

An Ecological Approach to Sustainability Development: Applications of Ecological Anthropology and Organizational Ecology-Sociology to Accounting Education

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Sustainability is a subject that has been researched by several interdisciplinary subjects to study the business environment in addressing economic and social development. Anthropology and sociology literature have examined sustainability within the context of evolutionary change processes. The application of the ecological framework in anthropology and sociology is an integrated approach that studies sustainability within the broader context of the environment, and business and society. Ecological anthropology has examined how cultural and social forces have evolved in ecological and land ethics in business education. Organizational ecology has related the resource-based transaction cost approach for the integration of sustainability into the accounting curriculum. The examples from sustainability accounting education from both the emerging and developed economies support the premise that when sustainability is integrated across the accounting curriculum, it can positively influence the attitudes of students, accounting professionals and policy makers. The purpose of this paper is to extend the ecology of sociological and anthropological approaches to study the integration of sustainability into the accounting curriculum in auditing and financial accounting courses, and the professional accounting community.

Keywords: accounting ethics education, integration of sustainability in accounting education, transaction cost approach, environmental factors affecting ethics education

INTRODUCTION

Sustainability in accounting education and practice has been a subject of interest for academic administrators and faculty, accounting professionals, and business and private sector policymakers. It has been noted that sustainability has substantive potential to alter the university's curriculum (Sterling, 2013), particularly accounting education (Hopwood and Fries, 2010 and Hopwood (2009). Hopwood (2009), who chaired the Prince of Wales Accounting for Sustainability Forum, has endorsed an integrated, holistic approach for sustainability education and reporting that relates environmental and sustainability information to accounting for their consequences and their presentation in "connected reporting framework" to report "the economic costs and benefits of environmental considerations". The objective is to make sustainability a "more mainstream part of business," thus making the management of environmental issues "an increasing material factor in many sectors of the economy in the years to come" (p. 141). Hopwood (2009) placed a sustainability agenda in the organizational life cycle that has the potential to change corporate actions and policies to develop the "connected reporting system" (p.141).

Hopwood's suggestion underscores the importance of integration of sustainability in all aspects of corporate economic, social, and environmental performances. He made sustainability an ecological issue.

Sustainability is a broad subject with a mix of several interdependent environmental factors as it relates to economic and social development. Anthropology and sociology literature have addressed sustainability within the context of evolutionary change processes. Applying the ecological framework in anthropology and sociology is an integrated approach that studies sustainability within the broader context of the environment, business, and society. In this context, the ecological approach views the integration of sustainability into the accounting curriculum as following the evolutionary process of organizational development. The premise is that organizational systems undergo an evolutionary process of organizational change and development. Evolutionary ecological developments shape accounting education and practice.

The paper is divided into five sections to address the subject. Section one addresses the evolution of sustainable development in the social sciences literature, particularly from anthropology and sociology. Section two extends the ecological approach by examining the link between ecological ethics and land ethics from anthropology and transactional analysis from sociology as they relate to sustainable development. Section three extends these ecological approaches and their integration of sustainability into accounting education, and practice. Section four specifically examines how sustainability has been incorporated into accounting in the financial and managerial and auditing courses and curriculum. The last section is the summary and conclusion.

ECOLOGICAL ANTHROPOLOGY AND ORGANIZATIONAL ECOLOGY (SOCIOLOGY) APPROACHES TO SUSTAINABLE DEVELOPMENT

Both ecological anthropology and organizational sociology assume that sustainable development is an evolutionary process transforming societal development over time. As an evolutionary change perspective, the ecological approach views sustainability within the broader context of the organization environment: community, nation, and ecosystems. However, their differences arise in their relative emphasis on cultural or structural changes. Ecological anthropology incorporates the study of cultural and economic development and industrial and business growth into the social systems adaptation process. These social systems include the population and their surrounding natural environmental resources. Ecological anthropology specifically addresses political systems, culture, language, beliefs, and religion as being part of the social and political systems. Technology, organization systems, and accounting information systems constitute human and industrial ecology systems that subsequently influence sustainable development.

In comparison, organizational ecology has addressed the sociological implications for environmental and structural changes, and social change and adaptations. They viewed organizations as continually changing and developing. Within the ecological framework, organizational change and development are related to those environmental, technological, and geographical factors that affect sustainable development and reporting in organizations. Sociological and anthropological research have focused on those ecological factors that are related to internal and external environmental resource constraints that necessitate organizational change and development.

Ecological Anthropology Approaches to Community and Sustainable Development

In anthropology, ecological studies have utilized ethnographic and socio-cultural approaches. Anthropology has expanded research on ethnographic, culture and nature-environmental relationships and how human activities can affect the preservation, destruction, neglect and use of land, forests, vegetation, wild animals and other habitats and forms of natural resources (Bennett, 2017). Ecological anthropology examines the influence of national and local organizational, and political systems and their subsequent influences on culture, people, and, in general, socio-cultural systems. Ecological anthropologists have primarily studied emerging societies' economies and political systems in developing nations. They have long recognized the role of politics in societies and communities as governing agricultural land use, farming practices, pastoral herding activities, and population migration movements. These are issues of sustainability concerns for emerging economies.

