attached to pig raising. Some related it to the *institutions* which espouse livestock development and a few gave *aesthetic* associations like a pig's development stage and as a food staple.

Given the alumni sample's background, awareness and associations of the Center and pig raising, the succeeding sections elaborate on this study's results, starting with the change in knowledge.

B. Knowledge Change

Knowledge change is the first main concept examined in determining the ways knowledge from training was integrated.

A general assessment of the lessons learned after training indicated that a big majority (65.9%) *strongly agreed* that training *introduced concepts* previously unknown to them (Table 5). A good number (40.9%) *agreed strongly* that the course *disproved things* which they thought beforehand was the *right thing to do* on pig raising. This was backed up by a combined 90.1% of the sample who agreed that the course *prompted them to change their previous pig raising practices*.

Table 5. *Distribution of Assessments on Lessons Learned After Training (N=132)*

Training Assessment	**Strongly Disagree**	**Disagree**	**Agree**	**Strongly Agree**	**Undecided**	**Mean**
	Percent (%)					
Introduced new concepts	0	0.8	28.0	65.9	0	4.68
Only complemented what they knew	3	25	37.9	25.8	1.5	3.63
Disproved things they knew	2.3	9.8	36.4	40.9	3.8	4.11
Changed previous practices	0.8	1.5	33.3	56.8	2.3	4.52

In contrast with these knowledge gain and replacement findings, a quarter (25.8%), mostly those with veterinary or animal science educational background,

strongly indicated that what they learned just *complemented* or *reinforced* what they previously knew.

The total mean scores in the interim showed that *knowledge reinforcement* had the least level of agreement while *knowledge gain* received the strongest agreement among 65.9% of the alumni.

These findings, however, needed to be grounded in order to confirm if indeed change in knowledge occurred. The next section compares the alumni's knowledge status before and after the ATI-ITCPH training.

1. General Knowledge Before and After Training

The self-assessed knowledge scores for the 13 aspects of pig raising in a six-point scale were used to determine the alumni sample's knowledge before and after their ATI-ITCPH training. Given the highest possible score of 78, the scores were clustered into three categories, shown in Table 6.

Table 6. *Distribution of Self-Assessed Knowledge Levels Before and After Training (N=132)*

Knowledge Score	**Before Training**	**After Training**
	Percent (%)	
High (60 to 78)	12.9	68.2
Moderate (40 to 59)	47.7	24.2
Low (39 and below)	38.6	3.0
No Answer	.8	4.5
Total	100	100

The sample distributed into three knowledge clusters suggest that almost half (47.7%) of the sample judged themselves to have *moderate* knowledge on pig raising aspects before they received the ATI-ITCPH course. More than a third (38.6%) deemed

their knowledge to be *below average*, in contrast to the 12.9% who rated themselves as *highly* knowledgeable even prior their training experience.

The grouped self-assessed knowledge scores after training meanwhile showed that more than half (68.2%) reported *heightened* knowledge – a 55.3% increase from the 12.9% before training. With the majority who reported such *high* knowledge scores, those with moderate (24.2%) and low (3%) knowledge scores after the training decreased dramatically. Most notably, those who indicated *below average* knowledge decreased by 35.6% after undergoing the ATI-ITCPH training.

To measure the extent of knowledge gained, the *mean difference* between knowledge before and knowledge after training was derived through a Paired-samples T-Test (Appendix H).

The test mirrored the previous section's observed general movement of knowledge from *moderate* before training to *high* after training. Scale-wise, a mean score of '3', meant *fairly knowledgeable* while a mean score of '5' denoted *very knowledgeable.*

Aside from confirming the increase in knowledge, the test also found evidence of it being statistically significant across all aspects investigated, even at $p < .001$.

2. Ranked Changes in Knowledge by Pig Raising Aspects

Given these quantitative findings on the alumni knowledge change post-training, it was also deemed important to determine the particular shift in knowledge that occurred for each of the aspects considered.

To do so, the mean scores obtained for the 13 aspects of pig raising before and after training were ranked and grouped into three knowledge categories (high, moderate

and low). Moreover, the qualitative data garnered from the focus groups also allowed the surfacing of the knowledge changes experienced per aspect.

The next three subsections intersperse the alumni's personal experiences and insights with the ranked knowledge on each aspect before and after their training.

a. Pig Raising Aspects the Alumni were Most Knowledgeable of

Table 7a presents the top 6 pig raising aspects the alumni judged to be most knowledgeable of prior and post-training.

Table 7a. *Ranked Mean Scores of Self-Assessed Knowledge on Pig Raising Aspects Before and After Training (High*)*

Rank	Before Training	After Training
1	Common pig breeds in the country	Breeding Methods
2	Proper C&D of pens	Proper C&D of pens
3	Prevention and treatment of pig diseases	Feeding scheme[a]
4.5	Feeding scheme[a]	Culling
4.5	Breeding Methods	Heat detection and the estrus cycle of sows
6	Physical and performance basis herd selection	Management[a]

**Descending Order ($\bar{x} \leq 3.69$, before; $\bar{x} \leq 5.05$, after training)*
[a] for different stages of pigs (breeders, piglets, weaners and finishers)

Before undergoing the course, the alumni already have a good grasp of the aspects of *Common pig breeds, Proper C&D* and the *Prevention and treatment of pig diseases*. The qualitative data obtained during the focus groups confirmed this, with the informants claiming familiarity with these three aspects due to their educational background or previous pig raising experience.

Prior training, the respondents also treated *Feeding*, *Breeding* and *Herd Selection* as aspects they were already quite aware of. This stemmed from the fact that these aspects were part and parcel of a basic pig production operation.

After the ATI-ITCPH training, the knowledge rank for *Proper C&D* remained the same. The group discussions surfaced that the course merely *confirmed* that the alumni were using the correct water-to-disinfectant ratio for their farms.

In spite of their prior knowledge on the aspects of *Breeding* and *Feeding*, the upward movements of their ranks post-training (4.5 to 1st and 3rd, respectively) signify that they still gained knowledge on these two aspects.

For *Breeding*, the course shifted their preference from natural to artificial insemination (AI). The alumni also gained skills on how to conduct AI and realized the importance of regulating their farms' breeding procedures.

The course also imparted a deeper appreciation for the previously taken-for-granted aspect of *Feeding.* One informant elaborated:

> *"Kapag sinabi mo yung feeding, parang andali naman di ba? Magpapakain ka lang naman. Pero dun kasi sa training… maganda pala not only yung feeding quality and quantity but also kung paano mo sya ibibigay. Dun ko nakita yung kahalagahan ng paglalagay ng automatic na feeder… it would lessen the stress of the animal. Pati yung difference ng dry and wet feeding… mas okay pala kung medyo i-moisten mo sya. Pwedeng mag-enhance ng gana ng biik na kumain."*
> [When you say feeding, it seems easy, right? After all, you just need to give them something to eat. But during training, it was not only good to check the feeding quality and quantity but also the manner in which you give it. (During the course) I saw the importance of putting up an automatic feeder… it would lessen the stress of the animal. Also, the difference between dry and wet feeding… it would be better to moisten it. It can enhance the appetite of the litter.]

Other alumni also affirmed that prior training, they only gave their pigs 'swill' (left overs) or whatever the feed supply store advices them to give. The course made

them realize that the pigs should be fed with the right quantity, quality and manner depending on the pigs' weight, age and litter size.

Tied at the fourth place after training were the aspects of *Culling* and *Heat Detection.* During the group discussions, the informants acknowledged that participating in the course *replaced* previously held knowledge and attitudes.

For *Culling,* a glaring change in attitude occurred. Before, the alumni could not help but be ruled by their emotional attachment to their pigs. They hedge on the small chance that their sow's performance could still improve, even if its previous litters were less than average. Training imparted the proper indices with which they could base their culling decisions on. It also made them realize that the loss of profit should outweigh emotional attachments. As one livestock entrepreneur put it:

> *"Before, masakit talaga sa loob na i-cull… Pero kung makikita mo yung business side na malulugi pala ako,lalong mas masakit yun sa bulsa".* [Before, it's very emotionally painful to cull… But if you realize the business side of it that I will lose my profit, which is more painful in the pocket.]

Meanwhile, for the aspect of *Heat Detection,* the course imparted measures of determining the sow's receptivity to breeding, whereas before training, they only relied on personal or their farm staff's guess works. One extension worker from Bicol described the change that occurred:

> *"Dati kasi akala ko kapag maganda ang tindig ng baboy okay na... after training, dapat pala tsi-ni-check talaga (ang record). Hinasa ko yan (skill)... Dapat yung likod medyo arched, tapos yung paa, hindi dapat pike... Ngayon ini-aadvise ko na din sa clients ko."* [I thought before that as long as the pig's stance looks good, it will do... after training I realized that you have to check (the record). I sharpened my skills (on selection)... You need a pig with its back a bit arched, it should not be bow-legged... Now I share this to my clients.]

The course imparted the value of combining physical and record-based performance to guide their breeding program decisions. Thus, for *Culling* and *Heat Detection,* the

training enabled the positive shift from beliefs based on emotions and guess work to decisions influenced by practicality and logic.

Lastly, the sample also identified *Management* as an aspect they became knowledgeable of after training. While indeed familiar with the basic farm operation prior training, the course allowed a deeper understanding of the ways production could be maximized through the interplay of the aspects investigated (i.e., how feeding, housing, herd selection and breeding are related to each other).

b. Pig Raising Aspects the Alumni were Moderately Knowledgeable of

The aspects the alumni were moderately knowledgeable of before and after training were presented in Table 7b.

Table 7b. *Ranked Mean Scores of Self-Assessed Knowledge on Pig Raising Aspects Before and After Training (Moderate*)*

Rank	Before Training	After Training
7	Culling	--
7.5	--	Common Pig Breeds
		Cost and Return Analysis
8.5	Management[a]	--
	Proper housing and equipment[a]	
9	--	Physical and performance basis herd selection
10	Heat detection and the estrus cycle of sows	Common diseases and health problems of breeders

**Descending Order ($\bar{x} \leq 3.27$, before; $\bar{x} \leq 4.96$, after training)*
[a] for different stages of pigs (breeders, piglets, weaners and finishers)

Some alumni rated themselves as fairly knowledgeable on the aspects of *Culling*, *Management*, *Housing* and *Heat Detection.*

For *Culling* and *Heat Detection*, while most reported changes in knowledge and attitude after training, some, particularly those with animal science degrees, indicated that

the course only served as a *"review".* These select alumni even jokingly said that they could perform culling *"kahit nakapikit"* [even blindfolded] as it was a skill they had a lot of practice with during college.

Their moderate knowledge for the aspects of *Management* and *Housing* prior to the course were also attributed to their work (as teachers or government extension workers) or educational background.

What is striking for these four aspects is that after training, all of the ranks still increased. These movements from *moderate* to high *knowledge* confirmed that training participants still stand to gain knowledge during training, even for those who already possessed prior knowledge.

The aspects of *Common Pig Breeds* and *Herd Selection* interestingly ranked lower after training. This confirmed the earlier qualitative insight that the alumni were already knowledgeable of such aspects even before taking the course.

On the other hand, moderate knowledge gains were experienced for two aspects (*Cost and Return Analysis* and *Common diseases and health problems)* after training.

For *Cost and Return Analysis*, the course imparted knowledge on the factors that should be considered in determining profit (i.e., labor, feed price, water and energy consumed). The course was also able to convince a few to treat pig raising "seriously" as a business endeavour, rather than just a hobby. The alumni also attained moderate knowledge on *Common diseases and health problems* after training. They learned how to look for signs of common diseases and realized that its early detection was crucial to achieving production targets. Further, the group discussions revealed that the extension

workers value knowledge of this aspect as it allowed them to "take-charge" in cases when a veterinarian was not available.

c. Pig Raising Aspects the Alumni were Least Knowledgeable of

Table 7c presents the remaining aspects classified as the topics the alumni were *least* knowledgeable of, prior and post-training.

Table 7c. *Ranked Mean Scores of Self-Assessed Knowledge on Pig Raising Aspects Before and After Training (Low*)*

Rank	Before Training	After Training
11	Cost and return analysis	--
11.5	--	Proper housing and equipment[a]
		Record keeping, calculation and analysis of technical figures
12	Record keeping, calculation and analysis of technical figures	--
13	Common diseases and health problems of breeders	Prevention and treatment of pig diseases

**Descending Order ($\bar{x} \leq 3.26$, before; $\bar{x} \leq 4.78$, after training)*
[a] for different stages of pigs (breeders, piglets, weaners and finishers)

It was found that before training, the *Cost and return analysis*, *Record keeping, calculation and analysis of technical figures* and *Common diseases and health problems* were considered as aspects the alumni were least knowledgeable of.

The FGDs revealed that the first two aspects were closely related to each other and that before the training, most were unfamiliar with the concept of stock projection given the lack of commercial farm experience. Informants explained that small farms do not require an elaborate system of recording. Rather, stocks and input procurements were just based on *"kung ano lang ang kaya ng bulsa"* [just how deep your pocket is.]

The alumni were also wary of *Common diseases and health problems*, as it entailed "technical terms" which they found difficult to understand.

After the course, *Housing, Record keeping, calculation and analysis of technical figures* and the *Prevention and treatment of pig diseases* were ranked lowest.

For *Housing*, the alumni found learning the different requirements for feeders, drinkers, roofing, flooring and pens as challenging. Some persevered and even found ways to apply the housing requirements learned to their farms using cheap and available indigenous materials.

Record-keeping (i.e., stock projection) was still classified under the *low* knowledge category, even after training. Qualitative data revealed that the informants also perceived this aspect as difficult to learn, mostly due to the quantitative figures, concepts and formulas used, which consequently required computations. Nonetheless, the course instilled appreciation for this aspect, as it could spell an enterprise's success or failure. One assistant professor in an agricultural school explained:

> *"Napakahalaga ng stock projection para magamit mo yung bahay (ng baboy). Halimbawa, 100 sow-level, ilan ba ang magiging gilt mo monthly? Para yung pagbebenta ng baboy regular dapat… kung wala kang stock projection, matatambakan ka, tapos minsan mauubusan ka kaya yung buyer mo pupunta sa iba. Backbone ito ng operation."* [Stock projection is very important so you could maximize its housing. For example in a 100 sow-level, how many gilts will you be able to produce monthly so that your selling will be regular… if you don't have stock projection, you will have an oversupply and sometimes you will have under supply. This will lead your buyer to seek out another (seller). This is the backbone of farm operation.]

Lastly, the aspect of *Prevention and treatment of pig diseases* was ranked the lowest after training, it slid from third to the 13th rank after training. Such change could be attributed to the alumni's perception of this aspect as something that only *reinforced* their previous knowledge garnered from school or work experience. Especially for those with veterinary background, the training only confirmed that they were prescribing the right treatment for their clients. Additionally, the course brought them up-to-date of the

medications (i.e., vaccines and vitamins) circulated in the market. The training also helped one extension worker verify her stand against selling sick animals:

> *"Minsan kasi, kapag may sakit ng baboy, hinahanap nila (farmers) yung buyer na kaagad. Sabi ko hindi dapat ganun, dapat gamutin muna. Na-confirm ko naman (pagkatapos ng training) yung ginagawa ko na tama yun."* [Sometimes, when their pig is sick what they look for immediately is a buyer. I told them they should not do that but to treat the animal first. After training, I was able to confirm that what I was doing was right.]

To sum up this section, the course so far had been holistic in its coverage of the basic aspects of pig raising with the reported positive changes in knowledge (gain) post-training. The combined quantitative ranks and qualitative thematic analysis revealed that the alumni processed the lessons imparted differently. The said approaches also affirmed the presence not only of knowledge gained, but also some knowledge being *replaced* (i.e., *Culling, Herd Selection* and *Breeding*) and *reinforced* (i.e., *Common pig breeds, Proper C&D, Prevention and treatment of pig diseases*).

3. Knowledge Gain and Participant Characteristics

Another objective of this study is the consideration that some participant characteristics influence the integration of knowledge. To determine such influence, six of the alumni's background information (sex, years of experience, type and number of courses, sector and pig enterprise type) were tested against the knowledge scores gained after training.

The Independent Samples T-Test and Analysis of Variance applied showed that while the alumni samples' sex and level of experience in pig raising had no significant relationships, four remaining characteristics stood out.

a. Course Type

The knowledge gained after training for the aspects of *Culling* and *Breeding* were significantly different among the type of ATI-ITCPH courses received (Table 8a).

Table 8a. *Significant Knowledge Gained on Culling and Breeding*

Aspect	Total Mean	P-Value
Culling	1.66	.023*
Breeding Methods	1.65	.002**

**significant at p < .05 **significant at p < .01*

Comparing the mean scores per course type revealed that the Intensive course alumni gained the most knowledge for *Culling* or the removal of sub-standard pigs from a herd (Table 8b).

In far second were the Basic course alumni and those who took the Trainors course gained the least knowledge.

Table 8b. *Mean Knowledge Scores on Culling according to Course Type*

ITCPH Course	Mean	P-Value
Basic	1.65	.023*
Intensive	2.78	
Trainors	1.41	

**significant at p < .05*

In terms of the aspect of *Breeding*, the Intensive course participants gained the most knowledge post-training, seconded by the Basic course alumni with a mean score of 1.63 (Table 8c). The Trainors course alumni again experienced the least gain in knowledge.

Table 8c. *Mean Knowledge Scores on Breeding according to Course Type*

ITCPH Course	Mean	P-Value
Basic	1.63	.002**
Intensive	3.00	
Trainors	1.36	

***significant at p < .01*

A closer examination of the mean scores across all the pig raising aspects, while not statistically significant, indicated that among the three courses under study, the Trainors course alumni gained the least knowledge.

This was most evident for the aspect of *Common Pig Breeds* in Table 8d. It confirmed that the Trainors course alumni were an already 'informed' group prior training.

Table 8d. *Mean Knowledge Scores on Common Pig Breeds according to Course Type*

Course	Mean
Basic	1.63
Intensive	3.00
Trainors	1.36

These differences found among the ATI-ITCPH courses could be explained by the background of the participants and the course design. The Trainors course was primarily designed for extension workers and those from the academe and these jobs require familiarity with the pig production aspects being investigated. As some alumni put it, a few course topics like *Common Pig Breeds, Culling, Breeding* and *Proper C&D* only served as a 'refresher' or 'review'. On the other hand, the abovementioned aspects could be unfamiliar to the Basic and Intensive course participants and their value have only been realized upon taking the course.

b. Level of Exposure to Specialized Training

Quite related to the type of course received, another statistically significant finding was the influence of the level of exposure to specialized training.

The sample's knowledge gain for the aspect of *Feeding* (Table 9) in particular showed that those who had an advanced level of pig production training (2 or more ATI-ITCPH courses) significantly gained more knowledge than those who only had a basic level of exposure (Table 9).

Table 9. *Mean Knowledge Scores on Feeding according to No. of Specialized Training Received*

Course	Mean	P-Value
Basic (1 course)	1.35	.038*
Advanced (2 or more)	1.97	

**significant at p < .05*

The difference found for those who had basic and advanced specialized training for the aspect of *Feeding* could be due to the level of appreciation that is heightened when an individual participates in learning opportunities, like the ATI-ITCPH traning. The participants with more training may have realized that improving their feeding quality and quantity directly contribute to the herd's weight gain, which when sustained bring more profit.

While no other statistical significance was found, the trend of advanced training bringing more knowledge than basic training was observed across all the remaining aspects of pig raising.

The highest gain of those with advanced training were for the aspects of *Record keeping* and *Heat detection* (mean score gains of 0. 61 and 0.53, respectively) and lowest for the aspect of *Culling* (mean score gain of 0.22). These highest and lowest knowledge

gains imply that though one could be adept at *Culling* with just one course, advanced training would be advisable for one to become well-versed on *Record keeping* and *Heat detection.*

c. Pig Farm Enterprise

The Independent Samples T-Test revealed a significant knowledge gain for the aspect of *Feeding* between the backyard and commercial pig farmers. That is, commercial farmers learned more than their backyard farmer counterparts (Table 10).

Table 10. *Mean Knowledge Scores on Feeding according to Pig Enterprise*

Enterprise	Mean	P-Value
Backyard	1.37	.045*
Commercial	2.21	

**significant at p < .05*

Qualitative inputs from the group discussions conducted suggest that this aspect is concerned with feed formulations and ratios, and types of feeding systems (i.e., manual vs. automatic). These technical concepts would have mattered more to the commercial farmers, given these technologies' suitability for large farms. Additionally, commercial raisers are more driven than the backyard farmers towards the production bottom line – to increase the pig's weight within the shortest amount of time through improving feed nutrition. Backyard farmers, as the informants explained, comparatively were less driven to improve nutrition. These farmers commonly resort to giving their herd whatever feed stuff is available to them, such as swill or left-overs.

While not statistically significant, it should be noted that across all aspects, the commercial raisers gained more knowledge than the backyard raisers. Aside from

Feeding, the most knowledge differences, found for farm enterprise types were for the aspects of *Heat Detection* and *Management* (both with a mean score difference 0.64).

