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Active Development of Tacit Knowledge: ADTK In a World Without Farmers

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ACTIVE DEVELOPMENT OF TACIT KNOWLEDGE:

ADTK IN A WORLD WITHOUT FARMERS

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ADTK in a world without farmers

TABLE OF CONTENTS

List of Tables and Figures

Abstract

Experiential Learning Theory (ELT) and extensions such as Transformative Learning Theory offer significant potential for skill development later in life – reskilling. Despite wide acceptance and deployment, practitioners are still obliged to design their own methods and activities in order to implement these theories. This paper introduces a novel curricular model, Active Development of Tacit Knowledge (ADTK). Educators can use ADTK to effectively implement and scale ELT. Agricultural Education, specifically the training of new farmers, is used as a sample context to demonstrate ADTK. In new-farmer education, it is necessary to compress the educational cycles of dozens of years of seasonal feedback and generations of familial knowledge to replicate a farm upbringing, often within just weeks or months. Increasing global demand for farm products along with economic constraints limit options for learn by doing on the farm where a poor understanding of natural processes can cause a new farmer to irreparably harm the environment of production. Globally, highly productive farmers are aging out of production, adding urgency to the demand for competent new producers. The combination of system stresses requires teaching methodology that accurately develops frequent and repetitive on-farm decision-making processes that are production environment centered. Yet many new practitioners possess pre-existing and variable skills, knowledge, or information that may not be compatible with their successful farm management needs. ADTK encourages learners to draw out tacit knowledge and restructure pre-existing beliefs with new information into a stable foundation from which a more complex theoretical development and mastery of skills can evolve.

Introduction

Education theories attempt "to explain the relationship of schools to society" (Khôi, 1986, p. 12). Normative theories seek to explain "good education" and sociological theories look at the changing meaning and role of education in societies (Khôi, 1986). Normative theory should allow the creation of education for purpose. When it is interpreted in sociological terms, it becomes a social theory and loses its impact through a change of conceptual interpretation. Today we face a global confluence of vicissitudes: an aging farmer crisis, deterioration of our quality farmland, climate change, and continuing population increase. Each constitutes a unique and global threat to humanity; combined, they invite a total collapse of social order through elimination of our accustomed productivity from agriculture and further threaten our productive resource environments.

Some are already responding to these risks and developing specialized education. Although based on noble principles, the tools at their disposal are creations from a different reality than the world of the learner, now or in the future. Globally, food security is being approached in part by the proliferation of new-farmer education programs based on the principle of putting new farmers in the shoes of experienced farmers: "You never really know a man until you understand things from his point of view, until you climb into his skin and walk around in it" (Lee, 1960, p. 39). While we should applaud these efforts to focus attention on one of our current and future consternations, there is a pervasive naiveté with the assumption that a new setting or information will result in change of behavior or awareness: "Knowing about something does not guarantee caring or doing anything about it" (Jacobson, McDuff, & Monroe, 2007, p. 63). Jacobson, McDuff, and Monroe (2007) continue with "behavior" not being a single concept, but something with different meaning to different people (p. 63).

Problem Statement

Demographic data reflects a global aging farmer population (EPA, 2013; FAO, 2010; Matthews, 2012; Kalu, 2013; Meyer, Hunter, Katchova, Lovet, Thilmany, Sullins, & Card, 2011). Their replacements, new farmers, are not the same as those they are replacing. A 1300 participant study of new farmers in the United States by The National Young Farmer's Coalition shows 78% were not raised on a farm (Shute, Anderson, Bernhardt, Creech, Flemming, Oakley, & Shute, 2011, p. 14). We known Agricultural Education must be kept current (Davis, 2009; Committee on Agriculture Education in Secondary Schools, Board of Agriculture, National Research Council, 1988; Moore, 1988; Retallick, 2010). But current agricultural education design, including Agroecology (Francis, Jordan, Porter, Breland, Lieblein, Salomonsson, Sriskandrajah, Wiedenhoeft, DeHaan, Braden, & Langer, 2011) programs, continues to promote learning and development of advance skills for those already grounded in core agricultural concepts (farmers) and encourages a divide between the farmer/producer and more socially "acceptable" occupations dependent on the wellbeing of the farmer (Francis et al., 2011; Waldenström, Salomonsson, Francis, Moulton, & Lieblein, 2008). Agroecology is for more technically proficient farmers and Farmer Field Schools (FFS) offer high efficacy even when farmers use low-input and "traditional" methods (Pemsl, Waibel, & Witt 2006; Ojo & Olakulehin, 2006). New-farmer education programs come in a number of styles that are loosely based on FFS and Training and Visit extension models (Resosudarmo & Yamazaki, 2011; Prain, 2005; Niewolny & Lillard, 2010; Anderson, 2013; Winther, Overton, & Heron, 2013).

Although ideologically committed to nature and agriculture, new farmers are a group of learners seeking farm life who bring their pre-existing notions that can impede development and application of appropriate agricultural practices. The natural resources they hope to respect and

profit from are put at risk (Crawford, 2013). This is not a new phenomenon. Farm machinery giant John Deere recognized that farmers required an explicit understanding of how their equipment interacted with different soils and crops when it began publishing instructional manuals such as The Operation, Care and Repair of Farm Machinery. My fifth edition copy from 1931 conveys in 199 illustrated small pages more detailed agricultural wisdom about soils under cultivation, efficient working patterns and methods, mechanics, and philosophy of working with draft animals than all literature on farm operation provided in my degree programs in Agriculture from 2009 and 2011. However, the greater concern than content is that design and implementation of new-farmer education uses educational theory intended to adapt the socialization necessities of the existing farmer rather than engage the beginner in the significant re-orientation from a human centric mindset to one focused on the natural processes of the farm: knowing from experiencing envisioned by mission and goal statements (Anderson, 2013).

NEEDS ASSESSMENT

Where would we be in a world without farmers? As farm productivity increased in the industrialized world, the percentage of farmers in the population fell and is already below a level required to replace aging farmers with youth raised on their farms, or even from their rural areas (EPA, 2013; Matthews, 2012; Kalu, 2013). In a 10-year Canadian demographic study, 50% of teens migrated out their rural area with in-migration primarily urban residents (Dupuy, Mayer, & Morrissette, 2000). Replacing family requires more than two reproductive children simply to maintain a stable population. But at least two reproducing children per farm family would still need to choose farming as their work to replace one farming family! The traditional rigors of farm-life urge farmers to push their children to a better life off the farm. In the less industrialized

world, this is especially true (Kalu, 2013). Out-migration driven by push-pull factors accelerates net loss from rural areas and rural raised replacement farmers.

Productivity defines income and the quality of farm life. Farmers depend on proper management in a complex web of interdependent natural resources and systems to prosper. Jack and Wallace (2011), Hsu (2013), and Reimers and Klasen (2013) all show age-based declining returns from farmer education. Also, Reimers & Klasen (2013) state the "effect of education is generally smaller for the poorest countries" and smaller impact is seen in countries where more traditional or "simple" agriculture is practiced (149). These studies suggest something is gained from life on the farm that is only partly understood by education systems. These studies are global in scope and agree with the technical concerns of "modern" higher education in agriculture (Francis et al. 2011; Waldenström et al. 2008) across enterprise scale, climate variation, geography, and culture. To see the risk of turning novices with limited knowledge of natural processes loose to learn by doing, we need only look at one of the largest natural disasters on record. Ken Burns' film *The Dust Bowl* (2012) shows the potential ecological nightmare of thousands of new farmers with access to modern technology learning *in situ*.

What happens when we lose our most productive farmers and try to replace them with lightly skilled "new-farmers" lacking the ability to produce similar quantities of food? Food will be scarce. More people will go hungry and die: globally, 842 million people may be chronically hungry right now (FAO, 2013a, World). Maybe it will not happen and each new farmer will have decades and generations to develop a deep understanding of and connection with the natural processes they work with. In the meantime, people will go hungry and *experimenting* on the land jeopardizes productivity in the future. The idea of pairing novice and mentor, the apprentice and

intern methods, based on a concept of walking a mile in the shoes of the *farm kid* is wrong about critical assumptions.

One - studies show declining returns from education as learners' age increases and when agriculture is simplified (Jack and Wallace, 2011; Hsu, 2013; Reimers & Klasen, 2013). Does this suggest adults learn differently than younger students, or does what a youth learns early have different impact than later learning? We cannot unlearn what we know, so our options are to dilute past learning with more current information and wisdoms, or work to understand what we thought we knew in a different way. Two - mentors are not automatically Masters. In the United States, Comfoodjobs.org (Community Food Security Coalition e-list server for food system jobs from Tufts University) and Sustainableag.org (Sustainable Agriculture e-list server from University of California, Davis) advertise unpaid internships, training-farm manager positions, and assistantships to fill mentorship roles in new and existing education programs. These programs are asking for applicants with from one to four years of actual farm experience as qualifications. When Francis et al. (2011) develop new curriculum for higher education, they do it because even farm-raised high school graduates lack basic understandings of agroecology processes on farms. There certainly are masters with well-developed wisdom who work in new-farmer education, but these are not one-to-four-year experience people filling entry-level positions. So, what is the efficacy can we expect from these programs? Three - is the assumption that short duration skill development, even if intensive, builds the wisdom needed to steward the natural processes, protect the productivity of your resources, and nurture your crops or stock in a way that achieves productivity and financial stability valid?

A likely reality is we must feed an increase in the global population to a projected nine billion people by the year 2050, in increasingly hostile climate conditions, and markedly fewer

resources than are available to us now (Palmer, 2013). We might not be facing a significant loss of farmers. Climate change might not be real or produce impacts within the same period we are projected to lose productive farmers. We may not actually be running out of land, water, or mineral inputs. Technology might produce responses to some issues like the breeding of plants that can produce food with saltier water. The other options are that we see exactly the scenarios predicted, or we horribly underestimate at least one of the risks we face. Twelve percent of the world is undernourished (FAO, 2013a) – "regularly not getting enough food to conduct and active life" (FAO, 2013b, Key Messages). Generational farm succession is failing. The aging farmer crisis is international in scope, and replacement farmers are multi-cultural and multi-national even within the same country or area (Ahearn, 2011; Crawford, 2013). New farmers may be recent immigrants not only looking to learn agricultural in their new local, but also the dominant culture as well. The question is less likely *if* we will be in crisis, but *how bad will it be* and *when does it start*?

Formal examples of agricultural education exist in the United States in primary, secondary, and post secondary schools (Committee on Agriculture Education in Secondary Schools, Board of Agriculture, National Research Council 1988 and Antoine et al. 2011) as well as an increasing quantity of non-formal offerings including incubator farms (Winther, Overton & Heron 2013), workshops, mentorships, and on-farm education (Anderson, 2013 and Braun & Duveskog, 2008). With decades of experience farming and advising mostly new farmers, 45 years of formal and informal involvement in agricultural education, and international mobility, I feel a necessary core component for success of the new-farmer's enterprise is missing from all education I have encountered. Can they all be wrong, or limited in their efficacy?

