

# **USING CRITICAL SYSTEMS THINKING IN EMANCIPATORY POSTGRADUATE SUPERVISION**

**Roelien Goede**

North-West University, Vanderbijlpark, South Africa, roelien.goede@nwu.ac.za

**Estelle Taylor**

North-West University, Potchefstroom, South Africa, estelle.taylor@nwu.ac.za

## **ABSTRACT**

Postgraduate study is a partnership between supervisor and student. The nature of this relationship is mainly guided by the supervision approach followed by the supervisor. Identified approaches include: Functional supervision, enculturation, critical thinking, emancipation, and developing a quality relationship. It is argued in this paper that this list is not mutually exclusive but rather distinctive goals of supervision of postgraduate students.

The aim of this paper is to present the structure of an action research project aimed at creating guidelines for emancipatory supervision. The participatory action research (AR) method used in this study has five phases: diagnosis; action planning; action taking; evaluation of success; and specifying learning. This paper focusses on the diagnosis and action planning phases of the action research project.

Critical systems heuristics developed by Werner Ulrich is used to guide the diagnosis process. Critical systems heuristics is used as a tool for participants to articulate their views on how supervision should be done and what the goals thereof should be. The paper presents findings from the diagnosis process representative of the student and supervisor views on their experiences of supervision. A total of ten students and supervisors took part in interpretive interviews. Interview questions were guided by critical systems heuristics and literature on constructivism. The qualitative data collected was analysed using interpretive content analysis.

From the findings of the interviews and results of a literature review a plan for taking action is developed to develop a flexible process described by guidelines for supervision of postgraduate students.

Although the implementation and evaluation of the guidelines and resulting process are outside the scope of the paper, reflection is done on the applicability of the chosen framework of understanding for the development of a methodology to achieve the desired goals of postgraduate supervision.

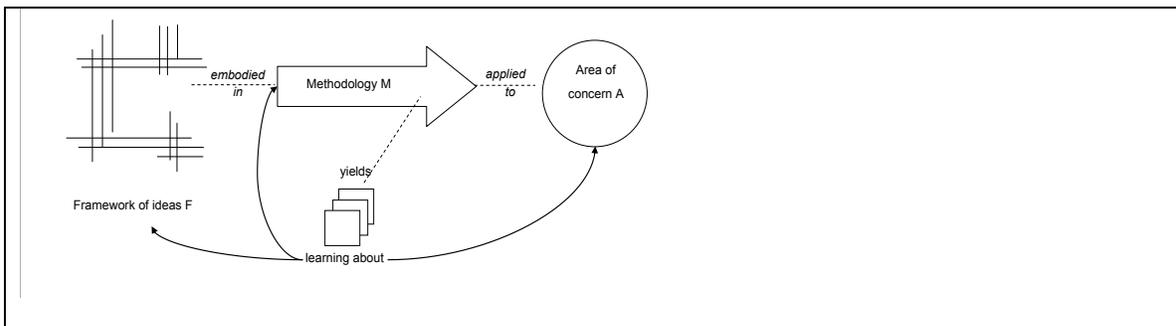
# Using critical systems thinking in emancipatory postgraduate supervision

## INTRODUCTION

Supervision is a complex and demanding job, (Deuchar, 2008; Connell, 1985; Sambrook *et al.*, 2008) and it is seen as one of the factors with the biggest influence on research student outcomes (Brew & Peseta, 2004; Mainhard *et al.*, 2009; Sambrook *et al.*, 2008; Fraser & Mathews, 1999).

The aim of this paper is to report on the structure and diagnosis an action research project aiming to develop guidelines for emancipatory supervision of postgraduate students in Information Systems in South Africa.

The study is conducted according to the FMA model of action research developed by Checkland and Holwell (1997). Action research aims to develop a methodology (M) that is continuously refined through its application in an area of concern (A) as depicted on Figure 1. The development of the methodology is guided by a framework of understanding (F).



**Figure 1. FMA framework for Action Research projects**

The area of application for the AR project reported in this paper is the supervision of dissertation based Master's and PhD students in Information Systems at a South African university. The individual student's studies are viewed as case studies. The methodology developed is a flexible process described in terms guidelines for guiding students to successful studies and development of scholars. The framework of understanding is critical systems thinking and constructivist education theory.

## POSTGRADUATE SUPERVISION

The purpose of supervision is to steer, guide and support students through the process of conducting a doctorate (Sambrook *et al.*, 2008). The supervisor should support the students' progression through their learning journey (Nulty *et al.*, 2009). Olivier (2007) defines supervision as overseeing, directing and managing the performance and preparation of postgraduate candidates to become independent researchers and complete their studies. This definition will be used for this study.

Problems reported in studies include student dissatisfaction, anxiety, supervisors with inadequate knowledge of practical aspects, delays in feedback, personality clashes and

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feelings of isolation (Aspland *et al.*, 1999). The relationship is further complicated by many hidden agendas (Deuchar, 2008).

A possible solution to the problem of delivering more PhD's could be the supervision of distance learners. Distance education is time flexible and location flexible (Devonshire & Crocker, 1999). The situation of distance students, however, can further complicate the already complex supervision issue. Advantages can be the opportunity to combine employment and study, and less need of travelling. Disadvantages can be the isolation and lack of educational environment (McCartan, 2010).

### Postgraduate Supervision in South Africa

The South African National Planning commission expects a threefold increase in doctoral graduates by 2030, and has set a target of 5000 doctoral graduates per annum for the South African higher education system. This against a backdrop of a system that only managed to double its doctoral output over the past 15-year period, from 685 to the current doctoral output of 1421 graduates (National Planning Commission, 2012; CHET, 2012). The 'burden of supervision' and limited supervisory capacity is seen as threats to initiatives to increase doctoral output at South African higher education institutions (ASSAF, 2010; CREST, 2009).