Conversely, the least knowledge differences between enterprises were observed for the aspects of *Proper C&D* and *Culling* (mean score difference of 0.21 and 0.24, respectively). As inferred from the discussions, these low knowledge scores suggest of knowledge being *reinforced*. That is, both commercial and backyard raisers were already familiar with the concepts of *Proper C&D* and *Culling* prior to training.

d. Sector

The last statistically-significant finding was observed on the influence of the sectors the alumni belong to with knowledge gain, observed for the aspect of *Herd Selection,* as shown below.

Table 11. *Mean Knowledge Scores on Herd Selection according to Sectors*

Sector	Mean	P-Value
Livestock Entrepreneur	2.06	.049*
Private Corporation	1.71	
Academe	1.59	
Local Government	1.33	

**significant at p < .05*

It was observed that the livestock entrepreneurs gained the most knowledge, seconded by those who work for private firms. Reciprocally, those from the academe and the local government units (LGUs) gained lower knowledge scores for *Herd Selection*.

This difference for *Herd Selection* among alumni's sectors could be due to the differing motivations the alumni have because of their work-orientation. The entrepreneurs, and to a lesser degree, the private firm employees are driven to improve their herds through better herd selection practices. Like the earlier scenario for *Feeding*,

both sectors need to mind the bottom line, which is to turn profit. On the other hand, alumni from the academe and the local government have lesser direct involvement with this aspect. As gleaned from the group discussions, only a few have been put in-charge of managing a pig farm. Most were familiar with this aspect in an academic way – when they teach the important points of selection to their beneficiaries (i.e., students, clients).

Notably, the livestock entrepreneurs showed the highest knowledge gained not only for herd selection but across all the pig raising aspects investigated. Though not statistically significant, this heightened knowledge indicates that among the course participants, livestock entrepreneurs are the ones who need pig raising knowledge the most.

C. Plan Implementation

This study also determined how pig production lessons from the course were integrated through the implementation of the alumni re-entry/action plans. The combined quantitative and qualitative results based on the seven measures of plan implementation are detailed in this section.

1. Degree, Duration and Satisfaction

Based from the survey data, more than half (67.4%) of the alumni sample confirmed to have crafted the plan before graduating from the ATI-ITCPH course (see Appendix I).

Of the percentage who confirmed to have had a plan, almost a quarter (21.2%) got to implement their plans within *a year or less* after training. This was followed by some (15.2%) of the alumni whose implementation took more than *a year* and 12.1% who took more than *two to three* years.

Table 12 presents the degree the alumni plans have been accomplished where a majority (38.6%) said that they *somewhat/mostly* managed to achieve their plans and 12.1% who indicated they have implemented it *fully*. In contrast, 12.9% said their plans have not been realized.

Table 12. *Distribution of the Degree of Plan Implementation (N=132)*

Degree	Percent (%)
Fully Implemented	12.1
Somewhat Implemented	38.6
Mostly to Not Implemented	12.9
No Answer/No Drafted Plan	36.4
Total	100

Somewhat similar to these results on plan implementation's degree is the satisfaction level that the alumni derived from their plans. For instance, the majority (35.6%) *somewhat to mostly* felt satisfied with their plans' results and 11.4% felt *very* satisfied.

Table 13. *Distribution of the Satisfaction Derived from Plan Implementation (N=132)*

Satisfaction	Percent (%)
Very Satisfied	11.4
Mostly/Somewhat Satisfied	35.6
Dissatisfied	8.3
No Answer	44.7
Total	100

A closer look at the frequencies revealed that for every five alumni who drafted a plan, one is *very satisfied* with its results. In the minority however were 8.3% who were *dissatisfied* with their plan implementation results.

As intended in this study's methodology, the affective attachments of the alumni to their re-entry/action plans and its outcomes were explored further during the FGDs.

Satisfaction, upon thematic analysis, stemmed from the plans' utility not only to the alumni but also to the institutions they belong to. As one academician explained:

> *"Nagawa ko naman, nagmaterialize naman. Nag-gagamit na namin yung AI farm… Napaka-sarap sa pakiramdam na yung plano mo ay nagagamit talaga."* [I was able to do it, (the plan) materialized. We were able to use the AI farm… It feels really good that we are able to use the plan I visualized.]

On the other hand, feelings of dissatisfaction could be explained by hurt pride. As one academician conveyed:

> *"Malaki ang regret ko dyan. Dahil ang plan ko, modesty aside was the one of the Best Re-entry Plan… Kasi na-assign ako sa extension, (kung di ganun) sana eh na-implement ko ito. Malaki ang hinayang ko diyan."* [I feel very regretful. My plan, modesty aside was recognized as one of the best re-entry plans during training. But, I was assigned in the unit of extension. (If the re-assignment did not happen), I know I would be able to implement it. It's such a huge disappointment.]

The focus groups also showed that while some fell short of accomplishing their plans, they were not completely disregarded. In example, an academician had been unable to implement his plan to adopt-a-community as a pig production model, but he still used it as part of fulfilling his masteral degree:

> *"Unfortunately hindi sya talaga umusad, kasi nag-plan ako ng May, pero June (of 2011), nag-aral naman na ako. So walang nangyari. Ang maganda naman ngayon is ini-incorporate ko sya sa thesis ko... parang needs assessment… Pero nakakahiya pa din."* [Unfortunately, the plan did not move. I drafted it in May but in June (of 2011), I took up my studies. So, nothing happened. I guess what is good right now is that I'm making use of my drafted plan and incorporate it in my (Masters) thesis… sort of a needs assessment… Still, it's embarrassing to think about it.]

Such emotions invested in their crafted plans, as gleaned from the usage of words like *hiya* and *hinayang*, mean that at the very least, the activity of drafting the plan makes the participants feel accountable of their knowledge integration results.

The Filipino concept of *hiya* according to Salazar (in Pe-Pua and Marcelino, 2000) has two concepts. Externally, it is common to equate this word to the word *shame*. Its internal concept meanwhile is introspective – an individual intrinsically has a *sense of propriety* (55).

Applying Filipino Psychology, it can be deduced that the training inculcated to the alumni a sense of accountability, reflected in the surfaced feelings of *pride* or *disappointment* regarding their plan's results. In cases of unsuccessful implementation, the alumni felt shame, cognizant of their responsibility that they *ought to* have done something more.

Hence, the alumni have positive evaluations about their plans' implementation processes and results. Majority accomplished what they set out to do, in about two years or less, yielding feelings of satisfaction and pride.

2. Aspects of Plan Implemented and Beneficiaries

The respondents enumerated aspects of their action plans which they were able to implement.

Coded and analyzed thematically, their open-ended and multiple responses were categorized in the next page (Table 14).

Table 14. *Distribution of the Aspects of Plan Implemented (n=89)*

Aspects Implemented	Frequency*	Percentage
Information, Education and Communication (IEC)	13	19.1
Establish or expand pig raising program or business	12	17.7
Breeding	11	16.2
Housing	9	13.2
Farm Management	7	10.3
Recordkeeping and/or Stock Projection	6	8.8
Treatment of diseases	3	4.4
Feeding	3	4.4
Waste Management	2	2.9
Others	2	2.9
Total	68	100

**Multiple response; 59 alumni specified the aspect implemented*

Majority indicated *Information, Education and Communication (IEC)* as their accomplishment. Under IEC were responses related to the conduct of trainings or seminars with students or livestock stakeholders as audience. This also includes the provision of technical assistance to clients who walk-in, or those who required on-farm and home consults. A few indicated to have presented their plans to the *barangay* council or the school administration. The alumni's accomplishments for IEC will be explored under the section of Knowledge Sharing.

A close second is the *Establishment or expansion of their pig production program* either as a personal enterprise or as part of the institution they belong to. Some elaborated that *expansion* refers to the increase in sow or fattener pigs. One notable alumnus had been able to add 10 sows to his previous five. Another stood out as rather than increasing the sow-level, she complemented her pig farm with a small-scale meat processing business.

Some (11) succeeded in achieving their plans on *Breeding*, particularly the shift from natural to artificial method (AI). In example, those who have the enough capital purchased the necessary equipments or established an AI laboratory. These adjustments made for the aspect of breeding was also observed in a Nigerian study (Sheshu et al., 2010), where it was found that the livestock producers felt the need to widen their herd's breeding and performance and consequently sought ways to obtain the apt technologies, regardless of government constraints (i.e., lack of extension budget and higher tax imposed).

Nine alumni managed to better their *Housing* aspect. For some, this entailed proper housing construction using indigenous materials. For others, it meant the installation of farrowing crates to lessen pig mortality. Still others indicated to have installed the appropriate ventilation and water supply systems for their herd.

Seven improved on *Farm Management* and the closely connected aspects of *Record Keeping* and *Stock Projection.* One explained that through his initiative, their farm now performs annual production planning and stock inventories.

The aspect of *Feeding* was also improved. One reported that he is now able to accurately give feeds relative to the pig's weight and maintain a good record-keeping system for his school's farm project. Two alumni improved on *Waste Management* and converted animal waste products to biogas.

Interestingly, the remaining responses under *Others* referred the activity of planning or the actual conduct of an evaluation. One crafted a needs-assessment plan to identify a pig production demonstration site. Another investigated the feasibility of his pig dispersal program.

The alumni said that their implementations benefitted the livestock raisers within their locale the most (17.3%), closely followed by their family members and farm staff (Table 15). Immediate neighbours and other extension workers also somewhat benefitted (12.8% and 9.9%, respectively). Even those not directly involved in the livestock sector also benefitted from their plans, according to some (8.6%).

Table 15. *Distribution of the Beneficiaries of Plan Implementation (n=89)*

Plan Beneficiaries	Frequency*	Percentage
Livestock raisers w/in community	42	17.3
Farm Staff	41	16.9
Family Member	41	16.9
Immediate Neighbors	31	12.8
Extension Workers	24	9.9
People not Engaged in Livestock within Community	21	8.6
Local Government	18	7.4
Academe	18	7.4
Others	7	2.9
Total	243	100

**Multiple responses*

The local government and the academe, as institutions which majority of the sample belonged to, were also identified as beneficiaries. The *Others* category pertains to the sub-groups the alumni's plans particularly catered to. For instance, one indicated *prison inmates* and another identified a rural *women's cooperative*.

The examination of the alumni's knowledge integration through re-entry plan implementation went further than the indicators of occurrence, aspects implemented, degree, duration and satisfaction derived. Both the quantitative and qualitative approaches also aimed to surface the factors that influenced implementation, experienced upon return to the alumni's locales. The next two sections cover the facilitating and limiting factors to implementation.

3. Facilitating Factors to Plan Implementation

The sample distribution for the close-ended, multiple survey responses presented in Table 16 suggests that the *Support by Staff and Management* was the most helpful factor in the realization of plans.

Table 16. *Distribution of the Facilitating Factors to Plan Implementation (n=89)*

Facilitating Factor	Frequency*	Percentage
Support of Staff & Management	45	30.4
Availability of Budget	41	27.7
Inclusion in Priorities of Management	31	20.9
Feasibility of Drafted Plan	28	18.9
Others	3	2
Total	148	100

**Multiple responses*

The qualitative data garnered confirmed this finding. Majority of the FGD informants agreed that supportive superiors and peers had been vital to their endeavours' accomplishment: *"Hindi naman pwede na pag-implement mo ng plan mo, ikaw lang mag-isa"* [It would not be possible to implement your plan alone], said one extension staff.

Another regional agriculture staff explained that a receptive local government (i.e., municipal or provincial offices), was crucial in their training-of-trainors activity. The local government, particularly its chief executives, should not only have enough clout to identify local livestock technicians, but also follow through such assignment with resource support. His re-entry plan led to a wider area for extension service since his office could now refer clients to the nearest local (provincial or municipal) livestock technician.

Another facilitating factor is the *Availability of Budget*, with almost half of the sample who agreed (41). Private farm owners were understandably the keenest on this factor. As one put it, the capital to invest in housing facilities and breeding improvements had been vital to farm expansion. Where prior to training he had no pig stocks at all, he now maintains a 20 sow-level farm.

For a practical few, financial resource was even more preferable than having their management's support. As enunciated by a senior academician: "*Kapag may budget, lahat kakayanin mo kahit hindi muna dumating ang support."* [If you have budget, you can manage, even if the support is not available.]

Incidentally, these two facilitating factors of support and fund availability were among the cited indicators of Davenport and Pruzak (n.d.) of a successful KM initiative. "Growth in resources... including staffing and budget" and "some evidence of financial return" whether actual or perceptual, are good criteria for determining KM's return-on-investment (11).

Meanwhile, some (31) considered the *Inclusion of the Plan to the Management's Priorities* as contributory to effective implementation. However, two informants explained that their plans' inclusions only became possible because they themselves were part of their institution's decision-making body. In example, a cooperative member who was unsuccessful in implementing on his own opted to include his aims in the long-term projects of his cooperative, where he is a board member.

More than a quarter of the alumni also considered their plan's *Feasibility* as vital. The word *feasibility* for the informants meant the alignment of the resources and the

addressing of priority needs. One professor said he successfully implemented his school's AI laboratory plan, to the benefit too of the nearby livestock raisers:

> *"Inisip ko talaga bago ko ginawa yung plan kung ano yung mga kakulangan na pwedeng punan."* [I've given the plan a lot of thought while I was doing it, what are the needs that it can fill.]

Feasibility also meant putting up safe-guards. One LGU staff recalled that at the time his pig dispersal plan was being drafted, he was already anticipating what problems could arise, especially for the beneficiaries who only wanted fast money and would just sell the pigs awarded to them. He decided to put up monitoring measures, periodically checking their beneficiaries' awareness of the sow's heat cycle. He also checked if the recipients availed the boar and AI services from reputable breeding farms prescribed.

Lastly, two out of the three responses under the *Others* category referred to donations in-kind or cash provided by partner institutions, which the alumni sought to make their plans a reality. A lone respondent meanwhile indicated his personal tenacity to act on his drafted plan as another facilitating factor, even if it meant the funds came from his own pockets.

The focus groups were also able to surface other facilitating factors, categorized as *individual* or *ATI-ITCPH-related* qualities that the survey results had not been able to cover.

a. Individual and ATI-ITCPH-related Qualities

The informants from the academe sector and the local agriculture offices believe that their *Positive Individual Qualities* of 'assertiveness' and 'receptiveness' helped their plan implementation. They elaborated *assertiveness* using terms like *commitment*,

motivation, *drive*, *passion*, *self-reliance* and *personal advocacy*. A few also gave attributes related to *receptiveness,* with the use of words such as *flexibility*, *adaptability*, *open-mindedness* and being considerate to *both animals and humans*.

Aside from these individual qualities, the informants also attributed their successful implementation to the knowledge and skills that training provided *(ATI-ITCPH-related qualities)*. Majority spontaneously mentioned the Center's training manuals, which until now serve as references when they give advice to their farm staff or students.

One singled out the ability to *"do a proper project proposal"*, including the process of presenting his plan to the ATI-ITCPH technical staff, as helpful to implementation. This academician was convinced that the soundness of his proposal was what won his school administration's support in their demo-farm expansion and pushed the envelope to initialize a pig dispersal program. Though his school administration ultimately had not been able to appropriate full funding, his proposal was endorsed and granted a Php 125,000.00 seed fund by the Department of Labor and Employment (DOLE), which propelled his plan's realization.

For livestock entrepreneurs, the knowledge obtained from training especially for the aspects of *Prevention and Treatment of Common Diseases* and *Record-Keeping* were of outmost importance. They also touted the Center's *accessibility* and *accommodation* even years after their training. The ATI-ITCPH had been treated as a vital source of information and was fully appreciated for their *no-charge* or *free* consultations.

4. Limiting Factors to Plan Implementation

The survey results also discovered evidences on factors that limited implementation.

Noticeably fewer responses were garnered for this operational measure than the earlier discussion on facilitating factors, with *Budgetary Constraint* cited as the topmost limitation (Table 17).

Table 17. *Distribution of Limiting Factors to Plan Implementation (n=89)*

Limiting Factor	Frequency*	Percentage
Budgetary constraint	58	55.8
Changing work assignment	16	15.4
Lack of support of staff & management	11	10.6
Non-inclusion in priorities of management	11	10.6
Others	8	7.7
Total	104	100

**Multiple responses*

The qualitative data mirrored the disappointment felt on limited, if not unavailable funding, upon return in the locale. One local agriculture officer recounted:

> *"Malungkot, syempre… pagdating ko dun, pi-ni-present ko na, wala naman palang pondo. Kasi grabe sa preparation and presentation with panelists pa yan eh, formal presentation talaga. Pero pagdating sa office, no funds for implementation, nakakadismaya."* [I'm sad, of course… when I presented, apparently there is no fund available. The preparation and presentation during training were intense, with panelists even and it was really formal. But when I went back to the office, there were no funds for implementation. So disappointing.]

Meanwhile, others also encountered problems with their implementation *schedule*, as upon return to areas, the budget plan for the year had already been approved and so they had to wait for the next year's cycle of budget proposal, review and approval.

For some who envisioned an AI laboratory and service, budgetary constraints meant they could not purchase necessary equipments and breed stocks.

Some wished they had the knowledge on *where to source out alternative funding*, in cases when their own offices fail to support their plans. A cooperative member recognized that though he could ask help from lending agencies (i.e., Land Bank) his cooperative was hampered by the bank's loan requirements. It also entailed processing fees and given the repetitive filing required, his cooperative eventually just opted out.

A far second under limiting factors is the *Changing Work Assignment*, experienced by 15.4% of the respondents. Oftentimes, these changes in responsibilities and goals were mandated by their superiors, but some also revealed shifts in personal priorities. One DA-RFU staff shared that though he had a budget allotted for his plans and the support of his immediate superiors, the DA central office had given him another coordinative responsibility. As bureaucracy entails, the orders from the central office take precedence. He said that such responsibility would likely occupy his time for the next two years.

Tied in third place were the staff and management's *Lack of support* and *Non-inclusion in Priorities*. The FGD informants explained that the former refers to staff/colleagues who were *"hard-headed"* while a few admitted to have had professional conflicts, which resulted in lackluster participation. Some of these conflicts even led to detrimental variations in plans (i.e., transfer of authority from the alumna to another staff). One said that the lack of policy in his locality about animal waste management hampered his advocacy to promote to fellow backyard raisers.

The alumni also were excluded in management priorities, their plans deemed as "not profitable" by superiors or local chief executives (i.e., Mayor or Governor). A handful stressed that these local leaders hold agriculture-related projects in abeyance, most especially against infrastructure projects. As one extension staff said, *"Yan ang talagang sigurado na popondohan nila kasi sigurado ang kita."* [They are sure to fund that (infrastructure) because it means profit.]

Sometimes though, the concern of the plan itself was in direct conflict with the top management's priorities. One recounted that his AI proposal was not approved because it countered the current administration's aim to revive the native pig breeds that his province is quite known for.

Overall, informants posited that these two limiting factors of *Lack of Support* and *Non-inclusion in Priorities* were rooted in a struggle for power. Such struggle is stimulated by politics and hastened by periodic administration changes. This resulted in the lack of sustainability – the shelving of a particular project in spite of its efficiency and benefits. One veteran extension staff explained:

> *"Grabe kasi yung pulitika eh… paiba-iba yung partido na nagiging nakaupo. Kunwari maganda yung sinimulan nung isa, biglang hindi na itutuloy, napapalitan. Mashe-shelf yan kasi iba na yung priority."* [The politics affects (projects) heavily… parties and those who hold position always change. Even if a previous project is good, suddenly it would be discontinued and changed. It will be shelved because priorities have changed.]

Even as the informants agreed with these inhibiting factors garnered from the survey data, they also added other implementation challenges encountered.

The present economic conditions - like the costly inputs (i.e., feeds, energy) against a product that is priced disadvantageously by haulers - hurt the livestock raisers. This condition makes them feel helpless: *"Kapag sinabi nila (hauler) na ito ang presyo*

ngayon… wala ka ng magagawa." [If the hauler says that this is the price he will pay, you cannot do anything about it.]

Another farm owner assented:

> "*Ang pinaka-masakit, baboy na natin, sila pa ang nagpe-presyo, sila (haulers) pa din ang masusunod… Business mo sya, pero parang iba ang may-ari."* [What hurts the most, we own the pigs, but they (haulers) are the ones who dictate the price and you have no choice but to follow them. It might be your business, but it feels like someone else owns it.]

The national and local government extension workers were also put in a tight spot with these market-related issues, for how could they be expected to promote the industry given its lack of profitability? How could they pacify frustrated pig raisers who say: *"Promote nga sila (government) ng promote, pero paano naman yung nasa pinaka-mababang level?"* [They (government) are quite good in promoting (pig raising), but (in truth) how is that fair to us with small-scale businesses?]

When asked of any solution for these limiting market factors, the informants insisted that there should be government policies that protect small farmers from the dictates of the middlemen or the haulers. Though price regulation policies should be put in place, opinions diverged on *how much* of an imposition should the government be capable of. Some suggested a standard retail pricing (SRP) be set for live pig weights. Others wanted a more stringent monitoring, in the same manner that the prices for the basic commodities like rice, sugar and bread are controlled.

While a majority of them believe that the government's hand would address these market issues, others took it upon themselves to organize. Joining these groups of pig raisers allowed the informants to dictate their own pricing, bypassing the dictates of the middlemen. They tell their members: *"Kapag mababa (ang presyo), wag mong*

ibibigay… naghahanap kami ng buyer na mas mataas". [If the price is low, you should not sell… we'll just look for a buyer who offers a higher price.]