Current theory for new-farmer education adopts an immersion concept thought to produce a direct transfer of knowledge from educator, or mentor to the learner (Niewolny & Lillard, 2010; Winther et. al., 2013). But Jacobson et al. (2007) say this does not work. While programs almost always include an on-farm component for the learner, the farm is a foreign place to a new farmer, so the idea that knowledge can be accurately contextualized through immersion is similar to dropping a foreign student into another country and expecting they can accurately comprehend the new context. A year ago, I landed in Hungary with no Hungarian language skills and my cultural context was from a research paper on Hungary's education system. Experience shows the delusion of immersion alone providing knowledge development. I knew a Hungarian couple from when they were in the United States, but when they asked why I brought so many clothes instead of buying some there, I exclaimed; "Hungarians are shorter than I am, so I won't be able to find clothes that fit in Hungary." Of course, I ride Hungary's public transit with dozens of men of all age brackets who are taller than I am. My construction of reality, my logic, had a basis. I only knew Hungarians who were shorter than I was; so "all" Hungarians are shorter than me.

I have a cadre of English-speaking Hungarian cultural guides, but neither cultural competency nor language development is automated by exposure. Most of the Hungarian I understand results from context. I notice intonation and body language. There are foreign words mixed in that can cue an understanding of general concepts. From tone and actions, I might intuit meaning, but I do not understand. I do not speak Hungarian, and I am often wrong or incomplete in my interpretation. Likewise, new farmers are rarely oriented toward the rhythms and voices of natural processes on the farm and attempting to deliver production knowledge before developing even the though processes needed to understand the knowledge is intercultural incompetence.

Idealists may come with an innate natural context, but miss the necessity of converting this into commerce. Those coming from rigid or methodical settings must learn about how their ideas of control contribute to failures and frustrations. The socially adept may understand advocating in the human environment, but nature is not people, and so needs different motivational incentives.

A farmer dreams of easier, better, and simpler, but extreme stress is often the reality. Can helping to weed a row of vegetables really provide insight into the pain of deprivation when you need to choose between asking for food and going hungry? If this sounds like a shock treatment, then I have impressed upon you a small part of the reality of life as a farmer. How then to ingrain this type of urgency into a system people voluntarily consume? As educators, we hold a greater public trust, as we are responsible for our students who waste hugely productive environments unless we instill in them the correct balance of resource stewardship and self-preservation. To train new farmers, an educational methodology must first help the learner unpack what tacit knowledge they hold, **and then** construct a new knowledge base fixated on natural processes and integration of systems – the natural way of working of successful and sustainable farmers.

PROGRAM DESCRIPTION

Program Scope

My assessment of current offerings is that they fall short of addressing the single most important concept of new-farmer education – the mental and social reorientation from a human centric and time-bounded understanding of management to a completion-oriented management delimited by resource availability. In agriculture, the control of time lies with nature. We can learn from the design of *farmer* education, but at best this is reference information signaling a destination for *after* we have launched the non-farmer on a path as a successful farmer, yielding results that imbue a non-farmer with what could describe as *indigenous knowledge* – a deep

intuition or wisdom of the ages that comes from adopting the environment as one's progenitor. Polanyi's (1958, 1962) discourse introduces *Tacit Knowledge* as an idea of similar construction.

Ideal farm management is location, scale, and type centric, but also frequently isolated (Niewolny & Lillard, 2010). A competent new-farmer education needs to be: easily localized and scaled, promote self-discovery and self-learning, rapidly produce competence, and be cross-cultural in nature. Farmers manage human interaction with the farm environment. Dictionary definitions of farm and farmer are simplistic. These fail to approach either the complexity or intensity of farming where life and death decisions are made regularly for animals, birds, fish, plants, insects, soil organisms, and occasionally even people. Abstract views of farming and agriculture promote oversimplification in design of agricultural education that lead to ecosystem destruction. If we look where the needs of the new farmer differ from those of an experienced farmer, methodology that enables transition becomes clearly defined.

Farming is a business. To treat it differently guarantees failure. But, farming is a business whose success is derived from hyper-active management: one that constantly monitors the state of intertwined natural processes and accurately predicts the fate of these processes to maximize and harvest the productivity of nature for the benefit of mankind. Failure to recognize and properly evaluate the causes of change or changes within interrelated systems on and off the farm shoves the farmer from the role of manager and harvester of natural surplus into a state of extraction – a miner.

"Farm, Farmer, and Farming" are used as inclusive terms to encompass farms and ranches as well as farmers and ranchers and farming and ranching. Where Anderson (2013) includes revenue in defining farmer, "Someone who collects revenue based on success of crop and animal growth," I expand this with "intends to collect" so that all non-cash equivalents of

10

trade such as exchanging agricultural production for cost of land, water, other foodstuffs, services, an intended trade that fails due to insufficient production to warrant trade, e.g. consumes all production as their own food, gives to relatives – even choosing not to collect or harvest as expense (time, labor, fuel, equipment, regulation compliance, etc.) exceeds anticipated return, makes one a farmer.

Further, I see participating in new-farmer education as a forward-looking act. Therefore, intent to profit from education and training is assumed in developing methodology to teach farm skills. While intent to profit can include esoteric goals of satisfying curiosity about a subject, education of a vocational nature must focus on the needs of the discipline and avoid catering to casual interests. Finally, I find that even experienced farmers become new farmers again with similar issues and needs after relocating an enterprise, even just across the street, stopping and restarting an enterprise, or altering production, e.g. converting from production of arable crops to production of vegetables or livestock. Despite prior experience and possession of farming skills, transitioning farmers have re-skilling needs during adjustment to the new enterprise or local.

In contributing Active Development of Tacit Knowledge (ADTK) methodology to the field and demonstrating it here in the context of new-farmer education, I hope to addresses several issues with theory and practice of education. I choose to demonstrate ADTK within the field of Agricultural Education using the preparatory needs of new farmers because of extreme demand for transformative results in this situation. Theorists and Practitioners should not feel that ADTK is confined to agricultural disciplines. As a child of Experiential Learning Theory (ELT), ADTK is appropriate for use in learning situations where new ideas must blend with pre-existing knowledge base. Although it is possible that someone or others have techniques similar to those described as ADTK, no explicit description seems to exist in the reviewed literature,

including descriptions of new-farmer education programs. I suspect that the theoretical

concentration on social concepts, the needs of learners to integrate into society, is responsible.

ADTK describes a method of instruction intended for implementation in both new and

existing education programs. The full scope of ADTK is the singular concept of connecting the

learner to their existing knowledge in a way that allows them to evaluate and make any necessary

modifications to their core construct of reality in order to amalgamate new information.

When working with tacit knowledge, and the demand for a learner to align deeply held

beliefs with natural processes and cycles, especially when working with more advanced or

experienced learners, we must first accomplish knowledge conversion before we can create new

knowledge. Although Nonaka and von Krogh (2009) do not offer theoretical constructs for

conversion of knowledge, this likely rises from the fact that an individual's way of knowing, their

core belief structure, is considered generalized and tacit instead of explicit and specific and thus

is not available to the learner for description. Ray (2009) critiques Polanyi's (1958) concept of

Tacit Knowledge as ramblings, musings, and bordering on the mystical. From my work in

Hungary editing Hungarian to English translations and reading Polanyi (1958), I suspect Ray's

(2009) impression comes from a poor concept of Hungarian culture, Polanyi's social status, the

impact on Polanyi and Hungary of significant sociopolitical change, and translation from the

inference based native Hungarian to the precision anticipated by extensive English vocabulary.

Tacit knowledge is the unknowable and hidden, born of ideas and practice at a level

beyond which normal descriptive research applies: or from Hildreth & Kimble, "…tacit

knowledge cannot be *represented* in language, writing, or tools" (as cited in Nonaka & von

Krogh, 2009). Describing movement of another along the continuum between tacit and explicit

knowledge requires that the subject of investigation assume a role of observer, the chronicler

must develop a common understanding of the observer's frame of reference, and that same frame must then be passed to each reader to be understood: "…tacit knowledge is difficult to communicate (Jimes and Lucardi, 2003; Cook and Brown, 1999), other than by direct interaction and storytelling (Hernandez-Serrano, Spiro, Lamartine, and Zoumas, 2002; Mascitelli, 2000)," (as cited in Goffin & Koners, 2011, p. 301).

Program Timeline

The timeline for ADTK is defined by the program structure within which it is deployed. ADTK is discussed here as a single-session model methodology, a multi-session component of a program, and integrated into an entire program. The single-session model allows for effective outcomes within a one to two hour session at a conference or workshop. The multi-session model is deployment as an ongoing component of a lecture or symposium series held over a regular school term and within regular class periods or as a daily component of a mixed methods program of variable length. Full program integration anticipates single and multi-session models and their components are deployed across an entire certificate, degree, or residency program. As discussed in the integrated model, delivery time of component parts can be as low as a few minutes per learner. Intrinsic features of the methodology are that rapid learner response is ideal and iterative peer evaluations provide real-time feedback for management of the program to maximize impact and efficacy. Timing is regulated through management of peer learning group size, which can range from single, mentor with mentee, to a group of four to six peers. Peer groups are normally capped at six learners with four being ideal; class or gathering sizes can range upwards of 50 people depending on program design and goals.

ADTK develops a new way of understanding information processing or abstracting using guided, iterative exploration and an assortment of backdrops producing rapid, stable adoption.

However, even a single exposure part of the larger construct, can spark to experimentation,

discovery, and a new way of knowing, the learners' context for experiencing the world.

Potential Participants

In this paper, it is assumed the participant is a young to middle age adult with prior

training and education in a field other than agriculture who wants to establish an agricultural

enterprise. The new-farmer demographic makeup is diverse in cultural background, gender, and

age (Niewolny & Lillard, 2010). They are not beginning learners, but bring with them ideas and

practices, even at a young age, that influence their perception of new information and their

ability to integrate this into a personal understanding. Diversity of place and type of each new

farm enterprise introduces additional cultural and practical variance that complicates delivery of

our current agricultural education using a discipline- or subject- based pedagogy. These are

global conditions not isolated to wealthy or highly industrialized countries.

In establishing the discourse on Andragogy in the United States, Knowles (1975)

attributed specific learning traits to adult learners, but I see students of all ages presenting active,

Pedagogy	Andragogy
Mandatory Attendance	Voluntary Attendance
Subject Centered	Problem Centered
Dependent Learners	Independent Learners
Inexperienced Learners	Experienced Learners
Teacher Prescribed Content	Learner Prescribed Content
Learners Grouped by Age Level or Ability	Learners Grouped by Interest or Needs
Learning for the Future	Learning for the Now
Learners Subordinate to the Teacher	Learners Equal to the Teacher
Rigid, Traditional Structure	Flexible, Alternative Structure
Passive Learners	Active Learners

Table 2 – Pedagogy vs. Andragogy or Child vs. Adult Learning

independent, and problem centered learner characteristics listed in Table 1 Pedagogy vs.

