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Francis K. Andoh-Baidoo
Virginia Commonwealth University, andohbaidoof@vcu.edu

Ojelanki K. Ngwenyama
Ryerson University, ojelanki@ryerson.ca

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Francis K. Andoh-Baidoo
Virginia Commonwealth University
andohbaidoof@vcu.edu

Ojelanki K. Ngwenyama
Ryerson University
ojelanki@ryerson.ca

ABSTRACT

Organizations implement Enterprise Resource Planning (ERP) systems seeking to integrate functional units, standardize business processes and enhance organizational efficiencies. Although several millions of dollars are spent in implementing ERP systems, most of these systems fail. As ERP systems are implemented in complex environments with extensive social and organizational interactions leading to dramatic changes in the organizational structures and business processes, two critical success factors in ERP implementation are user involvement and effective project communication. Although Checkland's soft systems (SSM) methodology is a proven tool for encouraging user participation, it does not fully embrace emancipation. In this paper, we reformulate SSM to incorporate emancipatory ideals to enhance project communication during ERP implementation. The emancipatory approach developed in this paper is suitable for the requirement specification phase of ERP implementation. The approach can enhance systems implementation practice and presents an opportunity for a new research stream in method engineering for ERP systems.

Keywords

Implementation approach, ERP systems, requirements specification, emancipation, reformulation, end-user participation, critical social theory

INTRODUCTION

Organizations continue to spend millions of dollars implementing enterprise resource planning (ERP) systems. These systems seek to integrate functional areas into seamless single unit operation to enhance organizational efficiencies. ERP market continues to grow where it was projected to soar to over $66 billion by 2003 (Somers, Nelson and Ragowsky., 2000). At the same time it is acknowledged that over 50% of ERP systems fail (Ewusi-Mensah, 1997). Among the major factors that lead to failure of ERP systems are lack of end-user participation and ineffective project communication (Amoako-Gyampah and Salam, 2004). If the end users' contributions are ignored in the implementation process, chances are that the political and social consequences of the system will not be questioned at the beginning. As these problems surface at later stages of the implementation the system could be rejected by the users (Markus, 1983).

The importance of methodologies in systems development and implementation cannot be overemphasized. Wastell (1996) suggests areas where some methodologies are useful. The Soft Systems Methodology (SSM) developed by Checkland (1981) for instance has practical importance in unstructured requirements. Requirements definition or specification is part of the implementation process. In fact requirements specification is probably the most critical phase that determines whether an information systems development and implementation project would complete or not. When end-users are prevented from participating in the requirements definition, the result is that the systems implemented do not meet the requirements of the users for which the system is developed. Sponsors of ERP systems development and implementation can eloquently and convincingly preach the benefits of the application, yet, if the agenda of the proposed IS application is hidden from the users and if all participants are not freed from the distortions in communicating the goals of the project, sponsors' aspirations will not materialize because end-users will eventually recognize the distortions and the social impacts or injustice that the system could bring and reject the system.

The use of SSM to enhance user participation has been well discussed. For instance Wastell (1996) suggests that SSM can be used to identify the value, impact, and barriers to ERP. While SSM encourages participation, it does not address the issue of communication distortion that may hinder user participation. In this paper we present an implementation approach for requirements specification of ERP systems that seeks to free users from communication distortion, encourage the analyst and consultants to facilitate rather than dominate, and enable end-user to fully participate in ERP implementation. The proposed

approach, the emancipation approach (EA), should at the minimum demystify the goals and ideals of emancipation of all stakeholders in the implementation process.

The paper is organized as follows. In the next section we discuss the neohumanist[1] paradigm discussed by Hirschheim and Klein (1989). This section discusses the ontological and the epistemological assumptions of the neohumanist paradigm relevant to EA. Critical issue is the discussion of how EA might fulfill the epistemological requirements of the neohumanist paradigm. Following we discuss emancipatory ideals that EA should embrace. We then present EA as the reformulation of SSM to embrace emancipation ideals using Hirschheim and Klein's (1994) reformulation approach. Finally we conclude the paper highlighting the contributions, limitations and possible future research.

