

Building Intellectual Capital for Sustainable Development: Combining Local Wisdom and Advanced Knowledge

Roland Bardy¹, Arthur Rubens¹ and Paul Eberle²

¹Florida Gulf Coast University, Lutgert College of Business, Fort Myers, USA

²Florida Southern College, Barney Barnett School of Business and Free Enterprise, USA

rbardy@t-online.de

arubens@fgcu.edu

Abstract: When intellectual capital is built “from the scratch” in an effort to move a society’s situation to a sustainable status, there is often a need for a catalyst that triggers the endeavor. The “trigger”, in the case that is reported in this paper, was the installation of a new college in a rural community in Northern Ghana where heretofore, no comprehensive tertiary education had been available. The college established an outreach program which was destined to provide the community with increased opportunities for improving the overall social and economic well-being. This creates an outer circle of engagement through accessing government officials, local businesses, community councils, health workers, traditional leaders (tribal chiefs), religious leaders and heads of NGOs on topics like labor relations, conflict resolution, sustainability management, social responsibility, cultural diversity, and social inclusiveness. At the onset, the members of the community contributed their traditional views on these topics and how this would combine with knowledge brought in through the new college. Since rural communities in Africa have a very intimate and intense relation to nature, good hands-on skills and an abundance of indigenous wisdom, it was felt that this combination would result in a rich body of knowledge and competencies. Ultimately, a valuable base would be developed from this knowledge for an inventory of intellectual capital that can be transferred to generations of descendants. At the heart of this endeavor was the Center for Cross Cultural Ethics and Sustainable Development, an institution created by the college, to move these efforts forward.

There are two perspectives which make this case relevant for new developments in knowledge management: One is the issue of what has been called the “fourth mission” of educational institutions (Trencher et al. 2013), moving the institutions to co-creating sustainability by collaborating with government, industry and civil society to advance sustainable transformation in their environment. The other is that when two bodies of knowledge co-exist, the question arises how this co-existence should be approached. This case embeds a variety of systems-thinking constructs. Which would be the best way to combine indigenous wisdom with new knowledge brought in by the college’s academicians and outside practitioners? How can a balance be coalesced between community needs that must often be satisfied short-term and needs for which long-term solutions are required? How can self-organization and relationality be conjoined? How can intellectual capital from both the traditional and the newly acquired skills and knowledge be generated in the community? The paper reflects on both the knowledge management and the systems-thinking interpretations of the case. community) and processes self-reference and other-reference.

Keywords: Ghana, Sustainable Development, Fourth Mission, Social Well-Being, Indigenous Wisdom, Systemic Co-Creation, Community Intellectual Capital, Luhmannian Framework.

1. Introduction

Traditional knowledge practices and traditional value patterns in relation to ecology and human life have not always met with an open-mind by developed nations. One reason is that socio-ecological systems in developed countries are often in marked contrast to those of the developing world where they use advanced technology, employ sophisticated scientific models and are built on a long history of democratic traditions. But it does not make sense to transfer this to a country or a region which is in a different stage of social and economic development. There are many examples which show that this fails (see, e.g. Williamson 2010), and the need to use a different approach for helping societies with low life expectancy, low levels of sustenance and low standards of living has been recognized for quite some time (see, e.g., Suneetha and Balakrishna 2010, Sukhdev, Wittmer and Miller 2014). However, losing traditional knowledge practices can have a significant negative impact on the livelihoods, production systems (bio-resource-based markets) and the health of local communities. Therefore, preserving this wisdom and providing opportunities to practically and purposefully apply this knowledge should be a major concern in development politics. One such opportunity is to create regional centers where this body of knowledge is conserved and its applications are made available in the region. The Education for Sustainable Development (ESD) Program at the United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS; see <https://ias.unu.edu/en/>) has created this type of centers. As of 2016, there is a global network of more than 100 Regional Centers of Expertise (RCEs) on ESDe.