(Jackson, 1998). Newly published research shows typical adult learning behavior of Andragogy,

"inductive inferences about the causal properties" (Walker and Gopnik (2013), in study

participants as young as 18 – 30 months. Sanguinetti (2013) shows meaningful mental

processing and interpreting significant input beyond our conscious understanding. These new

studies suggest that *Tacit Knowledge* and the *Knowledge Conversion* of Nonaka & von Krogh

(2009) exist as a normal process active even in the very young. Education and training must

account for and understand the individual learner's capability and it seems "adult" learner

typologies may be just more developed and extend from early childhood, possibly as an original

condition. There is concern that participant diversity could impact ADTK methodology

negatively. Duveskog, Friis-Hansen, and Taylor (2011) and my own work with international

students and multi-cultural groups show that proper design and implementation of a learning

environment overcomes both culture and gender bias. ADTK may be appropriate for all learners.

PARTICIPANT RECRUITMENT AND ADMISSIONS

ADTK is a methodology within the larger frame of a training or education program. In the same

way current programs may be ineffective even though developed under Experiential Learning

Theory (ELT), program efficacy is only partially defined by methodology choice. ADTK should

show an increase in post-program success rates per the evaluation section. Word of mouth

advertising is anticipated. However, participant recruitment and admissions is deferred to the

training program and will rise and fall based on attention to the full range of program issues.

LOGISTICS

ADTK is conversational in nature. As a methodology, it is part of the program within which it is

delivered. To the extent the program anticipates ELT and encourages interactive process,

logistics are deferred to the program and ADTK methods may be substituted for other planned activities.

GOALS AND OBJECTIVES

Program

This paper focuses on providing the relevant understanding of ADTK to rapidly produce learner competence for assimilation of new subject matter. The primary demonstration is as a tool for new-farmer education. ADTK is intended to address the needs of those transitioning from other careers, and considerations are provided for implementation and extension. ADTK is cross-cultural in nature as it seeks the underlying philosophy of the learner as the critical goal of the education. The culture of farming varies significantly from place to place and even within countries. There is a foundational skill set repeated across all types of farming and human cultures. Therefore, a system of education intended to develop a culture of farming is cross-cultural, international in scope, and application when it accentuates this foundation.

The ADTK methodology is flexible and described to guide the educator in production of iterative self-reflection with learners. Consistent and repeated use of ADTK allows learners to catalog strengths and limitations with rapid guided and reflections and peer groups. Self-directed use of ADTK is the definitive design goal, but introduction should be through guided experience to develop learner trust in their capacity to develop new insights. For agriculture, a feature of the ADTK methodology is the learner can rapidly identify with an agricultural enterprise **if that fit is personally viable**. ADTK is an accessible process, however, as with all ELT, it expects creation of safe learning places. Because agriculture is a difficult and demanding lifestyle that not all individuals appreciate or enjoy, with ADTK, learners can closely examine personal goals, talents, and ambitions.

Participant

Participants in new-farmer programs are as diverse as the local demographic. While *farmers* tend to self-identify as highly independent, my research experience shows them searching for new skills and knowledge across cultures and integrating new plants, animals, practices, tools, and methods into their own enterprises when benefits are believed to outweigh risks. They are communicators but also in a typically solitary occupation. There is a significant transition period before a new farmer becomes an independent individual supporting a productive environment, capable of seeking out what is appropriate for the farm – a farmer.

New-farmer educators must be prepared to manage the learning needs of successful individuals from other settings finding themselves complete novices requiring basic agricultural or business knowledge. Educators must also be prepared to work with idealists lacking aptitude for either agriculture or business. At times, the educator will encounter successful farmers in training who have properly identified an enterprise and possess the skill and attitude to aligning production and marketing goals with their personal talents.

THEORETICAL FOUNDATIONS

Understanding theory-to-practice relationships may best be accomplished by breaking out some of the discreet task groups a farmer experiences into somewhat more tidy packages.

Theory-to-Practice

Ordering from a seed catalogue, deciding on maintenance and repair work for farm equipment, considering acquisition of new land, thinking about entering a new market, or deciding if irrigation is needed or the rain predicted will be adequate; each decision is processed within a combined cognitive and subconscious frame. The frame includes a complex mix of economic and social influences, tested knowledge, untested ideas, and both practical and

impractical goals. Discovery Learning (DL) closely fits the development of the iterative farm management process but it is rare for new farmers to understand how to deepen their understanding of their own learning and decision making process (Castronova 2002). DL is appropriate and a practice used by experienced farmers, but limited for building understanding of relationships between natural processes on the farm and modifying ecological concepts learned in the built environment. We need a platform to practice and develop the self-critiquing critical to operating in a traditionally isolated setting and responsive to changing demands or understanding.

New farmers who come from non-farm backgrounds lack exposure to natural processes and the collection of life and business decisions made in concert with them during formative years. Rufus Stimson introduced the Supervised Occupational Experience (SOE) or, "the Project Method," to vocational agriculture education in the United States in 1908 (Moore, 1988). Stimson's SOE predates what Bruner (1960) refers to as "scaffolding" in constructivist theory which sees instructional design, and not chronological age, as the critical limiter of learning (as cited in McLeod, 2008, 2012). Stimson's SOE is still in use in formal agricultural education and is the basis for many new-farmer programs. SOE and Scaffolding allow flexibility to educate a wide cross section of learners including those with firmly held beliefs. Competing theories complicate design around the goal of new-farmer education programs: developing what Davis-Manigaulte, Yorks, and Kasl (2006) describe as the "learning environment conducive to whole-person learning" (p. 31, 32) and "learning as response" (Vandenabeele & Wildemeersch, 2010) in the learner.

A farmer may see feedback from a decision immediately, or it may be years before either success or failure is recognized. Thousands of decisions are made each day even to maintain

relatively simple production enterprises. Many decisions may be small, but necessary, additive, capable of produce broad impact. Program goals for new-farmer education must include rapid and accurate development of analytical skills. Even interning with an experienced farmer only exposes the learner to singular events and decisions that might be repeated a few times with new production cycles. However, production cycles are often annual, so while this can replicate familial and locational knowledge development through exposure, it is a very slow process. Replication using simulated or alternate conditions does not provide the same feedback as real conditions. Growing a spring crop in a "second season" as temperatures cool in the fall is not the same as growing when temperatures are rising in spring!

Vocational education is preparation of the learner for the workplace (Lambeth, 2008; Clakston, 2006; Cullen et al., 2002 and Illeris, 2003 as cited in Vaughan, 2008). We assume the learner will be or already is in the workplace. New-farmer education also assumes the workspace has been acquired or this is occurring, marketing has been or is being developed, and production is or will soon be underway. Workplace participation defines a relative maturity of vocational learners, especially the new farmer. We do see youth involvement, but normally with parental supervision. Even basic demands on farmers are more complex and involved than employment and well beyond the development of a service enterprise or manufacturing plant – farm life.

A new-farmer program can be multi-year, but often less than a single growth period from seeding to harvest is allowed. This limits Transformative Learning (TL) even though it is powerful enough to be a core method used to train nursing students in rapid patient evaluation. TL can promote behavioral change to aid transition to a farm lifestyle. TL is used to learn how to evaluate stored knowledge for symptomology matching the patient and respond appropriately (Patterson, Crooks, & Lunyk-Child, 2002). In a hospital setting, patients rapidly cycle in and out,

providing multiple opportunities to examine similarities and differences. Although farms are highly active in many dimensions, they tend to appear stationary and seasonal conditions are temporary. While TL may show how farm-raised youth accumulate generational and situational knowledge, cycle repetition must be amplified to use TL in a new-farmer education platform.

Rapid Prototyping (spiral) Model	**Classic Design (waterfall) Model**
1. concept definition	
2. implementation of a skeletal system	1. concept definition
3. user evaluation and concept refinement	2. requirements definition
	3. preliminary design
4. implementation of refined requirements	4. detailed design
	5. code implementation
5. user evaluation and concept refinement	6. test and acceptance
	7. [griping because you now realize that there was something that got left out back in step 2]
6. implementation of refined requirements	
7. [etc., etc., in a continuous cycle]	

Table 2 – Rapid Prototype and Classic project design models

Short duration education that replicates a farm environment can use rapid prototyping or spiral modeling for programs and projects as shown here in Table 2 and described by the Jet Propulsion Laboratory of the National Aeronautics and Space Association of the United States (as cited in Culatta, 2013) can work. Successful farmers are serial problem processors. Taking one thing at a time puts the farmer constantly behind since multiple processes are ongoing, overlapping, and presenting management opportunities before the endpoint of the singular process. Because the spiral model seeks evaluation feedback early and uses this to modify subsequent decisions, it builds an iterative process or continuous feedback loop. Spiral models do exist, but ELT, DL, and TL tend to get stuck in the serial Pedagogy or the classic/waterfall model. Learning this type of management means realizing that other processes also feed into and across at the evaluation loop allowing a manager to find more places to positively influence the natural processes in their enterprises. Farmers make parallel assessments using alternate

variables and this spiral model is repeated constantly. Still, without multiple repetitions of similar work in a variety of conditions, understanding of the nature of farm management is not developed during the educational program.

A farm may have multiple crops or production zones, but much of the production cycle is comprised of intense work periods followed by waiting for results. Multiple events are occurring: germination, emergence, first true leaf stage, but this is a slow moving process. Perceived "down time" while natural processes unfold are used for delivery of content, but adding content can distract a learner from subtle processes more critical than the additional content. Lewin and Schein's Change Theory needs to be incorporated in new-farmer education to "freeze" knowledge as a part of scaffolding and creating new knowledge or "cognitive redefinition" (Schein, 1996). The problem is this reinforces a concept that "nothing is happening." In medical training, TL seems to focus on crises where results are observable shortly after making a decision. Patient monitoring occurs between crises. Other industries use TL to integrate new employees into company culture and continuing projects, so if we can produce a sense of urgency, rapid feedback, and repetition, transformation could be achieved. Appelbaum and Goransson (1997) apply TL to "organization learning," showing how concepts of multiple intelligences and self-discovery generate an organization's intrinsic or holistic learning the same as Heron (1992) describes for the individual (as cited in Davis-Manigaulte, Yorks, & Kasl 2006).

Opportunities to produce urgency in new-farmer education are few and may result from inclement weather, accident, or poor management. While each of these presents a learning opportunity, ethical constraints as educators and program designers do not allow putting learners into situations of significant enough risk to experience "urgency" as a real farmer might. While raising live animals, I learned this sense of urgency and its antecedent "responsibility." When

your livelihood is put at risk by a neighbor's dog "having fun" chasing down and killing your stock, your engagement level is significantly higher than when baling hay on a 40-acre field at 2:00 A.M., or broadcasting arugula on to a prepared seedbed.