Political anthropology has long recognized the role of administrative and organizational systems in societies and communities as governing agricultural land use, farming practices, pastoral herding activities, and population migration movements. It has focused on conservation policies, local land management, and farming practices as sustainability concerns for emerging economies. Ecological anthropologists have primarily studied emerging societies' economies and political systems in developing nations. They have incorporated the study of cultural and economic development industrial and business growth into the social systems adaptation process. These social systems that affect sustainable development include population distribution, land use, and local agrarian practices in managing and using natural environmental resources and conservation patterns.

Ecological anthropology has sought to integrate conservation policies with local land management and farming practices. Anthropology is the primary field that developed the social soundness analysis (SSA) approach to sustainable development programs. The approach has focused on how the needs of the people can be aligned with technological developments to minimize the effect of technology on altering/changing indigenous/local modes of living and social life.

Kottack (1999) has related the social soundness analysis (SSA) approach to "sustainable development aims at culturally appropriate, ecologically sensitive, self-regenerating change" (p. 26). SSA framework suggests that accounting sustainability reports could include environmental resources conservation and management. The contribution of ecological anthropology to sustainability development is that the level of acceptance of sustainability programs depends on how well these programs can best promote and support economic development programs compatible with existing cultural practices (Bozzoli, 2000; Stone, 2003).

If sustainable development is to balance the present and future needs of both present and future generations, according to Brundtland's (1987) Report, Custance and Hilier (1998) suggest that there is a need for the development of social indicators. These indicators are primarily ecological and environmental related to land, soil, water, air, and natural resources that are not substitutable (p. 283). They elaborated that "economic growth does not merely cause pressures on the environment. It brings benefits – income, employment, and goods and services that people need and improve their welfare. One may argue about the relative merits of sustaining economic growth and improving environmental quality. But a balanced assessment of sustainable development must report on both aspects – not just the pressures caused by economic growth but also the benefits it brings. The model now also needs to incorporate the social aspects of welfare" (p. 284).

Custance and Hilier (1998) proposed that a balanced indicator that utilizes social, economic, environmental, and ecological resources needs to be developed. The targets at both the local and national scale levels are specified, and data are available in all sectors of the economy – environment, transport, energy, industry among others. These are pertinent to sustainable development when developed using "standard definitions and classifications" used by the United Nations (UN), the European Organization for Economic Cooperation and Development (OECD), and other international development organizations (p. 286). Many international donor organizations have used the ecological anthropological approach of Social Soundness Analysis (SSA) to develop both quantitative and qualitative indicators of sustainability development to manage and fund agricultural and industrial development projects in developing countries.

The ecological anthropological literature suggests that national and local politics govern human land relations and interactions with the natural and social environments. At the same time, organizational systems influence the formation and operations of class and economic structures to regulate social and political order as well as environmental resources management. The process of natural selection influences social behavior and interactions among groups, physical and psychological adaptations, and the social structure of organizations (Gray, 2000; Pierce and White, 1999. See also Kottack, 1999; Dietz and Burns, 1992; Feldman, 1986; Haenn, 2000; Mog, 2004). Anthropologists have been concerned with political institutions' role in managing environmental and structural changes, and how politics shape the process of social change and adaptation strategies involving culture, people, and general socio-cultural systems.

Organizational Ecology (Sociology) Approaches to Sustainable Development

Organizational ecology “focuses on the demography of organizational populations (births and deaths of organizations)” (Baker et al., 1998: 173). The approach describes the “relationship between population density and rates of founding, failure and growth” (Barron, 1999: 424). The founding rate refers to “the rate at which new organizations are founded,” the failure rate deals with “the rate at which existing organizations leave the population,” and the growth rate addresses “the rate at which they grow or decline” (Barron, 1999: 424). The growth rate explains changes in the organizational population – growth and decline over time. Organizational growth is faster at earlier periods and then slows down gradually.

The evolutionary theory describes a series of sequential stages (life cycles) of evolution in organizational development and societal changes over time (Carroll, 1984). The approach assumes that survival depends upon the organization’s ability for adaptability and resources sustenance as it interacts with the external environment. The extent to which organizations can adapt and change their strategies primarily depends on external environmental factors.

Organizational ecology has enhanced sustainability by linking environmental resources management to quality, production, service, and managerial systems (Cohen-Rosenthal, 2000; Ehrenfeld, 2000). Environmental resource management has an evolutionary focus for addressing sustainability, conservation, industrial growth, and population problems. This is because population and industrial growth are potential threats to environmental destruction. At the same time, people within and outside the organization are also concerned for environmental conservation and attempt to limit industrial growth by focusing on natural resources conservation (Penn, 2003). As a result, sustainability management is a continuous, ongoing process, not a one-time improvement or action program advocating specific government legislative, policy, or program. In this context, sustainable development and sound environmental management constitute the primary components for establishing organizational and anthropological ecological relationships.