The RCEs provide a framework for strategic thinking and action on sustainability by creating diverse partnerships among educators, researchers, policymakers, scientists, youth leaders within indigenous communities and throughout the public, private and nongovernmental sectors. Many of these sectors are associated with groups of persons who can provide indigenous sources of knowledge (see, e.g., Wade 2103). Another opportunity is to preserve and make avail of indigenous wisdom by connecting with academic institutions. The case that is reported in this paper is a prime example: Regentropfen College in the Upper East Region of Ghana was built in a rural environment, surrounded by communities who are guardians of indigenous wisdom. Their wisdom not only regards traditional views on ecology but on social matters as well: how to get people to participate in decisions (“Indaba”), how to resolve conflicts (“Ubuntu”) and how to rebound from a crisis (“Kanju”). When the socio-ecological wisdom of the communities bordering the campus of Regentropfen and the knowledge taught and studied in the new college coalesce, a rich body of intellectual capital is instituted that can help to improve the living standards of the population - not only of the people who live there but of the larger populace of rural communities beyond. The new college thus frog-leaps to a status that elevates its educational mission.

2. The “Fourth Mission” of Educational Institutions

Historically, the primary mission for universities and other higher education institutions has focused on education since the founding of the earliest recorded university in Bologna in 1088. This mission and total focus on education was largely unchanged until the nineteenth century, when what has been called the ‘first academic revolution’, was put forward, where ‘research’ was integrated into the universities’ core activities (second mission). This model of conducting applied research can be traced to the early agricultural extension programs at that time which encouraged faculty to conduct research that could be translated into practice. Since the 1980s, a new mission, or ‘second academic revolution’ has occurred with universities’, where economic development was incorporated into the core mission of many universities (Etzkowitz, 1998).

Prior to the second academic revolution or emergence of a third mission, educational institutions, departments and faculty, regarded their mission and responsibilities as teaching, research and service. This trilogy could be regarded as a three legged stool where teaching and research were the dominate legs of the stool and were regarded as key to the mission, with teaching being the first mission, and research being the second mission. Service, the third leg of the stool, primarily focused on university service (serving on committees etc.), with some select faculty being engaged on community boards or associations. However, this started to change: faculty and departments started to recognize that not only do their responsibilities go beyond service to the university or college but that the communities expected that they served them. Correspondingly, communities surrounding the universities started to recognize the human capital and assets that resided within educational institutions and requested their support and help. However, most significant, financial and economic constraints led to university colleges and departments recognizing the need to partner with businesses in the surrounding communities. In addition, universities were faced with an increased accountability due to political and financial pressures from local governments and others to show their contribution to their communities and the economy. This second academic revolution has brought about the advent of what has been called the “entrepreneurial university” (Clark, 1998).

More recently, a fourth mission is starting to emerge with a focus on sustainable development. The focus started within universities through varied programs and activities (see, e.g. López 2013; Kurland 2011), and has spread to outside the university through a variety of programs in the university community (Kretz and Sá). This fourth mission finds universities collaborating with government, industry and civil society to advance sustainable development and create sustainable transformation in these industries and communities. The model of the “triple helix” approach (Amaral, Ferreira, and Teodoro, 2011) has emerged: public, private, partnerships. These partnerships are evolving to what could be called “quadruple helix model” of public-private-people-professor-partnerships, and where universities, faculty, departments, etc., are networking and working with living labs in their community and beyond. These transformations and transition to this fourth mission are happening at varied educational institutions throughout the world to varying degrees.

It has been found that colleges that have a long history of embeddedness within their communities have many opportunities to develop this fourth mission through a wide variety of activities ranging from community based research projects, to service learning activities, community based training programs, to different shared programs with the community (see, e.g., Hunter 2013). An example of this can be drawn from the developing

nation of India (this is a case where Western universities and colleges can learn from a developing nation): India's highest court has mandated environmental education at all levels of formal education, which includes a compulsory undergraduate course. Yet, there have been challenges of implementing this requirement - primarily because inter-disciplinary competence among staff and students is not sufficient in all schools of this vast country, and traditional methods of assessment still prevail in higher education. However, with this said, India has demonstrated many examples of successful community-based initiatives, and many efforts to develop learning opportunities in this field have emerged primarily from academic and student interests and priorities rather than from formal policy initiatives (Kiran Banga Chhokar 2010).