In their quest to be self-sufficient, one resourceful pig raiser just opted to establish a feeds supply business. Now, even if the meat pricing for in his island province is not that competitive, he need not worry of his feed costs. His savings make up for any profit he loses in selling pigs.

Aside from the economic/market forces, the *Beneficiaries' Mindsets* also limited implementation. Some informants were challenged by the preference for natural over the artificial breeding, while some encountered obstinate farm staff who refused to learn new techniques.

For the island provinces of Region IV-B, the preference of native over cross-bred pigs and the stringent quarantine measures challenged its livestock raisers from improving their stock's genetics. These farmers explained that transporting animals and its by-products to their provinces required a lot of permits from the DA-Bureau of Animal Industry (BAI) as well as their local agriculture or veterinary office. Luckily, with the country's declaration of being FMD-freedom last 2011, animal transportation challenges have lessened.

In last place, with the category *Others*, were a handful of informants whose implementation were hindered by the *Lack of Time* to put forth their planned projects.

In capitulation, upon return to field, the training alumni faced challenges concerned with sourcing funding, management decisions (lack of support, changing assignments or non-inclusion in the priorities) and lack of time. Outside factors such as the prevailing market price for inputs and their product as well as the people's mindsets,

to some extent, also affected their effectiveness. On a positive note, in the face of these economic issues, some individuals expressed self-reliance and joined with fellow pig farmers to assert fair product price.

Likewise with the last part of the knowledge change section, the participant characteristics' possible influences on plan implementation were also considered.

5. Participant Traits and Plan Implementation

Statistical testing using Independent Samples T-Test and Analysis of Variance (ANOVA) were applied for the two indicators of the plan implementation, against the alumni's characteristics (see Appendix J). The three sub-sections below discusses the notable findings.

a. Farm Enterprise

A statistical significance was found for the alumni's farm enterprise at 95% confidence level (Table 18).

Table 18. *Mean Scores on Level of Satisfaction according to Pig Enterprise*

Enterprise	Mean	P-Value
Backyard	1.93	.011*
Commercial	2.33	

**significant at p < .05*

Specifically, commercial raisers derived a significantly higher level of satisfaction out of their plan outcomes than the backyard farmers.

While no other significance was found, the trend of the level of satisfaction mirroring the degree of plan implementation was evident for the alumni's type of enterprise. Table 19 shows that the commercial raisers' degree of implementation had also been higher than the backyard raisers.

Table 19. *Mean Scores on Degree of Implementation according to Pig Enterprise*

Enterprise	Mean	P-Value
Backyard	2.14	.741
Commercial	2.20	

The difference between the two pig enterprises on implementation degree and satisfaction could be explained by the availability of resources. As mentioned earlier, quantitative and qualitative findings point towards the lack of funding as the top limiting factor of implementation.

In this case, even prior the onset of training, the commercial raisers were already in a better position financially than their backyard counterparts. With this advantage, the commercial raisers would have also exercised their decision-making capacity to allocate and utilize the said resource better than their backyard counterparts.

b. Course Type

Though not statistically significant, interesting findings were also observed for plan implementation's duration and satisfaction against the type of ATI-ITCPH course received.

As seen in Table 20, the Intensive and Basic course alumni have slightly higher degrees of implementation than the Trainors course alumni.

Table 20. *Mean Scores on Degree of Implementation and Level of Satisfaction according to Course Type*

Type of Course	Degree		Satisfaction	
	Mean	*P-Value*	*Mean*	*P-Value*
Trainors	2.00	.328	1.95	.085
Basic	2.21		2.25	
Intensive	2.25		1.75	

Inferred from qualitative data, the Trainors participants were mostly from the academe and the government. Such work orientation does not leave a lot of room for plan enactment. Here we see the divide between service- and profit-oriented institutions. While those from the Trainors course were mostly in charge of teaching (for the academe) or extension work (for the local government), those from the Basic and Intensive course, were compelled to justify the cost of their training , not only to themselves, but also to the company/enterprise they belong to.

However, in terms of the level of satisfaction, the *Basic* course alumni felt the most satisfaction with their plan outcomes, seconded by the *Trainors* alumni. In this respect, the earlier trend observed for the level of satisfaction mirroring the degree of implementation does not apply.

c. Level of Experience in Pig Raising

Table 21 presents the degree and satisfaction mean scores according to the alumni's industry experience.

Surprisingly, those with five years or less of pig raising experience (*low*) achieved a higher degree of implementation and level of satisfaction than those with more than five years of experience (*high*).

Table 21. *Mean Scores on Degree of Implementation and Level of Satisfaction according to Pig Raising Experience*

Level of Experience in Pig Raising	**Degree**		**Satisfaction**	
	Mean	*P-Value*	*Mean*	*P-Value*
Low (5 years or less)	2.26	.174	2.19	.237
High (more than 5 years)	2.06		2.00	

While not overtly stated in the group discussions conducted, it could be deduced that industry experience had something to do with the drive to implement the plans, noticed during the exploration of the experienced facilitating and limiting factors.

The veterans, particularly for those who hold positions in the academe or the government, generally exuded weariness when recalling their implementation challenges rooted in bureaucracy/politics. In contrast, those who finished the ATI-ITCPH course recently showed more optimism in enumerating their implementation experiences. Two of the younger informants in fact still felt quite confident that though their plans currently have not been fully realized, there are alternative means of implementation, with the help of others (i.e., cooperative/community members, office co-workers).

Aside from the statistically significant finding for the level of satisfaction significantly differing between the alumni's farm enterprise, and the aforementioned notable findings on course type and pig raising experience, no other relationships were found for plan implementation measures and participant characteristics.

It can be deduced that for the alumni, effective implementation required financial and management support, in a sustained manner, within a market environment that offered a reasonable margin of profit for the pig raisers.

It was observed that the level of satisfaction mostly reflected the degree of plan implementation. Statistically, satisfaction from the implemented plan was found to be significantly influenced by the type of farm enterprise.

With this elaboration on plan implementation as the second measure of integrated knowledge, the discussion now turns to the alumni's knowledge sharing activities.

D. Knowledge Sharing

The third objective of this study is concerned with knowledge sharing. Operationally, this concept of knowledge integration has seven indicators, as expounded in this section.

1. Beneficiaries, Frequency and Manner

Table 22 summarizes the data gathered for the alumni's knowledge sharing occurrence and beneficiaries.

Table 22. *Distribution of the Occurrence and Beneficiaries of Knowledge Sharing*

Particulars	Frequency	Percentage
Occurrence		
Yes	112	84.9
No	5	3.8
No Answer	15	11.3
Total	132	100
*Beneficiaries**		
Pig raisers	80	16.2
Family members	73	14.7
Farm staff	60	12.1
Neighbours	59	11.9
Clients	55	11.1
Colleagues	50	10.1
Students	48	9.7
Extension workers	40	8.1
Superiors	28	5.7
Others	2	0.4
Total	495	100

**Multiple responses*

Out of the 132 respondents, an overwhelming 112 (84.9%) confirmed to have shared what they learned (*occurrence*) from the ATI-ITCPH training. This eclipsed the aforementioned 67 alumni who had managed to implement their plans to a certain degree.

Multiple responses indicate that the majority of the respondents shared their pig production knowledge to *Pig Raisers* (16.2%), followed by *Family Members* (14.7%) and

Farm Staff (12.1%). On the other hand, they shared the least to their *Superiors* and to other *Extension Workers* with only 5.7% and 8.1%, respectively.

Inferring from these survey results and supported by qualitative data, knowledge sharing seemed to be directed by a combination of *professional* and *personal* goals.

Professional goals motivated the extension workers and the staff from the academe. It galvanized them to share what they have learned to pig raisers and students. Personal goals meanwhile meant sharing their knowledge with the farm staff and family members. Such sharing was done to further their personal pig-related enterprise.

Kiptot et al.'s (2006) findings support this. Familial ties were found to be one of the leading factors to knowledge sharing, more so than the factor of proximity (i.e., sharing to their neighbours). In contrast though, the alumni have been less discriminating of knowledge sharing with their neighbours and clients. Both only differed minimally with the frequency of sharing with family members and farm staff.

Table 23 in the next page shows that almost half of the alumni (42.4%) shared what they have learned *quite often* (thrice a week to everyday).

Some (30.3%) shared *some of the time* (once a week to once a month). Opposite such encouraging feedback, a minority (9.8%) said they *rarely* or *never* shared what they have learned.

Table 23. *Distribution of Knowledge Sharing Frequency (N=132)*

Knowledge Shared	Frequency	Percentage
Often to Always	56	42.4
Seldom to Sometimes	40	30.3
Rarely to Never	13	9.8
No Answer	23	17.4
Total	132	100

In terms of the manner knowledge was shared, *Interpersonal* or *Face-to-Face Communication,* or what the respondents referred to as sharing in an *Informal* scenario, clearly dominated with 52%, against sharing through the *Print* and *Broadcast Media*, with only 1.5% and 3.6%, respectively.

Table 24 summarizes the findings for the alumni's manners of sharing after receiving the ATI-ITCPH course.

Table 24. *Distribution of the Manners of Knowledge Sharing (N=132)*

Manners of Sharing	Frequency*	Percentage
Informal face to face interaction	102	52.0
Seminars/lectures/classes	53	27.0
Print materials (brochures, presentations)	20	10.2
Online	10	5.1
Broadcast media (radio or TV)	7	3.6
Newspaper or Magazine	3	1.5
Others (i.e., demonstration)	1	0.5
Total	196	100

**Multiple responses*

An extension staff informant expounded on *informal sharing* as instances when:

> *"Kahit makita lang ako sa palengke, may tanong na yun – 'Yung aking alaga, ayaw kumain at matamlay, ano ba gagawin ko'? Kahit saan (may nagtatanong) sa jeep, sa palengke, sa labasan may magtatanong sa iyo."* [Even if they just see me at the market, they have a question for me - 'My pig doesn't eat much and looks weak, what should I do'? Wherever I am, whether in the jeep, the market, even at the streets someone will ask me a question.]

This informant furthered that there were cases when people actively sought him out to ask questions and described his preference for face-to-face interaction:

> *"Minsan talagang sasadyain ka sa bahay, tapos sa opisina naman kapag work days. Hindi ako masyado nag-i-entertain ng text, mas maganda kasi kausap mo."* [Sometimes they seek me out at home, or at the office during working days. I do not usually entertain texts, it's much effective if I can talk to them personally.]

Other informal means of sharing included casual *"kwentuhan"* (story telling) and *"inuman"* (drinking sessions), especially for the male informants. Those who were partial to these manners of sharing claimed that those who asked for help "absorb" information easily when it was delivered informally.

Some also shared *formally* classified as instances when they served as resource speakers in *Lectures, Classes* or *Seminars* (27%). As the informants revealed, the opportunities to share their knowledge in group contexts go hand-in-hand with their job to instruct and train others. Naturally, the alumni from the sectors of the academe and government have more opportunities to share in such *formal* contexts.

Some of them supported their sharing activities with *print and broadcast materials* (10.2%). They also found powerpoint presentations, handouts and even videos helpful during these knowledge sharing opportunities.

As vital sources of pig production knowledge at the field-context, it is good to know that the alumni put their audience needs first. Informants from the academe reported that they adjust lesson plans and training modules to make it understandable and interesting for their students. The contents of these altered knowledge products were based from the ATI-ITCPH materials obtained during training. One extension worker explained: *"I-a-adjust mo sya sa kliyente kung ano ang level of knowledge nya, ganun din ang ipapakita mo."* [What you show to your client should be based on his level of knowledge.]

As shared by a livestock entrepreneur, she instructed her farm to read the print materials she got from ATI-ITCPH. When the topics got to be "too technical" for them, she took the time to explain the contents further.

Other informants narrated that at times, they found it more helpful for their beneficiaries if they relate what they know specifically to their current farm situation. They too felt a responsibility to constantly check if their staff applied what was taught to them, giving corrections and repeating instructions when needed.

Though only mentioned once in the survey, academe informants underlined the importance of supporting the lectures with *demonstrations/applications* – a lesson impressed upon the alumni during their training. One assistant professor explained this methodology's value, particularly for skills-based topics like semen collection and culling:

> *"Mas madali nilang natututunan kapag nakikita nila. Kaysa sabi lang ako ng sabi na mga 10% lang ang natatandaan nila, kapag sila ang nakakita mismo tapos gumawa sila, mga 80% siguro ang maalala nila."* [They learn better when they see it for themselves. Instead of me just talking where they only remember about 10%, when they see and do it by themselves, maybe around 80% they can remember.]

Another pointed out that knowing something theoretically is different from actual knowledge, particularly for AI. Of the course's practicum component, he said: *"Ngayon, pag tinanong mo ako sa dalawang ito (theoretical and actual knowledge about AI), alam ko na."* [Now, if you'll ask me about these two (theoretical and actual knowledge about AI, I know it.]

Even as it contrasted with the *Face-to-Face* manner of sharing, *Computer-Mediated Communications* (CMCs) were mentioned by most of the FGD informants as something they usually do. However, most considered it as part and parcel of *informal* sharing. According to the alumni, CMCs, particularly mobile phone's texting and calling features enabled faster sharing of information with lesser effort and resources.

Under the CMCs too were the 5.1% of the alumni who shared their knowledge online. The informants qualified online knowledge sharing as responding to email queries and two specifically mentioned the social networking site Facebook (FB): *"Meron sa FB minsan, nagtanong sya ng mga design ng pen sa chat, so ipo-post ko na lang sa (FB) wall nya."* [In FB chat one asked for some pig pen designs so I posted it on his (FB) wall.]

Newspapers, Magazines and the *Broadcast Media (Radio and TV)* took last place with a combined 5.1% share and were employed by those from the national and local government sectors, who had a corner on these media. Their access came through being invited by the radio or TV show management and through sharing to newspaper or magazine correspondents. These broadcast and print media were distributed locally, sponsored by the institution they belong to (local government) or the private sector (i.e., feeds or drug companies).

The FGDs also revealed clinic duty and consultations, the handling of On-the-Job Trainees (OJTs), field trips, and being featured in a school paper or newsletter as other ways which their pig production expertise were shared.

Recapitulating the alumni's knowledge sharing preferences, interpersonal channels mainly face-to-face interactions were the most preferred. These interactions occurred through formal (i.e., classes) and informal contexts (i.e., *kwentuhan,* walk-in consults). These face-to-face/interpersonal preferences boast well for knowledge re-distribution if Joshi, Sarker and Sarker's study (2004) is to be believed. Their research revealed that on the average, face-to-face communication yielded three times more knowledge being transferred, in comparison with virtual communication.

2. Type of Knowledge Shared and its Usefulness to Beneficiaries

The informants concurred that their knowledge sharing activities were *demand-based*, catering to their recipients' current information needs. This *demand-oriented* communication of knowledge is described as one of the "desirable conditions" for rural communication (UN-FAO and GTZ, 2006: 12). Development communication researches (Salmen, 1999 and Rivera, 2001) extolled too the value of learning opportunities being "need-based" for it to be successful.

Knowledge needs most often were concerned with *Common Diseases and Treatment*. Clients or fellow pig raisers ask for the alumni's knowledge of health threats (i.e., diarrhea, pneumonia, lack of appetite and stunted growth) to the herd. A few meanwhile shared what they knew about *Breeding*, particularly artificial insemination and *Heat Detection* (i.e., proper breed and age, necessary procedures and equipments). The local government staff and livestock entrepreneurs were also often asked about *Feeding* ratios and feed types specific for a pig's growth stage. Some also gave advice about *Housing* design, with queries ranging from the cheaper alternative materials for roofing and flooring, as well as pen and feed trough specifications.

They also responded to occasional information needs on the current *Farm and Market Prices* and *Waste Management* techniques. These two needs stem from the viability of venturing into pig raising *vis-à-vis* the challenges it pose to the investor. An agriculture professor and waste management practitioner narrated his clients' common concerns:

> *"Ang laging tanong is yung paggawa ng organic fertilizer. Ang tanong nila ay kung paano, kasi mabaho yan eh at alam nila na laborious din yan… May tamang process. Dapat proper decomposition. Sine-share ko yung techniques and technology kung paano nila hina-handle yun (amoy*)." [They often ask me about

> organic fertilizers. They ask me how to do it because it smells unpleasant and they also know it's laborious to make… There is a right process... There should be proper decomposition. I share the techniques and technology on how they could prevent such smell.]

To summarize, the alumni were often asked of an array of topics concerning the pig raising operation. Their beneficiaries asked about day-to-day tasks such as feeding, housing, waste management, breeding and heat detection. Their knowledge were also sought when a pig's health is at risk. Their opinions on market-related topics, such as pricing and operation feasibility, also mattered to their beneficiaries.

Another indicator used for knowledge sharing was the perceived usefulness of the knowledge shared to their beneficiaries, summarized in Table 25.

Table 25. *Distribution of the Perceived Usefulness of Knowledge Shared (N=132)*

Knowledge Shared	**Percentage**
Very Useful	56.8
Somewhat Useful	22.0
Useless	.8
No Answer	20.5
Total	100

Survey data indicated that more than half (56.8%) believed that the information they imparted to others have been *very useful.* Almost a quarter (22%) also was convinced that their communication of their pig raising knowledge *somewhat* helped others. In negligible opposition was a lone respondent (0.8%) who indicated that the shared knowledge was *useless.*

These high usefulness ratings beg the question of how do the alumni know their sharing indeed benefitted others. According to the informants, there were contextually-based ways to verify their messages' effectiveness.

For the academicians, their students' grades – the fail or pass marks on written, oral and practical exams – are reflections of their teaching effectiveness. One assistant professor explained: *"Sa klase, kapag pumasa, ibig sabihin nakuha nya yung tinuturo ko."* [In class, if one passed the course, it means they understood what I taught.] Conversely, the teachers were evaluated annually by their superiors. This evaluation also holds true for those who belong in government service.

For the rest of the beneficiaries, one popular usefulness indicator is *return rate* or when a beneficiary comes back to ask another question. The informants reasoned that not only will return verify that their advices have been effective, it also meant that they were deemed as trustworthy and credible knowledge sources. An LGU staff enthused: *"Kapag nagtanong uli sa iyo, ibig sabihin effective yung dating sinabi mo. Ibig sabihin may tiwala na sa iyo."* [When they ask for your advice again, it meant what you had said before was effective. It means they trust you.]

A variation of return rate is *client referral*, when new clients come to them for advice per the endorsement of a previous client. These concepts of return rate and referrals are rooted on the values of trust and credibility. The alumni partly attributed their credibility to the training received. Incidentally, trust, according to Davenport and Pruzak (n.d.), is a vital factor in knowledge sharing. A person's title or position is a top indicator of "who has or should have valuable knowledge" (4). Opposite of this are informal knowledge sources, when people of similar stature "ask each other who knows what, who has previously provided knowledge that turned out to be reliable and useful" (4). While majority of the informants preferred *informal* ways of sharing knowledge (i.e., *kwentuhan*, office and house visits), it cannot be denied that both their occupation and

their training led people to deem them as credible, their advice on pig raising as trustworthy.

Additionally, some alumni equated their knowledge sharing successes with their pig raising earnings. This mostly holds true for the academicians put in-charge of their school's income generating projects post-training. They were bound to justify annual budget allotments to their superiors (i.e., school board) for its maintenance and expansion.

Judging the usefulness of knowledge shared has a more direct route for others who conduct follow-ups, done through texting or calling. In some cases, they go as far as personally visiting the homes of their beneficiaries. As one extension worker explained, nothing beats seeing their advice's progress with their "own eyes".

However particularly useful the knowledge shared was deemed to be, it was also affected by several factors, exposited in the next two sections.

3. *Facilitating Factors to Knowledge Sharing*

Open-ended survey responses categorized thematically indicated a quarter of the alumni who attributed the act of sharing to the *Nature of their Work* (Table 26).

Table 26. *Distribution of Facilitating Factors to Knowledge Sharing (N=132)*

Facilitating Factor	Frequency*	Percentage
Nature of work	34	25.8
Personal characteristics	31	23.5
ITCPH-related	30	22.7
Recipient-oriented	20	15.2
Channel of communication	9	6.8
Institutional support	4	3.0
Financial motivation	2	1.5
Others	2	1.5
Total	132	100

**Multiple responses*

This was noticeable for the Trainors course alumni, whose main work responsibilities involved extending relevant information to livestock stakeholders. The social context the livestock entrepreneurs belong to also encouraged sharing since they regularly socialized with fellow pig raisers (i.e., during cooperative meetings or seminars), family members and farm staff.

The alumni's *Nature of work* as contributory factor to knowledge sharing would be better explained by research findings from human resource. Foss et al., (2009) in their exploration of job design and knowledge sharing on firms posited that if a staff believes that the organization expects them to share what they know, then such staff would "make an effort to comply with that expectation to maintain feelings of worth" (875). Such effort eventually tallies to high engagement in knowledge sharing. As majority of the informants were from the academe and government sectors, the work-inherent *expectation* for them to share what they have learned to others indeed exists.