Project based and action learning; internships, mentorships, and the FFS platform (FAO, 2013a) that implemented experiential learning methods, all suffer from the same problem of developing context. Farms operate in natural environments. People who understand how they work and continually seek to update their knowledge manage the successful ones. Some environments are highly manipulated and while education offerings may provide in-situ learning, all these are impacted by seasonal fluctuations (seasonality), variable weather, different environments from prior cropping histories, prior weather events, driving or walking on wet soil, and the long-term impacts of past management decisions.

Jacobson et al. (2007) write about conservation education and outreach techniques where we finally find tools to contextualize new farmers that agroecology lacks. Jacobson et al. (2007) include the basics of ELT, learning styles, differences between learning capacity of youth and adult learners, and both content- and context- based curriculum development. Their "Changing Conservation Behavior" chapter is almost what we need to develop and deliver new-farmer education (Jacobson et al., 2007, pp. 63-84). Jacobson et al. (2007) offers us environmentally responsible behavior and theory for behavior modification including: Value-Belief-Norm, Reasonable Person, Systems Thinking, Environmental Citizenship Behavior, and Significant Life Experience models (pp. 64-72). An ideal new-farmer program should also include Fishbein & Ajzen's Theory of Reasoned Action (1975) and Ajzen's Theory of Planned Behavior (1985) elaborated on by Jacobson et al. (2007, pp. 73-76). Jacobson et al. (2007) treat the subject of education as centered *within* the individual, placing behavioral change in reach of the learner

subject to understanding their own preconditions to act and development of a superior reasoning to change this tacit behavior. This is learner development theory from an environmental focus.

No factor in farming, including the market, is static. To create a successful farmer is to create a life-long learner making meaning out of seemingly unrelated events and predicting the most prudent use of scarce resources that promotes the highest return on investment. Educational practice must create a sufficient understanding in the learner of how to view outwardly hard data, information, and content, as fluid and abstract. Designing education for the realities of the farm forces borrowing from multiple theories and methodologies informed by actual practice, multiple agricultural enterprises, including multiple actors and a variety of cultures to create a program promoting internal development of a persistent awareness, the tacit understanding of change. Agriculture has been pervasive through most recorded human history. The tendency is to view it as something that continues "on its own" with little intervention or guidance. This reality is at the heart of policy and practice regarding everything from land allocation to international relations.

Taylor (2007) provides us a review of Transformative Learning Theory (TLT) through 2005 that is a continuation of his earlier review. Although Taylor (2007) finds TLT a "uniquely adult," he also sees TLT as a utility for "paradigmatic shifts" (174). TLT is accepted in "critical" fields such as health care as well as cooperative extension. Farming demands a different mindset, a buy-in to the farm lifestyle as much as any specific commitment to production goals. The farm and its products are living things. Animals eat, digest, breed, defecate, urinate, breathe, bear young, and die whether the farmer is on-site, off tending to other vital business, or asleep. Dried grains change moisture and temperature inviting pathogen blooms, attacks by rodents, birds, and other animals. Fresh produce begins a decay cycle the moment or even before it is separated from the plant. Seeds germinate, weeds bloom and re-seed, rain falls, and wind blows whether

the farmer wants or planned it. As global populations become more removed from natural processes and accustomed to consumer goods, time-bound activities, paved roads, and the option to *leave things for tomorrow*, behavioral change, as Jacobson et al. (2007) describe, quickly becomes central to a paradigm shift (Taylor, 2007) into farming.

Patterson, Crooks, and Lunyk-Child (2002) pull out self-directed learning (SDL) from Knowles (1975) that TLT promotes. Patterson, et al. (2002) report on a BScN program using SDL for decades where, "Self-directed learning is explicit in the terminal objectives of the curriculum and is evident and expected within each program course" (25). Although written for nursing education, Patterson et al. (2002) take up the issues of ambiguity and gaps in knowledge providing valuable student requirement guidelines that should be adopted by developers of new-farmer training programs for SDL development: "Become proficient in assessing knowledge gaps of themselves and their group; Create a repertoire of skills; Learn to tolerate ambiguity in expectations of themselves and by their group and tutor; Explore a variety of learning styles or approaches to learning" (26).

Medical education is approached and financed as important where mistakes should be avoided or people die. This has resulted in increasingly realistic opportunities for education. Patterson et al. (2002) produced four-level progression tables covering: Assessment of learning gaps; Evaluation of self and others; Reflection; Information management; Critical thinking, and Critical appraisal. They also look at the educator side of the process with Barrows (1988):

> (T)he questions a tutor may ask to stimulate discussion are:
>
> • 'What is going on here?'
>
> • 'Do I have the entire picture?'
>
> • 'Have I thought of all the possibilities?'

- ‘What data do I need to consider such possibilities?’

- ‘Do I have all the facts needed?’

- ‘What does this finding mean?’

- ‘What is the best way to manage this?’

- ‘Have I had experiences with situations such as this in the past?’

- ‘Am I right about this or is there another way of looking at this?’

(as cited in Patterson, et al. 2002, p. 27)

These are not only questions for a tutoring and learner reflection. This is basic problem solving the successful farmer or businessperson uses in their lives. It is also the goal of new-farmer education: questioning at this level must be an internal reaction to the farm setting. When the farm is an endless iteration of *what is going on here*, then we are at the point of working with processes to guide them in the direction best suited for our needs, and understand *what is the best way to manage this* (Barrows 2008 as cited in Patterson et al. 2002).

Pennington, Simpson, McConnell, Fair, & Baker (2013), add a case study in which a common language or way of knowing develops to identify and react to the 1993 Hantavirus outbreak in the Southwestern United States. Pennington et al. (2013) describe teams competing to find best fits with a collaborative mutualism that drove problem identification and responses (569). Catalyzed by a potential epidemic, researchers, public health and safety officials, and others organized around developing a working understanding that produced a *Yatesian zone* of innovation where novel ideas and understandings from individuals outside their disciplines helped construct a collective knowledge (Pennington et al. 2013 p. 570). New-farmer education has interaction between people from different backgrounds and specific interests but rarely

urgency of crisis. New-farmer programs assume they work in this same type of interactive *Yatesian zone* (Pennington et al. 2013) context but fail to create it.

Because new-farmer education tends to be group practice for economic efficiency, Davis-Manigaulte et al. (2006) is included for their concept of *expressive ways of knowing*, a form of reflection at the group level. Using case-study and storytelling, Davis-Manigaulte et al. (2006) evaluate group interactions that help individuals interpret and deepen their understanding and meaning making of an event or process: "Expressive knowing helps a group get connected more quickly. It gave us a chance to learn about each other in ways that did not come out when I simply asked them, 'Tell me about yourselves'" (p. 30). We need to create the lived experience that is missing from most on-farm mentoring, work-share, and collective on-farm experiences. The new farmer is rarely at risk during education, unable to pay a mortgage, send a sick child to the doctor, or put fuel in the stove because of actions in the program. Focus is normally on a productive activity instead of a whole person experience that creates a felt experience and identifies unconscious knowing. The production task does not often define psychological ability. Therefore, tasks lose importance and are *just work* instead of a deeply felt learning experience. Davis-Manigaulte et al. (2006) employ the educator as a holistic learner. The new farmer needs the educator as a partner; discovering the learner and learning how to become the most effective guide, as much as information source.

Further resources on TLT such as Appelbaum and Goransson (2013); Vaughan (2008); and van den Heuvel, Demerouti, Bakker, and Schaufeli (2013) focus on organizational learning and constructive feedback processes in the workplace. Starting business can be overwhelming. Starting a farm, with its business responsibilities and problems as well as the production issues is even more daunting. Learning to think of requirements for a successful business while paying

attention to the immediate health needs of your chickens is a major undertaking. New farmers tend to suffer overload rendering them ineffective. Managing demands of the farm becomes delaying decisions on some issues only to find other processes continuing along on their own causing the farm to go out of control. Individual examples of TLT are available to cover most circumstances of new-farmer education as long as the learner can recognize similarities between farm problems and examples in other industries. This skillful abstraction must be produced from the onset of new-farmer education to avoid usual traps initiating the enterprise.

Review/authority

From Knowles sharing his thoughts on Andragogy and including the extensive classical contributions of Dewey and Piaget, nearly all ELT and methodology seems to seek development of the human capital, capacity to function in the human domain. Unfortunately, the primary need of a new farmer is not the ability to function within the human domain, but the need to function within the domain of nature. Therefore, the majority of our knowledge about education of people to interact with people is at best inference knowledge that is unsuited or must be significantly modified for the task. Learners participate in agricultural education for their individual reasons, whether to advance or receive initial basic understanding. Participation in the formal development of skills (participation in informal through formal learning events) is a self-selected activity: although potentially valuable to an individual's life, is not a life requirement.

Education must be accessible and cannot deny participation to curious individuals or those in true need of training. However, vocational education must adopt the realities of the discipline being taught if it is to provide truly unbiased skill development, concepts, and skill application. Vocational education is utilitarian and specialized, so separate from general education. An ideal vocational education will sort out individuals with limited interest from those

with aptitude, need, and higher interest. Despite this tendency for properly designed vocational education to become exclusive to individuals with less interest, program design and methodology employed must remain focused on the development of skill as required by the discipline.

Farm skill development has focused on traditional male participation at the exclusion of females (Trauger, Sachs, Barbercheck, Kiernan, Brasier, & Schwartzberg, 2010; Alston, English, Graham, Wakefield, & Farbotko, 2011). This is inconsistent with objectives of farming that align with feminist theory of nature and nurture, even if radically modified environments for production are the norm. Trauger et al. (2010) and Alston et al. (2011) have responsibility for promoting a better life within contemporary society as an organizing function of United States agricultural education and extension service, but operating with "(Freire's [1973]) oppressive pedagogy (that) require(s) the student to adapt and adjust to the content of the education rather than the education adapting to the student's identity and needs" (Trauger et al., 2010, p. 89).

New farmers should benefit from learning designed on andragogical precepts instead of a pedagogical "front loaded activity in a formalized, classroom environment" (Vaughan, 2008). Every part of agriculture is application of knowledge, and the greatest collection of information is rendered inadequate until and unless valid application skills are developed. Agricultural competence in application of knowledge extends from production activities to the research and development laboratories working to create advancements in agricultural sciences. It is necessary to blend Pedagogy with Andragogy to provide structure, but farmer education methods, and especially new-farmer education methods must be as successful at demonstrating and developing processes as delivering related data. If not, they lower potential effectiveness of the farmer.

HEALTH AND SAFETY PLAN

ADTK is a methodology for use within a structured program. Understanding the complete methodology of all program components is a basic part of developing a valid Health and Safety Plan. As a risk, ADTK is compatible with other competent ELT methodology.