In order for the third and fourth mission to be successful, it requires a careful balancing of university and community partnerships. However, these partnerships can be laden with multiple tensions and conflicts due to the diverse expectations of the respective groups. Roni Strier (2014) refers to the university community partnerships as a "field of paradox" which can be fraught with conflict which can impact the collaboration between the various partners. This paradox, according to Strier comes from issues such as top down institutional presence vs. grassroots orientation, unequal power relationships, trust, goal differences, etc. By contrast, the grassroots aspect is shared by all partners if a school starts all anew, if it embraces community relations from its very beginning and if goals are developed jointly through the new faculty, community leaders and the wider stakeholders in the community. This is the case with Regentropfen College where the fourth mission was envisioned by its founders when they formed the idea, the vision and the strategic planning for the new higher education institution. The case study of this new college will present the implementation of their vision, its repercussion and the first achievements that have become visible.

3. Regentropfen College: Education and Community Outreach

The continent of Africa is in a process of dramatic development; however, many regions of Africa have seen minimum increase in formal educational centers. This is the case, among others, in Ghana where some districts are underserved, especially with respect to tertiary colleges. One region where this applies the most is Ghana's Upper East Region. This region has schools that train teachers and nurses, and a small satellite of an out-of-the region university, but there is no comprehensive institute of higher education for the area's ca. 1 million plus people. So when a new college was formed in the rural community of Kansoe near Bolgatanga, the Upper East Region's capital, there were several effects to be expected on the area beyond just teaching and providing opportunities for research.

The main occupations in the Upper East Region are agriculture and related work (65.9%), production and transport equipment work (14.5%), and sales and service work (13.4%). The substantial lack of formal sector and of office-based bureaucratic activities in the region is reflected in the fact that only 1.7 per cent of the economically active are engaged in administrative, managerial, clerical and related work (Ghana Statistical Service, 2013, p. 487). Most of those working in these areas live and work in and around Bolgatanga, which has a population of 70,000 (Ghana Statistical Service, 2013, p. 228). Much of the outreach programs of the new College will be disseminated within this vicinity and population which should not only enhance improvements in the existing occupations but also create new job opportunities and more diversification of employment.

The new school is named "Regentropfen College of Applied Science". "Regentropfen" is the German word for raindrops, as it is a German foundation that raises the funding, with the initiator of the project being a native from Kansoe who now lives in Germany. "Regentropfen" also hints to a metaphor: Rain is a scarcity in the area where the college is located - if rain falls or, to extend the metaphor, if irrigation brings water to farming activities, green pastures will develop. Irrigation is one major theme for the rural population to achieve self-sufficiency in food supply - through technological support, but even more through capacity building.

Although Regentropfen College is derived from a German foundation, unlike educational systems in Germany where the state (Länder) decides its policies, Regentropfen College will determine its own standards. In pursuit of this, the college deploys various concepts to manage the delicate balance of teaching, research, and community outreach/economic development. Leading this effort is Regentropfen's Center for Cross-Cultural Ethics and Sustainable Development which is creating an outer circle of engagement through accessing the major stakeholders in the region. Its objective is to build a mindset throughout the area that combines ethics, entrepreneurship, environmental projects, systems thinking, self-awareness and spirituality.

The primary mission of the college is to provide students with knowledge that can be practically applied and to make opportunities available to get on-campus-training. For example, in pursuit of responding to the primary industry of the region and providing applied education and continuing opportunity, it is establishing a small experimental farm for the agriculture students, as well as establishing a primary and a secondary school on campus (this is something that is not found in other Teaching colleges in the country). The latter (primary and secondary school on campus), provides a chance for praxis, as opposed to theories, to students who pursue a career in teaching. In addition, this educational center will be used as benchmarks and models of excellence in education. The focus on these centers will not only be to produce great teachers for the children of the region, but also to serve as a model for retraining and continuing education for teachers within the region and beyond. Also, the physical vicinity to the experimental farm can help teachers demonstrate how caring for the soil and the crops prudently contributes to better cultivation – one step to develop a mindset that is aware of sustainability.

4. Regentropfen's Center for Cross-Cultural Ethics and Sustainable Development

The Center for Cross-Cultural Ethics and Sustainable Development (CCCESD) began its work in February of 2016, after the curricula for the college's ethics program had been devised and prepared for the academic accreditation process. The CCCESD's primary focus is to integrate the sustainability focus, together with a focus on ethics. It was felt that from the onset, both sustainability and ethics must be priorities in the teaching and practice for graduates of the college. This focus is extremely important due to the diversity of people, culture, and language in the region. For example, the cultural background of people from Burkina Faso and Togo, which neighbors Ghana's Upper East Region, is French with French being the official language in these other two countries. There is also a large diversity of ethnicities and religions in the region. The College and the CCCESD will work to integrate these multicultural entities.

