

**A SYSTEMS APPROACH TO THE DESIGN OF AN  
IDEALISED STUDENT ENROLMENT SUPPORT  
SYSTEM FOR THE UNIVERSITY OF  
KWAZULU-NATAL**

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IDEALISED STUDENT ENROLMENT SUPPORT  
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KWAZULU-NATAL**

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Management Systems.**

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**A Systems approach to the design of an idealized student  
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14 July 2008

## DECLARATION

I, Anita van Soelen , declare that

- (i) The research reported in this dissertation, except where otherwise indicated, is my original research.
- (ii) This dissertation has not been submitted for any degree or examination at any other university.
- (iii) This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.
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Signed:.....



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Donna and Nicole, for your technical assistance. In my defense, I would like to quote the anthropologist Anne Kirah, who stated that some older users fall into the 'digital immigrant' category, 'referring to people who have adapted to technology, but were not born to it as digital natives were'. 'Immigrants' may understand, but may not comprehend the way 'natives' do! (Kirah cited in Atkinson 2006, p. 19).

A big thank you to my family and especially my children Kyria and Schagen for their understanding and support.

## ABSTRACT

In the research we considered the viability of the current student enrolment support system at the University of KwaZulu-Natal. The system relied on the coordination and integration of activities across campuses and reporting lines. Its success was dependent on the successful interactions between a variety of sub-systems and individuals. A soft systems approach was required for the investigation, which allowed us to deal with both the complexity of the system and the variety of perceptions participants brought into the situation.

A theoretical framework for Soft Systems Thinking was provided in Chapter 2 with reference to General Systems Theory, Living Systems Theory and metaphors of organisation. In Chapter 3 different types of problem contexts were discussed, grouped and linked to preferred research methodologies. This framework assisted us to select Idealised Planning (IP) as research methodology.

The boundaries and structure of the research process were described in Chapter 4. In this Chapter we also provided information on the selection and briefing of participants. IP philosophy supported participative planning; a seeking of consensus which generated learning and the striving towards an ideal. Our aim was to reach consensus on the transformations required within our system.

Information on the application of IP in our situation and the learning generated during the process were recorded in Chapter 5. As much information as possible was collected and the transformations required for improvements were identified. We developed a mental construct of an ideal system and defined the properties such a system should have. An unconstrained design, not constrained by the current environment, was prepared as well as a constrained design in which our current limitations were recognized. The two designs were compared and the boundaries of the constrained design were pushed out as far as possible to incorporate as many of the ideal properties as possible. A detailed plan was developed for the implementation of the chosen design.

In Chapter 6 we reflected on the suitability of IP in our problem context, the learning generated and the degree to which the research objectives were met. The project enabled us to consider our key processes and to prepare detailed procedures. We identified the problem areas in our system and the transformations to be introduced for the system to remain viable and able to cope with future demands.

## CONTENTS

<b>1.</b>	<b>Chapter 1: Introduction</b>	<b>1</b>
<b>2.</b>	<b>Chapter 2: Soft Systems Thinking: Theoretical Framework</b>	<b>6</b>
2.1	Philosophy	7
2.2	Theory	9
2.2.1	General Systems Theory	9
2.2.2	Living Systems Theory	13
2.2.3	Soft Systems Theory	18
2.3	Methodology	25
2.3.1	Background theory revealing suppositions of Systems methodologies	27
2.3.1.1	Knowledge of Industrial and Social evolution	27
2.3.1.2	Sociological Paradigm	28
2.3.1.3	Metaphors of Organisation	31
2.3.1.4.	Modernism vs. Postmodernism	36
<b>3.</b>	<b>Chapter 3: Soft Systems methodologies</b>	<b>39</b>
3.1	Grouping problem contents	39
3.1.1	Simple-unitary problem context	41
3.1.2	Complex-unitary problem context	41
3.1.3	Simple-pluralist problem context	42
3.1.4	Complex-pluralist problem context	42
3.1.5	Simple-coersive problem context	42
3.1.6	Complex-coersive problem context	43
3.2	Grouping types of systems methodologies	44
3.3	Selection of research methodology	44
3.4	Idealised Planning	48
<b>4.</b>	<b>Chapter 4: Boundaries, Structure and Participation</b>	<b>55</b>
4.1	Introduction	55
4.2	Boundaries of research project	57
4.3	Structure of research project	59
4.4	Participation in research project	62
4.5	Briefing of participants	66

<b>5.</b>	<b>Chapter 5: Research findings</b>	<b>71</b>
5.1	Mess analysis	71
5.2	Design process	78
<b>6.</b>	<b>Chapter 6: Conclusion</b>	<b>87</b>
6.1	Ideliased Planning methodology	87
6.2	Reflection on the application of IP in the research scenario	90
6.2.1	Participation	90
6.2.2	Continuity and holism	92
6.2.3	Coordination and integration	93
6.3	Challenge in application of Idealised planning	94
6.4	Learning generated	97
6.5	Meeting of Research Objectives	101
<b>7.</b>	<b>References</b>	<b>105</b>
<b>8.</b>	<b>Appendices</b>	<b>108</b>
<b>9.</b>	<b>Ethical clearance letter</b>	<b>145</b>



**LIST OF TABLES**

Table 2-1:	Living Systems Theory sub-systems and Classification of functions	16
Table 4-1:	Processes involved in student enrolment support	58
Table 4-2:	Summary of IP Methodology	61

**LIST OF DIAGRAMS**

Diagram 2-1:	A system considered as a black box with no Interaction considered	11
Diagram 2-2:	A system considered as a white box with Interaction considered	11
Diagram 2-3:	Sociological paradigm matrix	30
Diagram 3-1:	Classification of problem contents in terms of complexity and participants	41
Diagram 3-2:	Grouping methodologies based on problem contexts	44
Diagram 4-1:	Five phases of IP methodology	60
Diagram 4-2:	Task Teams and their areas of responsibility	63

## LIST OF APPENDICES

Appendix A: Production of material: structure and sub-systems involved	108
Appendix B: Production of material: procedural flow chart	109
Appendix C: Production of material: instructions influencing process	110
Appendix D: Production of material: sub-systems influencing process	111
Appendix E: Production of material: income and expenditure	112
Appendix F: CATWOE analysis of five processes	113
Appendix G: SWOT analysis of five processes	115
Appendix H: Obstruction analysis	116
Appendix I: Report on reference projections	118
Appendix J: Reference scenario	120
Appendix K: Desired properties of the idealized design	124
Appendix L: Proposed University-wide centralized student enrolment	126
Appendix M: Existing structures and reporting lines	128
Appendix N: Constrained design	129
Appendix O: Comparison of unconstrained and constrained designs	133
Appendix P: Introduction of Planning Boards	134
Appendix Q: Means planning	136
Appendix R: Resource planning	138
Appendix S: Implementation and control	140

## **CHAPTER 1: INTRODUCTION**

The former Universities of Durban Westville and Natal merged to form the new University of KwaZulu-Natal (UKZN) on 1 January 2004. In preparation for the merger, staff from both Universities engaged in joined discussions to design academic and support systems (structures and processes) to satisfy the requirements of the merged institution. A new executive structure was designed and the allocation of portfolios to these Executive Offices resulted in a restructuring of support services. This restructuring resulted in changes to familiar reporting lines and the establishment of new initiatives (University of Natal 2003 a & b). The structures and processes in place in academic support services at the two previous Universities were aligned as far as possible and where the systems could not be matched, choices between the two systems were made based on the principles of best practice.

The initial proposals for the academic support services for the merged institution included the establishment of an Academic Planning and Student Enrolment Planning Office (APSEPO). It was envisaged that this centralized Office would manage the overall academic programme development and implementation in terms of the new University's strategic development policy, as well as formulate a student enrolment plan and marketing policies to support this strategy. Its functions would include the overall management of the student admission process and liaison with the proposed national application clearing house (National Higher Education Information and Application Service (NHEIAS) to be introduced by the Department of Education (Department of Education 2003).

It was proposed that the NHEIAS would serve as an applications and placement office for first time applicants to all Universities and other institutions of tertiary education in South Africa. Such a system would ensure equal access to educational opportunities, transparency in placement of applicants and provide holistic statistical data to guide future developments by the Department of Education.

Institutions in KwaZulu Natal (KZN) are already using the applications processing facilities offered by the Central Applications Office (CAO) a collective initiative of esATI (Eastern Seaboard Association of Tertiary Institutions). In the proposals for the establishment of NHEIAS

it was recommended that the existing CAO services form the core of the new facility and that the institutions linked to the existing CAO would be the first to be incorporated into the NHEIAS. Other institutions in South Africa would be phased in over a three year period and it was hoped that this facility would be firmly established by 2008. The UKZN (ex-Universities of Durban Westville and Natal) was one of the founder members of the CAO system and its undergraduate applications procedures and information systems are fully integrated with the services provided by the CAO. The UKZN would therefore have been a major stakeholder in the establishment of the NHEIAS and the introduction of that system to phase one institutions.

The functions of similar national applications offices in other countries included the placement of applicants in terms of criteria laid down by the institutions. The Department of Education maintained that this would be the best option for South Africa as it would ensure a fair allocation of places. The selection or placement of applicants function at UKZN and most other South African institutions has been delegated to Deans or Heads of Departments, supported by administrative staff in the respective Faculty Offices. Shifting this function to NHEIAS will require a restructuring of admissions policies, processes and procedures at South African institutions. The CAO in KZN therefore does not place applicants on behalf of institutions; it serves only as an applications clearing house but its existing IT and communication systems do have the facility to do bulk placements on behalf on institutions.

In pre-merger discussions the proposed Academic Planning and Student Enrolment Planning Office (APSEPO) was tasked to consider policies and procedures at UKZN and to make the changes required to facilitate a transfer to and future liaison with NHEIAS. It was expected that decentralized sections currently managing processes, and claiming 'ownership' to certain processes and information, would resist intrusion and development. Planning for the centralized APSEPO and its interaction with the NHEIAS would therefore be problematic and required university wide discussions by all sections involved in the planning and enrolment processes.