In a slighter degree, the alumni's *Personal Characteristics* (23.5%) also helped them share what they have learned. Among the top qualities that helped were self-confidence, drive, commitment, skills, knowledge and experience. Altruism also was in evident. One professor shared:

> *"Marami kasi na less fortunate sa area namin, mga rural people. Eh may advantage ka, bakit di mo ise-share? Kailangan ibahagi mo kung ano ang meron ka."* [There are plenty of less fortunate rural people in our area. If you have an advantage, why would you not share it? You need to share what you have.]

The informants also mentioned having an approachable/accommodating demeanour, an eagerness to learn, share and improve, as well as the appreciation if not 'passion' for animals and agriculture as essentials to knowledge sharing. Social science

explains such in terms of a person's intrinsic motivations, where some are intrinsically motivated to share what they have "simply out of passion for their work and as an expression of themselves" (de Vries et al., in Gagne, 2009: 574).

Closely following the alumni's personal characteristics, 22.7% directly attributed to the Center the knowledge and skills on pig raising they currently have, categorized as *ITCPH-related* factors.

The amount of exposure to 'demonstrations/hands-on/actual applications' on essential pig raising activities and the information materials training had provided them developed their confidence in catering to the knowledge needs of others, as one local government staff attested:

> *"Confident ka na sa knowledge mo, kasi galing ka na dito, natutunan mo na. May back-up nang tama yung ginagawa mo, yung itinuturo mo."* [You become confident of what you know because you came from the Center, you have already learned. You now have a back-up (confirmation) that what you are doing, what you are teaching is right.]

The reputation of the Center as the main source of knowledge about pig raising in the country were also extended to some who remarked that they too were now treated as pig "experts" within their communities, such as the case of an LGU staff: "*Minsan nga tinatawag ako na (animal) doctor eh, kahit hindi. Kino-correct ko na lang."* (Sometimes they tend to call me doctor (veterinarian), even if I'm not. I just correct them).

Still under the *ATI-ITCPH-related* category, the alumni considered the good relationships and the communication networks that they have with the Center's staff as vital to how they continuously learn and share. They feel confident of their knowledge sharing effectiveness because they could always clarify aspects they are unsure of to an ATI-ITCPH staff, even years after training. As one professor quipped:

> *"Approachable kasi sila… na-establish yung magandang communication, magandang relationship… Parang "call a friend" yang mga yan, mayroon laging online".* [They are approachable and the good communication and relationship have been established. They are like a "call-a-friend", someone is always online.]

Essentially, the positive manner the Center's staff accommodated the alumni and their queries was also the way the alumni treated those who sought their knowledge.

In direct contrast with *Personal Characteristics* were some *Recipient-Oriented* factors (15.2%) that encouraged knowledge sharing. The alumni were especially encouraged to share to someone who were familiar, if not already involved with pig raising and if they were geographically "accessible". Knowledge sharing was also made easier if those who needed information sought the alumni out personally, if they appeared to be "respectful" and someone who "trusted" their opinions. The discussions also uncovered other *recipient-related* aspects where, like any communication activity, the ability to "listen" and one's apparent "interest" and "willingness to learn" encouraged the alumni to share more.

A few respondents (6.8%) focused on specific *Channels* which provided them opportunities to share their expertise. Under this category were the preferences for face-to-face communication, giving seminars and demonstrations and supervising agriculture projects. Some also took advantage of the traditional (radio) and new media channels (internet and cellular phones).

From this *Channel* category, a mixture of alumni preferences – from face-to-face communication to the use of the new media was seen. Preference for the latter may be explained by the aforementioned ICT advantages of being mobile, ubiquitous, fast and relatively affordable (Singh, 2006). On the other hand, direct manners of knowledge sharing such as in classes, seminars or consultations also have its advantages. Face-to-

face communication was determined to be useful in terms of gathering cooperation and in sharing emotions (Arvy, n.d.). As it is synchronous, it was generally preferred when discussing complex tasks, such as the processes involved in operating a farm enterprise.

Institutional support also helped a few (3%) particularly with the allotment of resources and when one have good relationships with superiors and colleagues. *Financial motivation* meanwhile was deemed important only by two alumni. The same number said that having the available *time* and having an AI laboratory helped them transfer pig raising knowledge and technologies to others.

In summary, the alumni determined the factors that enabled them to share what they have learned. The alumni's personal characteristics, work engagement, the knowledge and confidence gained from training, and having receptive audiences all contributed to their knowledge exchanges. At the periphery, management support, getting their hands on the right technologies, having the available time and budget were also deemed helpful.

4. Limiting Factors to Knowledge Sharing

The last indicator of knowledge sharing investigated for this study was the limiting factor/s encountered by the alumni.

Table 27 at the next page presents the limiting factors culled from the survey data.

At the forefront with 24% hinged on the *Recipients* of pig raising information. The alumni were unwilling to share when faced with “narrow/close-minded”, “uncooperative”, “stubborn” or “uninterested” audiences. One professor pertaining to his students explained, *“... kahit anong gawin mo, kapag hindi motivated, wala na talaga*.” [if unmotivated, whatever else you do will have no effect.]

Table 27. *Distribution of the Limiting Factors to Knowledge Sharing (N=132)*

Limiting Factor	Frequency*	Percent
Recipient-oriented	24	24
Time	16	16
Personal characteristic	16	16
None/Nothing	14	14
Other priorities	13	13
Financial constraints	12	12
Others	5	5
Total	100	100

**Multiple responses*

Some also hesitated if their recipient acts like a '*know-it*-all' or if he/she is *'mayabang'* (full of him/herself). These identified *'turn-offs'* are similar with the finding of an Ohio State Univesity study (Wingerter, Kleon and King, 1995) where self-motivation and showing respect were among the encouraging factors older employees looked for in establishing relationships with new employees. Communication experts put emphasis in listening skills, not only for cognitive gains (i.e., understanding, ability to perform tasks), but also for affective gains, such as showing positive regard (i.e., respect, trust, enthusiasm) to the one speaking (Samovar and Porter, 1998).

Still under *Recipient-Oriented* factors, the informants were limited by "accessibility" and "timing" that is, when the problems they have to address, like pig diseases, have become too adverse to treat.

Some also curtailed knowledge sharing if their recipients already have negative notions of pig raising. Others deemed it a challenge to share their views if it goes against *traditional* thinking, like the general preference for native pigs and natural breeding. One farm manager recounted: *"Minsan din kasi hindi sila naniniwala, sasabihin sa iyo na 'mas matagal na ako sa iyo, bakit ako maniniwala"?* [Sometimes they don't believe, they tell me that 'I have been here longer that you, why should I believe you?]

Lastly for *Recipient-oriented* limitations, livestock entrepreneurs were reasonably careful in sharing what they know in the face of the risk that their beneficiaries could be their future business competitors. Such curtailing of sharing was also observed in Oye, Salleh and Noorminshah's (2011) exposition on communication *demotivators*, where workers refused to share what they know to possess competitive edge and attain job security.

Aside from these *Recipient-Oriented* factors, the alumni also have contended with the *Limited Time* to communicate to others (16%). Nevertheless, looking back at the degree to which the sample shared their knowledge (*everyday* to *once or twice a week*), the ATI-ITCPH alumni comparatively fared better than the faculty and extension specialists in Canada, where only 48% have dedicated 18% of their time in researching and extending organic farming information (Kang, et al., 2005).

The alumni were also limited by their own *Characteristics* (16%). Hesitance towards sharing stemmed from their perceived lack of knowledge, skill or actual experience. A few withheld sharing because they might give "improper information", since they only have 'basic' knowledge. For one instructor, it stemmed from the presence of veterinarians in his area, whom he presumed "knows more" about pigs than him.

Physical/health limitations also affected a few who said that no matter how strong your desire is to share and implement, when personal health becomes affected, job effectiveness surely suffers.

Having their attention split to *Other Priorities* also hindered some alumni. The said priorities may be personal (i.e., family demands), a change in the business they were currently engaged to, or a work assignment shift.

In contrast with the results of plan implementation (55.8%), only 12% of the alumni found *Financing* as a limiting factor to knowledge sharing. But, for the extension agents, this not only meant their own offices' funding limitations, but also that of their beneficiaries. One professor contextualized the futility of sharing as:

> *"…wala resources din yung pagbibigyan mo… Bibigyan mo sila ng knowledge and skills eh ni wala naman silang paglalagyan man lang ng biik."* [your recipients too do not have resources… You would give them knowledge and skills but they don't even have a pen to put their pigs in].

Here then, it is apparent that even the most basic requirements to pig raising, such as proper housing and feeding, could not be adopted – not because the beneficiaries doubted its positive effects – but because they lacked the resources to do so. Such weighing of cost-benefits was also observed in the case of US farmers, where the most adopted technology is the one which required the lowest monetary investment (Barao, 1992).

Further classified under this factor were instances when the alumni felt that the use of educational *Resources*, such as laptops and projectors, could have made them more effective knowledge sources. Lamentably, these educational aides were often out of reach:

> *"Minsan may training ka, dapat naka-LCD ka… pero ayaw ipahiram ng school kasi ilalabas mo daw, baka masira mo. Ang gusto mo lang naman maganda ang dating mo sa community…"* [Sometimes when you have training and you were supposed to use an LCD… but the school doesn't let me borrow it for outside use because I might break it. Even if what I just wanted was to present well to the community.]

For the last limiting factor identified (*Others*; 5%), a couple took this as the lack of available data and networks where they could have shared their knowledge. They also pointed out that what they knew were not necessarily conducive to another person's situation. Physical/environmental factors also affected the ways the alumni shared

knowledge. Conditions like being *too noisy*, *raining/typhoons* and *too hot* lessened their sharing frequency, length and even the quality.

In the face of these limitations, quite remarkable were the 14% of the respondents who indicated that they could not conceive of any reason that should hinder them from sharing what was learned. One stated a firm belief in *karma*: "the more you share, the more blessings you receive".

With these limiting and facilitating factors to knowledge sharing, the next discussion explores the participant characteristics and possible relationships with the measures of knowledge sharing.

5. Participant Traits and Knowledge Sharing

Similar to plan implementation, the statistical tests using Independent Samples T-Test and the Analysis of Variance (ANOVA) were applied for the two quantitative measures of knowledge sharing against the six participant characteristics (Appendix K). While no statistically-significant value had been found, some interesting trends for three alumni characteristics were observed.

a. Sex

One trend observed was for the participants' sex where females shared pig raising knowledge *slightly more than* the males (Table 28a).

Table 28a. *Mean Frequency and Usefulness Scores of Knowledge Sharing according to Sex*

Sex	**Knowledge Sharing**	
	Frequency	*Usefulness*
Female	2.63	2.83
Male	2.33	2.67

This difference, while not statistically significant, was also reflected in the perceived usefulness of the shared information to the alumni's beneficiaries.

If the focus group discussions conducted were to be treated as knowledge sharing opportunities, then this difference between the alumni's sex had also been noticeable. While most informants were men, the women exhibited the willingness to share their experiences and thoughts equally, if not a bit more than the males. However, it should be clarified that no direct comments pertaining to gender differences were garnered during the actual FGDs.

b. Sectors

Those from the academe and the local government sectors shared more than the livestock entrepreneurs and private company employees (Table 28b).

Table 28b. *Mean Frequency and Usefulness Scores of Knowledge Sharing according to Sectors*

Sector	**Knowledge Sharing**	
	Frequency	*Usefulness*
Academe	2.67	2.71
Local Government	2.43	2.83
Livestock Entrepreneur	2.39	2.67
Private Corporation	2.24	2.52

This supports the qualitative finding that *Nature of work* facilitated knowledge sharing, as both the teachers from the academe and extension employees from the LGUs were compelled to extend pig raising knowledge to their respective students and clientele. On the other hand, as the discussion on plan implementation posited, entrepreneurs and private employees were more compelled to put their plans into action, than their academe or government counterparts.

Also, the alumni's self-assessed scores for their knowledge sharing activities mirror perceptions of its usefulness to others. Those from the LGUs felt the knowledge they have shared has slightly more useful than those from the academe. This was opposite of the abovementioned observation on the frequency of sharing.

c. Level of Exposure to Training

Lastly, as presented in Table 28c, the alumni with advanced training shared more than their basic counterparts (*always/often* and *sometimes*, respectively).

Table 28c. *Mean Frequency and Usefulness Scores of Knowledge Sharing according to No. of ATI-ITCPH Training Received*

Level of Training Exposure	**Knowledge Sharing**	
	Frequency	*Usefulness*
Advanced (2 or more courses)	2.55	2.71
Basic (1 course)	2.31	2.75

However, both were convinced that the knowledge they have shared to their audience have been *very useful*.

From the qualitative data gathered, these observations for frequency and usefulness of sharing could be explained by the increased knowledge and confidence that additional learning opportunities bring to the alumni.

In the case of an informant who took both the Trainors and the short course on animal waste management for example, merging the two related disciplines naturally increased his areas of expertise. This allowed him to answer his beneficiaries' knowledge demands not only on how to better their pig production operation but also how to efficiently utilize the animal waste and by-products to save on farm inputs.

It can be surmised that the alumni's knowledge sharing activities were facilitated foremost by the nature of work, were reinforced by some qualities possessed by the

alumni, as well as the knowledge and skills gained from the ATI-ITCPH. Alternatively, the personality/attitude of the recipients and some lingering self-doubts their technical competencies mostly inhibited the drive to share knowledge. While the statistical tests applied did not yield statistically-significant results, some trends were evident for the participant characteristics of sex, sector and specialized training exposure.

E. Other Manifestations of Knowledge Integration

Apart from knowledge change, plan implementation and knowledge sharing as indicators of knowledge being integrated, this study also explored evidences of other manifestations.

1. Change in Self-Confidence and Perceptions

The KM literature suggests the possibility that knowledge increase also build confidence and positive attitude. Hence, the researcher sought evidences of such in the field data collected.

As Table 29 shows, more than half (68.9%) of the alumni *strongly agreed* and almost a quarter (23.2%) *agreed* that the ATI-ITCPH training increased their confidence about pig raising while conversely, only two or 1.6% disagreed.

Table 29. *Distribution of Agreement on Increased Confidence Post-Training (N=132)*

Increase in Confidence	**Percentage (%)**
Strongly Agree	68.9
Agree	22
Undecided	2.3
Disagree	.8
Strongly Disagree	.8
No Answer	5.3
Total	100

The informants' elaborations of the changes in self-confidence support this positive survey finding, as one farm manager explained:

> *"Nakikipagtalo na ako ngayon sa mga tauhan namin. I now have the confidence to correct mistakes especially for actual application. Malaking tulong yung actual demo sa training."* [I can now argue with my farm staff. I now have the confidence to correct mistakes especially for actual application. The actual demonstrations during training helped a lot.]

The increased self-confidence for some brought positive shifts in knowledge sharing activities. One LGU staff said that whereas before, during extension work, he relied on his supervisor to give the lecture because "*ayaw ko na madaming nakatingin sa akin."* [I don't like it when a lot of people are staring at me.], now he is the one who gives seminars to the pig farmers within their province. Additionally, the lively way the ATI-ITCPH staff conducted their training inspired him to engage his audience more:

> *"…kasi minsan may natutulog sa klase eh, alam ko na ngayon ang paraan kung paano mag-lecture na magising sila."* [because sometimes there are people who sleeps on my class, but I now know ways on how to keep them awake during lectures.]

Even those who belong to the academe with animal science teaching loads benefitted. Whereas before, they were unsure of the applicability of what they were teaching: *"…puro in theory lang galing sa pagbabasa, pero hindi sure kung paano ang gagawin sa field."* [all I knew before was purely theoretical, from what I have read, but I was unsure how to actually do it in the field.] The course, with its combined methodology of lecture and application, imparted theoretical and practical knowledge which built the alumni's confidence. This combined methodology inspired them to think of how they could better relate the necessary pig raising concepts to their students, who are the future livestock farmers and technicians.

Other than confidence, the study also uncovered changes in attitudes. Table 30 presents four additional manifestations of knowledge integration.

Table 30. *Distribution of Assessments on Other Manifestations of Knowledge Integration After Training (N=132)*

Manifestation	Strongly Disagree	Disagree	Unde-cided	Agree	Strongly Agree	n	Mean
			Percentage (%)				
Prompted thinking about improvements	-	-	1.5	24.2	68.9	125	4.7
Treat pig raising as a business	-	.8	2.3	29.5	49.2	123	4.6
Realization of role in livestock development	-	-	.8	31	62.1	124	4.6
Feel proud of job/business	-	-	1.5	25	67.4	124	4.7

Almost a quarter (24.2%) *agreed* and 68.9% *strongly agreed* that the course incited them to think about what *improvements they/their clientele could do* to their farm practices. The course also had *strongly encouraged* half of the sample to treat pig raising as an enterprise, as opposed to the traditional *alkansya* (piggy bank) mentality.

With a cosmopolitan sense, more than half (62.1%) *strongly agreed* that the course made them realize the crucial role they play in livestock industry's development. Even with the challenges encountered in knowledge integration, the training also triggered a sense of ownership and pride. More than two-thirds (67.4%) *strongly agreed* and a quarter (25%) *agreed* that the course made them *"feel proud"* about their jobs or businesses.

Complementing these quantitative findings, the informants during the FGDs also recognized the presence of knowledge integration manifestations outside the categories of knowledge change, sharing or plan implementation.

For example, two indicated that the pig raising knowledge gained encouraged them to apply it in other agriculture-related fields, such as waste management and organic farming. Two informants shared that they were now "more active" in the cooperatives they belong to. One of them took pride in the fact that the backyard farmers in his community now seek their cooperative's marketing expertise. Their cooperative also established a small meat shop that caters to their members at a lower price, with the pigs sourced from their members' farms.

The promotion of artificial insemination (AI) also seemed to be another manifestation of knowledge integration. One recalled that aside from influencing a friend to venture into semi-commercial pig farming, he also noticed that slowly, through his enterprise, other people were being convinced of the advantages of AI:

> *"…dahan-dahan nagbabago na ang kanilang attitude dito… Ngayon, naiinggit na yung kapit-bahay ko kasi ang lalaki ng mga alaga ko. Napapaisip na din sila."*[slowly their attitude on it (AI) is changing… Now, they are jealous of me because my pigs are big. It makes them re-evaluate their choices.]

Another informant shared that though his plan for an AI center did not materialize due to lack of funding, the knowledge he shared to a friend turned his plan to reality:

> "*Sila yung mga kasama ko para matupad yung pangarap ko na AI center. Nagtraining sila sa ITCPH pagbalik nila, sila na ang nag-start… from one boar naging anim na."* [They provided a way to realize my dream of an AI center. They also trained in the ITCPH and whey they came back they started… from one boar they now have six.]

The fulfilment of his plans through the help of friends emphasized to him the value of self-reliance and to not be stumped by the dwindling budget allotment:

> *"…nakaka-demoralize din kung iisipin mo. Pero dapat maging resourceful ka. Kung hindi pwede sa government, sa private... dapat public-private* mix. [… it's demoralizing when you think about it. But you have to be resourceful. If it did not

work in the government, then try the private... there should be a public-private mix.]

Another manifestation of integrated knowledge was the renewed interest in learning, as inferred from some who plan to enrol in another ATI-ITCPH course in the near future. Two were planning to complement their campus' pig production with a meat processing establishment, as part of their income generation programs. The alumni's enthusiasm for learning could also be indicated by how they reached out and convinced others – whether a fellow cooperative member, a neighbor or a work colleague – to undergo ATI-ITCPH training.

In recapitulation, the ATI-ITCPH training, aside from changing knowledge, prompting plan implementation and knowledge sharing, also had been able to increase the alumni's confidence and elicit pride on the alumni's pig industry engagements. It made them re-evaluate the possibilities for work and enterprise improvements. It also ushered a positive regard for the role they play within their community's livestock industry. Textual and thematic analysis of FGD data also yielded manifestations of applying what was learned to other agricultural endeavours (i.e., market supply, meat shop, AI center), as well as the renewed interest in learning and in cooperative participation.

2. Associations about the Center

The qualitative approach, particularly the use of projective techniques, enabled the surfacing of the alumni's perceived relationship with the Center.

Positive associations were obtained when the informants were asked to relate ATI-ITCPH to a person in their lives. They perceived the Center as a person of authority and of kinship (Table 31).

Table 31. *Thematic Associations about the Center*

Theme	Associated Person*	Connotation
Authority	*Father*	Gives guidance
	Older brother	You can seek advice
	Boss	Admirable Professional
	Teacher, Consultant or Extension worker	Provides knowledge/lessons
Kinship	*Partner or Asawa*	Irreplaceable Reliable Has a good relationship with
	Friend	Provides help and support Complements your qualities
	Family member	Part of your life Always provides support
	Colleague	Someone to collaborate ideas with Can approach if something needs to be done

**Direct Quotes*

In terms of *authoritative associations*, the alumni identified the Center to people who connote guidance, such as being a *father*, *older brother* or a *boss*. They also saw the institution as a "provider of knowledge" likened to a *teacher/professor*, a *consultant* or an *extension worker*. One likened the Center to a professor he had in college, who taught him well and encouraged self development: *"…ituturo nya kung ano ang tama, pero nasa sa iyo kung susundin mo o hindi*." [… he will teach you what is the right thing to do but is will be up to you if you will follow it or not.]