The Academy of Science South Africa (ASSAF, 2010) found that more research is required to develop a comprehensive understanding of doctoral education in South Africa. The primary barriers to increasing productivity of PhD programmes at South African higher education institutions are seen as financial constraints; the quality of incoming students; limited supervisory capacity; and government rules and procedures (ASSAF, 2010).

Available literature on postgraduate supervision in South Africa points to the same problems as found in the literature from other countries. Concerns are raised over issues such as inadequate supervision, the perception that academics automatically become qualified to supervise as soon as they have finished their own PhD, and universities not doing enough to ensure quality of postgraduate studies (Dietz *et al.*, 2006; Mouton, 2007).

### Supervision approach

The nature of the supervision relationship is mainly guided by the supervision approach followed by the supervisor. Identified approaches include functional supervision, enculturation, critical thinking, emancipation and developing a quality relationship. These can be described as follows (Lee, 2008):

*Functional supervision:* The supervisor's task is one of directing and project management. This approach is closest to the professional role of an academic and the area where least uncertainties lie, as supervisors are mostly clear on their functional responsibilities.

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*Enculturation:* In this perception achieving a higher degree is about becoming a member of an academic discipline and supervision is done in such a way as to encourage the student to become a member of the disciplinary community. This model includes an apprenticeship element. The supervisor aims to move the student from dependent to independent, getting the student to take on more responsibility as the supervision continues.

*Critical thinking:* Supervision is done to encourage the student to question and analyse. Critical thinking can be linked with problem solving, selecting pertinent information for solution of problems, recognizing assumptions, formulating hypotheses, drawing valid conclusions, and judging the validity of inferences (Dressel and Mayhew, 1954, quoted by many sources on critical thinking, amongst them Gadzella *et al.*, 1996). Critical thinking can be defined as active, purposeful, and organized efforts to make sense of the world by examining our thinking, and the thinking of others, to clarify and improve understanding (Chaffee, 1988). Conventionally this can be seen as the heart of PhD supervision.

*Emancipation:* Supervision is done to encourage the student to question and develop themselves. Supervision includes a mentoring role. Interesting quotes from Lee's research (2008) demonstrates this supervision: "*I am always waiting for that epiphany moment when they say - No I don't agree*" and "*Your job as supervisor is to get them to the stage of knowing more than you*".

*Developing a quality relationship:* The student is enthused, inspired and cared for. It includes a desire to enthuse, encourage, recognise achievement and offer pastoral support. The relationship between student and supervisor has many facets, opportunities and problems that have to be handled correctly for a quality relationship to develop.

It is argued in this paper that this list is not mutually exclusive but rather distinctive goals of supervision of postgraduate students.

### Guidelines for postgraduate supervision

From literature the following initial guidelines for postgraduate supervision were compiled:

1. Establish a formal contract setting out the roles and responsibilities of both the supervisor and the student (Dietz *et al.*, 2006; Olivier, 2007).
2. Adopt a structured 'task' approach with short-term steps (Connell, 1985; Watts, 2008).
3. Plan time management carefully, for instance sticking to a work plan and schedule (Connell, 1985; Dietz *et al.*, 2006; Olivier, 2007; Watts, 2008).
4. Plan a publication strategy with the student in advance, sorting out the authorship and contribution of both the student and the supervisor (Dietz *et al.*, 2006; Olivier, 2007).
5. Keep reports on each student and check for adequate progress of the student (Dietz *et al.*, 2006; Olivier, 2007).

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6. Request student to reflect on each contact session with the supervisor and provide the supervisor with his/her feedback and immediate goals for the next session (Olivier, 2007).
7. Provide regular verbal and written feedback to students on their work, about the process as well as the progress (Aspland, 1999; Olivier, 2007; Sambrook *et al.*, 2008).
8. Share responsibility for the study, ensuring that students are not too dependent on the supervisor (Olivier, 2007; Sambrook *et al.*, 2008).
9. Develop a satisfactory relationship, maintaining good communication with the necessary balance between support and critique (Connell, 1985; Olivier, 2007; Sambrook *et al.*, 2008).
10. Introduce the student to proper support, for example, in the library, statistics consultants etc. (Dietz *et al.*, 2006; Olivier, 2007).
11. Suggest relevant readings to the student (Connell, 1985; Olivier, 2007).
12. Set written tasks early on in the process to start the student writing (Connell, 1985).
13. Check the technicalities (this is the responsibility of the student, to be checked by the supervisor) (Connell, 1985).
14. Apply selection procedures, to take appropriate students on board and prevent problems with progress, disappointments and conflict (Olivier, 2007).
15. Adopt different supervisory practices dependent on the student and tailor approaches to guiding individuals, rather than adopting a one-size-fits-all model (Nulty *et al.*, 2009).

## CONSTRUCTIVISM AND REFLECTIVE PRACTICE IN EDUCATION AND ITS IMPLICATIONS FOR SUPERVISION

Constructivism argues that humans generate knowledge and meaning from their experiences and their ideas. John Dewey (1859 – 1952) and Jean Piaget (1896 – 1980) are seen as the founders of constructivism. Epistemologically, the constructivist view argues that all of our knowledge is constructed (not discovered) in that it is contingent on convention, human perception and social experience.

Reflective practice is a development strategy with roots in the constructivist paradigm. It is based on the belief that assumptions about cause-effect relationships shape behaviour and that improvement can only be achieved if existing theories-in-use are modified (Osterman, 1998). Constructivism and reflective practice share similar ideas on learning and both have implications for teaching. These key beliefs about knowledge and learning are described in table 1.