STAFFING PLAN

Any competent ELT practitioner should be able to implement ADTK within a wide range of program designs. Staffing and staff training is at the discretion of program management.

CRISIS MANAGEMENT PLAN

With ADTK, the traditional role of "instructor" becomes that of a learning guide. The educator needs to become familiar with the role the same as a mountain climbing guide must ensure participant safety as the primary objective of a program. Facilitating conversations that allow open and authentic dialog without exposing any learner to unnecessary risk needs to be practiced. Participants who do not feel safe will not engage. Creation of the inclusive learning environment is key to defusing cultural, ethnic, and gender related issues.

Evaluation of a test application of ADTK at Szent István Egyetem in Gödöllö, Hungary (see Appendix) found two personality types where the effectiveness was reduced. One student was disinvested in her own education and found ADTK methods "a joke" and "waste of time." The student was observed spending class time engaged with online shopping, email, and social media sites. Consequently, her ability to engage in collective or personal learning processes was reduced. Her frustration was voiced to the class during her second presentation. This case resulted in advisory notations made to the head of the program as the student may lack maturity, need assistance with assimilation to the foreign country, have difficulties with living away from home, and/or university life in general.

The other personality type showing resistance to ADTK shows in a middle-aged male student with a highly structured and male-dominated social background. In-class behavior was exemplary including open participation with all genders and ethnicities. However, in my long-term impact evaluation, the individual expressed concerns about efficacy of coursework based on ADTK. Comments from this individual mirror my own feelings when first exposed to some of the core concepts around which ADTK is framed. Here, time is needed for the learner to adjust to new ideas about processing information.

CURRICULUM

This curriculum for Accelerated Development of Tacit Knowledge is submitted within the degree of International Education (IE). In a global context, IE involves individuals and group mobility with the considerable knowledge and understanding of events, cultures, conditions, and workplaces from home countries. Traditional educational narratives deliver unified content with limited concern for learner diversity. This design strategy misses the unique ability to combining course content with the individual's development of context. My learning goal in International Education is to understand inter-cultural issues that impact education, especially as applied to food security and poverty issues. In the United States, farms have traditionally been immigrant havens and our agriculture is rich with methods and traditions from other countries. International mobility allowed me to investigate the design of ADTK using a test iteration with a group of 16 international students from 11 developing countries as part of a Rural Development lecture series in a Food and Agriculture Organization of the United Nations (FAO) Master's of Science Degree program at Szent István Egyetem (SZIE) in Gödöllö, Hungary, funded by FAO. Success of the methodology shown through the assessment included as an Appendix shows the potential of ADTK to reach beyond new-farmer education into professional development and academics.

Three basic implementations of ADTK are presented. A single-session intended for quick introduction to ADTK at a typical conference or workshop for new farmers, the multi-session version using the SZIE curriculum, and full program integration including discussion on using the interchangeable and repeatable components. While all components are easily modified and can be run in parallel as well as serial with other program components, it is advised that practitioners use published versions until they become comfortable with both their new role as a learning guide and the range of responses to ADTK from their typical learner population.

ADTK assumes experienced learners (regardless their age). Two variables need to be understood and accepted when developing a learning experience:

1) Not all ideas and knowledge brought by an experienced learners are of value to the new learning objective, and

2) All experienced learners bring at least some good knowledge.

Remember that learners have assembled voluntarily out of interest or need. Their presence shows motivation to understand problems they face, even if they do not know what these problems are. Share this common goal with each learner. Learners expect content to be relevant; if they did not believe there was value, they would choose a different use of their time. Educators should be prepared to work with active learners but also understand learners' display of engagement levels will vary.

Roles of the Educator

In ADTK, the educator is a guide and resource who influences the direction of discussion, encourages equal participation, ensures alternate story lines are active, and arbitrates any differences between participants. The educator creates and maintains a safe learning environment and authorizes learners as equals in the learning process. Specific tasks include:

introduction and administration of tasks ensuring acknowledgement of each learners' ideas, and keeping a "why" questioning active when discussing all input.

Roles of the Learner

In ADTK, the learner is a peer educator. The learner participates in authentic dialogue around the themes and concepts presented either individually or to the group. Shared experiences begin with understanding restrictions each learner brings to participation in the learning process. Based on the Lewin/Schein Change Theory (Schein, 1996), the learner will reach for Tacit Knowledge as a stabilizing mechanism when they are slightly off balance. As in word association drills, the important concept is the first thought. This reactionary outpouring is the programmed or tacit memory and knowledge. So the specific tasks of the learner are to develop a supportive peer structure, offer honest feedback and assessment of their own ideas as well as those of their peers, and learn to signal the guiding educator when assistance is needed.

Process:

ADTK adopts Lewin/Schein Change Theory (Schein, 1996). This includes learning as growth that can be threatening as it challenges strongly held beliefs. The purpose of attending the new-farmer education is preparation for the reality of farm and business life. New knowledge must fit with or replace tacit knowledge to form a solid base upon which to build the new enterprise. The learners will access their internal beliefs through topic discussion, and exposing conflict with issues while building confidence in their mastery of a personal development process.

ADTK provides the learner a process for analytical thinking. Recognizing changes in natural processes require opening to subtle variations of nature. Given a learner unfamiliar with the processes important for successful management, the educator faces two challenges: exposure

of the learner to critical information, and familiarizing the learner with both typical and atypical progressions of the critical processes. Predictive and responsive capacity begins when the learner evaluates their understanding of critical processes and information (processes and information will vary depending on industry and educational goals of the program).

Single-Session Model

Learners form randomized peer-groups of four to six and assemble with a facilitator. After establishing safe speech norms, learners are given a topical conundrum Learners in the peer-group provide a one-minute question response to their peers. Immediately after each presentation, peers then provide up to three minutes of feedback and prepare a written evaluation for each presentation. One such conundrum for a new-farmer education might ask, "How do you till your soil without killing earthworms?"[1] Peer presentation and evaluation continues until the entire group has presented. Facilitators know the conundrums in advance and need to coordinate with each other to ensure conceptual challenges (thought starters) exist in positive language to guide discussion. Restate a question when needed.

On completion of peer-group presentations, reconvene the full gathering. For gatherings of up to 25 learners, it is advisable for each to move around the room having all learners provide a second response presentation to the full gathering[2]. Depending on time management needs, a follow-up question or two can be allowed. With gatherings of more than 25 learners, ask volunteers to present but also encourage learners who appear to be holding back. Minimize post

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[1] For maximum impact, tasks should be conundrums, not have standard answers. In the example given, all tillage will kill some earthworms, therefore, tillage cannot be done without sacrificing some soil organism. However, the question does not ask whether you should till or not, it asks how to do the impossible. This type of question challenges the learner to resolve ethical issues of a possible necessity of tillage with the probable loss of a beneficial component.

[2] Note that this second response may be entirely different from the first. This is a positive indicator that learners are experimenting with alternate concepts.

questioning in larger gatherings to allow time for all learners to make a second presentation. During this second set of presentations, have recorders (facilitators) record themes.

Following completion of all presentations, a closing activity is needed to "re-freeze" (Schein, 1996) or release learners. An appropriate closing activity is a guided discussion about the most and least mentioned themes. Moderate the discussion to minimize any learner from monopolizing the discussion. Ideally, an open mixer type activity would follow the exercise to encourage networking. This organization also allows the main assembly to run long if learners still wish to present, but try to respect the timelines.

Goals:

Time serves a critical function within the ADTK methodology. Because we cannot put learners at risk to simulate true stressful conditions farmers face, time is used as a safe proxy. Pushing learners to make responses with minimal preparation time allows a conundrum to draw out tacit knowledge and the learner's current way of knowing the subject mater. When given time for deep contemplation the learner works consciously with explicit knowledge although tacit knowledge still has a hidden influence.

Different learners focus on different parts of a problem depending on their understanding of the issues. The educator and peer-group expand concepts. Through the process, the learner can experience their own ideas through the eyes of peers and must reconcile differences. This causes the learners to question closely held beliefs. The round-robin style of presentations followed immediately with peer input serves to prevent a learner from disengaging and dwelling on their own responses as they are quickly moving from presentation, to receiving input, to evaluating their peers. Again, time is the stressor that maintains access to the learner's tacit knowledge.

Evaluations help make connections between tacit and explicit knowledge driving a process of knowledge conversion for all peers (Nonaka & von Krogh, 2009).

The peer-group presentation opens or "unfreezes" the learner (Schein, 1996). Presenting a second time allows the learner to practice resolving differences between alternative ideas on importance and relevance of information and concepts (Schein, 1996). Peer-group comments alert the learner to alternate views but the possibility of change also brings anxiety. At this point, it is important for the facilitator to ensure positive questioning and constructive commenting. Change is facilitated when sufficient positive influence in the desired direction of movement occurs: new information, access to resources for further study, or discussion content and demonstrations, overcomes resistance.

The closing activity following second presentations provides group and individual reflection. Lewin/Schein Change Theory would consider this to be re-freezing (Schein, 1996). In practice, this is more a relaxing than a true freezing. Learners will continue to consider input and evaluate their own concepts until a new belief fully develops.

Follow through and limitations:

Expecting adoption of a substantive change from a single learning exposure or even several contact hours in any program is naïve. ADTK works no differently. Single exposure can open a window to new ways of thinking that encourages positive and lasting change for learners. Nevertheless, this still requires significant effort on their part as Wirth summarizes Schein (1996):

> Once there is sufficient dissatisfaction with the current conditions and a real
>
> desire to make some change exists, it is necessary to identify exactly what needs
>
> to be changed. Three possible impacts from processing new information are:

words take on new or expanded meaning, concepts are interpreted within a

broader context, and there is an adjustment in the scale used in evaluating new

input.

A concise view of the new state is required to clearly identify the gap between the

present state and that being proposed. Activities that aid in making the change

include imitation of role models and looking for personalized solutions through

trial-and-error learning. (as cited in Nauheimer 2005 p. 101)

When ADTK has opened the learner to seeing ways of knowing in conflict with desired progress,

a sufficient amount of quality and positive, explicit knowledge is required so that rebuilding tacit

knowledge can proceed in an orderly fashion. Post session networking, entry into communities

of practice, mentoring, and access to reading lists or web-links modeling concepts and behaviors

is required. One option is for the educator to maintain contact with the learners through e-mail to

forward relevant content gleaned from e-mail list servers and special interest sites to keep a

positive flow of explicit knowledge available through the process of converting new tacit

knowledge.

Multi-Session Model

(Note the following example is from Rural Development not New-Farmer Education.)

Learners were provided a syllabus for the course (Appendix B pp. 66, 67), which asked that they

provide a short biography to the educator and then prepare to view a slide presentation of images

from different rural development settings. Images ranged from landscape to those of people,

images of a remote roadway, a woman doing laundry in water covered by algae, rice terraces, a

small settlement in the desert, etc. The same prompt was given for each image, "what is the rural

development in this image?"