NEOHUMANISM PARADIGM

The importance of the systems developer/analyst developing the information systems to function as an emancipator or social therapist has been well argued (Hirschheim and Klein, 1994; Ngwenyama, 1991). The support for the neohumanism paradigm is that it embraces the concepts of work, mutual understanding, and emancipation which form the three fundamental domains around which society and other forms of social organization are arranged. Referring to Habermas, Ngwenyama (1991) indicates that these concepts form three domains of knowledge interest. Consequently systems implementation would proceed with the three knowledge interests in mind if they followed the neohumanist paradigm.

Epistemological Assumptions

The goal of EA is to emancipate all stakeholders in the systems implementation process - freeing stakeholders from communication distortions. As such critical social theory (CST) is an appropriate approach to employ. CST has been effectively discussed in the field of IS in many directions including: call for the use of CST approach in IS research (Ngwenyama, 1991; Orlikowski and Baroudi, 1991) and use of CST in information systems development and implementation (Hirschheim and Klein, 1994; Ngwenyama, 1991).

> In recent times, the most prominent example of theory that builds on the assumptions of neohumanism has been the critical social theory of Jurgen Habermas (cf. Habermas, 1984, 1987; Hirschheim and Klein, 1994).

Ngwenyama's (1991) succinct and eloquent summary of the assumptions of CST are: (1) people and for that matter organizations create their own world (organizational structure and processes) and thus these processes and structures can be changed by the organizational members whenever desired; (2) information systems researcher adds value to the object (organization and its information systems) as he/she creates scientific knowledge and that the researcher is not a passive observer; (3) the CST researcher should not only be concerned with understanding the organization but also critique it with the aim of improving communication distortion as well as the organization and its members; (4) theory and practice should be interconnected to improve the organization and its information systems; and (5) the critical social theory is concerned with the validity conditions of knowledge and change which it produces.

Ontological Assumptions

Lyytinen (1992), Ngwenyama (1991) and Hirschheim and Klein (1994) suggest the lack of use of the neohumanism paradigm in information systems development and implementation. Hirschheim and Klein's 1989 paradigmatic theory shows that neohumanism is the only paradigm that lacks practice, yet it is the only paradigm that has theoretically been proved to deal with the barriers to emancipation. In similar discussions, Ngwenyama (1991) and Hirschheim and Klein (1994) show how the approaches employed in neohumanism seek to advance the knowledge interests about organizations and their information systems.

Further, Ngwenyama (1991) describes three knowledge interests that are important in all human enquiries (technical, practical or social, and emancipatory) and as such will advance organizational and IT knowledge.   Since the technical knowledge has interest in confronting nature, it relies on engineering theories, methods and practice. It employs technical solutions such as the use of information technologies in building effective information systems to enhance organizational processes. Effectiveness is therefore the key validating measure for technical knowledge interest.

The social interest recognizes the importance that the stakeholders involved with systems implementation interpret the development and use of the IT application in the organizational environment. The goal of the social interest is gaining understanding of the meanings that those affected by the IT application ascribe to the application and the subsequent changes in social relations that the introduction of the systems brings to the individuals and groups present in the organization.

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[1] For a complete discussion of the different types of information systems development methodologies, see Hirschheim and Klein (1989).

EMANCIPATORY IDEALS

The emancipatory knowledge interest seeks to free people and organizations by presenting the true rather than the "false" assumptions surrounding the implementation and use of the IT application. In that case, it seeks to minimize and to prevent the growth of contradictions around the implementation and use of information technology. The knowledge interest lays down the assumptions and values inherit in the development, implementation and use of information systems applications. Furthering this cause, Baskerville (1996) argues that true emancipation requires that ethical decisions be made when using information technology to structure the work place. Alvesson and Willmot state that:

> emancipation is concerned with the process through which individuals and groups become freed from repressive social and ideological conditions, in particular those that place socially unnecessary restrictions upon the development and articulation of human consciousness (Alvesson and Willmot, 1992, p. 342)

Hirschheim and Klein (1994) proposed that emancipatory approach must: (1) support an active process for individual and collective self-determination; (2) support a process of critical self-reflection and associated self-transformation; (3) encompass a broader set of institutional issues relating particularly to social justice, due process, and human freedom; and (4) incorporate explicit principles for the critical evaluation of claims made throughout the systems development process.