In the African rural environment people are much closer to, and dependent on nature than in the Western world, and thus have a practical understanding of the essence of sustainable development which is "meeting the needs of the present without compromising the ability of future generations to meet their own needs" as per the Brundtland (1987) definition. From an applied perspective, the population can readily see how achieving human development goals is closely coupled with maintaining the natural systems which ultimately provide the resources and ecosystem services upon which the economy and society depend. One could say that there is an inherent 'mindset for sustainability' which is engrained in the subconscious of the population. However, as with any mindset, there is a need to "awaken" it. It is the belief that this awakening must begin with the young people within the region. One of the authors of this study participated in a presentation to the Youth Group of Kansoe Following the presentation, a rich and fruitful discussion ensued, where many of the young attendees gave stunning insights into how sustainable development affects their daily lives, and what each of them can contribute. This insight and sensitivity to this topic was in stark contrast to presentations given by the authors in Europe where many young people when asked about sustainable development primarily refer to issues of climate change (of which none of them is personally affected at present, cf.: Kagawa 2007). Conversely, the Kansoe discussants referred to topics like improving access to water and sanitation, enhancing self-sufficiency in food production, increasing mobility and security on the roads, raising the effectiveness of public institutions – all of which influence their daily lives and to which they might contribute their own share of action.

In the first deliberations among the faculty and with representatives of the community the CCCESD was designated to increase sensitivity and judgment and to build knowledge and skills in all areas of sustainable development and ethics. There are six focal points in the Mission Statement of Regentropfen College: to create sensitivity; build knowledge, provide soft skills; enhance judgement; strengthen ability; and raise will power. The eventual long-term goal of the CCCESD is to build a nucleus of research and consultancy that offers expertise and knowledge for ensuring the practice of ethics in economic and social business. Through its unique embeddedness in the rural African environment and culture, the CCCESD of Regentropfen College will be able to become a model that propagates a different narrative to many other colleges and universities around Africa (and potentially the world).

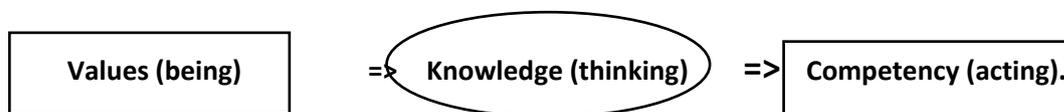
5. Building (on) a Sustainability Mind-Set

An environment like the one that surrounds Regentropfen College has been forced to cope with harsh climate conditions, with conflicts between ethnic groups and with colonial administrators for generations. This is

definitely true for any other African region, but the situation is certainly aggravated in remote areas, far away from national administrative bodies. The people who have been confronted with such circumstances needed to develop a certain mind-set for survival. Their indigenous wisdom has been built on this mind-set, and a bystander from outside the country might wonder how this connects to the very different endeavours for building a “sustainability mind-set” on a global scale. This deployment, which follows the decision to implement the United Nation’s 2030 Agenda for Sustainable Development, is instigated, among others, through several working groups under the auspices of the the United Nations Principles of Responsible Management Education (UN PRME). The example of the Working Group on the Sustainability Mind-Set (<http://www.unprme.org/working-groups/display-working-group.php?wgid=3344>) will be used here to draw parallels. Following this, the elements of traditional wisdom on sustainable development and ethics will be presented. This will clarify the comparisons made between what is around in the African circumstances that are reviewed here and what needs to be built in environments that have benefitted from mild climate, political and technological advancements for centuries (and thus have lost. at least in part, the contact to nature and the solidarity within their communities).