Planning for the enrolment function/system needed to be done holistically, systemically and collaboratively, to ensure successful delivery of changes to policy, marketing and enrolment. The new system had to be flexible enough to incorporate existing processes as well as facilitate any new developments. It had to be taken into account that only 66% of applications to UKZN were

to first time undergraduate programmes and entered the system via the CAO (or future NHEIAS). The other applications were for entry to non-CAO programmes, to postgraduate studies, from returning students and international applicants and would remain the responsibility of the UKZN internal system. The system to be designed therefore has to enable the University to participate in the phase one transfer of first time entrant applications to NHEIAS while, at the same time, allow us to continue with the in-house processing of applications made directly to UKZN.

In the planning for the new APSEPO at UKZN and the services to be offered we had to pay attention to the guidelines provided for the establishment of academic schools in the pre-merger documentation (University of Natal 2003 a & b, S). The duplication of structures and functions were not allowed and new systems had to be devised for the benefit of the community and the new institution as a whole. As many players as possible needed to be involved in the planning process and in the design process little attention would be paid to existing political and cultural elements. The new design had to satisfy the requirements of the merger, as well as lay the foundation for the proposed interaction with NHEIAS.

The APSEPO has, however, to date not been established at UKZN and the functions allocated to this Office are currently performed, on a semi-devolved basis, by a variety of staff in offices across the five UKZN campuses. In the actual merger of the support services of the two former independent Universities, the status quo was retained as far as possible and the idea of a University-wide office was lost. In addition, the proposed NHEIAS has not yet been established and very little development has taken place in that direction. The Department of Education has however indicated that it still intended to proceed with this project at some time in the future.

In contrast to the lack of planned development in enrolment support services, the UKZN has developed and implemented an academic plan across its five campuses. Programme offerings have been consolidated and duplication of qualification offerings in the Durban area has been eliminated. Faculties have been consolidated on different campuses to make better use of existing facilities and university wide entrance requirements have been introduced where a qualification are offered in both the Durban and Pietermaritzburg areas.

It was felt that the 'merged' application support system created at the time of the merger, no longer satisfies the requirements of this extended academic structure. We now need to establish an enrolment support system in place which would offer the best possible service University-wide. It is understood that the environment this system will be designed for will manage numerous functions (academic and administrative), to be performed by a large number of participants working in multiple interactive and interdependent sub-systems. The system to be planned for will not be independent, but a sub-system of the wider University system. The University environment as well as the needs of our community will influence the functioning and structure of the proposed system. The system will therefore have to be flexible and able to proactively develop and adapt to incorporate new demands, such as the introduction of NHEIAS at a future date.

It was proposed to use an appropriate soft systems approach in this research project to consider the current student enrolment support system at UKZN; to identify its strengths and weaknesses as well as possible obstructions to development. This information would be used in the design of an improved student enrolment support system which will offer the required services to the University as a whole. In the shared design process we will revisit the feasibility of the introduction of a centralised APSESO for UKZN but the chosen design will be influenced by developments within the wider University system. The main emphasis of the research would be on a shared planning process, involving all sections managing different functions within the enrolment process. In addition to the delivery of an 'idealised design', the planning process would generate an understanding amongst staff of the processes involved and the services required.

The system to be investigated relies on the interaction of various sub-systems and demonstrates a continuous exchange of energy and information with its environment. The system was rich in human interaction and the expectations of various clients relying on the system will have to be taken into account. A mechanical approach could not be used for this study as it would not allow for 'unstructured' human interactions and environmental input. It was therefore recommended that a soft systems thinking approach be used, which would allow for human influence, interaction between parts and input from the environment.

The research project would, therefore, be aimed at:

**‘A systems approach to the design of an idealised student enrolment support system for the University of KwaZulu-Natal.’**

**Structure of dissertation:**

- Chapter 1 provides background information which led to the choice of research topic.
- Chapter 2 provides a theoretical framework of soft systems thinking, with reference to General Systems Theory, Living Systems Theory and metaphors of organization.
- In Chapter 3 different types of problem situations are linked to preferred research methodologies and this information is used to select the methodology (Idealised Planning) used in the research project.
- Chapter 4 contains an introduction to the research project, a description of the boundaries of the research, a short description of IP methodology and the process to be followed, as well as information on the selection of participants.
- Chapter 5 provides a description of the research process and a summary of the research findings.
- Chapter 6 is a reflection on the application of Idealised Planning methodology in the problem situation and the degree to which the research objectives were met.



## CHAPTER 2: THEORETICAL FRAMEWORK

Systems thinking developed as an alternative to mechanistic or hard systems thinking and proved to be more satisfactory for explanations in complex social situations. Checkland and others considered hard systems thinking as having limited application in rich human interaction systems, as it required situations in which the objectives are clearly defined at the beginning of the methodological process (Jackson 1991, p. 79-81). In modern managerial situations the defining of such objectives form part of the problem faced. Hard systems approaches consider the human element as part of the normal elements to be engineered and the understanding and meaning human beings bring into the situation are ignored. In hard systems methodologies there is a focus on quantification and optimization; on the building of models. In complex human systems the building of such models will be subjective and based on the limited visions of their creators. Hard systems methodologies offer support in situations where we try to maintain the status quo but as we will be recommending transformations for the establishment of an improved student enrolment support system, these methodologies will not be suitable for our proposed research (Jackson 1991, p. 80).

Soft systems thinking is interpretive in character and the social world is seen as being the creative construction of human beings; a construction of human perceptions (Jackson 1991, p. 133). The approach, therefore, pays particular attention to the different world views humans may have in a given situation. Vickers refers to the world views as different systems of appreciation (Jackson 1991, p. 134). Such varying worldview may be present in our existing system and need to be investigated as they may give an indication of how our clients perceive our current services and may also drive the transformations required for an improved system which will meet the different expectations.

When this approach is used, it is important that we understand the philosophy on which it is based, the theory or set of interrelated concepts and principles the approach applies to all systems, as well as the methodologies that support the systems philosophy and theory (Flood & Jackson 1991, p. 7).

## 2.1 Philosophy of soft systems thinking

Systems ideas are used to design and manage complex processes for the benefit of individuals, organizations and society. These ideas are useful when we are dealing with highly complex, real-world problems set in social contexts, such as in our current system in which a variety of staff members perform a multitude of functions across hierarchical boundaries and as parts of bigger and more complex processes.

Checkland uses two paradigms to explain the nature and significance of systems thinking (Checkland 1978, p. 2). **In the optimisation paradigm** the world is considered as systemic; it is made up of systems which can be studied systematically. The focus is on the optimization of the system. This paradigm, or goal seeking model, is used in hard systems approaches to develop scientific models of systems, including measures used to predict and compare outcomes of alternative decisions, strategies and controls. The purpose is to help management determine policy and action in a scientific way. In the **learning paradigm** there is a shift from the systemicity of the object to the process of enquiry, or to the methodology itself (Checkland 1978, p. 2). This paradigm considers the world as problematic, as containing a number of interpretations by the subjects themselves and attempts to study it systemically. In systems thinking we therefore see a shift from the parts, to the organization of parts, recognizing interaction of parts as a dynamic process.

The shift is from absolute principles and knowledge to relative, conceptual and perceptual knowledge (Checkland, Ackoff, 1981, p. 10). Jackson describes the shift as a move from the 'systemicity from the world to the process of enquiring into the world' (Jackson 1991, p. 158). Systems thinking illustrates that events are separated by distance and time and small events can initiate large changes in complex systems. An improvement in one area may have a negative effect in another area of the system and such developments need to be eliminated by promoting communication at all levels of the organization. The application of soft systems philosophy to my research situation will be particularly useful as the system under investigation has already demonstrated that it is made up of various parts which require constant communication and interaction with each other and also with its environment to drive the system as a whole. We are also intensely aware of how the actions of a single element, in isolation, can disrupt or delay the functions of the whole system. The goal seeking approach could be used to enhance the

production in parts of our system, such as data processing, but we will require an approach based on a deeper understanding to ensure that the system develops the required understanding to stay viable as a whole.

Capra states that the more we study critical problems in the world such as population growth, the diminishing ozone layer and poverty, the more we become aware that these problems cannot be understood in isolation. He says, 'they are systemic problems, interconnected and inter-dependent' (Capra 1996, p. 1). These problems must all be seen as different facets of single crisis of perception. We need a shift in perception to be able to act differently; changes to our worldviews and value systems are currently required by science as well as society. We no longer see the universe or the body as mechanical systems composed of separate parts. The new world view emerging is a 'holistic view'; seeing systems as integrated wholes rather than a collection of parts (Capra 1996, p. 2). This view explains a system as a collection of elements which are connected to form one whole (Capra 1996, p. 2).

Systems thinking is aimed at integration and is based on the belief that parts of a system will act differently when they are isolated from the other parts or from the system's environment. In this approach we examine all the links and interactions between the elements the entire system is made up of (Flood & Jackson 1991, p. 5). A system is therefore seen as composed of regularly interacting or interrelating groups of activities; a configuration of parts connected and joined together by webs of relationships (Emery 1969, p. 4). A system can also be seen as a set of interacting units with relationships amongst them (Miller 1978, p. 16). Capra describes a system in terms of relationships and an integration process. The systems approach therefore does not concentrate on standard building blocks but rather on basic principles of organization (Capra 1996, p. 2). The perception has changed from seeing the world as a series of building blocks to seeing the world as a living system. This change concerns our perception of nature, of society, as well as of a business organization (Capra 1996, p. 2). We have to consider our system as a functioning whole, dependent on relationships and interactions between sub-sections and we must no longer try to optimize the functioning of individual sub-systems.