Although emancipation is a key value of neohumanism, efficiency and effectiveness as well as participation espoused in functionalism, are always critical in neohumanism "…neohumanism insists that participation is even more important for social sense making to create shared understandings and to meet the ethical imperatives of work arrangements in a democratic society" (Hirschheim and Klein, 1994, p.84).

Emancipation typically addresses both psychological and organizational dimensions.

> The neohumanist paradigm seeks change, emancipation, and the realization of human potential and stresses the role that different social and organizational forces play in understanding change. It focuses on all forms of barriers to emancipation – in particular ideology (distorted communication), power and psychological compulsions, and social constraints – and seeks ways to overcome them (Hirschheim and Klein, 1994, p.109).

"If communicative distortion … is a key issue in emancipation, then the application of information systems could help to mitigate distortions by facilitating the widest possible debate of organizational problems…which could be expected to contribute to an improved mutual understanding" (Hirschheim and Klein, 1994, p.86).

"The goal of information systems development from this perspective is to institutionalize a series of checks and balances that would guarantee this debate to occur, and to occur within the context of "emancipation discourse" (Hirschheim and Klein, 1994, p.89). What is needed therefore is emancipatory discourse. "Emancipatory discourse is concerned with defining conditions in which distortion tendencies are absent" (Hirschheim and Klein, 1994, p.89).

Organizational theories (action learning theory, holographic organization theory and communicative action theory) can be employed to ensure that end-users enhance their competence in systems development (Hirschheim and Klein, 1994; Ngwenyama, 1993). For instance using collaborative action learning method, Ngwenyama (1993) develops an approach that seeks to enhance both explicit and tacit knowledge of systems development which subsequently improves end-user's competence in systems development process (See (Ngwenyama, 1993) for detailed discussions).

The communication action theory seeks to eliminate communication distortion thereby allowing all stakeholders to openly and freely debate. Action learning theory encourages learning by experience. The holographic organization theory espouses cross-functional teams which is important in ERP systems. Overall the team members would have the skills required for effective implementation. End-users on the implementation teams will have experience in what they are doing and would be encouraged to learn from other disciplines as well. The following is a list of ideals that should be present for the communication action theory to be effective:

(1) Need for all participants to have equal status (power) in the group process

(2) All participants must have equal opportunities to raise issues, challenges, or defend the validity of all actions or statements

(3) All communications must be clear and understandable. No form of jargon may be used to mystify or erect barriers to communication

(4) All propositional statements and actions must relate to the existing state of affairs

(5) All statements and actions must be appropriate to the situation under consideration

(6) All participants must say what they mean and take action that is mutually agreed (where it is assumed the mutual agreement did not occur because one group pushed its goal over others)

(7) All proposed actions will be meaningful and effective for achieving the intended goals

THE EMANCIPATORY APPROACH (EA)

The Need for EA in ERP Systems Implementation

Reif (2001) discusses problems with existing System Development Life Cycle (SDLC) methodologies: build and fix, water fall, spiral and object-analysis often used in implementing ERP systems. The main problem with the waterfall methodology is that it is inflexible for refining requirements once the requirements analysis phase is closed. Since the spiral is an enhanced form of the waterfall methodology, many organizations currently prefer the spiral methodology to the waterfall methodology. Reif (2001) acknowledges the enhancement of the spiral over the water fall but observes that the spiral methodology is effective in user requirements only when users can clearly articulate their requirements. In systems where requirements are difficult to present, SSM is a good candidate. We argue that requirements for ERP systems can be effectively captured and represented using an enhanced form of SSM. Prototyping and RAD which are probable methodologies for ERP implementation are technically focused but methodologies with only technical focus ignore political, culture, social, semantic and managerial issues with the development process (Rose, 2002).

Purpose and Rationale

The requirements specification phase of most information systems development and implementations is seen as a technical issue whereby technical system requirements are developed. A key aspect of EA is that requirement specification is both technical and social.

Focus

EA seeks to ensure that "true" user involvement is achieved and project goals are effectively communicated and mutually agreed upon by all stakeholders. An information system development methodology or approach needs not cover all the various components or phases of a typical development process (Wastell, 1996). Thus it is appropriate for EA to focus on the requirements specification phase of ERP implementation.