Reflective practice can be described as an experiential learning cycle consisting of four stages (Osterman and Kottkamp, 1993): experience, observation and reflection, abstract reconceptualization, and experimentation. The first stage begins with a problem that is identified and analyzed (*concrete experience*). Motivated by awareness of a problem, the learner do research and gather information that is then critically reviewed (*observation and reflections*). The third stage involves developing alternate theories and searching for more effective strategies (*abstract reconceptualization*). This involves reconsidering old ideas, actions and outcomes and developing new action theories. This changed perspective motivates experimentation, Testing our changed behaviour and assumptions

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(*active experimentation*). This stage completes one cycle and begins another. The experiment produces new experience and the learning process begins again, but now reflective skills should be more developed and focused.

**Table 1. Assumptions and strategies of constructivism and reflective practice (Osterman, 1998)**

<b>Assumptions about learning</b>	<b>Pedagogical strategies</b>
Learning is an active process and the learner is in control of his / her own learning.	Learners must be actively engaged in the learning process.
Learning builds on the prior experiences and knowledge of the learner.	Opportunities must be provided for exploration and representation of knowledge.
Learning is constructed through experience, particularly of problems.	Existing views must be challenged; awareness of problems must be heightened.
New ideas will be more easily integrated if students experience them as effective.	Students must be given opportunities to reconceptualise and test new ideas.

Kolb (1984) originally described these as the four methods that can be used to determine learning styles (concrete experience; reflective observation; abstract conceptualization; active experimentation). According to Kolb (1984) concrete experience emphasises feelings rather than thoughts and follows a more intuitive approach; reflective observation emphasises understanding rather than practical application; abstract reconceptualization emphasises thoughts rather than feelings and focuses on logic, ideas and concepts; active experimentation focuses on influencing others and changing situation, and emphasises practical applications.

From this brief discussion on reflective practice it can be seen that the ideas of reflective practice can have implications for supervision practices. The four stages can be linked to Lee's five approaches to supervision described in the previous section, as it can be used to guide students to question and develop themselves (Lee's emancipation approach).

### **Critical systems heuristics**

Ulrich concerns himself with the question posed by the philosopher Immanuel Kant: "*How can we rationally identify and justify the normative content of our actions?*" Ulrich (1983:15). This question is important for us as postgraduate supervisors to reflect on. We have stated the importance of the supervisor in the relationship and success of the postgraduate supervision. We then need to justify the normative content of our actions as supervisors. What motivates our practices and what make us think we are doing the right things right? In the previous section we identified *emancipative supervision* as our goal. Emancipation is a normative concept. What/ Whom are we to emancipate our students of? Answers to these questions may include: control by supervisors, lack of ownership of study and preconceived ideas.

Critical Systems Heuristics (CSH) developed by Ulrich (1983) provides a methodology for self-reflection of assumptions in a problem environment. "Critical" in CSH refers to

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judging oneself explicitly or implicitly against predefined norms. One should be critical in terms of the stated norms but also critical of the stated norms. “Systems” in CSH refer to the Kantian idea of a system: *“the totality of relevant conditions of which theoretical or practical judgement depend, including basic metaphysical ethical, political and ideological a priori judgements” Ulrich (1983:21)*. This means that everyone views a system from his/ her condition reality. A reality conditioned by prior experience and knowledge that shaped their frame of reference. The system is the sum of the conditioned realities implying that one can never understand the complete system but the more conditioned realities (individual’s perceptions) one understand, the better one understand the phenomenon under investigation or the system. “Heuristics” in CSH refers to a tool for discovery of problem-relevant questions and knowledge. Heuristics is about teaching discovery and to teach the art of *“reflection on the sources of deception in his [the planner’s] discoveries” Ulrich (1983:22)*. CSH is thus a method to discover the conditioned reality (including the sources of deception) of oneself and of others when planning the solution in a problem environment.

From a critical social theory perspective, Ulrich is concerned with emancipation of the affected from the power of the planners or experts in the problem situation. The “affected” are those who has to live the social reality created by the “involved” thereby bearing the consequences. The affected can be a very large group affected by unintended consequences. It is not practical to involve all the affected in the planning process but their views must be represented by *“a witness: by virtue of their own affectedness, they can bear witness to the ways in which all those who cannot voice their concerns may be affected” Ulrich (1983:252)*. The “involved” are those that has the resources or the input resources to control the process of planning an improvement in the problem situation. There are three categories of involved, namely 1. Client (source of motivation; whose purpose is served) 2. Decision Maker (sources of control; who can influence the outcome) and 3. Planner (Sources of expertise; who has the know-how required).

From a critical systems thinking perspective CSH is concerned with understanding and identifying the boundaries in the problem environment. The first boundary to identify is the boundary between the system and its environment as described by Churchman (1968). The environment of a system is everything that affects the system but not controlled by the system. The second boundary in question is the boundary between the involved and affected as described in the previous paragraph.

When developing CSH Ulrich (1983) refers to Kant’s three basic questions that motivate man’s search for knowledge:

*What can I know?*

*What ought I to do?*

*What may I hope?*

*(Quoted from Ulrich (1983:259))*

One may intuitive link postgraduate study to the ultimate search for knowledge and these questions are instinctively answerable from the perspective of the supervisor and from the student. From an emancipatory supervision perspective one hopes that the student becomes an independent critical thinker. But a plan for action is needed to develop these

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traits from the current knowledge and skills base of the student. These ideas reiterate the learning characteristics of reflective practice given in Table 1. Based on the three questions above Ulrich (1983) developed two modes for each of his boundary questions namely an “is” and an “ought to” mode. The third question: “What may I hope?” refers to the guarantee that I will achieve what I want to if I do what I think ought to be done. In terms of CSH the built-in guarantee or the lack of guarantee of the proposed intervention schemes should be identified as part of the planning process. Table 2 contains the 12 boundary questions categories of CSH.