The Sustainability Mindset framework applied through the United Nations Principles of Responsible Management Education Working Group (UN PRME Working Group) on Sustainability Mindset (Rimanoczy 2014, Rimanoczy & László 2013) has high aspirations. It is about creating sensitivity, building knowledge, providing soft skills, enhancing judgement and raising will-power for ethical concerns and sustainability. The overarching topics are systemic thinking, spirituality, ecological concern and emotional intelligence. The framework denotes three dimensions that need to be employed for attaining the aspirations. They are values, knowledge and competency, connected in a sequence: Values, which are manifested, e.g., in the ecological perspective of sustainable development, by biospheric orientation, evolve into knowledge, e.g., ecoliteracy, and, on this, competency is built, e.g. protective/restorative action (Kassel, Rimanoczy and Mitchell 2016). With this, the UN PRME Working Group’s concept stands out from other frameworks that connect to the notion of Sustainability Mind-Set and which are limited to the instrumental. One such notion of the term “Sustainability Mind-Set” comes up in a post on the Project Syndicate Opinion Page (<https://www.project-syndicate.org>) by Nobel laureate Michael Spence. Spence argues that for many people sustainability is associated with finite natural resources and the environment and the fear that the planet’s natural resources and recuperative capacities will not withstand the pressure. For this to be reverted, Spence says, it makes no sense trying to change the existing economic growth model globally as there is no alternative at present to which we can all switch. The only solution lies with inventing a new growth model over time, step-by-step, for which the two key ingredients are education and values. If sustainability is to triumph, it must be predominantly a bottom-up process, driven by and driving local innovation, altering lifestyles, and shifting social norms and business behavior (Spence 2012). This will unquestionably help to create improvements in any society. But Spence’s elicited argumentation does not provide the tools for achieving a shift of values and of what would follow from this shift. It is the UN PRME Working Group framework that indeed provides pathways to both.

The pathways pointed out by the UN PRME Working Group framework follow from the sequence of the three dimensions on which it has been developed:



The authors of the framework proceed very carefully, taking account of the high potential of categorization between these dimensions - like inclinations such as a sense of interconnectedness, oneness with all that is, and biospheric orientation, which may superficially appear to overlap, as might systems theory and ecoliteracy (Kassel and Rimanoczy 2016, p. 29). This viewpoint strengthens the framework’s validity, because all of these inclinations and their relations to each other occur in practice. If we just take the limited “biosphere” of the community around ReCAS, we find interconnections (e.g. between upholding family cohesion and caring for nature) that apply to the values (maintaining indigenous tradition), knowledge (applying indigenous wisdom) and competency (implementing newly acquired skills and technology without sacrificing tradition). This would bring us to the elements that are being applied by the community.

6. Elements of traditional wisdom on sustainable development and ethics

Centuries of co-existence with ecosystems has resulted in some of the richest collective memories on patterns and behavior of biological resources and environmental changes. Indigenous peoples in Africa and elsewhere have developed a close and unique connection with the lands and environments in which they live, and they have a wide array of beliefs that include ethical issues. But they also have been deploying a wide array of techniques to cope with the intricate relationships with the biodiversity resources embedded in their cultures that by themselves served as a self-limiting mechanism to ensure sustainable use of resources. This is more visible in Africa because of the remoteness of many cultures from each other (Subramanian and Pisupati 2010).

There is a broad literature on the various components of African indigenous knowledge on agriculture (for an overview see Winklerprins 1999; Subramanian and Pisupati 2010). Table 1 below shows a very limited presentation of this:

Table 1: Components from the Literature of African Indigenous Knowledge on Agriculture

Topic	Description
Soil and Water	One issue is soil and water conservation where the technologies are agronomic, vegetative, and structural and management measures for controlling land degradation and enhancing soil productivity. Agronomy measures are mixed cropping, contour cultivation, mulching; vegetative measures are grass strips, hedge barriers, and wind breaks; while structural measures are terraces, banks, bunds, constructions, and palisades (see, e.g., Oladele and Braimoh 2010).
Rational Land-Use Planning	Another practice is rational land-use planning in agroforestry tries to find some balance in the raising of food crops and forests (see, e.g., Adesina et al., 1999), with, for instance raising shade tolerant crops in a permanent forest setting. This can lead to an increase in the amount of organic matter in the soil, thereby improving agricultural productivity and reducing the pressure exerted on forests. Similarly, crop-livestock integration in a farming system is believed to have numerous advantages, such that slack resources from crops could be used as feed for livestock while livestock would provide draft power and manure to replenish the soil (Erkossa and Gezahegn 2003).
Soil Fertility	Indigenous farmers have developed various techniques to improve or maintain soil fertility. In Senegal, the indigenous agro-silvo-pastoral system takes advantage of the benefits provided by an acacia tree which sheds its leaves at the onset of the wet season, permitting enough light to penetrate for the growth of sorghum and millet, yet still providing enough shade to reduce the effects of intense heat (Adedipe 1983). In Ethiopia, several indigenous technologies developed to control soil erosion and conserve soil water include cut-off-drains and drainage furrows, carefully devised to prevent soil loss due to runoff (Erkossa and Gezahegn 2003).
Weather and Climate Forecasts	There are also indigenous early warning systems for the forecast of events regarding weather and climate. Farmers have developed intricate systems of gathering and interpretation of data in relation to weather, and they are known to base decisions on cropping patterns and planting dates on local predictions of weather (Ajibade and Shokemi 2003).