The ATI-ITCPH was also associated to someone whom the alumni felt certain *kinships* with. Under this category were those who saw the Center like a *partner* or *asawa*, someone who is irreplaceable, reliable and someone you enjoy a good relationship with. One likened ATI-ITCPH to his wife, because he feels like the Center

is always with him: *"... mula umaga, tanghali at gabi, part sya ng buhay"* [… from morning, noon and night, it is a part of (my) life.]

Others related the Center to a *good friend* since it was someone "you ask for and give help to*"* or as someone who complements their personality.

The remainder related the ATI-ITCPH to a *family member*, whom they continuously interact with and a huge "part of life" or, to a trusty *colleague* since: "*Kapag work-related responsibilities pwede akong magpatulong sa kanya. Parang may collaboration of ideas."* [If it is a work-related responsibility I can ask for his/her help. There is a collaboration of ideas.]

Thus, it can be surmised that the alumni perceived the Center as an authority in the field of pig husbandry and an institution that provided knowledge and guidance. The Center, when personified is someone whom they could, if not already had, established a day-to-day, beneficial relationship with. They also felt that the Center was, and still is, an invaluable partner in their work and lives.

While such results boast well for the alumni's perception of their relationship with the Center, it is also important to explore how the training, as the extension-education component of the ATI-ITCPH, was perceived.

3. Associations about the Course

In order to support the positive valuations attached to their training, the informants were asked to think of an object that would best represent what the ATI-ITCPH course meant for them.

Coded, analyzed and grouped thematically, the responses centered on three themes of *function*, *emotion* and *aesthetics* as shown in Table 32.

Table 32. *Thematic Associations on ATI-ITCPH Course Received*

Theme	Associated Object*	Connotation
Functional	*Computer* *Hard disk* *Dictionary* *School*	Accessible and reliable sources of information
	Coconut tree *Syringe* *All-in-one vaccine* *Tackle/tool box*	Provided holistic and versatile knowledge
	Car *Boat* *Shoes*	Mobility or conveyance to places
	Cell phone *Power supply* *Incurable cancer*	Integral and necessary
Emotional	*Ex Girlfriend* *Telenovela*	Good memories Entertainment
	Gold	Valuable
Aesthetic	*Rock*	Steadfast and high-impact
	Pig	Field of livestock

**Direct Quotes*

The alumni predominantly valued the course because of its *functionality*. Objects that were accessible *sources of information* (i.e., dictionary, computers, hard disk) and an institution that *highlighted learning* (i.e., school) were linked to the course received. It was also perceived to offer *versatility* (i.e., coconut tree) and as a *holistic package* that gave necessary knowledge and skills regarding the pig industry. One informant expounded that the appreciation he has for his tackle box describes how he values his ATI-ITCPH training, as both make him *feel secure: "Kumpleto. Kapag dala ko ito, okay na ako."* [It's complete. If I have this, I'll be okay.]

Still under the theme of *functionality*, a few believed their training brought *new experiences and opportunities*. One informant likened the course to a boat which can go to places that were previously unexplored: *"Parang ako after training, madami din*

napuntahan dahil invited ako as a resource speaker ng mga agencies." [Like me after training, I was invited as a resource speaker by several agencies.]

The alumni also related the knowledge they gained to a power source. Possessing it is vital to get further in their work and lives. Their training is something that is *mahirap maiwan* or *tanggalin* [difficult to set aside], hence the associations given: cell phones, power supply and as an incurable disease.

While lesser associations were made for those *emotional* in nature, it also showed how the training touched not only the mind, but also the heart. Case in point, one entrepreneur likened the course to his *ex-girlfriend*. While his training had not been applied as his family's pig raising plans fell through, he fondly remembers his ATI-ITCPH experience, hence the ex-girlfriend association: *"Hindi kami nagkatuluyan, pero nung naging kami, enjoy kami."* [We did not end up together, but when we were together, we did enjoy a lot].

Other than entailing fond memories and as a source of fun and even entertainment, two informants also associated the course with *gold*, reflecting the *value* and *prestige* it brings to those who possess it.

Another entrepreneur said: *"Nabigyan ng kinang ang buhay ko… kasi nakilala ako sa amin dahil sa kaalaman ko sa baboy."* [It added light to my life… because I became known in our area because of my knowledge about pigs].

Finally, a couple likened the course to a rock, which connoted the *strong impact* it made to their lives. Another two, went for the obvious *(aesthetics)* and related it directly with the act of raising pigs.

With these positive associations about the Center and the training received, the next chapter reveals this evaluation study's general findings and conclusions.

VI. SUMMARY AND CONCLUSIONS

This chapter summarizes the study findings across the three general concepts investigated (knowledge change, plan implementation and knowledge sharing) in determining how knowledge from the ITCPH courses were integrated. It also highlights other manifestations of knowledge integration and intersperses the significant findings for the participant characteristics' influence on the three concepts of knowledge integration. This chapter also conclusively states how the alumni fared in integrating the pig production knowledge learned from training to their field work and personal lives.

A. On Knowledge Change

The combined quantitative and qualitative approaches surfaced evidences of positive changes in knowledge. Quantitatively, it confirmed that the ITCPH course received had been holistic as the alumni reported significant knowledge gains for all the 13 basic aspects of pig production investigated. Comparatively, while only 12.9% of the sample judged themselves as possessing *highly* knowledgeable on pig raising prior training, this figure dramatically increased to 68.2% after training.

1. Knowledge Changes per Pig Raising Aspect

The ranked mean scores demonstrated the per aspect difference in knowledge before and after the course, as enumerated below:

a. Heat Detection, Culling and Management

Dramatic positive shift in knowledge occurred for the aspects of *Heat Detection*, *Culling* and *Management*. The qualitative findings affirmed these gains and also surfaced the presence of the differing types of knowledge change.

Knowledge replacement occurred for heat detection, since the training afforded them practical and reliable ways of determining the sows breeding receptiveness.

For culling, the training also taught the alumni to temper emotional attachments to their pig herd, lest productivity and profit are put at risk.

However for a minority who had the previous work experience or education, the course only managed to reinforce their previous knowledge on culling.

For management, the alumni gained a holistic view of the previous piece-meal treatment of the day-to-day activities on a pig farm operation. They now see how all the aspects are related to one another and how each should be geared towards optimized production.

b. Breeding, Feeding and Herd Selection

While the alumni classified the aspects of *Breeding, Feeding* and *Herd Selection* as aspects they were already aware of prior training, further analysis revealed that knowledge still increased post-training.

Qualitatively, training replaced the previous adherence to the traditional natural breeding in favor of the more convenient and effective practice of artificial insemination.

For feeding, the course imparted the value of giving feeds with the right quality, quantity and manner so that the ideal weight and nutrition could be achieved.

In terms of herd selection, the training provided performance and record-based qualities a pig should have in order to be selected for breeding.

c. Common diseases and health problems and Prevention and treatment of pig diseases

After training moderate and low knowledge ranks were attributed to these two aspects, respectively. Qualitative expositions revealed that these two aspects are related

to one another but the types of knowledge change experienced differ. Particular for those with animal or veterinary science background who are now with the government or the academe, the course only served as a ‘review’. On the other hand, for those who did not have prior work or education background, learning these two aspects made them realize the importance of disease prevention and allowed them to take-charge in situations when a veterinarian is unavailable.

d. Cost and Return Analysis, Record keeping and Housing

Modest knowledge gains were for the first two aspects after training. For cost and return analysis, the course disabused the alumni of the ‘alkansya’ mentality and taught them how to account for the pig enterprise’s feasibility through the consideration of production inputs. For record-keeping, the alumni learned the importance of stock-projection in maintaining the regularity of pig supply. This aspect was also linked to housing, since effective record-keeping assures that no over-supply would occur.

The focus groups also revealed that while the alumni took housing for granted, the course taught them to pay attention to its construction as it prevents the herd’s exposure to harsh elements and consequently, minimize profit loss.

e. Common pig breeds and Proper C&D

The alumni already have a good grasp of these two aspects prior training, especially for those with the animal-related work experience or education. The course only managed to confirm that they made the right decisions on their herd’s breed and water-disinfection ratio. However, a few indicated that the course prompted them to exert stricter farm biosecurity measures.

In conclusion, the ITCPH course brought the alumni positive changes in knowledge for all pig raising aspects investigated. The presence of the three types of knowledge change was also confirmed, though experienced differently per aspect. While majority were classified as ‘new’ knowledge, instances of previous knowledge being replaced or merely reinforced were also found.

2. Knowledge Change and Participant Characteristics

Of the six participant characteristics considered in this study, the alumni’s course type, the level of exposure to specialized training, the farm enterprise and the sector the alumni belonged to were found to have significant influence to the knowledge gained in differing aspects.

In particular, the Trainors course alumni reported the least knowledge gained across all aspects and were found to be statistically-significant for the aspects of culling and breeding.

Those with advanced specialized pig production training gained more knowledge than those with only basic training. This difference was especially significant for the aspect of feeding.

Statistically-significant for the aspect of feeding but also observed across the other 12 aspects, commercial raisers experienced higher increase in knowledge than the backyard raisers.

The aspect of herd selection statistically differed among sectors, with livestock entrepreneurs and private corporation employees reporting the most knowledge gain. Looking at the other 12 aspects studied yielded evidence that among the alumni sectors, those from the livestock sector need pig raising knowledge the most.

B. On Plan Implementation

In terms of this study's second objective of exploring the context of the alumni's plan implementation, it was found that most of the plans focused on Information, Education and Communication (IEC) initiatives and in expanding the pig production operation. These plans have benefitted the livestock raisers, the farm staff and their own kin the most.

The alumni reported to have accomplished their re-entry plans up to a certain degree (somewhat to fully implemented) with implementation taking an average of a year. Interestingly, the results suggest that the alumni inferred their feelings of satisfaction from their plans' results. Hence, most also felt *somewhat to very* satisfied with their implementation outcomes. Results also showed a ratio of one satisfied alumnus for every five who crafted a plan.

While not all plans have been enacted, qualitative findings revealed that the course imparted a sense of accountability – that the alumni felt they owed it to the ITCPH, their institutions and themselves to implement their plans.

1. Facilitating and Limiting Factors to Implementation

Implementation in the field context were facilitated and limited by an array of factors. Management/staff support and budget availability were identified as imperatives to successful plan enactment. Informants concurred that these facilitating factors should be complemented by the knowledge and skills gained from training and positive individual qualities of assertiveness and receptiveness.

Aside from the challenge of funding, plan implementation was also hampered by changes in the alumni's work assignments and management priorities. Additionally for

the livestock raisers, the adverse market conditions (disadvantageous pricing of haulers or middlemen, rising cost of feeds and transport) also hampered their production's successes.

2. Plan Implementation and Participant Characteristics

It was found that the level of satisfaction attached the plan outcomes had been significantly different between farm enterprise with commercial raisers indicating increased satisfaction than backyard raisers.

Interesting findings also emerged for the alumni's degree of implementation and level of satisfaction based on the course type and level of pig raising experience.

For course type, the Basic course alumni both implemented and felt satisfied the most. The Intensive course alumni implemented more than the Trainors but, the Trainors alumni felt more satisfied with their plans' results.

For the level of pig raising experience, those with *low* pig raising experience achieved a higher *degree of implementation* and *level of satisfaction* than those with more experience.

In conclusion, the training alumni did fairly well in implementing their plans to a certain degree, for a relatively short period of time, to the benefit of their family, the farm staff and the livestock raisers within their community. Enacting their plans required the application of knowledge and skills as well as exercising their assertiveness and open-mindedness. Accomplishment meanwhile was hindered by financial and management constraints as well as the prevailing market forces. The satisfaction drawn from the plan's accomplishment was influenced by what type of pig raising enterprise one has. Some

implementation degree and satisfaction distinctions were also observed among the courses received and between those with low or high pig raising experience.

C. Knowledge Sharing

The third concept investigated for the integration of training on the field setting is the concept of knowledge sharing. It was found that most of the alumni shared the knowledge learned quite often, between the frequencies of thrice a week to daily. Among the top beneficiaries of knowledge shared were the pig raisers, family members, farm staff and neighbors. Reflecting the frequency in which they communicated their pig production knowledge, the alumni believed the information shared to be *very* useful to others.

The alumni's communication of knowledge is demand-based - brought upon by the specific need of a beneficiary. They shared information the most about the treatment of common diseases, breeding and feeding methods. Intermittently, they too were asked of market-related topics and the viability of a pig production enterprise.

Most of them shared knowledge informally (i.e., *kwentuhan*) while for those in the academe, shared formally through the classes they handle. All recognized the importance of face-to-face communication in making their messages understandable to their beneficiaries. However, the use of CMCs, particularly the internet and mobile phone technology were also preferred as it was cheaper and faster. Especially for the National and LGU staff and those from the academe, mobile phones allowed them to transcend geographic barriers.

1. Facilitating and Limiting Factors to Sharing

While comparatively, the alumni's knowledge sharing had fared better than their plan implementation; the act had been facilitated and limited by some factors.

Their work, their personal beliefs and knowledge gained from training compelled them to share what they knew. On the other hand, sharing was mostly limited by the recipient characteristics (i.e., obstinacy, lack of resources), their doubts on their proficiency in the more technical aspects of pig production, their priority shifts, the lack of time and educational resources.

Unlike their plan implementation experiences, funding barely influenced the success or failure of their knowledge sharing activities.

2. Knowledge Sharing and Participant Characteristics

No statistically-significant relationships were found for the frequency and usefulness of knowledge sharing for the six participant characteristics studied.

However, some notable differences between gender, level of exposure to training and among sectors were observed.

First, it was found that women shared their knowledge more and perceived the shared information to be more useful to their beneficiaries than the men.

Second, those with advanced training shared their knowledge more, but the perceived usefulness did not differ much to those who with only basic training exposure.

Third, those from the academe and the local government shared more and believed it to be more useful than the livestock entrepreneurs and the private firm employees.

In conclusion to this third indicator of knowledge integration, it was found that the alumni's knowledge sharing had been frequent, performed per request of pig raisers, family and staff. The alumni's frequency and quality of sharing have indeed been affected by some facilitating and limiting factors. Preference for face-to-face sharing in either an informal or formal setting was found, but the alumni also took advantage of the pervasiveness of CMCs. Some notable differences in knowledge sharing was also found for the alumni's sex, sector and level of exposure to training.

D. Other Manifestations

Aside from knowledge change, plan implementation and knowledge sharing, evidences of other manifestations of integrated knowledge were also found.

The alumni confirmed that their confidence have been increased by the ITCPH course received. The course impressed the importance of the pig raising industry and the role that the alumni should play in its development. Related to this, the course encouraged them to participate in their community or their cooperative's activities. What they have undergone also instilled pride about their pig raising endeavors.

Moreover, the course instilled a renewed interest in learning. They also sought to influence others to avail of ITCPH training. Applying their knowledge was also not limited to what their plans contained and instead, some applied to other agricultural endeavors such as establishing meat shops and AI centers.

This study also sought how the Center and its courses were situated in the minds of the alumni.

The Center was perceived to be an institution which commands authority and nurtures kinship. These respectively connote the concepts of respect and camaraderie,

reflecting the delicate balance the ITCPH has managed to achieve in being a respected and affable source of pig raising knowledge.

Positive thematic associations were also attached to the ITCPH training received. The courses were perceived to have a functional role, providing vital, reliable and versatile knowledge. Emotional and aesthetic associations, connoting the alumni's fondness and the worthiness attached to the course were also found.

Given these findings for knowledge change, plan implementation and knowledge sharing and the research problem from which this study sought to answer***, it can be conclusively said that the ITCPH alumni fared well in integrating the pig production knowledge learned upon return to their work and lives.*** Additionally, ***the influence of participant characteristics to knowledge gain, sharing and plan implementation and the presence of other manifestations of knowledge integration were also confirmed.***

The succeeding final chapter discusses the implications of this study's findings in the context of training, the participant and the field of communication. Recommendations for the Center, the ATI-ITCPH and other institutions of similar extension-education aims are also put forth.

VII. IMPLICATIONS AND RECOMMENDATIONS

This final chapter discusses the implications of the results garnered from the ways the alumni integrated the knowledge gained from training. The first part is about training situated in a dynamic learning continuum with recommendations about education methodologies and course design. The second part considers the possibility of elevating the alumni from practitioner to innovator through intensifying inter-agency convergence. This chapter ends with the researcher's postulations about the field of communication in the contexts of agriculture and national development.

A. Training in Dynamic Learning Continuum

The field of education during the 1970s experienced divergent views for adult learning. Malcolm Knowles proposed that adults as students learn differently. He coined the term *andragogy* to describe the teaching for adults, in contrast to *pedagogy*, then ascribed to teaching for children. Pedagogy maintains that adult learners are independent and intrinsically motivated. Therefore, teaching, rather than mere transmittal, should be characterized by inquiry and experimentation (Knowles, 1980).

Research and experience however determined that education as a field would benefit from viewing teaching and learning in a continuum rather than viewing it as unmoving polar opposites. Learners benefit from the right mix of directed (pedagogical) and facilitated (andragogical) learning. While the first imparts specific knowledge and skills relevant to the performance of a task, the latter is also needed as it helps the learner re-purpose the knowledge learned according to his/her own contexts (Herod, 2012 and UNESCO, 2009).

The ATI-ITCPH alumni's experience encapsulates a successful integration of the two abovementioned learning approaches. The alumni appreciated the practicum/learning-by-doing part of their training, particularly for the skills-dependent aspects of heat detection, selection, culling, breeding and feeding. Further, though the alumni treated some aspects as familiar even prior-training, these aspects' rankings still increased post-training.

Instances of *reinforced knowledge* found in both the alumni's qualitative accounts and quantitative knowledge rankings (i.e., the lack of movement or decrease) however, indicate that it would be wrong to assume the participants' minds as blank slates just waiting to be filled.

In contrast, the alumni's consideration of the course modules as the default reference material for both their own use and in their knowledge sharing activities years after training, while showcasing the training's relevance in practice, could also indicate a weakness in terms of encouraging *innovation*, as the next section will tackle. For now, this discussion on training closes with recommendations for the Center and the country's education system.

1. The Right Mix: Reflective and Non-Reflective Learning

First, the ATI-ITCPH and other development-oriented training institutions should design courses with the assumption that the knowledge being imparted would be perceived in varying degrees. Consequently, the ways of teaching should also be adjusted.

The course, depending on the learner's needs, should promote both *non-reflective* and *reflective* thinking (Jarvis, 1992). The former often refers to lectures and while it was

viewed to ask ‘less’ from the learners since it promotes memorization and procedural knowledge, it is integral to the successful performance of complex tasks. The course should also encourage reflective learning, because it allows deeper understanding where the learner breaks the knowledge into parts that could be re-assembled in a new, improved form. Due to this, the teacher, depending on the learner and the content, should also be able to assume the role of a learning *director* or a *facilitator* (Jarvis, 1992 and Herod, 2012).

Recommendation for Action: Training Curriculum Re-evaluation – Particular for the ATI-ITCPH, the findings on the knowledge rankings for the pig production aspects investigated should prompt a re-evaluation of the emphasis given for some lessons.

Perhaps, increased emphasis for reflective learning is needed for the aspects which involved technical concepts and figures (i.e., record keeping and cost and return analysis) given that these aspects were ‘difficult to learn’.

This is in contrast with the aspects of proper C&D, culling, common pig diseases and prevention and treatment, which, while also deemed important, were learned with comparative ease.

Locating agriculture extension in a dynamic continuum may increase the quality of various knowledge sharing activities. It encourages the understanding of complex ideas and deeper-level processing that influences possible courses of action. This combination would enable the alumni to effectively share with their beneficiaries the *what* and *how*, decide on the *when* and *where* and, when situation demands it, take a firm stand *why* or *why* not.

Recommendation for Policy and Action: Strengthening the Basic Education System for Agriculture Science and Technology

The findings of this study on learning and the increase in confidence it brings to the individual yield two useful insights that the country's decision-makers and implementers should keep in mind in strengthening the education system for agriculture science and technology.

The appreciation of the alumni for the practicum or hands-on activities during their ATI-ITCPH training calls for the re-consideration of the teaching methodologies, not only for adult, non-formal but also for basic, formal education.

The reported difficulty the training participants experienced in understanding technical figures and in performing computations and projections point towards the need to improve the students' foundations on the sciences and mathematics. Learning these two subjects require *activity-based* teaching approaches.

Hopefully, with the implementation of the K-12 Basic Education Program, the traditional 'chalk-and-talk' approach used to present lessons in classrooms would be complemented with hands-on experiences, so that even at the primary and secondary level, the students would have opportunities to develop their technical competencies.

For agriculture science and technology, alternative learning opportunities (i.e., crafting agribusiness plans, agriculture-based case-studies and farm training) should complement lectures. Of course, these methodological changes should be backed-up by the improvements in resources and infrastructures (i.e., computers, laboratories).

Agriculture stakeholders and policy makers should continuously guide the K-12's Technical Vocational Education and Training (TVET) certification on the emerging

needs of the field to improve the employability and entrepreneurial capacity of students after high school.

2. Check the Motivations for Learning

While the influence of some participant characteristics to knowledge integration still needs the benefit of further researches, it can be inferred from this study's results that the training participants have different motivations for learning.