An evolutionary ecological analysis integrates sustainability with other activities, including community development plans, resources management, geographical locations, and boundaries (Wilbanks, 1994). This approach is consistent with the view that business organizations as living ecological systems are in a constant sustenance mode of operation to adapt their economic growth and industrial development strategies with community social well-being and cultural development programs. This concern arises due to self-interest and concern to align their business activities with the welfare of external parties. Accordingly, strategy, competition, and cultural adaptations, i.e., both organizational and anthropological ecological practices, are intertwined to form the foundation for sustainable development.

While both sociology and anthropology share the community and societal perspectives that sustainability has for community and national development programs, ecological anthropology specifically examines the influence of national and local organizational and political systems and their subsequent influences on culture, people, and general socio-cultural systems. Both industrial ecology and ecological anthropology suggest that business sustainability interfaces with societies’ community development and social well-being, as well as the educational practices related to conservation, environmental health, and ecological ethics.

AN INTEGRATIVE FRAMEWORK OF THE ECOLOGICAL TRANSACTION COST APPROACHES TO SUSTAINABILITY DEVELOPMENT

The interrelationship of ecology and environmental sustainability has its basis in Williamson (1987) transactional cost and economics paradigm. Williamson (1987) introduced transaction cost economic analysis to study organizations and change. He provided an alternative view of the organization based on economic choice and cost efficiency. The transaction cost approach assumes that there are differences among organizations “because transactions differ so greatly, and efficiency is realized only if governance structures are tailored to the specific needs of each type of transaction” (p.568). Transaction then becomes the unit of analysis. He noted that transaction costs are critical because they constitute “the crucial importance of organizations for economizing on such costs. This brings organization theory to the fore since choice of an appropriate governance structure is preeminently an organization theory issue” (p.568).

Van de Ven (1986) connected transactions and organizational structures and systems. He formulated that “transactions are the micro elements of macro-organizational arrangements. Just as the development of innovation might be viewed as a bundle of proliferating transactions over time, so is the proliferation of functions and roles to manage this complex and interdependent bundle of transactions in the institution that houses the innovation” (1986: 598). Hence, organizational systems with interdependent functions are preoccupied with managing transaction costs.

Organizations go through staged cycles of growth and transactions to maintain functional relationships of organizational change and process innovation in management control systems. Accordingly, organizations experience several stages or cycles of growth, maturity, decline, retention and downsizing to manage transaction costs, adapt to their environmental surroundings, and institute sustainable environmental management programs.

The transaction cost approach assumes that human and societal decisions have economic consequences that impacts sustainability business; and these transactions transcend economic and ecological objectives. Moreover, moral and ethical dimensions are rooted in institutional arrangements that impact ecological transaction management (Beckman and Pies, 2008).

Transaction analysis assumes tradeoffs will be made between economic profitability goals and ecologically formulated accounting principles. Accordingly, accounting and auditing ethics education should be restructured to include both normative – profitability and corporate governance – and moral dimensions of institutional legitimacy and accountability. Sustainability thus broadens accounting ethics education to include auditor professional codes of conduct and environmental, social, and economic accounting reporting issues presented in triple bottom line (TBL) reports. Accounting ethics is now broadly embedded in ecological and philosophical ethics, where compliance reports of sustainability in environmental and natural resources management have become part of accounting reporting systems.

For example, the Brundtland Report (1987) embraced sustainability to address economic development issues related to natural resources management, agricultural production, food supply, environmental protection, and global climatic changes to address ecological changes related to drought, floods, and other natural disasters. The social science disciplines, particularly anthropology, sociology and economics, have concerned sustainability. Sub-fields in ecology and evolution, such as ecological anthropology and organizational ecology, among others have developed theories and methods to facilitate the study of sustainable development.

Accordingly, sustainability education has been covered in the social sciences and the environmental, biological, and agricultural disciplines. However, in accounting, sustainability education is non-existent, or if it exists, the topics covered are limited to focusing on both the internal and external dimensions of triple bottom line (TBL) reporting and disclosures to stakeholders and managers. Khan (2011) reviewed the sustainability course offerings in accounting in Canada, United States of America (USA), and United Kingdom (UK) from what was posted on the Web and found out that sustainability coverage is limited. Standalone courses are limited (Khan, 2013) and not commonly offered in accounting programs (Pippin et al., 2016), and most of the courses are electives offered in management and business courses in environmental economics, industrial ecology, business ethics and the environment (Khan, 2013).