Similarly, Table 2 below shows some of the features from the literature found in traditional health systems and ethics:

Table 2: Components from the Literature of African Traditional Health Systems and Ethics

Topic	Description
Traditional Health Systems Values	Traditional health systems are based in theories or cosmologies that take into account mental, social, spiritual, physical and ecological dimensions. A fundamental concept found in many systems is that of balance – the balance between mind and body, between different dimensions of individual bodily functioning and need, between individual and community, individual community and environment, and individual and the universe (Bodeker 2010).
Ethical sense of Right or Wrong	African peoples have a deep sense of right and wrong. This moral sense has produced customs, rules, laws, traditions and taboos which can be observed in each society. Any breach of this code of behavior is considered evil, “for it is an injury or destruction to the accepted social order and peace. Compliance to the rules of social order is requested on all levels. For instance, in Nigeria the traditional Ibo society enforces conformity by <i>Omenala</i> (customs). “Culturally speaking, <i>Omenala</i> is the means by which the social ethos is measured, the values of the society are continued from one generation to another and the process of socialization through the education of the young ones are facilitated. Harmony and equilibrium are in this way maintained as every member of the society knows what to expect from his neighbor and what to give to them”(Ilogu 1974, p. 23).
Holistic view of the Individual	The individual level of ethics can best be described by the way the Akan people of Ghana conceive of a person. They see a person consisting of three elements: <i>Okra</i> , which is the inner self, providing the source of energy and vital force to an individual; <i>Sunsum</i> , which is the spiritual actor of the person and the source of moral agency; <i>Honam</i> , which is the bodily appearance of a person (see: Gyekye 1997).
Ethical Decision-making	African tradition has long-standing means of bottom-up decision making and concocting common ideas. In Botswana, for example, the ‘Kgotle’ is the central decision-making agency of a village and serves as the village’s administrative and judicial Center. It is presided over by the local chief, and all adult community members are expected to attend to discuss public affairs (Silitshena, 1992). The Zulu and Xhosa as well as the Swazi use

Topic	Description
	‘Indaba’ or ‘Indzaba’ to make people get together to sort out the problems that affect them all, where everyone has a voice and where there is an attempt to find a common mind. The word, in their languages, means ‘business’ or ‘matter’ (Newenham-Kahindi 2009). Another concept is <i>Kanju</i> , a term that describes a specific creativity born from African difficulty. Kanju is “the rule-bending ethos that makes it possible to get things done in the face of headaches like crumbling infrastructure, corrupt bureaucracy and tightfisted banks unwilling to make loans to people without political connections” (Olopade 2015, pp. 20 ff.). One other principle by the name of <i>Ubuntu</i> in Zimbabwean, and <i>Hunhu/Kuntu/Munhu</i> in other African languages, is “the ability to overpowering urges in one’s own physical being” (Chivaura 2007, p. 232). Its emphasis is on coexistence, built on harmony, peace and justice – the “African way of how to connect with people” (Newenham-Kahindi 2009 , p. 90).

7. Conjoining traditional and academic wisdom on sustainable development into community intellectual capital

Traditional and indigenous knowledge related to biodiversity is central to elucidating its status in a region which has not yet had the opportunity to “codify” this knowledge. ReCAS has first developed intense community participation for storing all this wisdom which will then be combined with appropriate technology. It is definitely not about “state-of-the art” technology, but one which is commensurate with the conditions of the local rural communities (see, e.g. Voeste 2012). This combination would cut back soil erosion and increase the availability of water, improve the seeding, the cultivating, the harvesting and the storage processes. This will enhance biodiversity-dependent services such as provision of food and fiber, access and purification of water, improvement of air quality etc.