Why SMM is appropriate base methodology for reformulation

Rather than focusing on only economic values, organizational, culture, and social issues are also relevant in ERP systems implementation and therefore in requirement specification as well. It is truism that effective requirements as emphasized by the functionalist approach are insufficient to achieve project objectives. Problems with system requirements replicate in other phases of a system development process. EA presumes that the requirement specification process is iterative and not a closed phase as it is assumed in some methodologies. While the functionalist approach assumes that all requirements can easily be defined, SSM makes distinctions between hard and soft problems. Hard problems are those that can easily be defined. Soft problems are those difficult to define. Checkland's SSM emphasize soft problems – human systems.

SSM is very appropriate in situations and environments where there are divergent views. Other parameters that are suitable for SSM include environment with high social, political and human activity components. As such SSM is applicable in complex systems such as ERP often implemented in large organizations with diverse business units, cultures and purposes. Wastell (1996) sees SSM as a "perfect" methodology for requirements specification. Presley reiterates that SSM is applicable where multiple unclear objectives exist and argues that SSM is useful in such situations. He observes that SSM's emphasis and its integration of human aspects with technology supports the organizational change that ERP requires.

Hirschheim and Klein's (1994) critical reformulation is a two step process. The first step requires assumption analysis of the host methodology or approach to know its building blocks. Step two then makes recommendations addressing the limitations identified in step 1. The following describes the reformulated approach.

Challenges and Objectives of Soft Systems Methodology

Checkland's (1981; 1990) SSM is a seven stage process although it does not have to follow a specific order. SSM involves two activities: real world activities consisting of steps 1, 2, 5, 6 and 7 which involve people in the problem situation; and systems thinking activities (steps 3 and 4) that may not involve those in the problem situation. In the following we highlight the fundamental principles of SSM that embrace emancipatory concerns and discuss ways to strengthen SSM's emancipatory features.
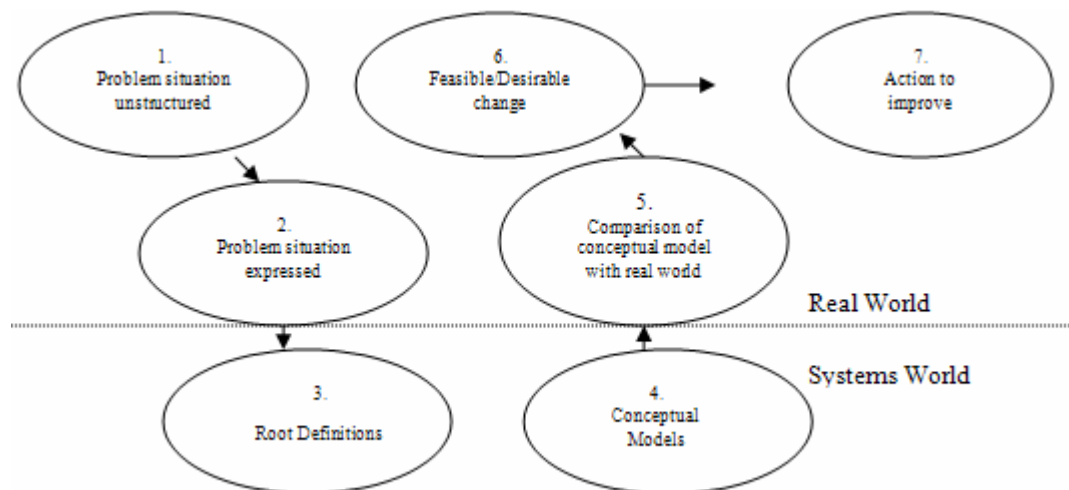
Figure 1. The seven stages of Soft Systems Methodology

SSM centers upon transforming processes where it encourages self-consciousness. SSM seeks to provide a learning methodology to support debate on desirable and feasible changes. Key aspect of the debate is the involvement of all stakeholders in the problem situation represented as rich picture. The root definition and CATWOE used to develop the root definitions recognize diverse participants, world views and the specific system within which the system is considered. The diversity it is assumed would enable users effectively participate leading to well specified systems requirements.