In particular, there are contrasting learning motivations for those in the government and the academe *vis-à-vis* those employed in the private sector and the entrepreneurs.

Private company employees and entrepreneurs placed importance on learning the aspects that lead to production efficiency. In industry practice, it is called the production efficiency triangulate, composed of *genetics* (i.e., breeding, selection, culling), *nutrition* (i.e., feeding) and *management* (i.e., housing, biosecurity). Both employee and entrepreneur groups are motivated to learn the aspects that directly relate to the bottom-line: what knowledge could be integrated in order to raise the herd's production with minimal cost, at the shortest time possible.

In contrast, alumni from the academe and the government exhibited a *service-oriented* appreciation of the pig production aspects since they are tasked to *extend* it to others. In example, they value their knowledge (whether gained, replaced or just reinforced) on the *identification, prevention and treatment of diseases*.

Further, while the private company employees and entrepreneurs (Basic course) excelled in putting their plans into action, those from the academe and government (Trainors) stood out in sharing their knowledge.

Recommendation for Policy: Learning Motivations to Guide Lesson Design – The presence of these *profit-* and *service-oriented* motivations should guide the Center's design of knowledge integration activities during training.

For example, future reflective learning opportunities such as problem-solving or practicum could be broken down into groups according to the alumni's sectors. These groupings should broaden the participants' horizontal processing and sharing of insights and experiences, as it rests on mutual interests.

Alternatively, the learning facilitator should also recognize if there is a need that inter-sectoral collaborations could fill and adjust the reflective learning opportunity's design accordingly.

Other agencies mandated to build knowledge and skills *via* specialized training should also be guided by their stakeholders' learning motivations. In training design, the basic effective communication tenet of *knowing your audience* should be a premium concern. As expounded in the last section about communication, this is a niche that development communication agents could occupy.

B. The Alumni: from Practitioner to Innovator

As stated earlier in the framework chapter, knowledge management, particularly its integration phase, is crucial because this is the venue where the individual transforms from being a knowledge *recipient* to a knowledge *manager*.

The ATI-ITCPH trainings were indeed successful in changing knowledge, in driving plan implementation and the sharing of pig production knowledge with others. The trainings even manifested changed attitudes about the self and one's stake in the livestock community.

With such commendable impact, the next milestone is how to turn the alumni from knowledge *practitioners* to knowledge *innovators*. Innovativeness, in this case, refers to an individual's capacity to harness both the knowledge gained from training and their own thoughts and experiences, with consideration of their own contexts and resources, which leads to tailor-fit pig production technologies and practices.

Pig farmers and farm managers in particular, should be strongly encouraged to proactively engage in the knowledge production process through field experimentations which will test their knowledge's effectiveness in their own (possibly, indigenous) contexts. In order to achieve this milestone on innovation, the next discussion focuses on FSTP and local government ties.

1. The FSTP

The Farmers' Scientist Training Program (FSTP) is an 'integrative' and 'holistic' program catering to corn-based farms, where the farmer-participants themselves determine what particular technologies should be adapted to their farms based from the field experiments they have conducted.

FSTP utilizes a three-phase methodology of research, development and extension. The first phase is concerned with delivering technical and enterprise knowledge and values formation; the second phase requires on-farm trials to verify the learned knowledge and the third phase is concerned with farmer-to-farmer sharing at the *barangay* level. While relatively smaller in coverage than other DA programs, the FSTP had been recognized for providing not only food for family consumption but also enough surplus produce for market, doubling farmer income in Cebu and its neighboring provinces.

Recommendation for Action: Consider FSTP as a Bridge Program – While currently oriented towards the corn commodity, the DA-ATI should consider the methodological fitness of the FSTP as the bridge program for livestock, particularly pig production.

As one of this study's findings indicates, the small corn and pig farmers without extension intervention hold the same attitude towards farming: it is only for consumption or a source of emergency money, rather than a serious enterprise.

If institutionalized as bridge program post-training, the FSTP would aid the alumni's determination of their areas of improvement and would encourage them to innovate through experimentation of what practices or technologies are appropriate for them. This program's third phase even helps ensure that knowledge flows horizontally at the village-level through.

On a larger scale, the transformation of the alumni from knowledge practitioner to innovator should go beyond the basic pig production aspects investigated. For farmers, because the transformation continues *in situ* or in the local context, they would also be able to effectively prepare for and respond to threats such as climate change, emerging diseases and environmental degradation.

2. Local Government Unit Support

The classification of the FSTP as a national program by virtue of Executive Order (E.O.) 710 issued in 2008 added to the chance of successful knowledge integration and innovation. The E.O. converged the efforts of the DA with other government offices such as the departments of agrarian reform, interior and local government, science and

technology, and agriculture state universities. With these involved offices, the resources and reach of FSTP as a bridge program for the ATI-ITCPH alumni could be maximized.

However, accounts garnered on the lack of prioritization and management support that hindered the alumni's plan implementations communicated the need for the top management's deeper understanding of the salient needs of the industry. For example, while some alumni managed to present their plans to their local chief executives (i.e., Mayor or Governor), most were shut down due to the lack of commitment to change and consequently, encountered challenges too in resource allocation.

Recommendation for Action: Intensify Local Government Unit Ties – Ancillary to the FSTP recommendation and given the alumni's encountered challenges in knowledge integration, together with the emotional investment attached to their development endeavors, the ATI-ITCPH should intensify their ties with the local government units. The local chief executives, particularly the newly-elected ones, should be briefed of the salient priorities and directions of their respective local agriculture offices thereby encouraging them to exercise political will towards prioritizing agriculture initiatives.

In the long-term, the DA should re-think how to facilitate a better dialogue with the LGUs and how to achieve sustainability in the face of politics and bureaucracy. This is crucial to pave the path for future ATI-ITCPH alumni so that their development plans would be realized post-training.

These two recommendations under the idea of innovation could also be adapted for other agriculture-extension initiatives with the same training methodology of lecture and application. If these two recommendations on bridge programming and intensifying relations are adopted by a substantial number of extension providers, then the agriculture

sector would greatly benefit from these emerging communities of innovation and practice.

C. Considering Communication

Knowledge management and communication have rarely been considered together and fewer still have utilized both in the context of agriculture extension-education. Yet, as with the case of the ATI-ITCPH, knowledge management and communication have proven to be one and the same.

The alumni's reported knowledge integration at the field context showed that more than just another corporate buzz-word, knowledge management *is* a strategic communication tool which could appropriately explore, describe and evaluate agriculture-extension outcomes.

1. Strategic Communication for Development

As a premier institution of learning and the center of excellence in communication research, the University of the Philippines Diliman - College of Mass Communication (UPD-CMC), particularly the Communication Research Department, should be at the forefront of encouraging communication scholars to discover the ways KM could be utilized to investigate communication sources, processes and outcomes.

This consideration of KM as a strategic communication platform reflects the flexibility of the field in the face of the continuously changing media and audience landscapes. It allows a fresher take on how communication serves as a vehicle for purposeful change. This then begs the consideration of the forces at work in communication and development.

Lamentably, in the same manner that evaluation struggles to gain a foothold in development initiatives, communication currently is also taken for granted. Thus, both communication scholars and practitioners should actively take part in showing that the field definitively plays a role in shaping and furthering national development agenda through social empowerment, particularly in the challenging sectors of agriculture, environment, welfare, health and education.

Aside from knowledge management, the researcher posits that two other emerging communication approaches, namely social marketing and risk communication, could aid this development-oriented pursuit, thus meriting future research and application considerations.

2. Changing Mindsets about Agriculture

While it is commendable that the ATI-ITCPH alumni felt increased confidence, pride and participation for their work and the sector they belong to after training, these could also speak for the current poor perceptions of agriculture (i.e., backward, unfashionable, a disadvantageous career option) in the minds of its stakeholders and perhaps, even of the general public.

These unattractive perceptions of the field hinder its growth. It discourages the engagement of new professionals who could infuse vigor to the aging, farm-dependent population. These negative perceptions breed detachment to the plight of the farmers, further marginalizing their voices in society.

Development communication agents should be prepared to take on the challenge of re-framing these detrimental perceptions. Empowering the farmer of his/her worth and opening their consciousness to the multitude possibilities for growth, such as value-

adding, is the sustainable place to start. Further, development-oriented reportage on salient agriculture issues, policy-making and implementation geared towards horizontal and vertical cooperation and an advocacy biased for the small-industry holders should also be intensified. The goal is to *create an empowered collective* that *convincingly re-writes the narrative of agriculture* in a *better* light.

The researcher hopes that through the distinction of knowledge management as a communication approach, this study spurs meaningful reflections and actions towards the unequivocal growth of communication theory, research and practice.

In a small way, she also hopes that this study incites the curiosity of other scholars about communication and development, in the context of agriculture. Increasing the country's productivity through improving the communication of appropriate knowledge, skills and innovations for farmers and other stakeholders is a peremptory matter to combat poverty and hunger. This is a call for help that communication students and practitioners should heed, as both have a stake in establishing a proactive and humanistic agriculture extension-communication service for Filipinos.

BIBLIOGRAPHY

Journals:

Abbad, G., Borges-Andrade, J. and Sallorenzo, L. 2004. Self-Assessment of Training Impact at Work: Validation of a Measurement Scale in Interamerican Journal of Psychology. Vol. 38. No. 2. p. 277-284.

Amin, A. and Stewart, B. Training and Visit Extension Program Outcomes in Ninia Governorate, Egypt in Journal of Agricultural Education. Vol. 35, No. 3. p. 30 – 34.

Evenson, R. and Mwabu, G. 1998. The Effects of Agricultural Extension on Farm Yields in Kenya. Center Discussion Paper no. 798. Economic Growth Center. Yale University. New Haven, Connecticut.

Arcury, T., Quandt, S. and Russel, G. 2002. Pesticide Safety among Farmworkers: Perceived Risk and Perceived Control as Factors Reflecting Environmental Justice in Environmental Health Perspectives Vol 110 No. 2. April 2002.

Barao, S. 1992. Behavioral Aspects of Technology Adoption in Journal of Extension. Vol. 30 No. 2. Retrieved: http://www.joe.org/joe/1992summer/a4.php.

Bartholomew, H. M. (1994). The world largest extension system. Journal of International in Agricultural and Extension Education. Vol.1 No. 1. p. 32-36.

Blume, B., Ford, J., Baldwin, T. and Huang, J. 2009. Transfer of Training: A Meta-Analytic Review in Journal of Management. Vol. 36, No. 4. P. 1067 -1105.

Boleman, C.T. and Burell, Jr., F. 2003. Agricultural Science Fairs: Are Students Truly Learning from This Activity? in Journal of Extension. Volume 41, No. 3. http://www.joe.org/joe/2003june/rb4.php. Retrieved: April 17, 2012

Bolwerk, C. 2002. The culture of farm work and its implications on health, social relationships and leisure in farm women and men in the United States in Journal of Cultural Diversity. From http://findarticles.com/p/articles/mi_m0MJU/is_4_9/ai_98135734/pg_7/?tag=content;col1 Retrieved: 6 March 2011.

Bondoc, O. December 2010. Better system of education, research and development, and governance in the livestock sector. Animal Husbandry and Agricultural Journal. Volume 44. No. 10. Page 24 – 26.

Carr, A. 1995. Innovation of diffusion: Landcare and information exchange in Rural Society: Vol. 5. p. 56-66.

Chapman-Novakofski, K., Boeckner, L., Canton, R., Clark, C., Keim, K., Britten, P., and McClelland, J. 1997. Evaluating Evaluation -- What We've Learned in Journal of Extension. Volume 35, No. 1. From: http://www.joe.org/joe/1997february/rb2.php. Retrieved 17 April 2012.

Cavaleri, S. and Reed, F. 2001. Organizational Inquiry: The Search for Effective Knowledge in Knowledge and Innovation Journal. Vol. 1, No. 3.

Dahiya, S. and Jha, A. 2011. Review of Training Evaluation in International Journal of Computer Science and Communication (IJCSC). Vol. 2, No. 1. p. 11– 16. Retrieved in: http://www.csjournals.com/IJCSC/PDF2-1/Article_2.pdf.

Donnellan, L. and Montgomery, F. 2005. Rethinking Extension Communications: Is Issues Programming the Key? In Journal of Extension. Vol. 43 No. 2. From: http://www.joe.org/joe/2005april/a2.shtml. Retrieved 19 May 2012.

Durlak, J. And DuPre, E. 2008. Implementation Matters: A Review of Research on the Influence of Implementation on Program Outcomes and the Factors Affecting Implementation in American Journal of Community Psychology. Series of 2008 No. 41. p. 327-350.

Eissawy, G., Hagras, H., and Radi, A. 2007. Performance of Agricultural Extension Agents to Create Rural Residents Awareness of Poultry Avian Influenza Disease in Kafr El- Sheikh and Gharbia Govemorates in Journal of Scientific Society of Agricultural Extension. Vol. 11. No. 3. p. 205-238.

Ensle, K. 2005. Burnout: How Does Extension Balance Job and Family? in Journal of Extension. Vol. 43 No. 3.

Erbaugh, J., Kibwaka, P., and Donnermeyer, J. 2007. Assessing Extension Agent Knowledge and Training Needs to Improve IPM Dissemination in Uganda in Journal of International Agricultural and Extension Education. Vol 14, No. 1. Spring 2007. P. 59 - 70.

Gregoire, A. 2002. The Mental Health of Farmers in Occupational Medicine Vol. 52 no. 8. p. 471-476. From: http://occmed.oxfordjournals.org/. Retrieved June 20, 2012.

Grudens-Schuck N., Cramer, J., Exner, D., and Shour, M. The New Adult Education: Bringing Peer Educators Up to Speed in Journal of Extension Vol. 41, No. 4. August 2003. From: http://www.joe.org/joe/2003august/a2.php. Retrieved 14 April 2012.

Hargrove, T. and Jones, B., 2004. A Qualitative Case Study Analysis Of The Small Farmers Outreach Training And Technical Assistance (2501) Program from 1994-2001: Implications For African American Farmers in Journal of Agricultural

Education Vol. 45, No 2. From: http://www.jae-online.org/attachments/article/305/45-02-072.pdf. Retrieved 17 April 2012.

Huynh,T., Aarnik, A., Drucker, A., and Verstegen, M. 2006. Pig Production in Cambodia, Laos, Philippines, and Vietnam: A Review in Asian Journal of Agriculture and Development, Vol. 4, No.1. From http://www.searca.org/ajad/archives/v-03/01-02/ajad-v3-n1-n2-huynh-pig-production-in-cambodia-laos-philippines-and-vietnam.pdf. Retrieved 5 March 2011.

Koloskov, A. 2010. Managing Knowledge or Knowing in Practice? A Critical Review of Perspectives on Knowledge Management in iSCHANNEL Vol. 05. p. 5-9.

Lim, D and Morris, M. 2006. Influence of Trainee Characteristics,Instructional Satisfaction, and Organizational Climate on Perceived Learning and Training Transfer in Human Resource Development Quarterly. Vol. 17 No. 1. p. 85 -115.

Little, A. (ed). 1998. Practical Knowledge Management: A Model That Works in Prism. Second Quarter. p. 17 – 29. http://genevaknowledgeforum.ch/downloads/prismartikel.pdf. Retrieved 5 March 2011.

Lurati, F. and Eppler, M. 2006. Communication and Management: Researching Corporate Communication and Knowledge Communication in Organizational Settings in Studies in Communication Sciences. Vol. 6 No. 2. p. 75-98.

Manantan, M. and Callanta, M. May 2008. Hog export: performances, challenges and prospects. Animal Husbandry and Agricultural Journal. Volume 42. No. 3. p. 8 – 12.

Margono, T., and Sugimoto, S. 2011. The Barriers of the Indonesian Extension Workers in Disseminate Agricultural Information to Farmers in International Journal of Basic & Applied Sciences IJBAS-IJENS Vol: 11 No: 02. 98-105.

Marsh, S., Pannell. D. and Lindner, R. 2004. Does extension pay? A case study for a new crop, lupins, in Western Australia in Agricultural Economics Vol. 30 No. 1. p. 17-30

Meludu, M. and Bajowa, O. 2008. Gender and Stress Coping Strategies of Poultry and Cassava Farmers in Nigeria in Journal of Human Ecology. Volume 23 No. 2. p. 159-164.

Millar, J., & Curtis, A. 1997. Moving farmer knowledge beyond the farm gate: An Australian study of farmer knowledge in group learning in the Journal of Agricultural Education and Extension. Vol. 4 No. 2. p. 133-142.

Noor, K.B.M. and Dola, K. 2005. A study on the Impact of Government Initiated Training towards Farmers in Malaysia in European Journal of Social Sciences. Vol. 14, No. 2. From: http://www.eurojournals.com/ejss_14_2_12.pdf. Retrieved 6 September 2011.

Okwu, O., Obinne, C. and Agbulu, O. 2006. A Paradigm for Evaluation of Use and Effect of Communication Channels in Agricultural Extension Services in Journal of Social Sciences. Vol. 13 No. 1. p. 31 – 36.

Ovwigho, B., Ifie, P., Ajobo, R. and Akor, E. 2009. The Availability and Use of Information Communication Technologies by Extension Agents in Delta Agricultural Development Project, Delta State Nigeria in Journal of Human Ecology. Vol. 27 No. 3. p. 185 – 188.

Rola, A., Jamias, S. and Quizon, J. 2002. Do Farmer Field School Graduates Retain and Share what they Learn? An Investigation in Iloilo, Philippines in Journal of International Agricultural and Extension Education. Vol 9 No 1. p. 65-76.

Sasaki, Y. and Koketsu, Y. 2011. Reproductive profile and lifetime efficiency of female pigs by culling reason in high-performing commercial breeding herds in Journal of Swine Health Prod. Vo. 19, No.5. p. 284–291.

Schultz, T. 1975. The Value of the Ability to Deal with Disequilibria in Journal of Economic Literature. Vol. 12, No. 3. p. 827-846.

Tesfaye, T., Karippai, R. and Tesfaye, T. 2010. Farmer's training effectiveness in terms of changes in knowledge and attitude: the case of Holeta, Melkassa and Debre zeit Agricultural Research Centers, Ethiopia in Journal of Agricultural Extension and Rural Development. Vol 2 No. 5, p. 89-96.

Thomson, J. Kiernan, N. Pierre, T. and Lewis, R. 1987. Between the Worlds of Work and Home in Journal of Extension. Vol. 25 No. 3.

Tladi, F. 2004. Job Content and Training Needs of Agricultural Extension Agents in South-Central Botswana in Journal of International Agricultural and Extension Education. Vol 11 no. 3. p. 33-40.

Wagler, S., Rusk, C., Blomeke, C., Richert, B., Latour, M. and Talbert, B. 2008. Classroom Evaluation Of An Elementary Educational Swine Curriculum: There's A Pig In My Classroom in Journal of Agricultural Education. Vol. 49 No. 3.

West, B., Drake, D., and Londo, A. 2009. Extension: A Modern-Day Pony Express? in Journal of Extension Vol. 47 No. 2 April 2009.

Wortmann, C., Koelsch, R., Shapiro, C., Deloughery, R., Tarkalson, D. 2005. Manure Use Planning: An Evaluation of a Producer Training Program in Journal of

Extension. Volume 43, No. 4. From: http://www.joe.org/joe/2005august/rb5.php. Retrieved 17 April 2012.

Theses:

Akyoo, E. 2008. Opportunities and Challenges of a partnership approach. The case of the "Income Generating activities Project", Morogoro Region Tanzania. M.S. Thesis. Larenstein University of Applied Sciences. Wageningen, The Netherlands.

Bonabana-Wabbi, J. 2002. Assessing Factors Affecting Adoption of Agricultural Technologies: The Case of Integrated Pest Management (IPM) in Kumi District, Eastern Uganda. Graduate Thesis: Virginia Polytechnic Institute and State University.

Dilworth, J. 2010. Evaluating the Impacts of Professional Development: A Mixed Method study of Adult Education Learning Communities. PhD Dissertation. Capella University, Minnesota, USA.

Harri, A. 1997. An Economic Case Study of Cost-Recovery, Commercialization and Privatization of Agricultural Extension Services. M.S. Thesis. University of Korca, Albania.

Kobusinge, G. 2009. An ICT Framework to Enhance Food Security in Rural Communities of Uganda. M.S. Thesis. Makerere University, Kampala, Uganda.

Llarena, E. 2006. Communicating Risk: A study on the Knowledge on Foot and Mouth Disease (FMD) and Communication Management in the Maintenance of FMD-Free areas in Visayas and Mindanao. Graduate Thesis. University of the Philippines Diliman.

Remigio, R. and Saubon, M. 2011. Transfarmers: Filipino Farmers Adoption of the ICT-Mediated Farming Environment Through the Open Academy for Philippine Agriculture. Undergraduate Thesis. University of the Philippines, Diliman.

Shahin, A. 2004. Adoption of Innovations in Smallholder Buffalo Dairy Farms in the Menoufia Province in Egypt. PhD Dissertation. Humboldt University of Berlin.

Books:

Anandajayasekeram, P., Puskur, R., Workneh, S. and Hoekstr, D. 2008. Concepts and Practices in Agricultural Extension in Developing Countries: A Source Book. International Livestock Research Institute (ILRI).