The college has the opportunity to make a difference because it is building common grassroots experience in its activities. In pursuit of this, an initial study was conducted regarding which topics would receive the best and highest interest - ranging from ethics in labor relations and community relations, to diversity management and sustainable development in agriculture and infrastructure. To corroborate the findings, interviews were held with key stakeholders in the region: Business owners, business managers, assembly members, heads of government authorities, civil service personnel, directors of education, school teachers, health service personnel, religious leaders and heads of NGOs. They were asked, among others, which (additional) course content they would suggest and for which or whom it should be applied to. From this series of interviews came four interesting outcomes: (1) over-population; (2) codes of conduct for law enforcement, (3) ethical conduct in business, and (4) dealing with the mainly small Chinese foreign enterprises which illegally exploit banks of streams and rivers for mining gold. Apart from a culture clash, there seems to be a potential for conflict in this regard that could be solved through persuasion, dialogue and consensual developing of solutions to the problem.

Awareness of conflicts is nothing new in the population of Ghana’s Upper East, as in many other African regions which have a long history of hostility between tribes, with foreigners and migrants from other regions (Miller, Vandome and McBrewster 2009). For overcoming conflicts, it is essential that the local populace respect each other. With this in mind, the programs of ReCAS are designed to support students and the community stakeholders to reflect on their own personal beliefs, passion and ethos and at the same time on those of others. This is of the essence not just for building a community intellectual capital on the topics of sustainable development and ethics but also for successfully applying this capital in practice.

Achieving a sustainability mindset is a holistic undertaking where multifold linkages need to occur - like inclinations such as a sense of *interconnectedness*, *oneness with all that is*, and *biospheric orientation*, which may superficially appear to overlap, as might *systemic thinking* and *ecoliteracy* (Kassel, Rimanoczy and Mitchell 2016, p. 29). Systemic thinking is an instrumental support to comprehend the manifestations of sustainability and sustainable development.

8. The systems thinking approach

There are various perspectives of a systems theory approach which the authors believe to be pertinent for conjoining indigenous wisdom and academic achievements into a community intellectual capital for sustainable development. The process of generating this capital starts from two ends: One is the interaction of an operationally closed system, which is the rural community, with the changing environment that originates through the new college. The other end is the outreach from the college which can be thematized through a Luhmannian interpretation. Luhmann’s sociological framework is about social communication, and it

specifically looks at the structural coupling between co-evolving systems, which has been called “inter-penetration”. This is exactly what is happening between ReCAS and the community around the college as one contributes traditional skills and the other one new scientific skills and knowledge. Luhmann would state that the effort of enabling intellectual capital to be brought about in the community is an undertaking of human beings. Human beings are integral elements of social systems environments. Hence, following Luhmann (see Moeller 2005), the rural community in question can be understood as a system affected by the lack of chances to properly maintain sustainability in its societal and natural environments. The members of this society are now seeing an opportunity to gain new chances from interacting with members of another system, which is the new college.

Conceptualizing the improvement in the sustainability of systems like the society around ReCAS is related to the idea of structural couplings connecting the system and the environment (Maturana and Varela 1980). Even though structural couplings do not allow the environment to directly govern the intra-systemic operations, they present channels from which the system might develop sensitivity to environmental feedback (Valentinov 2014). The example of ReCAS’ outreach to its community environment shows that self-organization which takes the form of knowledge accumulation can in principle promote the environmental sustainability of the relevant systems.

The ReCAS case also demonstrates very clearly that sustainable development is achieved only by transition processes that stimulate societies to undergo a fundamental and systemic change, the result of which is a new and sustainable constellation of the societal system. As this new constellation is to be used by future generations, sustainable development may also be viewed as an inter-generational communication issue (Paetau 2004): The principle (as spelled out by the Brundtland Commission) of not compromising the ability of future generations to satisfy their needs does not solely apply to material goods like natural resources, but it must also include non-material needs like knowledge. It does not suffice, though, to just have this knowledge base available: Knowledge and competitiveness (as a result of properly using knowledge), are interrelated and need to be interconnected. This is where intellectual capital is formed from the knowledge provided by human capital, from societal interrelations and from organizational devices that tie knowledge to social and economic purposes (Yapp 2000). They are all intrinsically linked together in a manifestation that conforms with Bontis’ (2004, p.14) definition of intellectual capital to include “the hidden values of individuals, enterprises, institutions, communities and regions that are current and potential sources for wealth creation”.