Before starting with the presentation of images, the educator and learners agreed on a concept of safe speech. The presentation then proceeded and learners were guided toward unique and different viewpoints about possible problems and solutions for each image. The educator balanced interaction of the students by encouraging or "calling on" students hesitant to engage and minimized the input of "talkative" students. Through the exercise, a dialogue was created between the learners with the educator as a guide, offering assistance and arbitrating differences of opinion between students. While the stated purpose of the first exercise was to introduce Rural Development to the learners, the instructional goal was development of the dialogue between learners by shifting the common understanding of roles from one of learner/educator, to a community of experts seeking a greater understanding of their field. Learners were recognized for their accomplishments that mimicked a development project through submission of scholarship applications, competition for resources, and commitment to a multi-year project taking them away from family, work, etc.

At the end of the introductory "lecture," instructions for the project task were reviewed. Each learner was required to prepare a two-page brief on a rural development project they wanted to submit for the fictitious competition and make a five-minute oral presentation of their project to the class at the next class session. The initial presentation is intended to establish a personal baseline for the learner and expose the class to the variety of rural development issues existing within even a small population (original class size was 16). A short question-and-answer (Q&A) period moderated by the educator followed each presentation to establish peer-to-peer inquiry and learning. The educator restated questions in a more positive wording to model safe speech behavior and presented additional questions to expand topics for consideration as needed.

All peers provided written evaluations of projects that were then scanned and emailed to the presenting learner along with additional comments and suggestions from the educator.

Following initial presentations, two learners were added to each project creating teams of three. Organization and management of teamwork was left to each learner with coaching on teamwork provided by the educator. Teams were tasked with improving each project using peer evaluations, new ideas, educator feedback, and questions raised in Q&A following presentation. Project groups then prepared a new two page written brief and the project owners (the original learners who visualized the project) presented their revised projects orally to the class. Originally, presentations were intended to all be on short timelines to encourage collection of "first impressions" and reactions while avoiding excessive consideration of style, formatting, etc. The goal of this strategy was to keep learners working primarily with tacit knowledge. By having to interact with others, the learner's understanding of their own ideas, practices, biases, must be justified to themselves in order to justify these to others.

The theory is that this introspection is necessary for the learner to put new knowledge into context with their pre-existing beliefs and understandings. As a profession, Rural Development requires practitioners who regularly consider alternative views, causes, and responses while at the same time providing knowledge and expertise in a measured but authoritative manner. Therefore, a benign form of personal psychological testing is employed in the exercise to expose students to future professional work situations while allowing them to had better understand their own strengths and limitations.

Peer evaluation is an integral part of all exercises and the course design. Having been anointed as experts at the beginning of the course, this expectation is upheld through the course by using the peer group as the examiner of competency for ideas submitted. Each learner submits

a written evaluation for each presentation using a simple one-page format provided by the educator. These evaluations are provided to the presenting learner. Feedback and Q&A following the first presentation serves to challenge the learner to consider additional issues and creates a complex situation where multiple actors present conflicting views. Again, the peer feedback is a collection of reactions to the ideas of another, leading the learner evaluator to confront their own beliefs and offer up their a small part of their own tacit knowledge. The Q&A following each presentation further encourages "thinking on your feet." While this group of learners had other courses together, they were not all "friends" with deep knowledge about each other. This allowed for randomness in questions and comments. With a prior knowledge of each project due from the written briefs, the educator prepares for questions and guidance of discussion in advance to maintain any critiques as constructive.

Peer evaluation of the second presentation includes a score from each evaluator. These scores on a scale of one through ten are used to determine the winner of the fictitious contest. These average scores are compared and the project with the highest average is announced at the following lecture on project evaluation. Learners have the opportunity then to view not just written comments and remarks of an evaluator, but also see how their project might be viewed in a true competitive setting. For the evaluator, the need to assign a numerical value to each presentation requires the learner to craft a mental continuum of project needs and responses and how close each project comes to fitting a personal ideal. By taking all scores and producing an average, evaluators are spared having to rank projects and are free to imagine more situations in developing their own concept of an ideal – either ideal for the presented project or ideal for a development project in general.

Program-wide Integration

Program wide deployment of ADTK uses a spiral and overlapping implementation. First exposure should occur during program orientation. Having the method endorsed by program management is a positive sign for the learner. Where a program consists of mentors, educators, and program staff (including program manager or organizer), ideally the manager or organizer initiates a single-session version of ADTK and all non-learner program participants act as peer-group guides (facilitators). This establishes an understanding with the learner that ADTK is an integral part of the whole program. As well, program staff, including volunteers, farmer mentors, and management, benefit from learning about the learners, and bonds of trust and respect can be initiated before other program components begin.

In a typical new-farmer education program, there will be a mixture of educational components. ADTK can be a distraction if attempted during fieldwork components. However, integrating ADTK as the reflection on fieldwork helps learners associate their understandings of ecological and agricultural principles with their real life experiences. To do this, organize short pre-fieldwork sessions to reflect on a single issue from the previous day's work so the learner enters the field for work in a frame of mind to observe the context of the work. Although rigors of harvest, tillage, planting, etc. may not seem to allow for mental processing of more than what is required to complete the necessary function, because ADTK is working with tacit knowledge below conscious thoughts and actions, the learner will continue to convert new explicit knowledge into tacit knowledge during the active work period.

A rest period or break from ADTK is recommended to avoid overthinking by the learner that can result in confusion. A debriefing session should follow each fieldwork session when preceded by an ADTK session. These will serve to generate topics for the next ADTK session

and allow each learner to re-freeze (Schein, 1996). Knowledge conversion is a personal process and continues while learners are away from the program and educators. Morning check-in activities allow educators, guides, mentors, etc. to monitor the learners' status. These activities need not be complex, simple conversation builds familiarity and trust between learner and practitioner and allows for adjusting future activities. ADTK recommends social activities to release energy and emotion that can results from internal conflict of restructuring deeply held beliefs. Social activities also provide another window for program staff to informally evaluate learners for any emerging mental health or social conflict issues.

In ADTK, Pedagogy and Andragogy are treated as complimentary methodologies. Part of any new-farmer education will consist of information delivery. Tacit knowledge is derived from explicit knowledge, so delivery of information does not conflict with ADTK. However, because ADTK is self-directed learning, information delivery should provide of a mixture of formats that include basic knowledge to reinforce principles, more advanced concepts to challenge learners, and both resources and time for learner centered inquiry. Universal resources such as Internet websites and content are valuable to ADTK as they allow the learner an ability to move at a comfortable pace and continue their self-directed learning outside of the training program. However, unguided, the Internet also carries information that can be harmful to the learner.

Integration components:

ADTK can be integrated through program modification to accept developed components. Alternately, ADTK components can be modification to work with existing program design and interactive sessions. Minimum commitment to add ADTK methodology includes:

- Introduction session that establishes safe speech norms to protect learners,

- Single-session ADTK component that promotes equality of participants and authorizes peer-to-peer feedback (sets all participants equal in the learning process),

- Daily use of single-session conundrums prior to a related planned work period or information session to encourage thinking about the conundrum post session,

- Post work or information session (end of day) check-in and debriefing to allow for partial re-freezing (avoids development of extreme anxiety from worry about needing to find solutions),

- Mix daily single-session ADTK components and peer evaluated presentation projects with short preparation times followed by addition of random peers to develop and present a second peer evaluated presentation,

- Daily collection of written peer evaluations and delivery of copies to each learner along with constructive practitioner feedback (may include additional resources, recommendations for refinement of concept, restatement of peer feedback to avoid confusion, and offers of personal time to explore concepts),

- Access to quality resources for self-directed use,

- Periodic work reviews (if a work program) to provide status updates to learner outside of the ADTK projects,

- Promotion of peer recognition and sharing of successes,

- End of program evaluation and review,

- Post program follow-up with additional resources (ideally establishment of a peer-group or community of practice for participants and practitioners).

When providing ADTK or any other education to a group of new farmers, it is critical to remember the learners are not farmers, but learners with a desire to become farmers. Without

first building the foundation for enterprise management and production, all explicit knowledge will rest on an unstable base. Therefore, it is advisable to initiate introspection and any necessary reconstruction of best production and management practices before attempting to cater to the "fun" parts of growing crops or raising livestock.

EVALUATION PLAN

ADTK is intended to fit within a program, which should have its own Evaluation Plan, but features of the methodology provide additional opportunities for program evaluation.

ADTK allows for and anticipates assessment of entering behaviors. Because the goal of ADTK is to interface with the learner's existing belief system, initial responses to the first iterations of ADTK provide excellent information on incoming learners. This information is used to adjust program content, to inform marketing, and as a benchmark for measuring program efficacy. Written peer evaluations are collected and digitized, with either a digital or paper copy provided to the learner and the other copy retained for program use.

Because ADTK initiates a long-term shift in personal ways of knowing and responses, short-term outcomes should not be expected to reflect the full impact of ADTK. However, the iterative and repetitive nature of ADTK provides incremental evaluation materials (peer evaluations) that can be used to evaluate program impact in real-time as well as predict longer-term outcomes of ADTK. These peer evaluations become an ethnographic record of each learner and each iteration of ADTK that allows program managers to monitor learning guides, response to specific themes, and knowledge development or change over time. Communication via e-mail or in electronic forums provides additional documentation opportunities.

Unlike typical program designs, program designers and managers implementing ADTK will face a potential overload of detailed evaluation material of program efficacy.

PROGRAM MARKETING

ADTK is a construct of ELT, TL, DL, and SDL, all of which are currently implemented in new-farmer education programs. While ADTK offers added benefit, no additional program marketing is required as the industry and participants currently expect ELT as the "preferred" learning environment. The addition of ADTK will differentiate programs over time, but the success of program participants will be measured two or more years after completion of the program. Pre-marketing is not required.

BUDGET AND BUDGET NOTES

ADTK should be treated as a seminar or presentation for budgeting needs. Standard overhead such as availability of electronic presentation equipment, a chalk or whiteboard, or flip charts, and evaluation forms are necessities. Advanced implementation of ADTK should include significant learner presentations. However, costs for these are subject to the program itself.

CONCLUSIONS AND IMPLICATIONS

ADTK is deceptively simple as it is designed by stripping away partially formed and competing learning theories to reveal the components necessary for the current needs of new farmers. ADTK can be considered "purpose built" and tailored to a group of learners. However, the basic theory and practical application show ADTK is a process to implement competent Self-directed, Peer-to-peer, and Group Learning.

Development of ADTK looked at what successful farms and farmers do that is different from what new farmers do to address establishing a new enterprise and manage it successfully. In doing this, a tool was developed that excludes the idolatry and egocentrism of arguments over

production methods, crops, and localization issues. At the same time, focusing the development

of ADTK on the critical evaluation methods process used by farmers – training in meaning

making – absolves ethnic, cultural, and gender bias from the process of learning how to manage

and profit from natural processes: the intent and purpose of farming.