This is the case because sustainability accounting and reporting is an emerging/current phenomenon. Sociological and anthropological approaches are used in this paper because sustainability, conservation and ecological resource management are well-established and well researched in these disciplines. Sustainability accounting research, education, and practice have benefited from the work being done in these disciplines. In this paper, we are extending the ecology of sociological and anthropological approaches to study the integration of sustainability into the accounting curriculum and the professional accounting education practices as it relates to the auditing and financial reporting courses and curriculum.

AN OVERVIEW OF SUSTAINABILITY EDUCATION IN THE ACCOUNTING PROGRAM: INTEGRATION VS. STAND-ALONE COURSES

In business administration and accounting, sustainability has received a great deal of attention in the form of research and pedagogical publications. To meet the growing demands of interested organizations, professional accounting associations and practice, and not-for-profit (NFP) organizations, most business schools and accounting programs have developed two types of courses-- standalone or integrative-- to incorporate sustainability into the curriculum (Vann and White, 2004). These approaches have helped them to realign their curriculum to increase coverage of sustainability topics by revising current course offerings at both the undergraduate and graduate levels.

However, the theory and methods in accounting education required for designing and delivering a standalone course in sustainability accounting are not yet entirely developed. For example, Hopwood (2009) suggested that an accounting theory with accompanying measurement techniques for sustainability has not yet been developed. It is at present only in the preliminary stage as sustainability has focused exclusively on public interest and corporate governance issues of business. Accordingly, sustainability has been viewed as a subject of corporate social responsibility that is consonant with accounting and business ethics.

The Background for Sustainability in the Accounting Curriculum

The triple-bottom-line (TBL) reporting of environmental, social, and economic objectives reflects business sustainability development strategies that are integrated into business organizations' core businesses. Transparency, accountability, and sustainability have become ethical and economic performance indicators. Accordingly, corporations have expressed interest in sustainability's impact on the well-being of communities where they conduct business.

Sustainability has become the emerging business discipline incorporating environmental and ecological ethics into accounting and auditing education. The sustainability framework relates ecological and economic assumptions in corporate practices and behaviors to develop critical and reflective thinking by applying new and different perspectives from the social and environmental sciences (Brown et al., 2017). Accounting and auditing ethics education focusing on sustainability initiatives and reporting would now become part of the business ethics curriculum.

Corporate boards realize that sustainable development is essential to corporate ethical governance. Accordingly, the number of companies publishing sustainability--or corporate economic, environmental, and social responsibility (TBL)--reports continue to grow. These reports highlight policies and programs that companies have targeted on economic, environmental, and social objectives. Sustainability accounting has been largely limited to the TBL social and environmental reporting approaches, focusing on accountability and performance (Gibassier and Unman, 2014).

Ecologically, sustainability education can be best addressed through systemic/holistic integration, limiting stakeholder issues into the accounting and business curriculum rather than in standalone courses. However, sustainability integration is currently at the earliest stage of the ecological, evolutionary process of educational development. Accordingly, the integration of sustainability into the accounting curriculum is likely to be subject to evolutionary changes in natural and resources management, the environment, competitive forces, and other external factors that shape ecological processes of organizational change and development and accounting education.

From the standpoint of accounting education, integration of sustainability into all facets of the accounting curriculum, i.e., financial, managerial, and auditing courses, is argued to be an appropriate and viable format that would enable students to have the overall picture of the subject matter and its implications for organizational resources allocation decisions. Applying both sociological and anthropological approaches in accounting ethics education suggests that the preferred approach to teach sustainability calls for integrating sustainability into accounting education and professional practices.

The Ecology of Anthropological and Sociological Implications for the Integration of Sustainability Into the Accounting Education

Sustainability development has been an established area of scholarly research in both anthropology and sociology. Recently, sustainability has emerged as an important area of scholarly research in business and accounting. However, a review of the recent research trends in sustainability by Wu and Shen (2016) revealed that sustainability development research is wide varied and focuses on trends and topics that are popular on the environment. This research does not cover the United Nations Educational, Scientific and Cultural Organization's (UNESCO's) strategic perspectives on sustainable development at a global level and the need to integrate sustainability at both the national and international levels. The research has been fragmented and addresses a topic that has attracted attention by the government or business, such as environmental concerns, regulations and business sustainability. They advocated research trends that integrate UNESCO initiatives and the development of curricula and courses that integrate them to the business education curriculum. In accounting, business and accounting academics have responded to both international development organizations and national government concerns and business growing interests to integrate sustainability in accounting education. The approach is mixed for both standalone courses and integration into existing accounting and business environment courses. Most universities have adopted integration instead of standalone courses.

The argument in favor of integrating sustainability into the accounting curriculum in financial, managerial, and auditing courses is that it is assumed that it can enable students to understand the overall picture of the business enterprise and implications in organizational resources allocations decisions. Recent developments in business and governmental policies towards environmental and sustainability issues have increased the need for a holistic view of business that calls for integrating sustainability into accounting education, that is, into the curriculum rather than into developing standalone courses.