Jackson describes systems thinking as the study of the whole before the parts (Jackson 1981, 1981). A holistic system is therefore seen as any set or group of interdependent or temporarily interacting parts. The parts are generally systems themselves and are made up of other parts (Jackson 1981, p. 2). Our system to be investigated is made up of parts which interact at

different times of the year to form part of our 'system' but they are indeed parts of others systems with whom they share different functions at other times of the year. Our system is therefore depending on sets of permanent interactions supported by a variety of temporary interactions.

## **2.2 Theoretical principles of soft systems thinking**

Systems thinking theory has its origin in both General Systems Theory and Living Systems Theory and we need to consider the philosophies and theoretical frameworks on which these theories are based.

### **2.2.1 General Systems Theory**

Ludwig von Bertalanffy, a Hungarian biologist is considered the father of the 'General Systems Theory' which was developed in reaction to the belief that not enough attention was paid to the relationship between organisms and their environment in biological research (Jackson 1991, p. 49). The Theory is based on the assumption that universal principles of organization can be identified and applied to all systems. In the mechanical world such universality was sought by reducing systems into their material components. When we, however, apply the systemic view, we ignore the material parts and search for universality in the abstract organization of systems (Heylighen 1998, p. 5). Real systems are now considered open to their environment and they can acquire qualitative new properties through emergence, and this could result in continued evolution.

General Systems Theory integrates the analytic and synthetic research methods and includes reductionalism and holism. In physical sciences the emphasis is on closed systems and interaction with the outside world is not considered. This exclusion eliminated environmental influences on the system and enabled scientists to make perfect calculations and predictions on the future states of their systems. Von Bertalanffy placed the emphasize on the interaction between a living organism and its environment (Heylighen 1998, p. 1). Organisms are considered open systems, not being able to survive without continuous exchange of matter and energy with their environments. Open systems are seen as interacting with systems outside themselves; input is received from outside the system and output from the system is released into the environment.

A system is considered to be separated from its environment by a boundary. The environment in which a system is embedded is made up of other systems and the environment also interacts with those systems. The collection of systems interacting with each other is seen as a larger system. The interactions between the components of a system bind them together as a whole. If the parts did not interact, the whole can never become more than just the sum of the parts. The interaction between the parts therefore adds more to the whole system. In our system we therefore have to consider the total interaction; the contribution of interactions between subsystems dealing with specific functions to the enrolment system as a whole. The efforts of sub-systems dealing with parts of the enrolment function will be irrelevant if they do not bind together and contribute to the enrolment system as a whole.

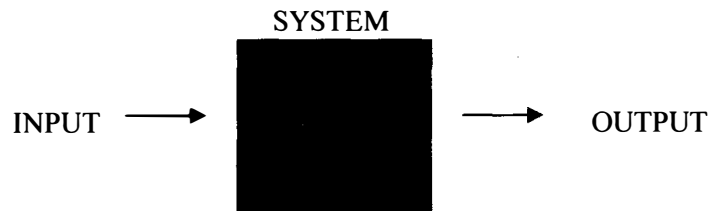
The science of living systems gives a new ecological vision of reality. Systems are seen as integrated wholes and their properties cannot be reduced to those of smaller units (Capra 1996, p. 2). The parts of a system are seen as sub-systems of the whole, and the sub-systems see the whole as the supra-system. We need not take into account the individual contributions of sub-systems when we consider the supra-system, we just have to look at the total input and output. The system is considered as a 'black box', taking in input and delivering output but the internal processes are hidden. We need only be concerned with establishing the final result. In a 'white box' scenario the internal processes of the system are revealed (Heylighen 1998, p.2).

The 'black box' view is not restricted to situations where we do not know how the output is achieved within the system. In some situations we may, however, choose to ignore the internal processes and concentrate on the output of the system as a whole. The 'black' and 'white box' approaches are complementary and assist us to demonstrate that systems are structured hierarchically. At the higher level systems are more abstract and consider the whole, without paying attention to the details of the parts. At the lower level, you observe different parts but fail to see how they fit together to form a whole.

In our research the black box approach can be used for a higher level audit to evaluate the overall functioning of the student enrolment system. We can, for example, measure the ratio of applications received against the number of qualifying applicants selected for entrance and determine how successful the recruitment and application processes have been. If these result is however not satisfactory, or if the process as a whole is not delivering the required category of qualifying applicants in terms of the enrolment plan, we need to turn to the interactions between

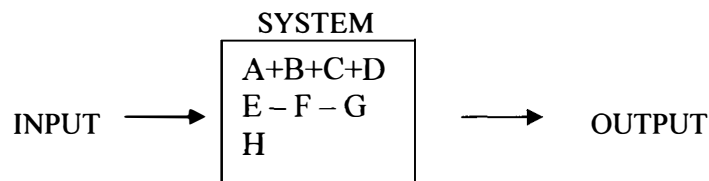
the parts within the system to determine what is obstructing the process and how can make the required changes to improve the process as a whole.

**Diagram 2-1: A system considered as a black box with no interaction considered**



(Heylighen, 1998, p. 3).

**Diagram 2-2: A system considered as a white box with interaction considered**



(Heylighen 1998, p.3).

The output of a system is a direct or indirect result of the input to the system. The system, however, is an active processor and the output will differ from the input. The transformation from input to output within a system is called the throughput (Heylighen 1998, p. 1). An unsatisfactory output of our system could therefore be as a result of ‘incorrect’ input (non-qualifying applicants) or as a result of inappropriate processing (procedures) in the throughput.

Environmental influences may cause fluctuations in a system and these fluctuations should not be seen as errors, but as an integral part of the functioning of a social system. A system cannot be fully understood without studying the impact external forces may have on it (Emery 1969, p. 101). If we should consider organisations as closed systems and ignore the impact of the

environment, we will ignore the intelligence or feedback function (the element of learning), which is based on changes in the environment (Emery 1969, p. 102). Traditional approaches have concentrated on internal organisation and failed to develop an understanding of the feedback function which is essential for the survival of a system (Emery 1969, p. 102).

Our system under investigation is sensitive to influences from and changes in both the external and the internal environment in which it is embedded. We have to take note of new expectations from our applicants and technological developments as well as the products offered by our competitors. The University internally is also continuously changing its course offerings and modes of delivery to ensure a more responsive product. It is the responsibility of our system to be aware of these changed expectations at all times and to adjust as is required to remain viable.

The analytical and reductionalistic approach which supports the belief that if you get to know enough about the parts of a system, you should be able to understand the system as a whole, is no longer applicable. In a system the state of one sub-system affects another, the interactions between them, as well as the system as a whole (Smuts 1926, Checkland 1981, Jackson 2000, p. 47). These interactions are not linear (cause and effect) but complex and full of interdependencies. These interactions can only be understood in terms of their common purpose which functions at the level of the 'whole' (Capra 1996, p. 2).

This principle is of key importance for our research. The sub-systems involved in the enrolment processes all focus on unique parts of the process and have many different reporting lines and are geographically separated (across five campuses). It will not be possible for an outsider to understand the process as a whole without us providing the required information on process links and interactions.

A number of common characteristics of open systems were identified and these also apply to our system: open systems import energy from the external environment and export some product to the environment (Emery 1969, p. 92-100); the pattern of the activities of the energy exchange has a cyclical character and open systems must have negative entropy to survive; they need energy as well as negative feedback from the environment as the negative feedback allows the system to make changes; these systems constantly import energy to try and maintain a stable state and this is required for survival; open systems move towards differentiation and elaboration and Von Bertalanffy calls it 'progressive mechanisation', saying that 'Today's social organisations move

towards multiplication and elaboration of roles with greater specialisation of functions' (Emery 1969, p. 98, 99). An open system 'can reach the same final state from differing initial conditions and by a variety of paths'; more than one way can therefore produce a given outcome (Emery 1969, p. 100).

In our research we need to consider the existing paths used to deliver the current outcomes of the enrolment support system. We need to consider the basic assumption on which our processes and procedures are based. If these paths no longer deliver the product required, we need to consider alternative ways of reaching our desired state. We should look at the 'need' and acknowledge that alternative measures may be desirable in particular situations.

Von Bertalanffy acknowledged that the same principles could apply to living as well as mechanical systems. This perception was popular with practitioners orientated towards systems engineering but systems engineering failed to interrogate or consider the environments of living systems when they were considered as open systems (Emery 1978, p. 8,9).

As a living system, an organization has a degree of autonomy. If managers think systemically they will recognize the organisation's own logic and try to influence the system rather than to control it. Such systematic management is the most important feature in the new approach to management (Capra 1996, p. 2). The change from control to partnership is a change in the values, a shift from the machine to the ecological worldview (Capra 1996, p. 2). We therefore have to establish partnerships with and between the sub-sections of our system, allowing them to share in the management rather than trying to control their actions.

### **2.2.2 Living systems theory**

Miller's Living Systems theory was considered 'the most ambitious attempt to integrate knowledge across different system types.' He wanted to formulate a general theory 'with the potential to unify the scientific study of living systems' (Jackson 2000, p. 177). His system deals with concrete systems existing in 'physical-space-time'; systems that actually exist and we can observe their structures and processes. He defines a concrete system as 'a non-random accumulation of matter-energy in a region of physical-time-space, which is organised into interacting sub-systems or components' (Miller 1978, Jackson 2000, p. 177).



Miller sees the Universe as containing a hierarchy of systems in which each system is higher or more advanced than systems at a lower level (Miller 1978, p. 15). The term 'level' is used to describe the position of a system in the hierarchy. The theory proposes that each level within a system is 'nested' (Macy & Brown, Sophia 2003, p. 2) in a following level; each higher level contains the next lower level in a 'nested' fashion. His theory holds that the mutual interrelationships of the components of a system extend across hierarchical levels (Miller 1978, p. 32).