On the one hand Checkland assumes that all participants have the same voice and equal choice during debates to ensure radical thought (Checkland, 1981). On the other hand, he recognizes that changes are possible only when power structures make it feasible. The conflict in these positions makes one believe that SSM does not address power structures issues although it recognizes that they exist in organizations and teams involved with the implementation. Meanwhile it is observed that "Among the obstacles to participation are lack of trust, conflicts of interest, time pressures, low morale, effects of authority, and communication gaps"(Mumford, 1983, p.31). Since power difference, communication distortions and conflict are not effectively resolved by SSM, it is certain that emancipation is not a key value to SSM. Therefore there is the need to incorporate emancipation ideals in SSM.

SSM uses five E's (efficacy, efficiency, effectiveness, ethicality, and elegance) to evaluate the human activity systems resulting from different world views that underlie the root definitions. There is no explicit discussion on technical efficiency and effectiveness. The effectiveness and efficiencies of the software tools used to gather the technical requirements need to be discussed and improved in SSM. The link between technical efficiencies and effectiveness and the counterparts expressed by the five E's need to be made and strong argument needs to be made that achieving the five E's leads to effective and efficient technical requirement specifications.

Achieving Emancipation Ideals in EA

In exploring SSM, we use the same questions that Hirschheim and Klein used since the application of these questions in similar studies is a major contribution of their work "… the point of our contribution is that the theoretical basis that we apply to ETHICS is independent of any particular methodology" (Hirschheim and Klein, 1994, p.94). These questions are:

1. What is the enquiry model of SSM? Following from that, how does SSM implement an approximation of rational discourse?

2. How does SSM address efficiency and effectiveness (i.e., technical) concerns?

3. How does SSM contribute to improving mutual understanding (i.e., communicative concerns)?

4. How does SSM contribute to emancipation?

Inquiry model of SSM and its application of rational discourse

SSM has been rated to have the most explicit inquiry (Iivari, Hirschheim and Klein, 1995, p. 169). "In SSM, the distinguishing feature is its explicit focus on problem formulation by helping the user to identify the 'relevant' systems from the perceptions of possibly disagreeing stakeholders. SSM aims at supporting a learning cycle that, ideally, is never ending, underlying the crucial importance of intellectual frameworks (e.g., SSM) as a precondition for effective learning and understanding" (cf., Checkland and Scholes, 1990, p.16).

Although both (Checkland, 1981; Checkland and Scholes, 1990) use logic-based analysis, there are sharp distinctions between the two versions of SSM. Perhaps the sharpest distinction is that Checkland and Scholes (1990) present cultural analysis in parallel to logic-based analysis. It is interesting that the cultural analysis would reveal that the dominant culture imposes its goals on other stakeholders yet SSM does nothing to address this situation.

SSM uses interpretive theory as its epistemology to ensure user participation. However, it is restrictive and fails to address power issues. SSM assumes that all stakeholders would fully participate in the requirement specification process. However, unless power, conflict and communication distortions are resolved, user participation will be difficult to achieve. Another critical issue is that owners and analysts do not function as facilitators but are there to probably push forward the agendas of the top executive. What is required therefore is the emphasis that project owners facilitate the implementation process whereby their presence is to resolve the conflict between diverse groups and not to side with particular group. Decision support systems are found to be useful to overcome communication barriers. SSM should encourage use of these tools during systems specification. In fact afraid of intimidation can use anonymous systems to contribute to the implementation process.

Realization of technical concerns

SSM addresses both technical and social aspects of systems development. However, it does not specifically address how technical efficiencies and effectiveness should be measured. It is critical that SSM incorporates techniques that would ensure that the database and other technologies that capture technical systems are monitored to ensure that data quality, security and other technical requirements are achieved. SSM's iterative process makes it imperative to monitor changes of the data specifications in databases of requirement specifications.

SSM is not very clear about the nature of data/information. SSM assumes data has a descriptive role. However, there is no discussion on the nature of data, which is critical in understanding what is required from the system. In addition, SSM's view of data seems to have relationship with the way the speech-acts approach views data yet SSM does not elaborate on what kind of relationship exists and also how the stakeholders help shape the data/information gathered and to be processed by the system.