Integration in accounting education has been viewed from several different perspectives. Some have treated the subject as integrated financial reporting where students, for example in Belgium, were exposed to both economic and social/environmental reporting to understand the rationales and motivation of inclusion of sustainability in integrated financial reporting (Bouten and Hoozee, 2015). Owen (2013) examined integrated reporting within the context of triple bottom line (TBL) reporting, which encompasses economic, business, physical and natural environmental resources. The study examined TBL within the context of South Africa by linking the successes of business organizations with "three independent subsystems: society, the environment, and the global economy" (p.348). Hazelton and Haigh (2010) overviewed the integration of sustainability across the accounting curriculum in a technical post graduate education curriculum in Australia.

These studies suggest that integration requires linking accounting to the social and ecological resources contexts where sustainability evolved. In accounting, there is a movement towards integrating topics covering social, environmental and resource issues (Khan, 2011).

Sustainability has been a subject of interest in sociology and anthropology for many years because it addressed ecological resources, organizational development, community welfare, economic growth, and national geographical boundaries. Accordingly, the integration of sustainability into the accounting curriculum has been influenced by evolutionary changes in natural and resources management, the environment, competitive forces, as well as other external factors that have shaped accounting education, the most notable one is ethics, which preceded sustainability education and practice. Within the ecological approach, there is the presupposition that organizational systems undergo an evolutionary process of change and development. Accordingly, organizational sociology and ecological anthropology provide the evolutionary context for integrating sustainability into the financial, managerial accounting, and auditing courses. The importance of multi-disciplinary approaches in ethics education (Ponemon and Glazer, 1990), particularly in the social sciences, has long been recognized by business school and accounting administrators, the accounting professional community and business school and accounting programs accrediting institutions.

The Association has spearheaded the movement towards integration to Advance Collegiate Schools of Business (AACSB International), the organization responsible for accrediting business school and

accounting programs. AACSB has recommended integrating topics related to corporate governance, ethics, and social responsibility into the business curriculum. Following the AACSB International guidelines, business school deans and accounting program administrators have advocated implementing integration as the best approach to any overhaul of the business curriculum. They have called for integration of sustainability, ethics and social responsibility in functional business courses, including accounting to provide the students with an overall picture of the economy, polity, and society that affect business organizations' resource allocation decisions and competitive behavior.

Effects of External Environmental Factors on Accounting Ethics Education: The Background to Sustainability Education

The accounting and auditing education environment has significantly changed since the mid-1980's. The stock market crash, dissolution of savings and loans institutions, increased business bankruptcies, and liability suits against public accounting firms have all impacted accounting and auditing education. The 2000's financial scandals at Enron, Arthur Andersen, and WorldCom significantly increased governmental and public inquiries into whether accountants' and auditors' participation in covering these scandals.

The Call for the Integration of Ethics and Sustainability Into Accounting Education

The outcomes of financial scandals: Enron and Arthur Anderson and, followed by the collapse of the housing industry and the stock market, generated increased interest in accounting ethics instruction in higher education. Formal education thus provides the framework for addressing questions of moral obligations and societal responsibilities. However, accounting and auditing policies impact public policy decisions with broader financial, economic, and societal implications. Thus, accounting choices are contingent upon environmental and ecological factors that involve moral choices affecting organizations and society. The sustainability of ecological and natural resources management is incorporated in accounting ethics education. This is prompted by the realization that prospects for growth and survival of all levels of species are linked to current ecological and sustainability efforts to maintain reasonable living standards by protecting the environment. These issues are rich and complex, but they also have a long-term impact on society and the world community at large (Parker, 2005, pp. 856-857).

Ecological issues call for collaborative research with other disciplines to make them relevant in addressing broader social and environmental issues pertinent to sustainability accounting and reporting. The culmination of ecological and environmental issues in sustainability accounting and their subsequent impact at the local, regional, national, and global/international communities have broadened the scope of ethics research beyond corporate normative practices. Ecological and environmental accounting has broadened the functional focus of accounting ethics education beyond auditors' professional codes of conduct and corporate governance to incorporate ecological and environmental issues in ethics education.

Ecological and Environmental Approaches to Accounting Ethics Education: Implications for Sustainability Educational Theory and Practice

Many universities have incorporated sustainability as a mechanism for promoting changes in programs through the coordination of resources, environmental management, sustainable resources management, energy usage, garbage, and recycling programs. They lead sustainability efforts to transform their administrative structures and academic programs (Ferrer-Balas et al., 2008). Ryu and Brody (2006) reported that university graduate programs and education in sustainable development have positively impacted students' sustainability and ethical behavior in ecological and land preservation, waste management, and mode of transportation. They have augmented courses on ethics in accounting and auditing. They have altered student and consumer behaviors about the consumption of goods and services to favor companies with environmental management programs. These programs have improved universities' environmental and natural resources management performance consistent with business and community interests. Sustainability practices are used to support water management, energy, and solid waste -reduction, as well as facilities and hazardous materials management (Walton and Galea, 2005).