In terms of this theory systems exist at eight hierarchical levels: the cell, the organ, the organism, the group, the organization, the community, society and supra natural systems (Miller 1978, Miller & Miller 1990, Jackson, 2000, p. 177). These levels have common elements in that they are open systems, with semi-permeable boundaries and exist in certain environments (Jackson 2000, p.178). They contain sub-systems processing inputs, throughputs and outputs. They have purposes and goals directed at a state of internal stability. Their purposes are linked to reaching desired internal states as well preferred external relationships (Jackson 2000, p. 178). Sub-systems therefore try to maintain a steady state (equilibrium) through interactions with the environment. Their equilibrium is, however, dynamic; they try to maintain steady states of negentropy (negative entropy) (Jackson 2000, p. 178).

If we apply Miller's theory to our situation, we can place the wider University as our supra-system which will then consist of sub-systems at different levels within that supra-system. Each sub-system will have its own boundary, defining the functional area it is responsible for. A sub-system will therefore have its own goals and will process inputs via throughputs to reach that desired output, which is required for its viability.

Purposes and goals 'derive from the system's original template, which guides its development but can be modified by learning' (Jackson 2000, p. 178). The purposes and goals of a system are reflected in a 'hierarchy of values' which determines how the system acts. The structures and processes of systems increase in complexity as the system moves up the hierarchy and systems at higher levels have more emerging capabilities which allow them to accomplish things not possible for systems at the lower levels (Jackson 2000, p. 178). We should therefore at all times remember to take the bigger picture into account; we should consider the properties emerging at higher levels within the University. Our system does not operate on its own; it is part of a much bigger system and changes will not be allowed at our level if it will not be to the benefit of the

University as a whole. Changes affecting the whole University will be dealt with at a higher level within the University.

In terms of Living Systems Theory a system contains twenty critical sub-systems which perform specific processes essential for survival (Jackson 2000, p. 180). A summary of the sub-systems and their functions are provided on page 16.

The structure of a system refers to the arrangement of the sub-systems and their components in three-dimensional space at any point of time (Miller 1978, p. 22). The components in a system which carry out specific functions/processes are referred to as sub-systems. A sub-system can therefore be identified by the process it carries out (Miller 1978, p. 30). The student enrolment system can therefore be divided into various sub-systems based on the different processes contained within the enrolment system as a whole.

A process can be reversible or irreversible and refers to the change or transformation of matter/energy or information in a system over time (Miller 1978, p. 23). If a number of living systems have the same characteristics, they are classified as a type (Miller 1978, p. 24). 'Type' therefore classifies living systems and adds certain characteristics to the systems. The supra-system is the next higher system in which the system under consideration is a sub-system (Miller 1978, p. 29).

The student enrolment system at UKZN forms part of a wider student support system. In the student support services we have already differentiated between academic support services; application, registration, records and examination (grouped under Student Academic Administration) and student services in general which include international students support, accommodation and financial assistance. We have therefore grouped types of sub-systems with the same characteristics together; sub-systems dealing with specific types of student activities. We could, however, take this a step further by considering that in the enrolment process we have grouped sub-systems at a lower level together, based on their contributions to the enrolment process (recruitment, application, selection). These sub-sections do not all fall within Student Academic Administration but are from across different sections and different reporting lines. They do however fall within the same 'type' of activity.

**Table 2-1: Living System Theory sub-system classification and functions**

(Adapted from Jackson 2000, p. 180).

<b>Sub-system</b>	<b>Function</b>
Reproducer	Provide template, resources and support for new systems
Boundary	Binds elements together, controls access, protects from environment
Ingestor	Bring matter/energy from the environment
Distributor	Carry matter/energy to each system
Converter	Change inputs to useful forms
Producer	Converts energy/information input to output enabling growth and maintenance.
Storage	Deposits of various types of energy/matter
Extruder	Transmit energy/matter out of the system
Motor	Move parts in relation to environment and moves environment components into relation with each other
Supporter	Maintain spatial relationships between components
Input transducer	Bring information into the system and change it into forms that transmit within the system
Internal transducer	Receive markers from sub-systems and changes them into forms that transmit within the system
Channel and net	Carry information around the system
Timer	Provide decider with timing signals
Decoder	Change input code to a private code
Associator	Form associations between items of information
Memory	Store, maintain and retrieve information
Decider	Establish purpose and goals for system, receive information inputs from other systems, analyze, synthesize and choose a plan, transfer information and implement
Encoder	Alter information from private to public code
Output transducer	Change markers into other forms of energy/matter and transfer information from the system

As a scientific theory, Living Systems Theory aims to describe real phenomena but it also implies that it can be used as a problem solving approach. As a scientific theory its findings will be subjected to the normal rules of scientific methods; all hypothesis derived from the theory must be tested against reality. As a general theory, such hypothesis can refer to communalities between systems of the same type, or systems at different levels. The strength of Miller's theory lay in his emphasis on cross-level analysis (Miller 1978, p. 32). This allows for sub-system research and the development of cross level hypothesis and testing of the hypothesis in two or more sub-systems at a time. He made use of the concept 'joint sub-system' to describe a sub-system that belongs to two systems simultaneously (Miller 1978, p.30). This development is of crucial importance to us. Our system is not contained within a single system but the processes are performed by, or contributed to, by a number of sub-systems throughout the University. We depend on interaction with all the sub-sections involved and we have to ensure that our functions are coordinated and integrated.

Tracy (Tracy 1994, Jackson 2000, p. 180) applied Miller's theory to organizations, considering them alive and therefore to be treated as living systems. Organisations are considered alive because they derive many of their characteristics from the generic makeup of their members and the structures and processes displayed by organizations are linked to this origin (Jackson 2000, p. 180). He believes, organisations like cells, primarily comprise of 'protoplasm' and this gives them the character of living systems. They have a template governing their behaviour, development and reproduction. This comes partly from the members but also from ideas carrying information about the structure and processes of the system. An organization is for example, founded based on a) its corporate character (the template), or b) a franchise agreement or c) beliefs of its founder (Jackson 2000 p. 180). Such an idea, called a memetic template, supplements the underlying instructions supplied by the genetic templates of the individuals in the system (Tracy, Jackson 2000, p. 181). The original purpose which led to the establishment of an organization will therefore determine the actions throughout the system.

Organisations sustain themselves through the input, throughput and output processes. They try to ensure the flow or availability of resources required to deliver their product or service. The templates are copied for the creation of new sub-systems which try to reach their potential within their own boundaries and by maintaining a productive relationship with their environments. Organisations have to adapt to their environments but must also influence the environment to make it 'more congenial', enabling the organization to reach its goals (Jackson 2000, p. 181).

Organizations depend on the twenty critical sub-systems defined by Miller to manage this interaction and therefore their survival.

Tracy believes managers should treat organizations as life forms; protecting them from predators and invaders, attending to their health, feeding them with resources, guiding them to suitable environments, modifying their behaviour, diagnosing illnesses and prescribe treatments, realizing their right to survive and to develop their potential, and making good decisions for them based on their values, purposes and goals (Tracy 1994, Jackson 2000, p. 181).

When we apply Living Systems theory to an organization we will therefore have to approach problem diagnosis in the same manner a physician would with a patient. It will involve: observing and measuring the important relationships between inputs and outputs of the total structure, identification of the structures performing each of the twenty sub-system processes, consider the flow of energy, matter and information and the adjustment processes within the sub-systems and the system as a whole. The status of the system is compared to the norm for similar systems and if the system is experiencing a disturbance of its steady state, the source of the strain is determined and corrected (Miller & Miller 1995, Jackson 2000, p. 182).

### **2.2.3 Soft systems theory**

Systems ideas were first developed in the biological sciences but the 'systems' concept is separated from its biological roots in soft systems theory. A general concept of a system has to be developed which can be applied in different contexts (Flood & Jackson 1991, p. 3).

A system is seen as consisting of a number of elements with relationship between them. Some groups of elements may have rich interactions and these can be separated from the weaker interactions by drawing a boundary around the groups of elements with rich interactions and these then form a system or a sub-system. The system identified by this boundary will have inputs and outputs and these may be either physical or abstract. The purpose of a system is to transform inputs to outputs and this process depends on feedback. Feedback may indicate how the behaviour of one element affects another or the relationship between elements. Such feedback may eventually influence the behaviour of the element which initiated the behaviour (Flood & Jackson 1991, p. 5).

In the research we hope to identify areas in which boundaries between sub-systems have become blurred; areas in which interactions are no longer separated by clear and acceptable boundaries and where the actions of specific sub-systems cause conflict amongst staff and a duplication of functions. We will need to consider if the original boundaries are still required and if so, take corrective action to adjust the behaviour of the transgressing sub-systems to enable us to maintain those boundaries.

A system's boundary separates it from its environment and if the boundary allows inputs from and outputs to the environment it is termed an open system. Any distinct entity that takes in resources from its environment, processes them and produces output is considered an open system. When we take an open system approach we look both inward and outward; considering relationships and patterns of interaction between sub-systems and their environments within the organization as well as the relationships and reciprocal influences between the organization and the environment outside its 'formal' boundary (Symphony Orchestra Institute 2005, p. 1). Our system will not remain viable unless we satisfy the requirements of both the internal University system as well as community we serve. We need to ensure that our output serves both the system as a whole and the external environment (our community) on which we depend for survival.

When the input-throughput-output cycle is complete, an organisation receives feedback from the environment about its products and services. Individual sub-systems may also receive feedback from their immediate environments inside the organization. The information serves as new input and becomes part of a new cycle, potentially shaping future actions (Symphony Orchestra Institute 2005, p. 1).