**Table 2 Categories of Critical Systems Heuristics (adapted from Ulrich 1983:258).**

	Question	Categories	Central Issues Covered			
1	Who is/ought to be the client (beneficiary) of the system S to be designed or improved?	Client	Sources of motivation (of S)	The involved	The social systems S to be bounded.	
2	What is/ought to be the purpose of S; i.e. what goal stated ought S be able to achieve so as to serve the client?	Purpose				
3	What is/ought to be S’s measure of success (or improvement)?	Measure of improvement				
4	Who is/ought to be the decision taker, that is, have the power to change S’s measure of improvement?	Decision maker	Sources of control (of S)			
5	What components (resources and constraints) of S is/ought to be controlled by the decision taker?	Components				
6	What resources and conditions is/ought to be part of S’s environment, i.e. should not be controlled by S’s decision taker?	Environment				
7	Who is/ought to be involved as designer of S?	Planner	Sources of expertise and implementation (of S)			
8	What kind of expertise is/ought to flow into the design of S; i.e. who ought to be considered an expert and what should be his role?	Expertise				
9	Who is/ought to be the guarantor of S; i.e. where ought the designer to seek the guarantee that his design will be implemented and will prove successful, judged be S’s measure of success (or improvement)?	Guarantor				
10	Who is/ought to belong to the witnesses representing the concerns of the citizens that will or might be affected by the design of S? That is to say, who among the affected ought to get involved?	Witness	Sources of legitimization (of S)			The affected
11	To what degree and in what way is/ought to the affected be given the chance of emancipation from the premises and promises of the involved?	Emancipation				

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12	Upon what world-views of either the involved or the affected is/ought S's design be based?"	Weltanschauung			
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Our goal in the paper is to better understand the conditioned realities of supervisors and successful students in terms of supervision in Information Systems in postgraduate studies in South Africa. The next section of the paper reports on the empirical study.

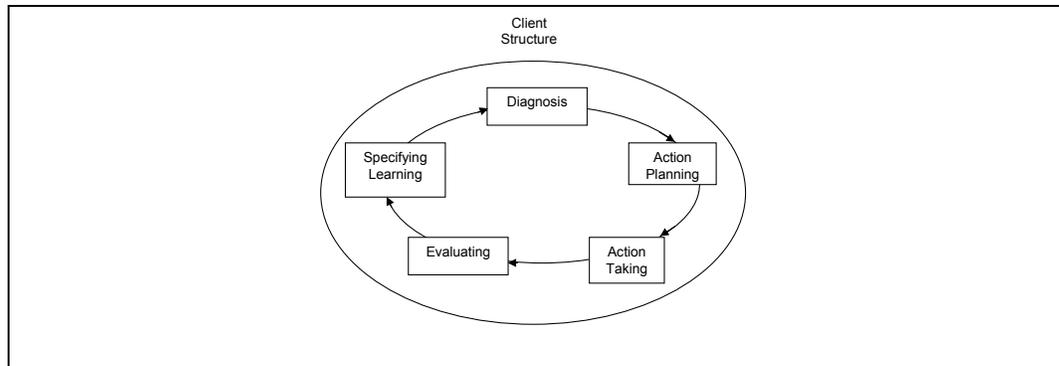
### EMPIRICAL STUDY

This paper form part of a larger research project to formulate guidelines for postgraduate students in Information Systems. This paper focuses on the diagnosis phase of an action research project conducted from a critical social theory perspective. A brief introduction is provided of action research from a critical social theory perspective, followed by a description of the diagnosis phase and brief notes on the other phases of the AR project.

#### Action Research Methodology

Action research (AR) is a research methodology aimed at guiding intervention in a problem environment. Its origin is credited to the work of Lewin. The tutorial of Baskerville (1999) gave prominence to the methodology amongst IS researchers. Baskerville (1999) provides a paradigm free discussion of AR. In his discussion of different research paradigms Myers (1997), argues that AR can be conducted from different ontological perspectives supported by positivism, interpretivism and critical social theory. In this paper, we adopt the critical social theory stance when conducting AR. Goede (2014) provides a description for conducting AR from a critical social theory perspective focusing on accommodating the principles of critical social research of Myers and Klein (2011) and those of Harvey (1990) in the AR approach of Baskerville (1999). Harvey (1990) explains that critical social theory aims to identify oppressing structures by means of reconstruction in a problem situation during diagnosis of the problem. This is followed by the reconstruction which is done in terms of action planning and action taking. An evaluation phase is used to verify the success of the intervention. The role of knowledge is important in AR in order to distinguish it from consultation and to contribute to the scholarly body of knowledge in the field. Figure 2 depicts the cyclic AR approach promoted by Baskerville (1999).

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**Figure 2: The action research cycle (Baskerville, 1999)**

From our discussion of reflective practice it is intuitively understood that the AR researcher employs reflective practice as he/she attempts to conceptualise experiences in terms of theory which leads to better planned action or experimentation.