Sustainability has impacted the scope of accounting education to incorporate social and environmental issues (Collison et al., 2014). The Sarbanes-Oxley Act of 2002 formalized these concerns and broadened the scope of accounting reports to include sustainability programs. Many organizations have integrated these concerns into their strategic planning processes.

Therefore, it can be argued that there are ethical obligations for both corporations and society at large to use natural resources responsibly with a focus on sustainability for future generations (Curry, 2007; Rozzi, 1999). It is, therefore, appropriate in accounting contexts to support ecological concerns that can develop to individual conviction and responsibility to sustain ecological ethics for preserving the health of the land. Land includes soil, water, plants, animals, and other living organisms in this context. The land ethics approach has an accounting ethics component that advocates land use practices that are environmentally beneficial and restore ecological health to sustain community welfare (Anderson-Wilk, 2008, pp. 142-144; Palmer, 2007).

Accordingly, social and environmental reporting has constituted business sustainability programs. To this effect, Thiele (1999) elaborated the evolving relationships among ecology, environmental ethics, and sustainability (see also Cowdin, 2008). She formulated that “ecology pertains to the study of relations of interdependence within biological communities. Ecology is inherently related to sustainability. The two concerns stand together” (Thiele, 1999, p. 29).

The Basis of Ethical Principles in the Ecology of Sustainability Education

In general, ecosystems comprise interdependent co-existing environmental and social systems with enduring and sustaining relationships. Ecology and natural resources management have sustainable relationships that are “amenable to ethical formulation. Ethics might be defined as a system of mores that arises out of and sustains certain relations of social interdependence” (Thiele, 1999, p. 29). These ethical considerations provide the foundation to sustain and conserve resources for future generations.

Thus, Sustainable development depends on the moral dimensions of institutional legitimacy and structural arrangements. Sustainability concerns have advanced ecological and ethical issues covered in higher education (Ferrer-Balas et al, 2008; Ryu and Brody, 2006). It can be inferred that sustainability management is embedded in the Darwinian organizational ecology theory of natural selection (Barron, 1999; and Carroll, 1984) focusing on individual actions and economic choices that make ethical education and training necessary. When ecological ethics focuses on sustaining the interdependence of social and biological relationships, accounting ethics education can be broadened to include issues related to human morality and individual responsibility. Accordingly, sustainability education is inherently an ethical issue that is embedded in the conservation decisions and the development of ecological and natural resources to balance the economic, social, and environmental objectives of organizations, communities, and societies.

SUSTAINABILITY ACCOUNTING AND REPORTING: EVOLVING TOPICS THAT CALL FOR INTEGRATION

Sustainability development has been embedded in natural and environmental resources management ecology. There are at least three subject areas where the sustainability concepts can be integrated into accounting. These areas are broadly classified as financial, auditing, and managerial accounting.

Financial Accounting: External Reporting Guidelines

This section covers the integration of sustainability into financial accounting course materials. It describes several external financial reporting guidelines recently emerging to incorporate sustainability in corporations’ annual reports. These guidelines describe external reporting regulations that can be incorporated in a financial accounting course.

Some of these external reporting guidelines are outlined in the Global Reporting Initiative (GRI), Dow Jones Sustainability Index (DJSI), and the Morgan Stanley Capital International Index (MSCI). They specifically address sustainability indicators to assess the performance of social and environmental programs. These guidelines have been favorably received by the Financial Accounting Standards Board

(FASB) to develop Generally Accepted Accounting Principles (GAAP) to supplement the Sarbanes-Oxley Act of 2002 to provide a general framework and approaches for reporting on sustainability.

The accounting profession has stressed the importance of accountability and verifiability of environmental and social information in annual reports. The AICPA and the big four accounting firms have focused on external reporting guidelines and possibly verification of information by CPAs. These timely performance issues must be integrated and addressed in financial and managerial accounting and auditing courses.

Auditing and Attestation: Sustainability Reporting Issues in Accounting Education and Practice

The role of auditors in the sustainability reporting system has become important (see AICPA, 2010) on integrating social and environmental performance with financial reporting rather than issuing separate reports and advocates integrating of oversight to review these reports (not necessarily mandatory) and the provision of assurance of integrated reports (external opinion validation). These are pertinent sustainability issues that require integration in the accounting curriculum to provide students with a holistic picture of organizational performance, the economy, and society.