Anderson, J. and Feder, G. 2004. Agricultural Extension: Good Intentions and Hard Realities in The World Bank Research Observer. Vol. 19, No. 1. From:

http://www.wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2004/07/19/000012009_20040719154730/Rendered/PDF/29662.pdf. Retrieved 6 September 2011.

Davenport, T. H., Prusak, L. (1998) Working knowledge: How organizations manage what they know, Harvard Business School Press. Boston, USA.

Giddens, A. 1979. Central Problems in Social Theory: Action, Structure and Contradiction in Social Analysis, MacMillan Press Ltd., London.

Herdt, R. and Capule, C. 1983. Adoption, Spread and Production Impact of Modern Rice Varieties in Asia. International Rice Research Institute (IRRI). Laguna, Philippines.

Knowles, M. 1980. The Modern Practice of Adult Education: From Pedagogy to Andragogy. Englewood Cliffs, NJ: Prentice Hall Regents.

Jarvis, P. 1992. Paradoxes of Learning: On Becoming an Individual in Society. San Francisco, USA.

Rivera, W. and Qamar, K. 2003. Agricultural Extension, Rural Development and the Food Security Challenge. Sustainable Development Department. Food and Agriculture Organization of the United Nations (UN-FAO). Rome, Italy.

Rogers, E. 1995. Diffusion of Innovations. The Free Press. New York, USA.

Singh, S. 2006. Selected Success Stories on Agricultural Innovation Systems. Thailand: Asia-Pacific Association of Agricultural Research Institutions. Emerald Group Publishing Limited, Pathumthani. p. 1-11.

Swanson, B., Bentz, R., and Sofranko, A. (ed). 1997. Improving agricultural extension: a reference manual. Rome: Food and Agriculture Organization of the United Nations (UN-FAO). In http://betuco.be/voorlichting/Improving%20agricultural%20extension%20FAO.pdf. Retrieved: 6 September 2011.

Swanson, B. and Claar, J. 1984. The History and Development Of Agricultural Extension in Agricultural Extension: A reference manual. Food and Agriculture Organization of the United Nations (UN-FAO).

Wiig, K. (1993). Knowledge management foundations. Schema Press. Arlington, Texas.

Papers:

Aker, J. 2010. Dial “A” for Agriculture: Using information and communication technologies for agricultural extension in developing countries. Working Paper

269. Center for Global Development. From: http://www.cgdev.org/content/publications/detail/1425497/. Retrieved 8 September 2011.

Alavi, M. 2000. Systems for Managing Organizational Knowledge. The Organizational Change Program for the CGIAR Centers. Georgia, USA.

Balisacan, A. 2007. Why Does Poverty Persist in the Philippines Facts, Fancies, and Policies. SEARCA Discussion Paper Series. No. 2007-1. Southeast Asian Regional Center for Graduate Study and Research in Agriculture.

Baconguis, R. 2007. Extension Delivery System in a Layer and Swine-Based Farming Community: The Case of San Jose, Batangas in the Philippine Institute for Development Studies Discussion Paper Series No. 2007-11.

Baxter, M. Slade, R. and Howell, J. 1989. Aid and Agricultural Extension: Evidence from the World Bank and Other Donors. Technical Paper no. 87. The World Bank. Washington, D.C.

Bonifacio, M. 1987. Community-based agriculture and the problem of technology transfer. Professorial Chair Lecture, Faculty Center, University of the Philippines Diliman, December 3, 1986. Bureau of Agricultural Extension, Q.C.

Caro, D. 2006. Report on the Knowledge, Attitudes and Practices of Target Audiences on Highly Pathogenic Avian Influenza in the Philippines. United Nations Food and Agriculture Organization (UN-FAO).

Del Castello, R. and Braun, P. 2006. Framework on Effective Rural Communication for Development. Food and Agriculture Organization of the United Nations (UN-FAO). From: http://www2.gtz.de/dokumente/bib/07-0218.pdf. Retrieved 10 May 2011.

Firestone, J. and McElroy, M. 2003. The New Knowledge Management in Knowledge Management. Vol 6. No. 9. Page 12.

Garforth, C. and Lawrence, A. 1997. Supporting sustainable agriculture through extension in Asia. Natural Resource Perspectives. No. 21. From: http://www.odi.org.uk/resources/specialist/natural-resource-perspectives/21-sustainable-agriculture-extension-asia.pdf. Retrieved 22 February 2011.

Habito, C. and Briones, R. Philippine Agriculture Over the Years: Performance, Policies and Pitfalls. Paper presented at the Policies to Strengthen Productivity in the Philippines Conference on June 27, 2005. From http://siteresources.worldbank.org/INTPHILIPPINES/Resources/Habito-word.pdf. Retrieved 18 February 2011.

Kiptot, E. Franzel, S., Hebinck, P. and Richards, P. 2006. Sharing seed and knowledge: farmer to farmer dissemination of agroforestry technologies in western Kenya. Springer Science and Business media.

Livestock Sector in Asia: an analysis of present situation of livestock sector and its importance for future development. Ministry of Education, Culture and Technology, Government of Japan. Research Subject No: 13660234. Page 5.

McElroy, M. 1999a. Double-Loop Knowledge Management: A White Paper. IBM Knowledge Management Consulting Practice.

McElroy, M. 1999b.Second-Generation KM: A White Paper. IBM Knowledge Management Consulting Practice.

McElroy, M. 2000. The Knowledge Life Cycle an Executable Model for the Enterprise. ICM Conference on Knowledge Management. Florida, USA.

Mengis, J. And Eppler, M. 2005. Understanding and Managing Knowledge-intensive Conversations: An Appreciative Reading of the Literature on Conversations and Organizations and an Integrative Approach for their Management. Paper No. 1. Faculty of Communication Sciences, Università della Svizzera italiana (USI).

Obidike, N. 2011. Rural Farmers' Problems Accessing Agricultural Information: A Case study of Nsukka Local Government Area of Enugu State, Nigeria. Library Philosophy and Practice. From http://www.webpages.uidaho.edu/~mbolin/obidike.htm. Retrieved 27 February 2011.

Perryer, C. And Mcshane, S. The Influence of Training Transfer Climate and Individual Trainee Characteristics on Customer Orientation. University of Western Australia Business School.

Rees, D., Momanyi, M. Wekundah, J. Ndungu, F. Odondi, J. Oyure, A., Andima, D. Kamau, M., Ndubi, J. Musembi, F., Mwaura, Lucy and Joldersma, R. 2000. Agricultural Knowledge and Information Systems in Kenya - Implications for technology dissemination and development. Agricultural Research and Extension Network Paper no. 107. Department for International Development (DFID).

Rezvanfar, A., Akbary, M. and Hemmatyar, A.H. 2009. Analysis of communication linkage from livestock research specialists to livestock owners in Iran. From http://www.lrrd.org/lrrd21/1/rezv21009.htm. Retrieved 27 February 2011.

Sturdy, J., Jewitt, G. and Lorentz, S.2008. Building an understanding of water use innovation adoption processes through farmer-driven experimentation. Physics and Chemistry of the Earth No. 33. p. 859-872. From: http://dx.doi.org/10.1016/j.pce.2008.06.022. Retrieved 6 March 2011.

Swanson, B. and Rajalahti, R. 2010. Strengthening Agricultural Extension and Advisory Systems: Procedures for Assessing, Transforming, and Evaluating Extension Systems. Agriculture and Rural Development Discussion Paper 45. The World Bank. Washington, DC.

Trushinski, M. 2010. Creating Bright Ideas: Analyzing the Nonaka's Model of Knowledge Creation. Paper for Communication 440. Royal Roads University, Canada.

Reports:

Annual Report 2008. International Training Center on Pig Husbandry. Department of Agriculture-Agricultural Training Institute (DA-ATI). Marawoy, Lipa City, Batangas. p. 4, 17-19.

Cerdán-Infantes, Maffioli, A. and Ubfal, D. 2008. The Impact of Agricultural Extension Services: The Case of Grape Production in Argentina. Ex-post Evaluation of the IDB's Agricultural Technology Uptake Projects. Inter-American Development Bank (IDB). From: http://ove/oveIntranet/DefaultNoCache. aspx?Action=WUCPublications@ImpactEvaluations. Retrieved 6 May 2011.

Department of Agricture-Agricultural Training Institute Annual Report 2010. From: http://www.slideshare.net/ATI_CentralOffice/ati-2010-annual-report. Retrieved 16 March 2013.

den Biggelaar, C. 1996. Farmer Experimentation and Innovation: A case study of knowledge generation processes in agroforestry systems in Rwanda. Community Forestry Case Study No. 12. Food and Agriculture Organization of the United Nations (UN-FAO). Rome, Italy. From: http://www.fao.org/docrep/006/W2406E/W2406E08.htm. Retrieved 8 September 2012.

Department of Agriculture, Forestry and Fisheries (DAFF) Report. No Date. Agricultural Education and Training Access Barriers Report. Republic of South Africa.

Department of Agriculture. 2010. Annual Report: New Leadership… New Beginnings. Quezon City, Philippines.

FAO/GTZ, 2007. Communicating Knowledge: From Good Practice to Systematic Change. Workshop on communication and KM in rural areas. Framework on effective rural communication for development. Rome, Italy.

GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit ed.). 2006. Strategic Communication for Sustainable Development: a conceptual overview. http://www.cbd.int/cepa/toolkit/2008/doc/Strategic%20Communication%20for%20Sustainable%20development.pdf. Retrieved 28 February 2012.

Joshi, K. Sarker, S. and Sarker, S.2004. Knowledge Transfer Among Face-to-Face Information Systems Development Team Members: Examining the Role of Knowledge, Source, and Relational Context. Proceedings of the 37th Hawaii International Conference on System Sciences.

Kilpatrick, S. no date. Education and training: Impacts on farm management practice. Centre for Research and Learning in Regional Australia. University of Tasmania, Australia.

Parry, J., Barnes, H., Lindsey, R. and Taylor, R. 2005. Farmers, Farm Workers and Work-Related Stress. Research Report 362: Policy Studies Institute, Health and Safety Executive. London.

Pernia, E. and San Pascual, M. (no date). Knowledge Management as Strategic Communication: A Model for Evaluating K-Agrinet. University of the Philippines, Diliman.

Rivera, W. 2001. Agricultural and Rural Extension Worldwide: Options for Institutional Reform in the Developing Countries. Food and Agriculture Organization of the United Nations. Rome, Italy.

Solomon, P. 2000. Exploring Structuration in Knowledge Organization: Implications for Managing the Tension Between Stability and Dynamism in Dynamism and Stability in Knowledge Organization: Proceedings of the Sixth International ISKO Conference. C. Beghtol, L. Howarth, and N. J. Williamson (Eds.). Würzburg, Austria. p. 254-260.

Sudsawad, P. 2007. Knowledge translation: Introduction to models, strategies, and measures. Southwest Educational Development Laboratory, National Center for the Dissemination of Disability Research. Austin, Texas. From: www.ncddr.org/kt/products/ktintro/. Retrieved 28 February 2012.

Timbrell, G., Delaney, P. and Chan, T., Yue, A. and Gable, G. 2005. Structurationist review of knowledge management theories. Twenty-Sixth International Conference on Information Systems. p. 247-259.

UN-FAO. 2012. Expert Consultation: Communication for Development (Meeting Today's Agriculture and Rural Development). Final Report. Food and Agriculture Organization of the United Nations (UN-FAO). Rome, Italy.

United Nations Educational, Scientific and Cultural Organization (UNESCO). 2009. Global Report on Adult Learning and Education. UNESCO Institute for Lifelong Learning: Hamburg, Germany.

US Department of Agricuture-Foreign Agricultural Service (USDA-FAS), 2004. Philippines Livestock and Products Report. Global Agriculture Information Network (GAIN) Report. From http://www.thepigsite.com/articles/?Display=1178. Retrieved 14 December 2010.

Websites:

Abaygar, C. no date. Swine/Hog Raising Business Guide. From: http://www.mixph.com/2006/04/swine-hog-raising.html. Retrieved 17 July 2012.

Brown, S. 2010. Three Important Aspects of Raising a Pig to Consider Even Before You Start Rearing Pigs. From http://ezinearticles.com/?Three-Important-Aspects-of--Raising-a-Pig-to-Consider-Even-Before-You-Start-Rearing-Pigs&id=3797942. Retrieved 3 June 2012.

Cleveland, J. 1994. Complexity theory: basic concepts and applications to systems thinking. Innovation Network for Communities. From: http://www.slideshare.net/johncleveland/complexity-theory-basic-concepts. Retrieved 3 October 2012.

Facts and Figures on the Philipppine Agricultural Economy, 2009. Bureau of Agricultural Statistics (BAS). From http://countrystat.bas.gov.ph/index.asp?cont=factsandfigures. Retrieved 14 December 2010.

Laguna Lake Development Authority (LLDA) Resolution No. 169, Series of 2001. Approving the Policy Guidelines Governing the Operation of Backyard/Small-Scale Hog Farms in Laguna de Bay Region. From http://www.fao.org/WAIRDOCS/LEAD/X6170E/x6170e1p.htm. Retrieved 7 August 2011.

Robins, M. no date. Communication Missing from KM's Core Strategies. From: http://www.knowledgepoint.com.au/knowledge_management/Articles/KM_JA001.html. Retrieved: 7 September 2012.

Swine/Hog business introduction. Business Ideas (bizfil.com). From: http://bizfil.com/swinehog-business-introduction/. Retrieved 3 June 2012.

Booklets and Pamphlets:

ATI-ITCPH. AI sa Barangay. Artificial Insemination Brochure. Lipa City, Batangas, Philippines.

ATI-ITCPH. Gabay sa Pag-aalaga ng Palakihing Baboy. Finisher Production Brochure. Lipa City, Batangas, Philippines.

ATI-ITCPH. Walang Aray sa AI. Course Manual on Artificial Insemination. Lipa City, Batangas, Philippines.

Dhuyvetter, K., Tonsor, G., Tokach, M., Dritz, S. and DeRouchey, J. 2012. Swine Wean-to-Finish Cost-Return Budget. Farm Management Guide. Kansas State Research and Extension. From: http://www.ksre.ksu.edu/library/agec2/mf2757.pdf. Retrieved 3 June 2012.

Herod, L. 2012. Adult Learning: From Theory to Practice. From: http://www.nald.ca/library/learning/adult_learning/adult_learning.pdf. Retrieved 16 March 2013.

UN-FAO. 2011. Frequently Asked Questions on Pig Biosecurity and Disease Reporting Handbook. Food and Agriculture Organization of the United Nations (UN-FAO). Bangkok, Thailand.

UNIVET Nutrition and Animal Health Care Company (UNAHCO). 2008. Usapang Baboy: Wastong Pangangalaga, Nutrisyon at Programang Pangkalusugan. Swine Management Learning Kit. UNIVET: Mandaluyong City, Philippines.

Telephone:

Telephone Interview with Sison, M. ITCPH Monitoring and Evaluation Officer. 13 December 2010.

Appendix A. *ATI-ITCPH Monitoring and Evaluation (M&E) Activity according to Area and No. of Participants*

Year	**Area Covered**		**No. of Participants**
	Region	*Province*	
2001	Data unavailable		
2002	External (ATI-led evaluation activity)*		
2003	III (Central Luzon)	Bulacan, Tarlac and Pampanga	27
2004	No M&E conducted		
2005	CAR and I (Ilocos)	Benguet, La Union, Ilocos Sur, Ilocos Norte	35
2006	VI (Western Visayas) IX (Zamboanga Peninsula) XII (Soccsksargen)	Data unavailable	50
2007	IX (Zamboanga Peninsula) X (Northern Mindanao)	Data unavailable	37
2008	VIII (Eastern Visayas)	Eastern and Northern Samar	22
2009	III (Central Luzon) VII (Central Visayas)	Data unavailable	48
2010	VI (Western Visayas) VIII (Eastern Visayas)	Biliran, Leyte and Negros Occidental	31
2011	CARAGA	Agusan del Sur	29

**not centered on ATI-ITCPH courses*

Appendix B. *Online Survey Tool*

Good day ITCPH Alumni!

We are currently conducting a nationwide evaluation study of the training courses provided by the ATI-International Training Center on Pig Husbandry (ITCPH). As one of the Center's selected alumni, we would like to get your honest assessment of the things that you have learned during training and the ways that you have applied such in your work and life though the survey questions below.

Your participation in this study is very much appreciated as it will serve as basis for improving the trainings offered by the Center. As a gesture of our appreciation, we are pleased to inform you of a chance to receive a cell phone load/credit if you complete this survey. To claim your load and for verification purposes, kindly make sure to indicate your background information found at the last part of this survey.

Thank you very much.

Sincerely,
The ITCPH Research Team

Part I. Knowledge Change

A. Kindly rate your knowledge on certain aspects of swine raising **BEFORE** you had your ITCPH Training by checking on the appropriate rating below.

Aspects of Swine Raising	**Self-Rating on your Knowledge <u>BEFORE</u> Training**					
	Never Heard	**Poor**	**Fair**	**Good**	**Very Good**	**Excel -lent**
1. Common pig breeds found in the country (i.e. Landrace, Hampshire, Large White, Duroc)						
2. Physical and performance basis herd selection						
3. Culling (removal of sub-standard pigs due to age, reproductive capacity, abnormalities etc.)						
4. Breeding Methods (i.e. natural method, artificial insemination)						
5. Heat detection and the estrus cycle of sows						
6. Management of breeders (sows and boars), piglets, weaners and finishers						
7. Feeding scheme for different stages of pigs (breeders, piglets, weaners and finishers)						
8. Common diseases and health problems of breeders (i.e. Foot and Mouth Disease, Hog Cholera, Brucellosis)						
9. Proper cleaning and disinfection of pens						
10. Prevention and treatment of pig diseases						

Aspects of Swine Raising	Self-Rating on your Knowledge BEFORE Training					
	Never Heard	Poor	Fair	Good	Very Good	Excel -lent
11. Proper housing and equipment for different stages of pigs (breeders, piglets, weaners and finishers)						
12. Record keeping, calculation and analysis of technical figures i.e. litter index, pigs weaned/sow/year (PWSY)						
13. Cost and return analysis of pig farming						

B. For the next part, kindly rate your knowledge on the same aspects of swine raising **AFTER** your ITCPH Training by checking on the appropriate rating below.

Aspects of Swine Raising	Self-Rating on your Knowledge AFTER Training					
	Never Heard	Poor	Fair	Good	Very Good	Excelle nt
1. Common pig breeds found in the country (i.e. Landrace, Hampshire, Large White, Duroc)						
2. Physical and performance basis herd selection						
3. Culling (removal of sub-standard pigs due to age, reproductive capacity, abnormalities etc.)						
4. Breeding Methods (i.e. natural method, artificial insemination)						
5. Heat detection and the estrus cycle of sows						
6. Management of breeders (sows and boars), piglets, weaners and finishers						
7. Feeding scheme for different stages of pigs (breeders, piglets, weaners and finishers)						
8. Common diseases and health problems of breeders (i.e. Foot and Mouth Disease, Hog Cholera, Brucellosis)						
9. Proper cleaning and disinfection of pens						
10. Prevention and treatment of pig diseases						
11. Proper housing and equipment for different stages of pigs (breeders, piglets, weaners and finishers)						
12. Record keeping, calculation and analysis of technical figures i.e. litter index, pigs weaned/sow/year (PWSY)						
13. Cost and return analysis of pig farming						

C. Below are some statements which pertain to your ITCPH training experience. Please choose your answer among the following choices provided.