When using AR from a critical social theory perspective to development guidelines for practice to ensure emancipation, it is our conviction that the following steps are required:

1. Do a literature study of the key aspects in the discipline in order to create initial guidelines rooted in current research. We did this in the section on supervision.
2. Do a diagnosis in the problem situation, understanding that the goal is to investigate the problem situation in terms of the critical social theory characteristics identified by Harvey (1990) namely essence, totality, abstraction and history. The list of guidelines must be updated after analysis of the data collected during diagnosis phase. We use CSH for this purpose.
3. Identify an applicable theory to guide the intervention in terms of action planning and action taking. This theory should also provide some degree of guarantee in terms of the guarantor idea of CSH. Goede (2014) describes how the planning and intervention phase coincide with the restructuring and praxis principles of Harvey (1999).
4. Use the evaluation phase to determine the success of the intervention in terms of the area of application as described by the FMA framework (refer Figure 1).
5. The specifying learning phase is divided into specifying of learning on M and F of FMA respectively. Here the methodology (M) is the proposed guidelines and in this phase the guidelines are refined according to the evaluation of success of the intervention. In terms of the framework for understanding (F) reflection is done on the applicability of the chosen framework to guide the intervention process.

### **DIAGNOSIS**

The aim of our diagnosis phase is to better understand the conditioned realities of individual students and supervisors and to verify the applicability of the identified theoretical guidelines in our context. Interviews were held with five supervisors in the field of Computer Science and Information Systems. These supervisors were from two

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different campuses and had different levels of experience. Interviews were also held with five students in the field of Computer Science and Information Systems.

As discussed in step 2 above, an interview was developed to verify the guidelines developed in the literature review. The development of the interview questions is presented in Table 3. In terms of diagnosis of the problem or system, categories from CSH were used to allow participants to reflect on their practices.

**Table 3 Development of the interview questions**

<b>Question to participant</b>	<b>Motivation of question in terms of literature</b>	<b>Motivation of question in terms of CSH's categories and Critical social research principles</b>
1. Information about yourself: a. Are you a supervisor / student who recently completed a study? Please indicate which. b. Supervisors: how many completed M and PhDs have you supervised? Students: Did you complete your M or PhD?	Understand the experience level of the supervisor in order to better understand his belief in his own practices.	Understand the context of student / supervisor Understand the experience level of the supervisor in order to better understand his/her conditioned reality.
2. What do you think is the aim of supervision?	Link to supervision styles.	Purpose category of CSH.
3. Supervisor: What are the supervisory practices you think has best results (for instance how do you give feedback, how do you guide student to develop writing skills, what should the frequency of meetings be and other aspects of interest)? Student: Which practices of your supervisor do you think worked well?	Verify stated guidelines in open-ended question to allow participant to add other guidelines.	Expertise but also a possible understanding of the guarantees delivered by good practices.
4. What are the things you struggle with as supervisor or a student in terms of supervision.	Verify guidelines and identify scope for improvement.	Investigation of the oppressing factors and the environment of the system.
5. How can successful supervision be measured?	Verification of guidelines.	Measurement of success but also Weltanschauung.
6. What aspects of the supervision process should be discussed between student and supervisor? How did you experience talking to you supervisor / students about supervision?	Verification of guidelines and possible identification of new aspects.	Boundary judgement of involved and affected. Is the student involved or affected? Emancipation.
7. What are the responsibilities of students AND supervisors respectively?	Verification of guidelines and identification of new aspects.	Components, planner, expertise.
8. Supervisor: What do you plan to do differently in future or what advice would you give inexperienced supervisors? Students: What supervision practices would you prefer your supervisor adopt? How will the "perfect" supervisor supervise?	Verification of guidelines and identification of new aspects.	Expertise, guarantor, this question refers more explicitly to the "ought to" mode of CSH than the others.
9. In what way does supervision in the field of CS and IS, in your opinion, differ from that in other fields (for instance unique challenges or opportunities)?	Verification of guidelines and identification of new aspects.	Environment.

The analysis of the data is presented for each of the nine questions.

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### Question 1: General information

Interviews were held with five supervisors in the field of Computer Science and Information Systems. Two of these supervisors had delivered only one Master's student. One had delivered two Master's students. One had delivered one PhD and nine Master's students, and one had delivered three PhD's and 23 Master's students. Interviews were also held with five students in the field of Computer Science and Information Systems. Four have recently completed their Master's and one a PhD.

### Question 2: What do you think is the aim of supervision?

According to these answers the main aim of supervision is guidance. Guidance on the process, in the completion of the research, on knowledge and understanding of the subject field, and in development as scholars (including facilitating the development of article writing and presentations) were seen as important by most supervisors and students. Also mentioned was feedback, motivation, time management, getting relevant material, and supervising a student to reach his / her academic goals in terms of better qualifications. This can be linked to the *functional approach* to supervision (guidance on the process, completion of the research and time management); and *enculturation* (development of students as scholars). Aspects regarding *critical thinking*, *emancipation* and *developing a quality relationship* were not directly mentioned.

### Question 3: What are the supervisory practices you think has best results?

From the responses in the interviews some guidelines from the initial list were repeated, some guidelines could be improved and four guidelines were added to the list. In table 4 these changes can be seen.

**Table 4 Initial guidelines with changes after question 3**

Guidelines relevant to question 3	Interviews (best results)	New guidelines
Establish a formal contract setting out the roles and responsibilities of both the supervisor and the student.	Formulate a working relationship with the student.	<i>Nothing specific</i>
Plan time management carefully, for instance sticking to a work plan and schedule.	Motivate students by realistic deadlines.	<i>Nothing specific</i>
Provide regular verbal and written feedback to students on their work, about the process as well as the progress.	Verbal and written feedback is important, and feedback should be critical but constructive. Ensure that the student understands the feedback.	Provide regular verbal and written feedback to students on their work, about the process as well as the progress. This feedback should be critical but constructive. Make sure that the student understands the feedback.
Introduce the student to proper support, for example, in the library, statistics consultants etc.	Refer student to available help facilities like the library staff.	Introduce the student to proper support and help facilities, for example, in the library, statistics consultants etc.