A system sustains its identity by maintaining itself in a dynamic state within a changeable environment but the environment can also be used to maintain this state referred to as homeostasis (Flood & Jackson 1991, p. 6). All parts of the system may continually change and undergo essential transformation processes to maintain this balance (to react to entropy). A system exhibits control if it manages to sustain its identity (through internal transformation) under changing circumstances over time. Communication of information is required for it to be able to do this. If a system carries out transformation it is described as purposive and if the transformation is generated within the system, the system is considered purposeful.

A 'stable' system possesses an identity and can be studied through its emergent properties. These properties may relate to the system as a whole and not necessarily to its parts. Where parts work together as a whole, the term 'synergy' applies. Where a complex interconnected network displays synergy, it is found that the product of the whole is greater than the sum of the effort of the individual parts (Flood & Jackson, p. 6). It is suspected that overall synergy is not in place in our system to be investigated; all sub-systems are not operating in ways maximizing their contribution to the whole. Their functioning is aimed at perfecting procedures at their level and they do not consider the impact their contribution has on the performance of the system as a whole.

Systems occur in hierarchies and the system we are studying may be considered as a sub-system of a wider system and may obtain other sub-systems. Attributes are given to elements in systems and to relationships between the elements, depending on how we measure them. Elements may be considered in terms of size, weight, volume, etc., and relationships between them in terms of intensity or flow. By adding content or different 'flavourings' to the general concept of a system, we are able to develop systems metaphors which we employ as filters when we study problem situations (Flood & Jackson 1991, p. 7). The way we view our organization in terms of the available metaphors or 'filters' will assist us with the selection of an appropriate research methodology to be used in our problem situation (Flood & Jackson 1991, p. 7). The various systems metaphors are discussed in more detail under item 2.3.3 in this chapter.

The idea of a 'filter' or metaphor helps us to understand difficult problem situations in terms of familiar concepts (Flood & Jackson 1991, p. 14). We need to recognize the value of these comparisons and maximize the benefits we can gain from applying them in problem situations. The general conceptions of a system combined with the 'likenesses' provide systems metaphors to be applied in problem situations (Flood & Jackson 1991, p. 14). The systems metaphors provide a general knowledge base of management and organizational theories, as well as the basic assumptions underpinning the range of system based problem-solving methodologies (Flood & Jackson 1991, p. 11).

Ackoff explains the concept of a system as a set of two or more elements that satisfies three conditions: the behaviour of each element has an effect on the behaviour of the whole, the behaviour of the elements and their effect on the whole are interdependent and the way each element behaves and the way it affects the whole, depend on how at least one other element

behaves. No element has an independent effect on the whole but sub-groups of the elements are formed and each has an effect on the behaviour of the whole. They 'are so connected that independent sub-groups cannot be formed' (Ackoff 1981, p. 15). Every part of a system therefore has properties which it will lose when it is separated from the whole system and every system has properties that none of its parts have (Ackoff 1981, p. 15). If a system is taken apart it will lose its essential properties.

In systems thinking the problem to be considered is therefore treated as if part of a containing whole. This approach expands the focus of the investigator by allowing him to sweep in information from a wider area and this additional information may assist us to understand interactions between elements and the effects such interactions have on the whole (Ackoff 1981, p. 16,17).

In terms of systems thinking a system cannot be understood by analysis alone and in new methodologies system thinking combines analysis and synthesis in a new way (Ackoff 1981, p. 17). Three steps are involved: identification of the containing whole or the system of which the situation to be explained forms a part of, explaining the behaviour or properties of the containing whole and explaining the behaviour or properties of the situation studied in terms of its role(s) as part of the containing whole (Ackoff 1981, p. 17). Analysis and synthesis 'complement' each other in these approaches. Analysis focuses on structure; it explains how things work. Synthesis focuses on function; it reveals why things operate as they do. Analysis provides knowledge/information and synthesis brings understanding (Ackoff 1981, p. 17). Systems thinking is concerned with the interactions between parts, but is also occupied with the integration of a part with other parts in its environment and also with the integration of a part and its own environment (Ackoff 1981, p. 17). In systems design, parts are designed 'to fit together harmoniously as well as efficiently and effectively' (Ackoff 1981, p. 15). Harmony in this case refers

to the effect of the interactions of the parts on the whole, as well as the effects of the functioning of the whole and the interactions of the parts on the parts themselves (Ackoff 1981, p. 15).

Harmony is also concerned with the effects of the functioning of the whole and its parts on the system in which it is contained (the environment) and on other systems in its environment (Ackoff 1981, p. 17).



The difference between analytical and synthetic management is illustrated in the following systems principle:

If each part of a system, considered separately, is made to operate as efficiently as possible, a system as a whole will not operate as effectively as possible (Ackoff 1981, p. 18).

Even if we add up the individual performance of the sub-systems within the whole will not get to the same sum as the total output of the system as a whole. In working together the systems perform better than the sum of their individual performances (Ackoff 1981, p. 15).

Systems thinking will therefore provide us with the means to look at the functioning of our parts (analytical), but more importantly, will provide us with the means to study the interactions between those parts (synthesis) and to understand how these interactions influence the system as a whole.

The way we conceptualise a corporation has changed a lot over the last hundred years. We have moved away from viewing it as a machine or an organism (Ackoff 1981, p. 18). A new concept has emerged, namely the consideration of corporations/institutions as organizations. Ackoff describes an organization as

a purposeful system (therefore no machine) that is part of one or more purposeful systems (not free of the environment), and parts of which, people, have purposes of their own (no organism) (Ackoff, 1981, p. 18).

We have become increasingly aware of the interactions of these three levels of purpose: societal, organizational, and individual; and how well a corporation operates depends on how it is affected by both the people who are part of it and the systems of which it is part. By thinking (Ackoff 1981, p. 29).

In terms of systems thinking managers are required to move away from competition to coordination; considering expansion versus conservation and quality rather than quantity. We have to move away from 'economic growth to ecological sustainability' (Capra 1996, p. 3). We need to consider when we should expand/grow and when not. This is where the sustainability concept is introduced. Lester Brown stated that: 'A sustainable society is one that satisfies its needs without diminishing the prospects of future generations' (Brown, Capra, 1996, p. 3). Ecology conscious management is therefore challenged to modify corporate growth by introducing sustainability as a key criteria to business activities. Such a shift in thinking can be

established through dialogue (Capra 1996, p. 3). It is often thought that our enrolment system at UKZN could be improved if we had more staff or more equipment available but Brown urges us to consider the sustainability of such a system and leave room for future developments.

A new concept of planning has emerged to deal with planning for organisations. In this concept planning is viewed as an activity in which development takes place; it is not merely seen as an activity 'whose output may contribute to development' (Ackoff 1981, p. 52). In this type of planning we consider the whole first, then the interaction of the parts, and finally the parts themselves. The planning concept that arises, deals with interdependent problems. Two or more interdependent problems form a set which constitutes a system. Planning is

conceptualized as a participative way of dealing with a set of interrelated problems when it is believed that unless something is done, a desirable future is not likely to occur, and that if appropriate action is taken, the likelihood of such a future can be increased (Ackoff 1981, p. 52).

Based on the principles of interactivism, the focus is on the improvement of performance over time rather than on how well a system can do at a particular time and under particular conditions. The objective is to maximise the system's ability to learn and to adapt; the emphasis is on development. When we therefore consider a problem in our system we should consider all possible interactions between parts to determine if problems also exist in other areas. By linking these problems we can form a set or system of problem and in planning the focus must then be on dealing with a set of interrelated problems. Humans are seen as 'ideal seeking' and within a system humans will pursue three types of ends: goals expected to be attained within the period of planning, objectives we hope to obtain later and towards which progress is possible within the planning period, and ideals - the ends believed unattainable but towards which we believe progress is possible during and after the period planned for (Ackoff, 1981, p. 63).

Our ability to identify interrelated sets of problems and to solve them, depends critically on how well we conceptualize the causal connections between what we do and what we want. In most 'real' situations we deal with weak causal relationships. In our problem solving we need to look at what causes the current problems; we need to identify the causal relationships within our system. A variety of participants from different backgrounds and subsystems taking part in planning will assist as they will all bring different information and experiences to the situation. A

change in one thing will only bring about a change in another thing if they are causally related. Causal relationships may also depend on other variables and are often complex; such interactions may be subtle and not easy to determine (Ackoff 1981, p. 118).

In a complex problem situation such as ours, we can expect a multiple of causal relationships that could be manipulated. With constant changes in the environment and demands for different types of services, relationships and interactions within the system will constantly change, requiring continuous manipulation of a variety of variables. A plan (our plan) will never be complete, but will constantly change to accommodate further developments. A system therefore has an adapting seeking element; based on feedback and further research and information (Ackoff 1981, p. 126,127).

It is recommended that we enlarge the system under investigation if the causal relationships are not easily identified. The enlarged system may offer more solutions and we may find that the origin of a problem may not be clear within the boundaries of a system, but by enlarging the system we may note where the problem element is feeding into our system. The problem may be identified in our system but the origin and the solution may lie outside our system (Ackoff 1978, p. 77). In our system for example, a delay in correspondence may be contributed to the inability of the packers to dispatch the selection letters in time, but if this cannot be determined, we need to look at all sections handling the correspondence and may find that the delay could in fact be rooted in the internal postal services' inability to deal with bulk mail (Ackoff 1978, p. 77).

In problem situations, particularly about organizations, our thinking and our search for solutions tends to be limited by our own restricted mental pictures (Ackoff 1978, p. 77). Such mental dimensionality or restriction is under our control and is not inherent to the system. By thinking of problems from different dimensions we can often reveal new and more effective solutions (Ackoff 1978, p. 77). By involving more participants in discussions we can introduce new mental pictures and thereby enlarge the number of options to select from.