Although an innovation for educating new farmers today, ADTK is rooted in traditional

learning of apprenticeship, mentoring, and learn by doing. This paper shows ADTK applied to

the problem of educating new farmers. The implications of ADTK as a method bridges

theoretical divides between different modes of experiential learning cannot be underestimated.

ADTK may not be the missing link to form a general educational theory, but it is an important

example of designing education to address critical problems. Returning briefly to agriculture, we

cannot afford to treat new farmers as farmers until after they have learned the most basic

principles needed to protect their productive resources. Because of its simple and singular

orientation, self-evaluation, ADTK is as applicable in the Farmer Field Schools of Indonesia,

Southeast Asia, and Africa, as it is in the universities of the United States and Europe as well as

the new-farmer education and farm exchange programs around the globe.

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Appendix A

Preface

Appendix B of this Capstone, pages 52 – 69, contains an assessment of ADTK that was performed as an Independent Study project at SIT Graduate Institute, Brattleboro, VT, on the use of ADTK in a seminar course on Rural Development Issues at Szent István Egyetem (SZIU), Gödöllö, Hungary. ADTK was the method used when student 16 students from 13 different developing countries on grants from the Food and Agriculture Organization of the United Nations (FAO) prepared and presented projects in a course titled *Consultation with Experts*.

The seminar series was part of an introductory content course in English within the FAO Master of Science (MSc) program in Rural Development and Agribusiness and the department of Economics and Social Sciences. The FAO MSc program roughly parallels the *Integrated Rural Development* MSc in Hungarian but includes specialized coursework to account for the diverse backgrounds and countries of origin of participants. Eight class sessions (one every other week) were originally anticipated in the course design. Unannounced schedule conflicts resulted in reducing to 6 actual sessions during the 2013 Spring Semester at SZIU. This republication of *Contacting Tacit Knowledge* as Appendix B provides insight into issues with implementing ADTK in a multi-session course. Results of a post-practice study are included along with copies of peer evaluation forms, syllabus, and instructions. The PowerPoint slides used in the introductory lecture are not included as it is recommended that they be matched to anticipated learners and course focus for best results.

Appendix B

Contacting Tacit Knowledge

Ed Garrett

SIT Graduate Institute

Contacting Tacit Knowledge

International Education frequently involves mobility of individuals in a global context who bring with them considerable knowledge and understanding of events and conditions in their home countries, cultures, and workplaces. By contrast, the typical training narrative is to deliver a unified content with limited concern for diversity of the population. This design strategy may miss the unique ability to consider combining course content with the individual context. This case study looks at a novel method for drawing out tacit knowledge in a group of students from multiple countries as the basis for teaching cultural competency in Rural Development.

Introduction

Course design

The coursework being studied was developed by the author for a Masters level seminar at Szent Istvan Egyetem (St. Stevens University – SZIE) in Hungary. Students in the course were all recipients of FAO (Food and Agriculture Organization of the United Nations) scholarship winners. Qualifications for FAO scholarship include residence in a "developing" country as defined by FAO. The Masters of Science degree program within which the course was presented was Rural Development and Agribusiness intended only for FAO students. Every other week of the course was devoted to lecture/discussion from a variety of experts on Rural Development Policy in Hungary and the European Union (EU) with the bye weeks devoted to the portion of the course studied here – as a general overview, an interactive student driven project design course assuming the presence of a fictitious prize of €100,000 for the best project presented by a student.

Students were provided a syllabus for the course (Appendix A), which first asked them to view a slide presentation comprised of images from different rural development settings. Images

Contacting Tacit Knowledge

ranged from photos of landscape to those including people, images of a remote roadway, a

woman doing laundry in water covered by algae, rice terraces, a small settlement in the desert,

etc. The same prompt was given for each image, "what is the rural development in this picture."

Students were guided toward unique and different viewpoints about possible problems

and solutions. The instructor balanced interaction of the students by encouraging or "calling on"

students hesitant to engage and minimized the input of "talkative" students. Through the course

of this exercise, a dialogue was created between the students with the instructor as a guide,

offering assistance and arbitrating differences of opinion between students. While the stated

purpose of the first exercise was to introduce Rural Development, the instructional goal was

development of the dialogue between students by shifting the common understanding of roles

from one of student /instructor, to a community of experts seeking a greater understanding of

their field. Students were recognized for their accomplishments that mimicked a development

project through submission of scholarship applications, competition for resources, and

commitment to a multi-year project taking them away from family, work, etc.

Tasks

At the end of the introductory "lecture," the instructions for the project task were

reviewed. Each student was required to prepare a written two-page brief on a rural development

project they wanted to submit for the fictitious competition and present their project orally to the

class at the next meeting. This initial presentation was intended to establish a personal baseline

for the student and expose the class to the variety of rural development issues existing within

even a small population (class size was originally 16 students).

Following the initial individual presentation, two additional students were added to each

project creating teams of three. These teams were tasked with improving each project based on

Contacting Tacit Knowledge

feedback from peer evaluations completed during the first presentation, instructor feedback, and questions raised in the question and answer period immediately following each presentation. Organization and management of teamwork was left to each presenter with coaching on teamwork provided by lecture.

Project groups prepared a two page written brief and the project owners (original students who visualized the project) presented their revised projects orally to the class. Originally, these presentations were intended to be on short timelines to encourage collection of "first impressions" and reactions while avoiding excessive consideration of style, formatting, etc. The goal of this strategy was to keep participants working primarily with tacit knowledge. By having to interact with others, the individual's understanding of their own ideas, practices, biases, and preferences must be justified not only to others, but also to themselves. The theory under development being that this introspection is necessary for the learner to put new knowledge into context with their pre-existing beliefs and understandings. As a practice, Rural Development expects practitioners will regularly be required to consider alternative views, causes, and responses while at the same time providing knowledge and expertise in a measured but authoritative manner. Therefore, a benign form of psychological testing is employed to expose students to future professional work situations while allowing them to better understand their own strengths and weaknesses.

Peer evaluation is an integral part of all exercises and the course design. Having been anointed as experts at the beginning of the course, this expectation is upheld through the course by using the peer group as the examiner of competency for ideas submitted. Each student submits a written evaluation for each presentation using a simple one-page format provided by the instructor. These evaluations are provided to the presenting students electronically following

Contacting Tacit Knowledge

instructor review along with feedback from the instructor. Feedback on the initial presentation serves to challenge the student to consider additional issues and creates a complex situation where multiple actors can present conflicting views. Again, the peer feedback is a collection of reactions to the ideas of another, leading the student evaluator to confront their own beliefs and offer up their own tacit knowledge. A question and answer period following each presentation further encourages "thinking on your feet" but must be monitored and directed by the instructor to maintain constructiveness of any criticism. With a prior knowledge of the project due to submission of the written briefs, the instructor can prepare for questions and guidance of discussion in advance.

Peer evaluation of the second presentation includes a numerical score from each evaluator. These scores on a scale of one through ten are used to determine a winner for the fictitious contest. Scores are totaled for each presentation and divided by the number of evaluations. These average scores are compared and the project with the highest average is announced at the following lecture on project evaluation. Participants have the opportunity then to view not just written comments and remarks of an evaluator, but also see how their project might be viewed in a true competitive setting. For the evaluator, the need to assign a numerical value to each presentation requires the student to craft a mental continuum of project needs and responses and how close each project comes to fitting an ideal. By taking all scores and producing an average, the evaluator is spared having to rank projects and is free to imagine more situations in developing their own concept of an ideal – either ideal for the presented project, or ideal for a development project in general.

Contacting Tacit Knowledge

Methods

This research is descriptive in nature due to the small population available. 16 students started the course. One student was called back to his home country early in the course and another later in the course for employment necessities. Of the remaining 14 students, only 11 were able to present their projects at the designated second meeting time. Complications with scheduling a course meeting time required two students to present at the beginning of the final lecture period. Significant differences were noted in evaluations of these two final presentations from those submitted previously, so those presentations and projects have been removed from this case study. One other student failed to appear at any of the second presentation times or submit a revised project brief and a final student was not emotionally developed enough to accept the independent nature of the assignment[1]. Therefore, the study group size is restricted to 10 individuals. As these individuals are from six different countries, treating them as a group is only practical in observing cross-cultural potential of this instructional design, as they do not present either a random or homogenous population.

The research includes assessment of 10 sets of student evaluation forms to determine if individual students considered issues primarily based on their own project areas of interest or moved themselves into the "shoes" of the presenter and considered primarily issues of the project presented. Trends, if any, are documented through comparison of first and second presentation evaluations. Additionally, participation in a project group is considered for any noticeable impact on second project evaluations. Finally, an online survey was delivered to the 13 students completing course requirements. Nine responses to the survey were obtained and evaluated as part of the case study.

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[1]This reaction does point to a limitation for educational methods based on Andragogy as they assume the learner has already obtained a minimum level of maturity and self-direction.

Contacting Tacit Knowledge

Assessment

Students presented projects as follows

1. Ethiopia - Development of Irrigation System in a region

2. Kenya – Development of a seed bank for indigenous crop varieties

3. Kirgizstan – Female entrepreneurship through training and microfinance

4. Vietnam – Renewable energy from agricultural waste (rice)

5. Laos – Revitalization of craft silk production

6. Macedonia – Development of a regional/state agricultural marketplace

7. Kenya – Radio programming to promote youth involvement in agriculture

8. Ethiopia – Introducing sheep rearing to promote economic development for females

9. Kenya – Development of a community farm commodity market

10. Ethiopia – Demonstrating inclusive development of a village

The reader can judge from the above listing the variety of projects goals and cultural backgrounds present in the class. Additional students involved included one each from Tajikistan, Mongolia, Ukraine, Kosovo, Montenegro, and Afghanistan. The students from Tajikistan and Montenegro were called back to their countries early. The student from Kosovo failed to complete most assignments and attend later course sessions, and the students from Afghanistan, Mongolia, and Ukraine were removed from the case study for the reasons previously noted. Projects presented by these additional students included: Establishment of goat rearing to provide milk and meat to tourist trade; Development of a business to provide housing from shipping containers for persons of low income; Advisory work on design of a rail connection between the urban perimeter and city center to improve flow of rural goods; and Solar installations on homes in rural villages to provide water pumping and heat.

Contacting Tacit Knowledge

Evaluations

Forms provided for initial oral project proposals ask for evaluation of each project in three dimensions of development: Social, Economic, and Political. A separate request is made to evaluate the presentation itself, "was the speaker easy to understand …" (Appendix B). Forms for the second oral presentation ask for evaluation in Environmental, Social, and Economic dimension for development and to provide a numerical rating of the project ranging one to ten (Appendix C).