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Set written tasks early on in the process to start the student writing.	Improve writing skills by making the student read more.	Improve writing skills by setting written tasks early on in the process and by making the student read more.
Check the technicalities (this is the responsibility of the student, to be checked by the supervisor).	Use a technical checklist to help the student take ownership of the technical quality.	Use a technical checklist to help the student take ownership of the technical quality.
Adopt different supervisory practices dependent on the student and tailor approaches to guiding individuals, rather than adopting a one-size-fits-all model.	Relate to the student in terms of his / her needs and personality.	<i>Nothing specific</i>
<i>Not yet in list</i>	Ensure that the student read the official documents relating to general matters concerning post-graduate studies.	Ensure that the student read the official documents relating to general matters concerning post-graduate studies.
<i>Not yet in list</i>	Hold regular meetings (either twice monthly or once a week for full-time students).	Hold regular meetings (either twice monthly or once a week for full-time students).
<i>Not yet in list</i>	Spent enough time on the proposal so that the technical aspects are perfect and good writing skills are developed and demonstrated; this means less time spent on the dissertation.	Spent enough time on the proposal so that the technical aspects are perfect and good writing skills are developed and demonstrated; this means less time spent on the dissertation.
<i>Not yet in list</i>	Put emphasis on research methodology and verification of good research in order to transfer the responsibility to the student.	Put emphasis on research methodology and verification of good research in order to transfer the responsibility to the student.

### *Updated list of guidelines after question 3*

1. Establish a formal contract setting out the roles and responsibilities of both the supervisor and the student.
2. Adopt a structured 'task' approach with short-term steps
3. Plan time management carefully, for instance sticking to a work plan and schedule.
4. Plan a publication strategy with the student in advance, sorting out the authorship and contribution of both the student and the supervisor.
5. Keep reports on each student and check for adequate progress of the student.
6. Request student to reflect on each contact session with the supervisor and provide the supervisor with his/her feedback and immediate goals for the next session.
7. Provide regular verbal and written feedback to students on their work, about the process as well as the progress. This feedback should be critical but constructive. Make sure that the student understands the feedback.
8. Share responsibility for the study, ensuring that students are not too dependent on the supervisor.
9. Develop a satisfactory relationship, maintaining good communication with the necessary balance between support and critique.
10. Introduce the student to proper support and help facilities, for example, in the library, statistics consultants etc.

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11. Suggest relevant readings to the student.
12. Improve writing skills by setting written tasks early on in the process and by making the student read more.
13. Use a technical checklist to help the student take ownership of the technical quality.
14. Apply selection procedures, to take appropriate students on board and prevent problems with progress, disappointments and conflict.
15. Adopt different supervisory practices dependent on the needs and personality of the student and tailor approaches to guiding individuals, rather than adopting a one-size-fits-all model.
16. Ensure that the student read the official documents relating to general matters concerning post-graduate studies.
17. Hold regular meetings (either twice monthly or once a week for full-time students).
18. Spent enough time on the proposal so that the technical aspects are perfect and good writing skills are developed and demonstrated; this means less time spent on the dissertation.
19. Put emphasis on research methodology and verification of good research in order to transfer the responsibility to the student.

### Question 4: What are the things you struggle with in terms of supervision?

The aspects of postgraduate supervision that supervisors and students struggle with conform what was found in the literature study. The pressure that is put on lecturers to deliver postgraduate students was mentioned. The specific aspects that were mentioned can be addressed by some of the existing guidelines, as can be seen in table 5.

**Table 5 Guidelines addressing the struggles mentioned in question 4.**

Guidelines relevant to question 4	Interviews (struggle)
Establish a formal contract setting out the roles and responsibilities of both the supervisor and the student.	No mentoring taking place (sink or swim attitude). Meetings not attended. Supervisors not being available because of many reasons like illness, and overseas conferences.
Adopt a structured 'task' approach with short-term steps	Part-time students who progress slowly due to work responsibilities. Time and work constraints.
Plan time management carefully, for instance sticking to a work plan and schedule.	Part-time students who progress slowly due to work responsibilities. Time and work constraints.
Keep reports on each student and check for adequate progress of the student.	No feedback on progress. Part-time students who progress slowly due to work responsibilities.
Request student to reflect on each contact session with the supervisor and provide the supervisor with his/her feedback and immediate goals for the next session.	Supervisor underestimating time needed to make corrections.
Provide regular verbal and written feedback to students on their work, about the process as	No feedback on progress. Providing quality feedback when flooded with other

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well as the progress. This feedback should be critical but constructive. Make sure that the student understands the feedback.	work. Negative feedback.
Share responsibility for the study, ensuring that students are not too dependent on the supervisor.	Supervisors not being available because of many reasons like illness, and overseas conferences.
Develop a satisfactory relationship, maintaining good communication with the necessary balance between support and critique.	External factors affecting students (e.g. emotional/sickness/other academic issues). Part-time students who progress slowly due to work responsibilities. Supervisor tending to discredit student's feelings and personal situation. Supervisor underestimating time needed to make corrections.
Introduce the student to proper support and help facilities, for example, in the library, statistics consultants etc.	External factors affecting students (e.g. emotional/sickness/other academic issues).
Improve writing skills by setting written tasks early on in the process and by making the student read more.	Rectifying bad writing skills.
Apply selection procedures, to take appropriate students on board and prevent problems with progress, disappointments and conflict.	The student's motivation. Students tend to enrol for postgraduate studies without making sure what it requires in terms of commitment and regular hard work.
Adopt different supervisory practices dependent on the needs and personality of the student and tailor approaches to guiding individuals, rather than adopting a one-size-fits-all model.	External factors affecting students (e.g. emotional/sickness/other academic issues). Part-time students who progress slowly due to work responsibilities. Supervisor tending to discredit student's feelings and personal situation.
Hold regular meetings (either twice monthly or once a week for full-time students).	Meetings not attended. Supervisors not being available because of many reasons like illness, and overseas conferences. Part-time students who progress slowly due to work responsibilities.
Spent enough time on the proposal so that the technical aspects are perfect and good writing skills are developed and demonstrated; this means less time spent on the dissertation.	Getting to a proposal that can work.