Sustainability In the Management Accounting Curriculum

The most important implications for the managerial accounting curriculum can be derived from the Sarbanes-Oxley (SOX) Act of 2002, which recognized the criticality of sustainability issues for management accounting decisions. New measurement and reporting techniques in management accounting are essential in sustainability management for changing the basis for cost allocation within a unit or division. Changes in accounting sustainability reports can be targeted to provide timely information (“scorecard”) that enables managers to achieve desired profitability and income objectives consistent with sustainability goals/constraints. These changes in reporting systems will require cooperation and teamwork among managers, corporate board members, and employees for successful implementation.

SUMMARY AND CONCLUSION

This paper has presented the extent to which the ecology of sustainability, particularly from ecological anthropology and organizational ecology from sociology, have elaborated how ecological factors have shaped environmental resources, industrial-organizational structures, technological developments, government regulatory agencies, and natural resources endowment differences. In contrast, ecological anthropology has addressed how cultural and social forces have shaped sustainability development. The coevolution of organizational ecological (sociological) and ecological anthropological views of sustainability development have related the resources-based and transaction cost approaches overall framework for integrating sustainability into the accounting curriculum. Accordingly, social, and environmental data in sustainability reporting comprise interdependent co-existing ecological, natural resources, and geographical systems with enduring and sustaining relationships. Ecology and natural resources management have sustainable relationships that govern individuals, group and community behaviors, values, cultures, norms, and living standards to conserve current resource use to sustain future generations.

Ecology has promoted sustainability topics in higher education. Sustainability management is thus embedded in the Darwinian theory of natural selection, individual actions, and economic choices that make accounting education and training functional for the maintenance and stability of social systems. Accordingly, sustainability integration in accounting education has become a byproduct of organizational ecological, environmental resources of management, and ecological anthropology. Both ecological anthropology and organizational ecology (sociology) of sustainability are embedded in the conceptual framework of conservation and development of ecological and natural resources to balance the economic, social, and environmental ecological objectives of organizations, communities, and societies. The integration of sustainability into accounting education and the role that the accounting practice profession has played in promoting sustainability reporting reflect the importance of environmental and ecological

issues for the sustenance and long-term resources management of the natural resources of nations. Sustainability has economic and financial objectives to advance business organizations' economic profitability, simultaneously with social and environmental goals to promote the well-being of individuals, communities, and societies.

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REFERENCES

- American Institute of Certified Public Accountants (AICPA). (2010, July). Good governance and sustainability: Fundamental for improved business reporting. *Accountants Today*. The issue contains reports by Professor M. King of South Africa titled Governance is king, pp. 16–23 and by other practitioners.
- Anderson-Wilk, M., (2008). Science and stewardship in a monolithic conservation movement: Facilitating positive change. *Journal of Soil and Water Conservation*, 63(5), 142–146.
- Baker, W.E., Faulkner, R.R., & Fisher, G.A. (1998). Hazards of the market: The continuity and dissolution of inter-organizational market relationships. *American Sociological Review*, 63(2), 147–177.
- Barron, D. (1999). The structuring of organizational populations. *American Sociological Review*, 64(3), 421–445.
- Beckman, M., & Pies, I. (2008, Autumn). Sustainability by corporate citizenship: The moral dimensions of sustainability. *The Journal of Corporate Citizenship*, 31, 45–57.
- Bennett, J.W. (2017). *The ecological transition: Cultural anthropology and human adaptation*. London: Routledge.
- Bouten, L., & Hoozee, S. (2015). Challenges in sustainability and integrated reporting. *Issues in Accounting Education*, 30(4), 373–381.
- Bozzoli, M.E. (2000). A role for anthropology in sustainable development in Costa Rica. *Human Organization*, 59(3), 275–279.
- Brown, J., Soderbaum, P., and Derenlowska, M. (2017). *Positional Analysis for Sustainable Development: Reconsidering Policy, Economics and Accounting*. Routledge, London.
- Carroll, G.R. (1984). Organizational Ecology. *Annual Review of Sociology*, 10, 71–93.
- Cohen-Rosenthal, E. (2000). A walk on the human side of industrial ecology. *American Behavioral Scientist*, 44(2), 245–264.
- Collison, D., Ferguson, J., & Stevenson, L. (2014). *Sustainability accounting and education* (2nd Ed.). London: Routledge.
- Cowdin, D. (2008). Environmental ethics. *Theological Studies*, 69(1), 164–184.
- Curry, P. (2007). *Ecological Ethics: An Introduction*. Malden, MA: Polity Press.
- Custance, J., & Hillier, H. (1998). Statistical issues in developing indicators of sustainable development. *Journal of the Royal Statistical Society. Series A (Statistics in Society)*, 161(3), 281–290.
- Dietz, T., & Burns, T.R. (1992). Human agency and the evolutionary dynamics of culture. *Acta Sociologica*, 35(3), 187–200.
- Ehrenfeld, J.R. (2000). Industrial ecology: Paradigm shift or normal science. *American Behavioral Scientist*, 44(2), 229–244.
- Feldman, S. (1986). Management in context: An essay on the relevance of culture to the understanding of organizational change. *Journal of Management Studies*, 23(6), 587–607.
- Ferrer-Balas, D., Adachi, J., Banas, S. Davidson, C.I., Hoshikoshi, A., Mishra, A. . . . Ostwald, M., (2008). An international comparative analysis of sustainability transformation across seven universities. *International Journal of Sustainability in Higher Education*, 9(3), 295–316.