Our perceptions of what can be done are often limited by constraints attributed to technology but we forget that technology and its application are controllable variables (Ackoff 1978, p. 78). The environment of a problem consists of controlled variables and those affect the outcome of the course of action taken. These variables create the conditions and some of the constraints under which the problem must be solved. Variables not controlled by one person may however be

controlled by another. If we impose constraints on our thinking we may think that certain variables are uncontrolled and cannot be controlled. We may 'convert controllable variables into ones that appear to be uncontrolled' (Ackoff 1978, p. 79). It is also important to question 'facts' when they are considered as the truth without providing any evidence (Ackoff 1978, p. 81). A self-evident 'fact' may prevent us looking for an effective course of action or from considering existing courses of action available. Formulating the right problem is at least as important as getting the right solution (Ackoff 1978, p. 81).

If we come across a variable that we do not have control over, or which is controlled at a higher level, it will benefit our process if we can determine who that element is controlled by (Ackoff 1978, p. 79). The proposed change can then be discussed and the 'owner' could be willing to change that variable, thereby dissolving the problem at our level. Through discussion we can identify the relation between the variable and the problem at our end and decide on means to prevent, for example, the activities of one sub-section having a negative impact on the functioning of another.

By revealing points of future breakdown in existing systems we are able to introduce planned interventions (Ackoff 1981, p. 98). 'Interventions under crises conditions seldom provide effective solutions to problems' (Ackoff 1978, p. 128). The recognition of a future crises can force us to think about creative alternative courses of action to introduce now to avert the future crises (Ackoff 1978, p. 128). In my proposed study I would like to consider actual problems within the enrolment support system but will also try to identify elements in the system which could lead to future breakdowns.

### **2.3 Methodology**

The term methodology in social sciences refers to the procedures a researcher uses to gain information about social reality (Jackson 1991, p. 1). Methodologies used are based on specific theoretical assumptions which determine how knowledge is gained in their interventions into social reality (Jackson 1991, p. 2).

Methodologies are the methods used to explore systems and to gain knowledge about them; methods or approaches used to intervene and make changes in real world problem situations (Jackson 1991, p. 2). Systems approaches are based on different metaphorical understandings, or

views of reality, which determine how the methodologies approach interventions and change organizations. The intention is to generate a systemic learning process in which the participants come to appreciate the different world views amongst themselves but still manage to reach consensus on how the required changes will be introduced (Jackson 1995, p. 28). The shift is to an interpretative approach where the process has to bring about accommodation between different value positions and create a commitment to agreed changes between the participants (Jackson 1995, p. 38).

Jackson's definition of a 'methodology' is commonly accepted; the term is used to refer to theoretically grounded sets of methods, whether the theory is explicit or implicit and whether these are used to learn about the world or to intervene in it. He concentrates on systems intervention methodologies; wanting to perform the practical task of managing problems and bringing about change (Jackson 1991, p.4). Systems thinking is dedicated to practice and common sense assumptions guide attempts to change the world. Systems practitioners may therefore place more value on gaining knowledge (theory) about real-world systems. They concentrate on the development of methodologies based on systems ideas and principles used to intervene and change systems.

Systems thinking was initially based on the traditional systems approach dominated by the positivism and functionalist characteristics of the traditional research method (Jackson, 1991, p. 5). Theorists in the 1970's, however, considered the traditional approach unable to deal with ill-structured and human problem situations. It was considered that the shortcomings in the traditional approach held back the development of the discipline and that an intervention methodology was required, based on the assumption that all research intervenes in the world and that our task is to do this in the best way possible. Researchers became interested in organizational change, not just as 'observers', but as 'agents of change' (Flood & Romm, 1997, p. 29). New approaches were developed to deal with messy human-centred activities and it was considered that approaches based on interpretive system thinking proceeded more smoothly than those governed by functionalist rationales. The involvement of participants in the change process gives them a feeling of ownership of the solution (Mingers & Gill 1997, p. 374). The involvement of participants in any planning process within our system will be essential as our participants operate from within various sub-systems with different reporting lines. If they are not part of the solution, we will have difficulty implementing the required changes (Ackoff 1981, p. 15).

In a systems approach problem situations are considered holistically, rather than reducing the problem situation into parts. Soft methodologies involve managing debate between people so that learning may be facilitated, ideals evaluated and plans of action developed; the aim is to achieve mutual understanding (Mingers & Gill 1997, p. 374). Alternative systems approaches developed during 1970-1980's include soft systems thinking, organizational cybernetics and critical systems thinking. These approaches not only challenged the traditional approach but also each other. They are based on different philosophies or paradigms. They have different uses for the term system and this became evident in Checkland's break from 'systems engineering' to develop Soft Systems Methodology (SSM) (Checkland 1978, p. 2). In SSM a system is seen as a mental construct of an observer rather than an 'enquiry' into the real world (Checkland 1978, p. 2).

Jackson describes five types of methodologies; the organizations as systems tradition, hard systems thinking, organizational cybernetics, soft systems thinking and critical systems thinking. Each methodology is based on specific theoretical assumptions, its own paradigm, but all the approaches are committed to holism and do not break the world down into functional units but rather consider it as a whole with emerging properties. They also maintain that human beings organize their knowledge into cognitive systems or structured frameworks, linking all elements of their knowledge into cohesive wholes (Flood & Jackson 1991, p. 7). In research the concept 'system' is seen as the fundamental element in the ordering of our cognitive processes. The origin of research methodologies are mostly based on four paradigms:

### **2.3.1 Background theory revealing suppositions of systems methodologies**

#### **2.3.1.1 Industrial and Social Evolution paradigm**

In his sociological theorizing Habermas states that human beings have two basic cognitive interests that drive their search for knowledge: a technical interest which is work related and based on achieving goals to sustain material well being and an interaction or practical interest focusing on relationships with others and based on a process of mutual understanding (Flood & Jackson 1991, p. 7). Social power may, however, develop in relationships and can prevent open discussion. A desire to be freed of power relationships (to decide their own future) and to learn via a process of democratic participation can bring a third interest, the emancipatory interest, into the situation (Jackson 1991, p. 12).

Three different types of knowledge are sought and these correspond with the three cognitive interests; empirical analytical knowledge linked to the technical control interest, historical heumanistic knowledge linked to the practical interest of seeking to access understanding and meaning in a world of inter-subjective life and critical science knowledge linked to the emancipatory interest (Jackson 1991, p. 6). The complexity of a situation and power relationships within the situation can however prevent mutual understanding and genuine consensus. Critical interest synthesises the first two types of knowledge and goes beyond, to provide knowledge to enable us to reflect on structures and to liberate us from the very forms we help to create but cannot escape from (Jackson 1991, p. 13-14).

Habermas tried to develop a rational basis for a critique of the development of the institution itself (Jackson 1991, p. 15). He developed his theory of communicative competence in which he observes the impact of distorted communication and alienation in institutions (Jackson 1991, p. 15).

For free and open debate we require mutual understanding and in an ideal speech interaction, participants accept four basic principles: communication must be intelligible, contact must be true, the speaker sincere and participants must have the right to speak. If any of these assumptions are questioned, we enter into discourse (Jackson 1991, p. 16). Mutual agreement can only be obtained if participants enter the discussion willingly with no constraints to participation, have equal opportunity to participate and to defend their view and have unlimited opportunity for discussion; free from constraints and domination. In an ideal speech situation it would be implied that any emerging consensus will be genuine and rationally motivated (Jackson 1991, p. 16). Distortion caused by social conditions related to freedom and justice may jeopardize the emergence of shared purposes (Jackson 1991, p. 17).

### **2.3.1.2 Sociological paradigm**

Systems methodologies are not theories or real world accounts but rather attempts to set out principles of method for systems researchers to follow when they try to learn about or intervene in the real world. The methodologies contain assumptions of how we can and should learn about reality and the nature of reality (Jackson 1991, p. 19). Assumptions about the nature of systems thinking and social systems are built into the methodologies. We should try to discover the

implied theoretical assumptions of different systems methodologies and Burrell and Morgan developed a map of sociological paradigms to assist with this (1979, Jackson 1991, p. 17).

They maintain that theories about the social world can be understood in terms of four paradigms, or assumptions, directing understanding about the nature of social science and society. These assumptions can be objective or subjective. The distinction between objective and subjective assumptions forms the first dimension of their framework.

Theories underpinned by **objective assumptions** will perceive society as having a hard objective (realistic) existence, external to the individual. They search for regularities and causal relationships in the social world. Human behaviour is seen as being determined by external circumstances. Scientific tests, quantitative methods and analysis are the preferred techniques for collecting information. Theories based on **subjective assumptions** seek knowledge of the view of people in a creative social reality. Researchers will try to get as close as possible to the subject under investigation (Jackson 1991, p. 17).

Burrell and Morgan further stated that assumptions about the nature of society can seek either regulation or radical change. When **seeking regulation** we are studying the existing situation; society is seen as consensual and researchers study mechanisms maintaining social control. Sociology of **radical change** (Jackson 1991, p. 19), however, seeks explanations for radical changes within social systems. Society is seen as driven by contradictions and structural conflicts. The difference between seeking regulation and seeking change makes up the second dimension of the framework. By combining the objective-subjective and regulation-radical dimensions, a matrix is produced which defines the four sociological paradigms: functionalist, interpretive, radical structuralist and radical humanist.



**Diagram 2-3: Sociological paradigm matrix**

	<b>RADICAL    CHANGE</b>		
<b>S U B J E C T I V E</b>	<b>RADICAL HUMANIST</b>	<b>RADICAL STRUCTURALIST</b>	<b>O B J E C T I V E</b>
	<b>INTERPRETIVE</b>	<b>FUNCTIONALIST</b>	
	<b>REGULATION</b>		

(Jackson 1991, p. 20).

Each paradigm generates its own distinctive analysis of social life. Jackson argues that systems methodologies are built upon assumptions about the nature of systems thinking (social science) and social systems (society). The grid assists us to relate systems methodologies to different sociological paradigms and to determine what they may 'take for granted about social science and society' (Jackson 1991, p. 19). We can either question these assumptions or agree that some methodologies may be more appropriate in certain problem situations than others.