### Question 5: How can successful supervision be measured?

Answers included: Completion of the degree within the allotted time (this can be ensured by most of the guidelines, but especially guidelines 1, 2, 3 and 5); both parties sharing responsibility of the project (guidelines 1 and 8), acceptance of the work by peers and publishing (guideline 4); the input of the supervisor decreasing from chapter to chapter (guidelines 1 and 8); student taking full ownership of the study and the process (guidelines 1 and 8); and by constant progress (guidelines 1, 2,3 and 5).

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### **Question 6: What aspects of the supervision process should be discussed between student and supervisor?**

Answers from supervisors included the responsibilities of each party (guidelines 1 and 8), the frequency of meetings (guideline 17), expectations (guideline 1), an agreement on comments (guidelines 1 and 7), the document for postgraduate studies (guideline 16), and supervision style (guidelines 1 and 15).

Students felt that all aspects should be discussed between student and supervisor. Specific aspects mentioned by the students were the deadlines of the university (guideline 16), goals and progress (guidelines 2, 3, 16), expectations from both sides (guidelines 1, 9), duties (guideline 1, 2, 3), responsibilities (guideline 1), co-authorship of any resulting papers (guideline 4), and type and timing of feedback (guideline 1, 6, 7).

### **Question 7: What are the responsibilities of students AND supervisors respectively?**

The responsibilities mentioned in the interviews correlates with the existing guidelines. According to the supervisors interviewed responsibilities of both parties include working according to plan (guidelines 1, 2, 3) giving honest feedback on time (guideline 7) and to be fully committed towards the student's study.

The supervisors feel that the responsibilities of a supervisor are to guide the student, to make sure that they have the needed knowledge and resources to do their part (guideline 10 amongst others), to give frequent, constructive feedback within acceptable time frames (guideline 7) and to allow the student to grow as a person.

According to the students supervisors need to understand the student's personal situation and know that not every student can be 'handled' the same way (guidelines 9, 15), listen to the student's concerns (guideline 9), try to give feedback in an acceptable timeframe (guideline 7), give direction and structure to both the study and the student, and be encouraging.

The supervisors see the responsibilities of students as asking for help when needed (guideline 9), keeping the supervisor updated on the progress of the research (guidelines 6, 9), staying focused and motivated and not letting hurdles influence their studies negatively.

According to the students, students should try to work on their thesis daily, listen to what the supervisor has to say and be actively invested in their research.

### **Question 8 Supervisors: What do you plan to you do differently in future or what advice would you give inexperienced supervisors?**

Advice given in the answers to this question can be linked to existing guidelines, and one guideline can be added to the list. See the results in table 6.

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**Table 6 Guidelines after analysing answers to question 8**

Guidelines relevant to question 8	Advice given
Provide regular verbal and written feedback to students on their work, about the process as well as the progress. This feedback should be critical but constructive. Make sure that the student understands the feedback.	Respect the person and think about the effect of your comments.
Share responsibility for the study, ensuring that students are not too dependent on the supervisor.	Share responsibility of the research project.
Develop a satisfactory relationship, maintaining good communication with the necessary balance between support and critique.	Respect the person and think about the effect of your comments. Have the students' interest at heart.
Use a technical checklist to help the student take ownership of the technical quality.	Make sure the student takes ownership of quality issues.
Apply selection procedures, to take appropriate students on board and prevent problems with progress, disappointments and conflict.	Choose students carefully.
Adopt different supervisory practices dependent on the needs and personality of the student and tailor approaches to guiding individuals, rather than adopting a one-size-fits-all model.	Have the students' interest at heart. Experiment with different styles of supervising, fitting them to the student's needs.
Hold regular meetings (either twice monthly or once a week for full-time students).	Arrange frequent meetings.
Spent enough time on the proposal so that the technical aspects are perfect and good writing skills are developed and demonstrated; this means less time spent on the dissertation.	Start off with a clear plan and a good proposal.
<b>New guideline:</b> Adopt a mentoring role and guide the student to develop into a worthy academic.	Adopt a mentoring role. Aid the student to develop into a worthy academic.

**Question 9: In what way does supervision in the field of CS and IS, in your opinion, differ from that in other fields (for instance unique challenges or opportunities)?**

Aspects mentioned were the fast changes in the CS/IS field; complexity; experimentation requiring patience and a willingness to perform trial-and-error runs; experiments sometimes taking months to complete; the struggle to get external examiners, and the body of knowledge in CS/IS not being very big and fairly new in comparison with other fields, which can be seen as a challenge but also an opportunity.

*Updated list of guidelines*

1. Establish a formal contract setting out the roles and responsibilities of both the supervisor and the student.
2. Adopt a structured 'task' approach with short-term steps
3. Plan time management carefully, for instance sticking to a work plan and schedule.
4. Plan a publication strategy with the student in advance, sorting out the authorship and contribution of both the student and the supervisor.
5. Keep reports on each student and check for adequate progress of the student.