The lessons I learned from the ITCPH training:	Strongly Disagree	Disagree	Agree	Strongly Agree	Undecided
1. Introduced me to new hog raising concepts that I did not know before					
2. Has only complemented what I already knew about hog raising before					
3. Prompted me to change some of my previous hog raising practices					
4. Disproved the things I previously thought was the right thing to do about hog raising					
5. Boosted my confidence on what I already knew about the basics of hog raising					
6. Prompted me to think of new ways on how can I further improve my or my clients' hog farming practices					
7. Were useful in my current work or business					
8. Encouraged me to treat hog raising as a business enterprise					
9. Made me realize my role in the development of the livestock industry in my community					
10. Made me feel proud about my job/business					

Part II. Re-entry Plan Implementation

1. During the course, were you required to prepare a re-entry plan or an improvement plan?
   ( ) Yes, I drafted a plan
   ( ) No, I did not draft a plan *(Please proceed to Part III)*

2. If you answered 'Yes', how would you rate the degree of your plan implementation in your area?
   ( ) Completely implemented
   ( ) Mostly implemented
   ( ) Somewhat implemented
   ( ) Mostly <u>not</u> implemented
   ( ) Not implemented at all

3. By your best estimation, how long did it take you to implement your plan to reach its current status?
   - ( ) 6 months or less
   - ( ) 7 months to a year
   - ( ) 1 year and a half
   - ( ) two years
   - ( ) two years and a half
   - ( ) three years
   - ( ) three years and a half
   - ( ) four years
   - ( ) four years and a half
   - ( ) Others, please specify: _____

4. What particular part of your plan were you able to implement?
   _____
   _____
   _____.

5. What are the factors which you think have helped you in your improvement/action plan implementation? *(You may choose multiple answers)*
   - ( ) Inclusion in the priorities of the management/local government/academe I belong to
   - ( ) Support of staff and management
   - ( ) Availability of budget
   - ( ) Feasibility of the drafted plan
   - ( ) Others, please specify:

   _____
   _____
   _____.

6. On the other hand, what do you think were the factors that hindered your plan implementation? *(You may choose multiple answers)*
   - ( ) Non-inclusion in the priorities of the management/local government/academe I belong to
   - ( ) Lack of support from staff and management
   - ( ) Budgetary constraints
   - ( ) Changing of my work assignment
   - ( ) Others, please specify:

   _____
   _____
   _____.

7. Overall, how would you rate your satisfaction on the way your plan has been implemented?
   - ( ) Completely Satisfied
   - ( ) Mostly Satisfied
   - ( ) Somewhat Satisfied
   - ( ) Mostly Dissatisfied
   - ( ) Completely Dissatisfied

8. Who do you think are the people who directly benefitted from the plan you have implemented? *(You may choose multiple answers)*
   - ( ) Family Members
   - ( ) Farm Staff
   - ( ) Immediate Neighbors
   - ( ) Other livestock raisers within your community
   - ( ) Other people not engaged in livestock
   - ( ) Extension workers
   - ( ) The local government
   - ( ) The academe (faculty, students)
   - ( ) Others, please specify: _____

Part III. Knowledge Sharing

1. Can you say that you have shared the things you have learned in the ITCPH course you undertook?
   ( ) Yes
   ( ) No *(Please proceed to Part IV)*

2. To whom do you share such knowledge gained from training? *(You may choose multiple answers)*

   ( ) Family Member
   ( ) Farm Staff
   ( ) Pig Raisers
   ( ) Extension Workers
   ( ) Neighbors
   ( ) Clients
   ( ) Students
   ( ) Colleagues
   ( ) Superiors
   ( ) Others, please specify:
   _____
   _____

3. In what manner do you share the knowledge you gained in the ITCPH course with the abovementioned people? *(You may choose multiple answers)*
   ( ) Informally, through face to face interaction
   ( ) Through speaking in seminars/lectures/classes
   ( ) Talking about it in a radio/TV program
   ( ) Being interviewed or contributing for a newspaper/magazine write-up
   ( ) Putting your knowledge in a printed material (i.e. brochure, lecture/presentation, radio script, etc.)
   ( ) Online (i.e. blogging about it, answering queries online, uploading in videos)
   ( ) Others, please specify:
   _____
   _____.

4. By estimate, how often do you share the knowledge you have gained about hog raising?
   ( ) Everyday
   ( ) Every other day
   ( ) Thrice a week
   ( ) Once a week
   ( ) Once every two weeks
   ( ) Once a month
   ( ) Once every two months
   ( ) A few times in a year
   ( ) Once a year
   ( ) Never

5. What do you think were the factors that helped you in sharing your knowledge to the people you mentioned above?
   _____
   _____

6. On the other hand, what were the factors that limited you in sharing your knowledge
   _____
   _____

7. In your opinion, how useful was the hog raising information you have shared to the people you have cited above?
   ( ) Very Useful
   ( ) Mostly Useful
   ( ) Somewhat Useful
   ( ) Mostly Useless
   ( ) Completely Useless

8. Aside from the plan you have implemented and the knowledge you have shared, can you think of other ways you have applied what you have learned from the training?
   _____
   _____.

Part IV. Background Information

Name of Alumni : _____
The mobile number in which you wish to receive the cell phone load (Required): _____

The network the mobile number you indicated above belongs to:
( ) Globe
( ) Touch Mobile (TM)
( ) Smart
( ) Talk and Text (TNT)
( ) Red Mobile
( ) Sun Cellular

Sex: ( ) Male ( ) Female

Agency you are connected to: _____
Office/Company/Agency address:_____
Municipality: _____
Province: _____
Region: _____

Present Occupation: _____
Sector you belong in:
( ) Local Government
( ) National Government
( ) Livestock Entrepreneur
( ) Academe
( ) Private Corporation
( ) Member of Cooperative or an NGO
( ) Others, please specify: _____

Years of Experience in Hog Raising: _____

Number of ITCPH Course/s Received: _____

Type of ITCPH Training Course/s Received:
( ) Trainors Course
( ) Basic Course
( ) Intensive Course
( ) Other courses, please specify: _____

Type of Farm Enterprise owned or managed (answer only if applicable to you):
( ) Backyard (20 or less sow-level)
( ) Commercial (more than 20 sow-level)

- *Thank you for taking the time to answer this survey!* -

Appendix C. *Focus Group Discussion Guide*

I. INTRODUCTION

- Thank people for coming and being part of the study
- Introduce self, the research team and purpose of the discussion
- Explain nature of the discussion, assure that it is only for academic purposes, ask permission for audio recording
- Ask respondents to introduce himself, background, how long they have been engaged in the livestock/hog industry and in what nature, present occupation etc.

II. KNOWLEDGE CHANGE (38 mins)

Objective: Determine changes in knowledge (what things were new to them, what only complemented/replaced what they knew) and their experiences and feelings about the lessons learned during training.

A. Knowledge Gain *(10 mins)*
   1. Looking back on the things that you have learned on your ITCPH Training, can you point out a topic/learning which was completely new to you/you have never heard of before? *(Unaided enumeration)*
   2. *(Aided enumeration: Use show cards of Aspects of Swine Raising)* Among these topics covered in the course, can you select around 2 or 3 which contain lessons that were completely new to you? Explain your selection.
   3. How do these new lessons make you feel?
   4. Can you say that the said new knowledge was applicable to your work or life? In what way?
   5. *(If not mentioned)* What did you do with the said new knowledge?

B. Knowledge Replacement *(10 mins)*
   1. Were there some ideas from the course which replaced or disproved what you used to know, such as your old beliefs or practices? Kindly cite some examples *(Unaided enumeration).*
   2. Why do these replacements occur? What makes you say the said ideas replaced what you previously do/think of?
   3. *(Aided enumeration: Use show cards of Aspects of Swine Raising)* Among these topics covered in the course, can you point out the ones which contain lessons that replaced your previous beliefs? Explain your selection.
   4. How did these items which replaced your previous beliefs and practices make you feel?

5. Was the said knowledge replacement/s helpful in your current work or life? In what way?

C. Knowledge Reinforcement *(10 mins)*
   1. On the other hand, were there any ideas learned from the course which only complemented what you already knew? Please cite a particular example. *(Unaided enumeration)*
   2. Why do these replacements occur? What makes you say the said ideas complemented what you previously do/think of?
   3. *(Aided enumeration: Use showcards of Aspects of Swine Raising)* Among these topics covered in the course, can you select the ones which contain lessons that complemented the things you previously knew? Explain your selection.
   4. How did these items which complemented your previous beliefs and practices make you feel?
   5. Was the said knowledge complementation/s helpful in your current work or life? In what way?

D. Overall Evaluation of Lessons Learned *(8 mins)*
   1. Among these lessons which three 3 do you value the most. Why?
   2. Among these, can you pinpoint some which you value the least? Why?
   3. In general, which knowledge change occurred the most if you are to analyse your ITCPH training – knowledge gain, complementation or replacement?

III. EXECUTION OF IMPROVEMENT/ACTION PLAN *(40 mins)*

Objective: Surface the context and particulars of the alumni's improvement plan execution

1. Did you draft an action plan before you finish the course?
   a. *(For those who said 'Yes')* What was the output/end result of your plan (i.e. constructing an AI lab, establishment of a sow farm)
   b. *(For those who said 'No')* In what way then did you plan to apply what you have learned?
2. How far did the implementation of the plan go? *(Fully completed, somewhat or none at all)*
3. What part of it was in fact implemented?
4. How do the said results make you feel right now? *(Positive or negative)* Why is that?
5. Inhibiting Factors: Were there some factors (people, situation, things) which made the implementation of the plan difficult for you? Enumerate

and expound *(Moderator to write on board. If they find it difficult, enumerate inhibiting factors from survey)*

6. Among the mentioned factors, rank the most to least hindrance in plan implementation. Why decide on such ranking?
7. Ask the same questions (no. 5 – 6) for Facilitating Factors to Plan Implementation
8. Beneficiaries: Who are the people who directly benefitted in your plan implementation? Describe how said plan helped them.

IV. SHARING OF KNOWLEDGE *(40 mins)*

Objective: Surface the context and particulars of the sharing of knowledge learned from training

1. Manner of sharing: Were there some instances where you have shared the things you have learned to others? Narrate said instance/s *(Moderator to write on board).*
2. Frequency: Among the situations enumerated, detail how frequent each manner is.
3. If we are to group such ways of sharing, what would the groupings be?
4. To whom do we share what we have learned? *(Rank top people whom they share what they know the most).* Why so?
5. Information shared: What hog-raising related information you have learned from training have you shared the most? Why is that?
6. Materials produced: Were there any materials produced as you were sharing your learning to others? What were these materials? *(Moderator to write items on board).*
7. What made you decide to produce such?
8. If we are to group these materials, what would the groupings be?
9. Could you say that the information you have imparted to others were helpful? In what way?
10. How does sharing what you have learned make you feel? Why is that?
11. Facilitating Factor: What are the factors (self-characteristics, situations, people, things) that enabled you to share what you have learned? Enumerate and expound *(Moderator to write items on board. If they find unaided enumeration difficult, cite findings from survey).*
12. Among these enumerated facilitating factors, please rank what was the most/least helpful when sharing what you know.
13. Ask the same questions (no. 9 – 11) for Inhibiting Factors to Knowledge Sharing.

V. OTHER MANIFESTATIONS AND RECOMMENDATIONS *(15 mins)*

Objective: Determine if there are other manifestations of knowledge integration and some recommendations for improvement

1. Aside from implementing your improvement/re-entry plan and sharing your learning to others, can you think of other ways you have used/applied the things you have learned from the training? *(If they find it difficult, enumerate other manifestations as indicated in survey i.e. joining cooperative, selling pigs instead of merely for personal consumption, integrated farming system, meat processing)*
2. Based on your experiences after training, what are some suggestions you can give on how the ITCPH can further improve their courses?

-Thank respondents and end FGD-

Appendix D. Informant Screener

Name: Age: Status: Sex:
Address:
Mobile no: Email address:
Occupation: Agency:
Sector: ITCPH Course/s Received:
Years of Exp. in Hog Raising: Farm Enterprise: ( ) Backyard ( ) Commercial N/A
Drafted Action Plan: ( ) Yes ( ) No Shared Knowledge: ( ) Yes ( ) No

A. **CONTEXTUALIZATION** (8 mins)

1. How did you come to know and enroll in your first ITCPH Course? *(Find out if they came to know it on their own or if someone recommended it to them, or they were mandated to by their office)*

2. What did you like best about it? Why?

3. Anything you liked the least? Why?

B. SPONTANEOUS ASSOCIATIONS (5 mins)
Note: Get sunburst template, show it to alumni. Explain that they have to enumerate answers as quickly as possible and interviewer would write.

1. When we say **"hog raising"** what thoughts and feelings immediately come to mind*?*

2. When you think of **"ITCPH Training"** what thoughts and feelings come to mind?

C. LESSONS LEARNED AND VALUE ATTACHED TO TRAINING (12 mins)

1. Offhand, enumerate some lessons you have learned from the Center? Are these important to you? Why is that?

2. In what way did the ITCPH Training affect your confidence about the basics of hog raising? If we are to compare your confidence level before and after your training in a scale of 1 to 10 (with 10 being the highest), what would the ratings be? Why?

3. Overall, how would you rate your satisfaction with the ITCPH training you received? (scale of 1 to 10, with 10 being the highest). Why say so?

4. *Instruct respondent to visualize:* If the **ITCPH training you received is an object** in your life right now, what kind of object would it be and why?

5. *Instruct respondent to visualize:* If the ITCPH is a person in your life right now, who would it be and why?

Appendix E. *Profile of Respondents (N=132)*

Participant Characteristic	Frequency*	Percentage
Gender		
Male	79	59.8
Female	25	18.9
No Answer	28	21.2
Total	132	100
Type of Course		
Trainors	48	36.4
Basic	47	35.6
Intensive	9	6.8
No Answer	28	21.2
Total	132	100
Level of Exposure to Specialized Training[a]		
Basic (1 course)	54	40.9
Advanced (2 or more courses)	43	32.6
No Answer	35	26.5
Total	132	100
Level of Experience in Pig Raising[b]		
Low (5 years or less)	43	32.6
High (more than 5 years)	42	31.8
No Answer	47	35.6
Total	132	100
Area of Origin		
Luzon	79	59.9
Visayas	17	12.9
Mindanao	5	3.8
No Answer	31	23.5
Total	132	100
Sector		
Local Government	23	17.4
Private Corporation	23	17.4
Academe	22	16.7
Livestock Entrepreneur	19	14.4
National Government	7	5.3
Cooperative or NGO	3	2.3
Others	1	0.8
No Answer	34	25.8
Total	132	100
Enterprise		
Backyard	37	28
Commercial	23	17.4
No Answer/Not Applicable	72	54.5
Total	132	100

**Alumni who volunteered information on the item*

[a]*Number of ITCPH courses the alumni participated in* [b]*Total years spent in pig production*

Appendix F. *Focus Group Discussion (FGD) Informants*

Informants	ITCPH Course	Sector
1. Arzel Babierra Farm Manager Babierra's Piggery Farm Tayabas, Quezon	Basic	Livestock Entrepreneur
2. Alfonso Katigbak Businessman Katigbak Enterprises, Inc. Lipa City, Batangas	Basic	Private Corporation
3. Jaylord Tanora Professor Cavite State University Indang, Cavite	Trainors	Academe
4. Noel Lara Teacher Lalayat Public High School San Jose, Batangas	Trainors	Academe
5. Dr. Violeto Coronacion Professor Southern Luzon State University Infanta, Quezon	Trainors	Academe
6. Renee Villaflor Agricultural Technologist Office of the Municipal Agriculturist Rizalina, Quezon	Trainors	Local Government
7. Nelson Ulan Assistant Professor Quezon National Agricultural School Pagbilao, Quezon	Trainors	Academe
8. Hilda Asis-Lopez Administrative Officer V Provincial Agricultural Services, Albay Legaspi, Albay	Trainors	Local Government
9. Diogenes Pinoy Veterinarian Regional Field Unit V Pili, Camarines Sur	Trainors	National Government
10. Franklin Juan de Jesus Supervising Agriculturist Provincial Veterinary Office – Camarines Norte Daet, Camarines Norte	Trainors	Local Government

Informants	ITCPH Course	Sector
11. Antonio Padayao, Jr. Instructor I College of Agriculture and Forestry Bicol University Guinobatan, Albay	Trainors	Academe
12. Noel Escalante Assistant Instructor Don Bosco Agro-Mechanical Technology Center Legazpi City	Trainors	Academe
13. Dr. Jose Sabater Instructor Central Bicol State University of Agriculture Pili, Camarines Sur	Trainors	Academe
14. Maria Remedios Almazar Agriculturist I DA-Regional Field Unit V Camalig, Albay	Trainors	National Government
15. Roberto Mendoza Assistant Professor Sorsogon National Agricultural School Castilla, Sorsogon	Trainors	Academe
16. Pedro Dimayuga Farm Owner Socorro, Oriental Mindoro	Trainors	Livestock Entrepreneur
17. Nelson Diona Farm Owner Sta. Maria, Gloria, Oriental Mindoro	Basic	Livestock Entrepreneur
18. Elmer Marbello Agriculture Center Chief II Provincial Government of Marinduque	Trainors	Local Government
19. Noli Gerona Asst. Professor II Iloilo State College of Fisheries Dingle Campus	Trainors	Academe
20. Dr. Leah Abella Instructor I Capiz State University Dumarao Campus	Trainors	Academe
21. Mr. Jonnie Huervana Associate Professor I Western Visayas State University Calinog Campus	Trainors	Academe

Informants	ITCPH Course	Sector
22. Mr. Sancho Lustica, Jr. Assistant Professor I Western Visayas State University Calinog Campus	Trainors	Academe
23. Mr. Manolito Gantalao Assistant Professor I Negros State College of Agriculture	Trainors	Academe
24. Mr. Glenn Mariano Agriculturist II DA-Regional Field Unit VI Parola, Iloilo City	Trainors	National Government

Appendix G. *Thematic Associations on Pig Raising (n=24)*

Associations	**Category**	**Particulars***
Positive	Business	Source of livelihood/income Business opportunity Money/profit High demand Piggy bank
	Emotional	Hard but rewarding Fun Love for animals Passion for pig raising Responsibility Challenging but worthwhile
	Activity or Skill	Artificial Insemination Farm Management Nutrition and Feeds Waste Management Disease control/treatment Meat processing Breeding and Culling System Leadership skills Extension work Upgrade knowledge
Negative	Business	High mortality Laborious High cost of feeds Price fluctuation Low price of pigs Profit loss Marketing problems Stressful
Neutral	Institutional	ITCPH BAI DA
	Aesthetic	Stages in pig's growth: weaner, sow, gilt and boar Fiesta Pork dishes/lechon High blood Source of protein

**Direct quotes; Multiple Responses*

Appendix H. *Mean Scores on Pig Raising Aspects Pre- and Post-Training and Knowledge Gained (N=132)*

Pig Raising Aspect	**Knowledge**			***SD***	***n***
	Before	*After*	*Gain****		
Common pig breeds in the country	3.69	4.96	1.32	1.46	124
Physical and performance basis herd selection	3.29	4.91	1.66	1.26	125
Culling	3.27	4.96	1.71	1.42	126
Breeding Methods	3.37	5.05	1.71	1.34	123
Heat detection and the estrus cycle of sows	3.27	5.00	1.76	1.30	123
Management[a]	3.29	4.98	1.73	1.25	124
Feeding scheme[a]	3.32	5.02	1.74	1.39	125
Common diseases and health problems of breeders	3.11	4.74	1.69	1.35	124
Proper C&D of pens	3.48	5.06	1.62	1.33	123
Prevention and treatment of pig diseases	3.49	4.77	1.32	1.37	121
Proper housing and equipment[a]	3.45	4.78	1.38	1.66	119
Record keeping, calculation and analysis of technical figures	3.17	4.78	1.67	1.60	123
Cost and return analysis	3.26	4.71	1.52	1.56	120

****all significant at $p < .001$*

[a] *for different stages of pigs (breeders, piglets, weaners and finishers)*

Appendix I. *Distribution of Occurrence and Duration of Plan Implementation (N=132)*

Particulars	**Percentage**
Drafted Plan	
Yes	67.4
No	28.8
No Answer	3.8
Total	100
Duration	
More than 3 years	3.0
More than 2 years	9.1
More than a year	15.2
A year or less	21.2
Others	2.3
No Answer	49.2
Total	100

Appendix J. *Significance Test on Mean Implementation Degree and Satisfaction Scores according to Participant Characteristics*

Characteristics	**Plan**			
	Implementation		Satisfaction	
	Mean	*P-value*	*Mean*	*P-value*
Gender				
Male	2.10	.822	2.06	.728
Female	2.06		2.00	
Type of Course				
Trainors	2.00	.328	1.95	.085
Basic	2.21		2.25	
Intensive	2.25		1.75	
Level of Exposure to Specialized Training[a]				
Basic (1 course)	2.03	.471	2.09	.564
Advanced (2 or more courses)	2.14		2.00	
Level of Experience in Pig Raising[b]				
Low (5 years or less)	2.26	.174	2.19	.237
High (more than 5 years)	2.06		2.00	
Sector				
Local Government	2.06	.728	2.00	.611
Private Corporation	2.33		2.33	
Academe	1.95		1.95	
Livestock Entrepreneur	2.20		2.10	
National Government	2.00		1.67	
Cooperative or NGO	2.33		2.33	
Enterprise				
Backyard	2.14	.741	1.93	.011*
Commercial	2.20		2.33	

**significant at p < .05*

[a]*Number of ITCPH courses the alumni participated in*

[b]*Total years spent in pig production*

Appendix K. *Significance Test on Mean Knowledge Sharing Frequency and Usefulness Scores according to Participant Characteristic*

Characteristics	**Knowledge Sharing**			
	Frequency		Usefulness	
	Mean	*P-value*	*Mean*	*P-value*
Gender				
Male	2.33	.063	2.67	.139
Female	2.63		2.83	
Type of Course				
Trainors	2.49	.341	2.79	.141
Basic	2.28		2.67	
Intensive	2.43		2.43	
Level of Exposure to Specialized Training[a]				
Basic (1 course)	2.31	.099	2.75	.742
Advanced (2 or more courses)	2.55		2.71	
Level of Experience in Pig Raising[b]				
Low (5 years or less)	2.44	.460	2.71	.643
High (more than 5 years)	2.54		2.76	
Sector				
Local Government	2.43	.170	2.83	.265
Private Corporation	2.24		2.52	
Academe	2.67		2.71	
Livestock Entrepreneur	2.39		2.67	
National Government	1.86		3.00	
Cooperative or NGO	2.33		2.67	
Others	2.00		2.71	
Enterprise				
Backyard	2.57	.456	2.74	.625
Commercial	2.45		2.68	

[a]*Number of ITCPH courses the alumni participated in*
[b]*Total years spent in pig production*