Evaluation forms were anonymous with only the presenter name and project title and location requested to allow for forwarding to participants. For analysis, evaluations were grouped by handwriting, pen color, line weight, letter form, use of special symbols, etc. and the missing student assigned as the author[2]. Questions, comments, and instructions under each of the development dimensions were recorded in a spreadsheet. In addition, a rudimentary appraisal of comment quality was made. Coding for quality and content was not done as the study group size and composition does not lend itself to extensive statistical analysis, but only to a general assessment of this initial course design for engaging students.

Comparison of first and second sets of evaluation forms show that in general, comments become much more limited toward the end of the first round with 15 students presenting although two of the more commented on presentations occurred immediately following a program break. In contrast, second round evaluation forms show the highest number of comments for last and second to last presentations, fluctuating between ~17 and ~25 comments throughout depending on content of the proposed project. No correlation was found between

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[2] All evaluation forms contained the name of presenter. Once grouped by handwriting, the names on forms were compared with the student list and the name of the student not appearing in the set of evaluations is assumed to be the author. Where more than one name does not appear, the set is held until the other possible student sets are identified using the same process. No cases of the same multiple potential students occurred.

Contacting Tacit Knowledge

final score and number or quality of comments. The highest scoring presentation (8.80) received 20 comments from the study group of 10 (9 commenting) for just over two comments per evaluator. The highest number of comments (27) was received by a presentation tied for fifth/sixth in scoring. Three presentations received comments in almost all dimensions from almost all evaluators but these scored near the midrange in points. These highly commented presentations differed from those receiving the most comments in the first round.

The most significant finding was the difference in drop off of commenting between first and second round. This may be explained by randomized ordering of presentations resulting in higher quality projects toward the end of the second round and audience fatigue in the first round. Although there may be some correlation between comments and familiarity with project goals, setting, etc., truly novel projects also received greater interest in both rounds.

Group influence

Group membership was also tracked with the assumption that familiarity with a project could lead to bias either for or against the project. While this was expected to show as higher commenting on projects a student was added to, it appears the opposite is true. Project owners[3] tend to comment more on the projects of their team members. Interestingly, scoring does not follow this trend and may indicate a perceived value of the teammate. In no case was scoring higher for both team members than for other students. In some cases, one team member may have received a higher score from a project owner but in only one case did a team member receive the highest score of all presentations from a project owner. More frequently, teammates received among the lowest scores from project owners.

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[3] Project owner is defined as the original student who has had team members added to the project they originated. Teammate and team member refers to the student(s) added to the project.

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Survey results

Eight of ten students in the case study responded to the online survey as of this writing. One student answered only one question and then left the survey. All questions except the final comment required an answer but an N/A option was included. Students were asked how well the course compared with a model for experiential
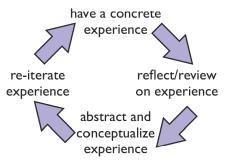
have a concrete experience

re-iterate experience

reflect/review on experience

abstract and conceptualize experience

Figure 1 Kolb learning style (1975)

learning (Figure 1 - Kolb, D. A., & Fry, R. 1975). Davis-Manigaulte, Yorks, and Kasl (2006) note, "…often educators may want to evoke the experience that learners are trying to learn more about" (32). The design of this coursework expects to do just that, place the student into a simulated but realistic experience. Question 1 provides a Likert scale of one to five with three, four, and two responses respectively for well (3), very well (4), and exactly (5) matching the included graphic. Half the respondents had had an experiential course before.

Part of the course design intends to catalyze self-directed-learning (SDL) through requiring students to take responsibility. Questions three and four of the survey look at how challenging it was for the student to work with somewhat vague directions and short timelines. Likert scales were again used. With half of respondents only selecting the middle range for comfort with the work (all others were higher), and three of eight responding that they needed more instruction, it is likely that a more detailed description of expectations is needed, especially as this was a class of English as Second Language (ESL) students from a variety of educational and cultural backgrounds. A good rating would have required midline or higher responses for

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both questions (note that response orders were randomized to improve accuracy of data collection).

Only one student replied that no new learning was used from this or the rest of the course in development of the project. However, this student responded that more was learned from projects of others than from the self-directed work, that there was learning from the course, and that that learning has already been applied outside of the course. Although the intent of delayed surveying was to look at permanent impressions of the course impact, it is likely this student did not understand the questions on applying learning to the project as considerable learning was observed by the instructor. Nonetheless, the responses are noted. All other respondents either indicated they did use new learning (6 of 8) and did use something they learned elsewhere in the course (the lectures from experts) in their own projects (6 of 8) with one N/A also recorded for each of the questions. All respondents felt they had learned in the course and nearly all (7 of 8) have already applied course learning in their work. Even the single N/A recorded to the learning application question believes course learning will probably (4 of 5 on Likert) be used with five others definite (5 of 5, Likert), one additional probably and one maybe (3 of 5, Likert).

Questions 11 and 12 looked at working with others as a project owner and a teammate. The course design anticipates scores in the mid to above-mid range and survey results show this. Half of respondents register four on a one through five Likert scale with 5 being "No problem!" There is only one Five for each question and it is a different student for each. Stepping back to question nine, responses were evenly split between learning more working on the student's own project versus another. When combined with responses to other questions, it is possible to make rudimentary assessments about each respondent. One student chose "uncomfortable" (2) for each question, which may be consistent with personality and cultural indicators. This student is

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often in charge at work and in family life, so the design goal to expose students to an environment where they must work with others to create durable solutions appears to have been achieved.

When asked if they were surprised to find out what they already knew about Rural Development, five out of eight were surprised with two choosing not to answer. Seven of eight responded that they did identify areas where their knowledge could use improvement. The "uncomfortable" student above answered no to both questions. In four free responses, students felt the practical design of the course was helpful even though it was known to be a fictitious "game." This section of the course could have benefitted from more direct practical information (it is understood that the lecture portion of the other half of the course was highly slanted toward rules and regulations rather than "working" in development). Further, one comment drew attention to the positive aspect of the heterogeneous makeup of the group, a factor which influenced initial design considerations, calling it a "resource" exactly as was intended.

Conclusion

With a small heterogeneous group, this course model appears to have merit for bringing out existing knowledge in such a way that the group of learners can benefit from it. Further, identification of "holes and gaps" in an individual's knowledge base is critical to SDL development. Indications are that this model can put students on the path towards SDL. Not all students are ready to accept responsibility for their own learning however. Additionally, students from highly structured backgrounds may be resistant to this initial exposure. For this course, scheduling was a significant issue and probably contributed to confusion as much as any lack of direction indicated in the survey. Most of the classes were rescheduled which resulted in the loss of two lecture days and conflicts with project presentations.

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Further development of a lesson plan should include relevant information that can be combined with this type of exercise. This would not only allow the stimulation of SDL, but would also give students a place to practice what they are learning and better develop new concepts and methods contacted in lectures. Extending the concept to a larger group of learners as well as other timelines could provide a significant new tool for adult education.

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Reference

Kolb, D. & Fry, R. (1975). Toward an applied theory of experiential learning. In C. Cooper (Ed.),

    Theories of Group Processes, New York: John Wiley and Sons.

Davis-Manigaulte, J., Yorks, L. and Kasl, E. (2006), Expressive ways of knowing and transformative

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    doi: 10.1002/ace.205

Contacting Tacit Knowledge

Appendix A – Course Syllabus presented in e-mail

By Sunday evening, 24 February, 18.00 hours, please send me an email that includes:

1) Your name (what you prefer to use, not the government version)

2) A recent photo in electronic form (scanned or digital photograph)

3) Your home country

4) Your undergraduate degree field (BSc or other degree)

5) Your personal goals for the MSc program you are enrolled in

6) What you believe the purpose of the MSc program is

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This section of the course is a practical where each student will work individually and as part of three small teams on the development of a project proposal. Because this is a practical, participation each week is required.

The premise for this proposal is that a competition exists with a prize of €100.000 to be awarded for a rural development project.

Week one - (27 Feb.) - Introductory lecture to define seminar goals and objectives followed by student introductions to include background on areas of interest.

1. **Week two** - (27 March) - Delivery of project brief by students to include question and answer period following each brief.

- **Week three** - (10 April) - Team building exercises based on student project briefs (each student will commit to two additional student projects for duration of semester).

- **Week four** - (24 April) - Delivery of revised brief by all teams (limit of 5 minutes per brief).

- **Week five** - (8 May) - Dissection of briefs.

- **Week six** - (22 May) - Feedback and group discussion on emerging themes.

The project brief: Delivered both in (electronic) paper format and in front of the class. Paper briefs are limited to two pages, double-spaced, including headings. A title page must

Contacting Tacit Knowledge

be prepared with project name and name of individuals preparing the brief. Title page is not part of the two-page limit.

Verbal presentation will be 10 minutes for initial delivery (27 March) followed by a 5-minute question and answer period. Presentation of revised brief (24 April) will be 5 minutes followed by a 5-minute question and answer period. Each student will produce an evaluation of all other brief presentations.

Teamwork: The purpose of the team exercise is to integrate knowledge from classmates into a focused proposal and allow for practice working on multiple projects in a typical work environment. Teams will be formed by posting of each project on 10 April. The first two people to add their names to another project fill out each three-person team.

Participation on two project teams in addition to your own project is required. You will work on three teams starting 10 April with the goal of perfecting each project brief for delivery on 24 April. You will have evaluations of your first presentation available.

Please note, there is only a two-week period to revise project briefs once you form teams.

Feedback: You will receive feedback from multiple sources. PhD and Researchers at SZIU will be monitoring this practical. They will be available to assist with development of your initial brief and revisions. Your classmates will evaluate both of your verbal presentations to provide feedback on content and quality of your project and presentation. You will also have feedback from me on your projects, teamwork, and presentation.

Thank you in advance for your commitment to your educational process and rural development.

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Appendix B – Evaluation form for first presentation

Presenter: _____

Project Title: _____

Project Location: _____

Project Type: (Economic, Social, Food Production, Infrastructure, Industry, etc.)

_____

_____

-- Evaluate this proposal for each of three development dimensions --

Social:

_____

Economic:

_____

Political:

_____

Please evaluate the presentation below. Was the speaker easy to understand? Was a strong case made for the project? What do you suggest to improve the presentation?

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Appendix C – Evaluation form for presentation two

Presenter: _____

Project Title: _____

Project Location: _____

Project Type: (Economic, Social, Food Production, Infrastructure, Industry, etc.)

_____

_____

-- Evaluate this proposal for each of three development dimensions --

Environmental:

_____

Social:

_____

Economic:

_____

_____ On a scale of 1 – 10 with 10 being the highest, please rate this project.

(The project receiving the highest score will win this competition. Remember to consider factors such as how practical the project is as presented, project impact in the geographical and social area where it is focused (think in percentage of people positively impacted), and both long and short-term benefits.)