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6. Request student to reflect on each contact session with the supervisor and provide the supervisor with his/her feedback and immediate goals for the next session.
7. Provide regular verbal and written feedback to students on their work, about the process as well as the progress. This feedback should be critical but constructive. Make sure that the student understands the feedback.
8. Share responsibility for the study, ensuring that students are not too dependent on the supervisor.
9. Develop a satisfactory relationship, maintaining good communication with the necessary balance between support and critique.
10. Introduce the student to proper support and help facilities, for example, in the library, statistics consultants etc.
11. Suggest relevant readings to the student.
12. Improve writing skills by setting written tasks early on in the process and by making the student read more.
13. Use a technical checklist to help the student take ownership of the technical quality.
14. Apply selection procedures, to take appropriate students on board and prevent problems with progress, disappointments and conflict.
15. Adopt different supervisory practices dependent on the needs and personality of the student and tailor approaches to guiding individuals, rather than adopting a one-size-fits-all model.
16. Ensure that the student read the official documents relating to general matters concerning post-graduate studies.
17. Hold regular meetings (either twice monthly or once a week for full-time students).
18. Spent enough time on the proposal so that the technical aspects are perfect and good writing skills are developed and demonstrated; this means less time spent on the dissertation.
19. Put emphasis on research methodology and verification of good research in order to transfer the responsibility to the student.
20. Adopt a mentoring role and guide the student to develop into a worthy academic.

### SUBSEQUENT ACTION RESEARCH PHASES

A brief discussion of the subsequent AR phases is presented in terms of their planning, as a report of their implementation is outside the scope of the paper. A more complete discussion is provided in of the final phase of *specifying learning*.

#### Action Planning

The result of the *diagnosis phase* is an updated list of guidelines. The list originated from the literature and was enriched during the analysis of the interview data. At this stage the list is a “raw” unsophisticated list representative of the discovery process of the items. During the *action planning* the list must be reworked, consolidated and reordered. The detail process is outside the scope of this paper. It is important to note that the process of reworking should be done according to the guiding theories of CSH and reflective practice. Reflective practice and constructivism is of outmost importance here. The items

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must be ordered and subcategorised to shape a particular frame of reference. As an example, all the procedural guidelines must be grouped together and all the guidance in terms of literature mastering should be grouped together. In terms of CSH, it is important to accompany the refined list of guidelines with a clear explanation of the emancipatory purpose of the list. The list should not appear to the student as a set of rules but it should rather be presented as a guide to emancipation.

### **Action Taking**

During the *action taking* phase, the refined list, compiled during the *action planning* phase must be implemented. It must be explained to new students and all participating supervisors.

### **Evaluation**

After the refined list has been used for a substantial period allowing students to finish their studies, an evaluation of the success must be done. Interpretive interviews would be as suitable method for this purpose.

## **SPECIFYING LEARNING**

The aim of the specifying learning phase is to reflect on the scholarly contribution made by the AR project. From a critical social theory perspective, we also need to reflect on the emancipation we set out to achieve. We do this reflection in terms of the FMA framework.

### **Reflection on the Framework of ideas (F)**

Using critical systems thinking to guide the AR project enabled us as research team to adopt a holistic approach aimed at emancipation of the students and supervisors. The Kantian systems idea enabled us to develop the research process. We wanted to represent as many conditioned realities as possible, starting off with perspective presented in scholarly literature. Our diagnosis phase was aimed at understanding the conditioned realities of supervisors and students. From this experience we do feel that the CSH questions enabled us to provide a set of interview questions that allowed the participants to express their conditioned reality. We did however mask the CSH questions as we felt at the time they might find the CSH questions difficult to answer. One aspect of supervision that requires more reflection is the measure of success. Our participants gave us rich data in this regard.

In true interpretive fashion we developed our list of guidelines as we discovered it. But as the list is, one can intuitively accept that the list is not user-friendly. Reflective practice provides us with ideas that will be used to redefine the list. We presented learning characteristics of reflected practice in Table 1 and will use these to restructure our list to achieve optimum affect.

When reflecting on the proposed process for the remaining phases of the AR project, we should be careful not to forget our initial goal. The list can easily be received as a set of

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rules. If this happens, we have achieved the opposite of our intention. We want to provide students and supervisors with ideas or guidelines to achieve emancipation. The manner in which we present the guidelines should be representative of this.

### Reflection on the methodology (M)

The methodology in the AR process is the set of guideline for emancipatory post graduate supervision. The process of refining the guidelines was explained and partially reported on. The guidelines resulting from the *diagnosis phases* has the potential to achieve the desired goals after the completion of the AR cycle as discussed.

### Reflection on the area of application (A)

The aim of the AR project in terms of emancipation is to empower the student to take responsibility of his own scholarly development. This should also provide relief for overburdened supervisors. The result of the initial diagnosis phase provided good quality data that will be transformed as explained in the previous section. Only after the *evaluation phase* is completed, it will be possible to judge whether the desired emancipation occurred.

## CONCLUSION

The aim of this paper is to present the structure of an action research project aimed at creating guidelines for emancipatory supervision. This was achieved in the discussion of the action research method where we outlined the process of developing and refining or the proposed guidelines for emancipatory supervision.

In our reflection of the framework of ideas we highlighted what we gained from using critical systems thinking and specifically CSH. We will now use the ideas of reflective to refine our list of guidelines to guide emancipatory supervision.

The pragmatic nature of action research when done from a critical social theory perspective guides our future research. The first AR cycle will be completed as discussed before a new cycle will be used to further verify and improve our guidelines. This process will only be completed once the desired emancipation is achieved.

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