Within the functionalist paradigm (objective, sociology of regulation) systems are seen as having a hard, easily identifiable, independent existence. There are regularities in the relationships between sub-systems and the whole. Individuals within the system act orderly. These characteristics facilitate prediction and control of the system.

Systems within the interpretive paradigm (subjective, sociology of regulation) are softer and cannot easily be identified. They are in existence as a result of the creative constructions of human beings. In studies we try to understand subjectively the viewpoints and intentions of the humans who construct these systems. People are in the system of their own free will and we cannot produce a quantitative model of the system. The researcher needs to get into the system to

try to understand the current situation and through this understanding prediction and control may be enhanced (Flood & Jackson 1991, p. 21).

Systems within the radical structuralist paradigm (objective, sociology of radical change) have a hard existence external to us. We need to find the causal regularities governing their activities. Not much attention is paid to human intentions. A quantitative model can be developed and the emphasis is on finding contradictions within the system and conflict between groups within the system. It facilitates the emancipation of the humans from their existing social structures (Jackson 1991, p. 23).

Systems within the radical humanist paradigm (subjective, sociology of radical change) are creations of human beings and we need to understand the intentions of the people who constructed them. People can change the systems they create and we can learn about them by involving ourselves in their activities. We need to search for understanding of the current social arrangements in which we will find human development. This approach facilitates the emancipation of humans from their current social structures (Jackson 1991, p. 23).

The classification in the grid has been criticized by other theorists because it does not allow us to differentiate between functionalism and structuralism. Theorists found this problematic as transitional cybernetics differs from hard systems thinking because it is based on structural rather than functional assumptions. Structuralism is concerned with discovering the underlying structures or systems of relationships which govern the characteristics, or phenomena we observe on the surface (Jackson 1991, p. 23). An attempt is made to provide models of the causal processes at work at the deep structural level that produce the elements and relationships between elements on the surface (Jackson 1991, p. 23).

### **2.3.1.3 Metaphors of organisation paradigm**

Metaphors are linked to organizations and each metaphor provides an understanding of the character and functioning of an organisation. The way we choose to see an organization will influence the approach we choose to study or change the organization (Jackson 1991, p. 23). Where systems methodologies are based on metaphorical understandings of the nature of systems it will add to the strength of a methodology if we can identify which image of an organization is embedded within that methodology.

In the **machine** or '**closed system**' view emphasis is on bureaucratic and scientific management (Flood & Jackson, 1991, p. 9). This metaphor is considered a pre-system thinking and views a machine as a technical apparatus consisting of several parts, each with its own function (Flood & Jackson 1991, p. 7). The machine performs predetermines activities, in a routine way, to reach pre-set goals and objectives. The emphasis is on internal control and efficiency of the parts. No emphasis is placed on the environment.

When an organisation is considered a **machine**, it is seen as goal orientated by the people who control it. Parts are set up to assure maximum efficiency and decision making and control within the organisation are based on rules and a hierarchy of authority. This view is useful when a task is simple and repetitive but breaks down when it reduces the adaptability of the system and thereby making it unable to cope in changing circumstances. It will also not be successful when the aims of the system and those of the humans within the system are conflicting (Food & Jackson 1991, p. 9).

The machine view was challenged by the emergence of systems thinking in which systems were being considered as complex systems. Systems thinking was initially based on biological sciences and that foundation resulted in the creation of the **organic model** of a system in which the machine view is challenged and emphasis is placed on the psychological and social needs of humans within the system (Flood & Jackson 1991, p. 9). The primary aim of these systems was seen as survival rather than goal seeking as in the case of the machine. It is an open system, made up of a complex network of elements and relationships. The system depends on feedback to manage self-regulation to assure survival. Survival and adaptation are the key concepts linked to these open systems (Flood & Jackson 1991, p. 10).

An organization considered as an **organism**, will have a complex system of which the parts exist in close interrelationship. These organisations can be studied as wholes. Their primary aim is their own survival and certain needs must be met by sub-systems to ensure the survival of the whole. These are open systems and they take action in response to changes in their environment. The organic view is useful when there is an open relationship between the organisation and the changing environment and where certain needs have to be fulfilled to promote the survival of the system. It promotes change and responsiveness and application is successful when the system is embedded in a complex and competitive environment. It does however not consider the impact

of humans on a system and breaks down when conflict and coercion disrupts its harmony. This view sees change as a response to external developments and does not allow for proactive development from within the system. (Food and Jackson 1991, p. 10).

The **neurocybernetic** view of a system was developed in parallel with the organic view. In this model the concentration is on active learning and control in contrast to the passive adaptability found in the organic metaphor. The key elements focused on in the neurocybernetic or brain metaphor are information processing and viability (Flood & Jackson 1991, p. 10). The metaphor considers the brain an effective control system with an ability to communicate and learn. Building on cybernetics the brain model has a transformation process (transforming that what is being controlled), an information system (relaying needs for change to a control unit), a control unit that considers the need for change by comparing the actual and the ideal states, and an activating unit, bringing about the change desired by the control unit. The control function will however only be effective if the variety available to the controller is equal to or greater than what is being controlled (Flood and Jackson 1991, p. 11). The metaphor propagates dividing the whole into parts and creating connectivity and redundancy, and simultaneously emphasizing the need for specialization but also generalization (Flood & Jackson 1991, p. 11).

When the **neurocybernetic or brain metaphor** is linked to an organization it implies that emphasis is on active learning rather than passive adaptability. The focus of the organization is on decision making and collection of information. If the task uncertainty is high, alternative systems are required to either increase or reduce the capacity of information processing. The approach allows for goal seeking based on learning, it promotes creativity, self learning and self criticism, especially when there is a high degree of uncertainty. It neglects to consider that the purpose of the parts of the system may be different from the purpose of the whole. The demand for change may be resisted by people clinging to the 'status quo.' This view does not consider that organisations are socially constructed phenomena (Flood & Jackson 1991, p. 11). Morgan added more to the metaphor by including the second loop of learning. In double-loop learning we consider the assumptions on processes are built on or the norms we apply. Organization then 'become capable of learning to learn, questioning the actual appropriateness of what they are doing' (Morgan, Jackson 2000, p. 28).

In the **culture or family** metaphor we consider the familiar and often unspoken ways of thinking and resulting actions within any system. A corporate culture can be reflected by employees who have and

accept a community-like collaborative spirit. An official as well as an unofficial (or even sub-cultures) culture may exist within an organization (Flood & Jackson 1991, p. 11). Culture refers to the shared characteristics present at any level.

At the level of the firm a culture is a shared reality (of values and beliefs) that deems certain social practices to be normal, acceptable and desirable (Flood & Jackson 1991, p. 11).

The culture embraced will determine how an organization reacts to change and considers the feasibility of the proposed changes.

An organisation is treated as a **culture or family** when its efficiency and effectiveness are not affected by the logical design of appropriate structures. The 'essential character of these organisations is conditioned by the fact that their component parts are human beings who contribute meaning to their situation' (Jackson 1991, p. 25).

Humans can determine the purpose of an organization and see the organisation as they wish to construct it (Jackson 1991, p. 25). Organisations are seen as 'processes in which different perceptions of reality are continually negotiated and re-negotiated' (Jackson 1991, p. 25). The long term survival of the organisation will depend on its ability to develop shared values and beliefs. This view is successful when we consider that

'rational' aspects of organizational life is only rational in terms of the 'installed' culture and that there are other values with which any official culture can be contrasted' (Flood & Jackson 1991, p. 12).

Flood & Jackson (1991, p. 12) further states that cohesion is generated through shared practice and needs to be well managed as it can either inhibit or encourage organizational development. In this perspective organization change is dependent on changes in the cultural perspective built on the perceptions and values of human beings within the organizations (Flood & Jackson 1991, p. 12.). The approach may lead to explicit ideological control in larger organisations and employees may feel manipulated and resentful. Organizational culture develops over time and it will take time to implement changes or for some groups to accept specific ideologies. The approach does not provide guidelines for organisational structuring and cannot be applied where behaviour within the organisation is determined by internal conflict (Flood & Jackson 1991, p. 12.).

In the **political or power metaphor** relationships between participants and between groups in the organisation are seen as competitive and involves the pursuit of power. Industrial relations literature differentiates between three different types of political situations; unitary (common objectives but a desire for leadership), pluralist (divergent group interests but conflict can be resolved) and coercive (opposing and contradicting interests, requiring radical change due to presence of inequality and domination). These differences are used to distinguish types of relationships between participants in a problem situation (Flood & Jackson 1991, p. 13). In these situations the focus is on interests, conflict and power and using the metaphor makes us aware of the possibility of conflict within an organization.

Organisations linked to the **coercive or political** metaphor are seen as hierarchical systems which are composed of different class and status groups. These groups have different interests and the organisations are held together by power groups who control the activities of others. The relationships between classes are exploitive and organisations are coercive systems involving structural conflict, internal domination, contradiction and radical change within the organisation. (Jackson 1991, p. 26). Organisational activities are based on specific interests and power plays a role in political outcomes. Goals set may be seen as rational by certain actors while others may not be willing to pursue those specific goals. This view places the emphasis on functionality and order. In order to obtain order, existing tensions and constraints have to be broken down or managed. The approach does however encourage the recognition of political interests of actors (political activity within the organisation) and this recognition is used for motivational and structural purposes. This view breaks down when the political situation dominates the functioning of the organization. Three types of relationships emerge between the individuals and the organization: unitary relationships imply that the organization is well integrated in the pursuit of common goals and interests; pluralist relationships emphasize the diversity of individual and group interests and radical relationships see the organization as a loose coalition and an instrument of dominance, used by some to benefit themselves at the cost of others (Jackson 2000, p. 29).