One more piece of systems thinking that applies to the ReCAS case is conjoining self-organization and relationality. Here, the efforts of the Center could build on results achieved in innovation deployment projects run within the European Commission’s Framework Programs (Kapsali 2011). The programs, having studied the effects of implementation instruments upon actors’ behavior, resort to the logic of systems thinking as it covers the design of both horizontal interaction and vertical control mechanisms. The vertical would be the various layers of knowledge which interact, and the horizontal are the relations of the actors that use them. We perceive various constructs of thinking in this: There is a junction of equi-finality (the overall objective of improving well-being), multi-finality (the many goals, e.g., of the SDGs), feedback (between the bodies of knowledge), self-organization (of the actors) and relationality (see Jackson 2003). This creates an atmosphere of both accountability and trust which need to be the primordial facets of the community intellectual capital. Transferring this to the community intellectual capital, we can view it as an open-system, where all of its components (actors, organizations and instruments) are open to each other’s influence because they interact and relate through their boundaries (Rametsteiner and Weiss 2006).

Another stream of systems thinking conceptions that relates to intellectual capital building is co-creation. The term is mostly used with regard to businesses and their customers sharing their knowledge to define which characteristics and qualities are needed for a new product (see, e.g. Espejo and Dominici 2016). But there is also an application of the concept that regards the integration of different knowledge towards global sustainability. In this context, integration is an iterative process that involves reflection among stakeholders (actors from science and society), within the three stages of co-design, co-production and co-dissemination (Mauser et al. 2013). This concurs with what has long been acknowledged about sustainable development and societal change: They that can only be achieved bottom-up (Kemp, Loorbach and Rotmans 2007, Fraser et al. 2006): The design of institutional, economic and behavioral changes towards sustainability needs to be tailored to local and regional cultural and natural contexts. However, in order to translate this co-creation into systems thinking for the process of creating intellectual capital some type of organizational mechanisms or

'integrators' (Bratianu et al, 2011) are required. According to Bratianu et al (2011) an integrator is a powerful field of forces capable of combining two or more elements into a new entity. Based on this premise, integrators and/or integrating forces that can create intellectual capital from co-creation for ReCAS would be the schools vision and mission, the organizational leadership and culture, as well as the processes that have been instituted to transform the school and the community. In this direction, the pathway opened by ReCAS will generate new forms of learning and problem-solving action inter "society" and "academia" of which it is hoped they will prosper because there is a uniquely close contact between these partners in the region.

9. Conclusion

Combining knowledge that originates in starkly different fields is a task that requires prudence. When new knowledge is brought to a region which is underserved in regards to tertiary education, other sources of knowledge need to be taken into account, like, e.g., indigenous wisdom. The case of ReCAS shows that employing all capabilities for shaping and influencing relationships with the society in a new school's environment co-creates a new community intellectual capital reservoir. A key advantage of ReCAS and its CCESD is that the principal persons to direct operations and activities are locals and thus closely intertwined with the social network of the constituency. There are various success factors that should work into this directions: The college's constituency has a vested interest in and a strong understanding of the benefits that will be derived from the college's activities; indigenous members of the community are key players in the operation which provides a word of mouth network per se; the region needs this intellectual capital to become more self-sufficient; and sustainable development is not a new concept for this rural community, but it has been practiced throughout many generations.

A distinct feature in the endeavor, that is also decisive success factor like elsewhere in Sub-Saharan Africa, is what is termed the 'non-individualistic character' of this culture, e.g., by Jesse N.K. Mugambi, renowned Kenyan theologian and ethics professor who said: "*Community is the cornerstone in African thought and life*" (Stückelberger and Mugambi 2007, p. vi). This is the perspective that gives the most hope for the establishment of a body of intellectual capital on cross cultural ethics and sustainable development.

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