Realization of communicative concerns

Even as ERP replaces Legacy systems, the requirements definition process should address how the system meets social needs associated with personality, task structure, employee values, or ethical needs. Personality needs requires that users have opportunities to use and enhance knowledge and skills to earn respect, status, self-esteem, and career advancement. Task structure needs makes it possible for employees to have choice where they are not forced to undertake anything that they regard as too onerous, too demanding, too dull, or too simple. Ethical needs ensures that employees through work can achieve what they believe in and that the organizational policies on communication, consultation, and participation meet the employee's expectations (Hirschheim and Klein, 1994).

The goal of EA is to avoid communication distortions and enhance end-user participation during the implementation of ERP systems. Since SSM does not provide any means of ensuring that conflicts are resolved what can happen is that the most powerful group could impose its goals over other groups especially the end user. Since the analyst is considered as requirement specification specialist, he/she could intimidate end-users to realize his/her goals over those of the end-users. More so the analyst could be conduits through which top management push their agenda. Thus analysts and consultants should act as effective facilitators rather than dominating the process using experience and skills as reasons to distort communication. SSM needs to include training plans to allow end-users to learn about the requirements process to be able to participate. Issues such as time pressure, morale, disparities in educational level of team members need to be addressed to enable users fully participate. The business owners' function as facilitators should help overcome the obstacles by ensuring that everyone contributes and is listened to. End-users should be encouraged during the first stage of the implementation to learn the systems development practice. Once this is done, end-users should continually be urged to put their knowledge into practice so that they become more efficient and effective in making useful contribution and debate in subsequent projects.

Realization of emancipatory concerns

Hirschheim and Klein (1994) identify free inquiry and democratic practices as the prerequisite for emancipation. Although SSM seems to encourage democratic practice through its call for all stakeholders to participate in the systems requirement process, the problem is that dominant culture has great potential to dictate the systems specifications as SSM does not have any policies to address conflicts and power structures except that it accepts that they exist and can influence the democratic process. Although SSM recognizes communication barriers and possible remedial solutions, it does not have any systematic approach towards emancipation ideals (Hirschheim and Klein, 1994).

What is needed is environment where owners influence democratic practice by having the authority to autonomously make decisions on what is accepted based on whether the processes used favored all stakeholders to effectively participate and if not have the capacity to ask that the requirements be changed to reflect the consensus of all stakeholders. It is only genuine participation of all stakeholders that would ensure that true emancipation is achieved.

SSM inquiry model does not seem to address the problems listed. The model is silent about issues of conflict and coercion. SSM offers no direction or solutions to address these issues. It is critical that SSM empowers oppressed groups, increase self-reliance and transform social structures.

CONCLUSION

Information Systems methodology is very important in the implementation process. An effective methodology facilitates rather than guide the implementation process. Using Hirschheim and Klein's (1994) reformulation approach, we have developed an approach based on Checkland's Soft Systems Methodology. This approach is appropriate for requirements specification phase of ERP development and implementation. The approach incorporates emancipation ideals. Our contribution is a theoretical structure for enhancing participation in ERP systems implementation of all those involved in the implementation. For practitioners, this theory presents guidelines for implementing ERP systems that frees all stakeholders and enhance end user participation. For researchers, we believe that our work will start up a stream of discussions on method engineering and ERP implementation. We have shown that the reformulation approach can be applied to one or several phases of a development and implementation cycle.

Ngwenyama (1993) suggests questions that need to be answered during development of a methodology or approach: (1) What is the nature of the problem to be addressed, (2) Who is the user of the methodology? (3) What is the nature of the development environment?, and (4) What kind of software tools will be used? In this paper, we have tried to address the first three issues. We intend to address the fourth issue in a future research.

There are other limitations of the paper that we discuss. First the approach developed does not cover all the phases of a typical system development process. However, it has been argued in the literature that a methodology or approach does not need to cover the whole development process. Second, we have not tested this approach in practice.

Future Research

A plausible future research is to perform analysis of existing methodologies to see which can be reformulated to integrate its other components with RMM to make it useful for the entire systems development cycle. In fact a future research that seek to make greater contribution to method engineering is to develop a specific methodology (instance of the approach developed in this paper) that will include methods, principles, techniques, tools, activities, etc.

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