- Gibassier, D., & Unman, J. (2014). *Sustainability Accounting and Accountability*. London: Taylor & Francis Group.
- Gray, S.J., (2000). A memory loss: Ecological politics, local history, and the evolution of Karimojong violence. *Human Organization*, 59(4), 401–418.
- Haenn, N. (2000). Review article: Renovating ecology. *American Anthropologist*, 27(3), 736–745.
- Hazelton, J., & Haigh, M. (2010). Incorporating sustainability into accounting curricula: Lessons learnt from an action research. *Accounting Education*, 19(1–2), 159–178.
- Hopwood, A., Unerman, J., & Fries, J. (Eds.). (2010). *Accounting for Sustainability*. London: Earthscan.
- Hopwood, A.G. (2009). Accounting and the environment. *Accounting, Organizations and Society*, 34(3–4), 433–439.
- Khan, T. (2011). Sustainability accounting education: Scale, scope and a global need. *Journal of Modern Accounting and Auditing*, 7(4), 323–328.
- Khan, T., (2013). Sustainability accounting courses, Talloires Declaration and academic research. *International Journal of Sustainability in Higher Education*, 14(1), 42–55.
- Kottack, C.P. (1999). The new ecological anthropology. *American Anthropologist*, 101(1), 23–35.
- Mog, J.M. (2004). Struggling with sustainability – A comparative framework for evaluating sustainable development programs. *World Development*, 32(12), 2139–2160.
- Owen, G. (2013). Integrated reporting: A review of development and their implications for the accounting curriculum. *Accounting Education*, 22(4), 340–356.
- Palmer, C. (2007). The future of graduate education in environmental philosophy/ethics. *Ethics and the Environment*, 12(2), 136–139.
- Parker, L.D. (2005). Social and environmental accountability research: A view from the commentary box. *Accounting, Auditing & Accountability Journal*, 18(6), 842–860.
- Penn, D.J. (2003). The evolutionary roots of our environmental problems: Toward a Darwinian Ecology. *The Quarterly Review of Biology*, 78(3), 275–301.
- Pierce, B.D., & White, R. (1999). The evolution of social structure: Why evolution matters. *Academy of Management Review*, 24(4), 843–853.
- Pippin, S.E., Weber, J.L., Wong, J.A., & Bernger, J. (2016, June). The inclusion of sustainability in the accounting curriculum. *The CPA Journal*, pp. 35–39.
- Ponemon, L.A., & Glazer, A. (1990). Accounting education and ethical development: The influence of liberal learning on students and alumni accounting practice. *Issues in Accounting Education*, 5(2), 195–208.
- Rozzi, R. (1999). The reciprocal links between evolutionary-ecological sciences and environment. *Bioscience*, 49(11), 911–921.
- Ryu, H.-C., & Brody, S.D. (2006). Examining the impacts of a graduate course on sustainable development using ecological footprint analysis. *International Journal of Sustainability in Higher Education*, 7(2), 158–175.
- Sterling, S. (2013). An analysis of the development of sustainability education internationally: Evolution, interpretation and transformative potential. In J. Blewitt, & C. Cullingford (Eds.), *The Sustainability Curriculum: The Challenge for Higher Education* (pp. 43–62). London: Earthscan.
- Stone, M. (2003). Is sustainability for development anthropologists? *Human Organization*, 62(2), 93–99.
- Thiele, L.P. (1999). Evolutionary narratives and ecological ethics. *Political Theory*, 27(1), 6–38.
- Van de Ven, A.H., (1986). Central problems in the management of innovation. *Management Science*, 32(5), 590–607.
- Vann, J.W., & White, G.B. (2004). Sustainability reporting in the accounting curriculum. *Journal of Business & Economics Research*, 2(12), 17–30.
- Walton, S.V., & Gales, C.E. (2005). Some considerations for applying business sustainability practices to campus environmental challenge. *International Journal of Sustainability in Higher Education*, 6(2), 147–160.
- Wilbanks, T.J. (1994). ‘Sustainable development’ in geographic perspective. *Annals of the Association of American Geographers*, 84(4), 541–556.

- Williamson, O.E. (1987). The economics of organization: The transaction cost approach. *American Journal of Sociology*, 87(3), 548–577.
- World Commission on Environment and Development. (1987). *Our Common Future (The Brundtland Report)*. New York, NY: Oxford University Press.
- Wu, Y., & Shen, J. (2016). Higher education for sustainable development: A systematic review. *International Journal of Sustainability in Higher Education*, 17(5), 633–651.