The view of organizations as **psychic prisons** derives from the work of Freud and other psychoanalysts. Organisations may be reflections of our minds; reflecting repressed sexuality or a desire to protect ourselves from fear or death. Organizations can also be the manifestations of ideologies which we consciously or sub-consciously embrace and which may trap us in alienating forms of behaviour (Morgan, Jackson 2000, p. 29).

In the **flux and transformation metaphor** organizational systems are compared with natural systems which are in themselves not stable absolutes. The butterfly effect (Jackson 2000, p. 83) demonstrates how an insignificant change produced by a small element at one point may cause a dramatic change to the system as a whole at a later stage. The structures of organizations are not seen as built on established relationships with the environment but they emerge from continuous interaction between parts which are unstable. A system is undergoing 'continuous structural change while preserving its web-like pattern of organization' (Carpa 1996, Jackson 2000 p. 79). Organizations do not try to sustain stable equilibrium but try to seek the 'edge of chaos' by using changes for further development (Jackson 2000, p. 194). Long term planning is not possible and management must manage an unknown future. (Jackson 2000, p. 190). The aim is to manage the balance between legitimate ordinary (goal seeking) managerial elements and shadow/informal or extraordinary management. (Jackson 2000, p. 194). Legitimate management will try to sustain the status quo while the informal management elements will fight for change. This tension must be carefully managed or the system will fall into chaos. (Jackson 2000, p. 190,191, 194).

The view of organizations as **instruments of domination** 'is based on Marx's account of the capital labour process'. (Jackson 2000, p. 30). Organisations are seen as hierarchical systems made up of different class and status groups who may have unbridgeable interests within the structure of the organization or society (Jackson 2000, p. 30). Organisations only manage to hold together because the power of some groups control the activities of others. Relationships between different groups are based on conflict and management must control such conflict and the labour process to ensure that the power groups maximize their benefits (Jackson 2000, p. 30).

#### **2.3.1.4 Modernism versus postmodernism paradigms**

This paradigm focuses on the establishment of a 'postmodern' theoretical position in social sciences which involves changes to our culture and the way we understand knowledge and reality and the way this is linked to developments in society (Jackson 1991, p. 32). This 'postmodern' culture is associated with post industrial society, consumer society, media society, knowledge and information based society, dominance of multi national companies, decentralization of enterprises and a new stage of capitalism in which everything becomes a commodity (Jackson 1991, p. 32.). The culture has had a distinct influence on architecture, literature, art, theatre and also social

theory. A new social and economic system was born and systems methodologies had to respond to the claims identified by the postmodernists.

Modernism is committed to the achievements of the enlightenment, upholding reason and believing that it can play an increasing role in helping human being perfect themselves and their societies (Jackson 1991, p. 33).

The world is seen as logical and orderly; objective truth can be reached through scientific studies. The meaning of history is determined by the rationalization of social systems. There is progress towards obtaining a unitary, predictable end state, either the emancipation of humanity or the perfect functioning of a system. Language is seen as transparent and an ideal tool for conveying the truth and reaching consensus. Modernism upholds the order of things and strives for consensus (Jackson 2000, p. 35). Modernist explanations of human development, the increasingly complex society we live in and the direction of progress are rational and in depth and provide a feeling of security for the human race (Jackson 2000, p. 35).

Postmodernism disrupts the certainties introduced by modernism; it questions rationality, truth and progress (Jackson 1991, p. 32).

It denies that science has access to objective truth, and rejects the notion of history as a progressive realization and emancipation of the human subject or as an increase in the complexity and steering capacity of societies (Jackson 1991, p. 32).

The development of a 'meta-language' propagated by the modernists is questioned; language is not seen as universal and cannot be used to reach world-wide consensus (Jackson 1991, p. 36). We have to allow for a multitude of different interpretations of the world. Struggle and dissension are present and generate innovation and 'motivate human behaviour' (Jackson 1991, p. 36). Communication should therefore lead to 'innovation, change and renewal' and should be discouraged from establishing conformity (Jackson 1991, p. 36). '...there is no meta-theory' available to 'reconcile or decide between different positions' (Jackson 2000, p. 36).

Postmodernism offers no security and 'thrives on instability, disruption, disorder, contingency, paradox and indeterminacy' (Jackson 2000, p. 36). It emphasizes superficiality and play, rather than seriousness and depth. The concentration is on image rather than reality (Jackson 2000, p. 36). If we consider systems methodologies in terms of the modernist and postmodernist philosophies, we note for example, that Operational Research can be linked to the postwar consensus philosophy (Jackson 1991, p. 36). It is applied best to 'large centralized and



hierarchical organizations' (Jackson 1991, p. 36). If we consider the postmodernist idea that history can no longer be predicted, it will have little value if we continue to support methodologies to develop forecasts about possible futures systems may have. Methods depending on 'deep analysis of systems in search of laws and regularities' such as the scientific method, are also 'unlikely to receive much support' (Jackson 1991, p. 37). 'It will be more productive to emphasize the superficial, to concentrate on image, to note accidents, and to respect arbitrariness and discontinuities' (Jackson 1991, p. 37).

If no grand narrative is available

'to guide the idea of progress, systems methodologies can only bring about temporary and contested improvements. In a world of multiple truths competing for prominence, systems practitioners will be impotent unless they recognize the social, political and ethical contexts of their work' (Jackson 1991, p. 37).

Having considered the emergence of philosophies behind systems methodologies, we can now turn to the classification of systems methodologies to assist us with the choice of methodology to be used in our problem situation (Jackson 1991, p. 38).

## CHAPTER 3: SOFT SYSTEMS METHODOLOGIES

A wide range of systems methodologies is available to choose from and each has been tested and found effective under certain circumstances (Flood & Jackson 1991, p. 32). Guidelines have been provided on the respective strengths and weaknesses of the different approaches and the guidelines also provide information on the situations in which specific approaches are more successful. The diversity of the approaches should not be seen as confusing but rather as a strength of systems thinking (Flood & Jackson 1991, p. 32). Understanding of the different approaches adds to our ability to act efficiently and competently in a variety of problem situations (Flood & Jackson 1991, p. 32).

A system of systems methodologies was developed based on the underlying assumptions that the methodologies make about problem situations in terms of metaphors (Flood & Jackson 1991, p. 32). Two new dimensions were added to the 'classification' of systems methodologies, providing a clearer understanding of the use of metaphors and how they are interrelated. This understanding, based on the nature of problem situations, assists with the selection of a methodology and type of intervention most suitable in a specific problem context (Flood & Jackson, p. 33).

### 3.1. Grouping problem contexts

The classification of problem contexts should be seen as an 'ideal' type classification drawing out key features of problem concepts. No real world situation could be expected to fit exactly in any of the boxes (Flood & Jackson 1991, p. 32). In the classification, problem situations are grouped along two dimensions: systems and participants.

In the systems dimension we consider the relative complexity of systems within a problem situation; the system may contain difficult pluralistic or coercive issues. In the participants dimension we concentrate on the relationship between individuals who may gain or lose from the interaction.

In the classification of **participants** relationships between participants are defined as unitary, an intervention into the system (Flood & Jackson 1991, p. 33). It was argued that these two dimensions cast light on the nature of the problems and characteristics of problem situations.

Systems can be classified along a continuum of 'system types' with simple systems at the one end and highly complex systems on the other extreme. In a **simple system** we will find a small number of elements with little interaction between them. The elements have predetermined characteristics and the interaction between them is highly organized. The behaviour within such systems is governed by clearly defined laws and the system does not evolve over time. Sub-systems within the system do not have their own goals but perform functions contributing towards the goal of the system as a whole. The system is closed to the environment and not affected by behavioural influences (Flood & Jackson 1991, p. 33). In a **complex system** we find a larger number of elements with many interactions between them. These interactions are loosely organized and the attributes of the elements are not pre-determined. Systems are probabilistic in their behaviour and evolve over time. Sub-systems within complex systems pursue their own goals. These systems are open to the environment and they are subjected to behavioral influences (Flood & Jackson 1991, p. 33).

In **unitary relationships** participants share common interests and their values and beliefs are highly comparable. Participants agree on ends and means. They take part in decision making and act according to agreed objectives (Flood & Jackson, p. 34). In **pluralist relationships** participants have a basic compatibility of interests but their values and beliefs may diverge. They do not always agree on ends and means but strive to reach compromise. All participants take part in decision making and act according to agreed objectives (Flood & Jackson 1991, p. 34). In **coersive relationships** participants do not share common interests and their values and beliefs are likely to conflict. It is difficult to obtain 'genuine' compromise and some participants may be coerced to accept decisions (Flood & Jackson 1991, p. 34).

When the systems and participants dimensions of problem contexts are combined a six cell matrix can be formed, identifying the following types of content (Flood & Jackson 1991, p. 35):

**Diagram 3-1: Classification of problem contents in terms of complexity and participants**

	UNITARY	PLURALIST	COERSIVE
SIMPLE	Simple-unitary	Simple-pluralist	Simple-coersive
COMPLEX	Complex-unitary	Complex-pluralist	Complex-coersive

(Flood & Jackson 1991, p. 35).

The different characteristics of these problem contexts are useful when we consider types of ‘problem issues’. The next step would be to determine how the assumptions underpinning existing systems approaches reflect on the problem context identified in the grid. It is important to understand that in the grouping of systems approaches we concentrate on the essence of the different approaches. Assumptions about methodologies do not preclude their inclusion in more than one cell and methodologies may also transcend the matrix of cells (Flood & Jackson 1991, p. 35).

### **3.1.1 Simple-unitary problem context**

Approaches recommended for use in such problem contexts include operational research, systems analysis, systems engineering and system dynamics. In these approaches it is assumed that the objectives of the system under investigation can be easily identified and that there is no dispute between participants about these objectives. The performance of such systems can be simulated in a quantitative and highly structured model under different operational conditions. The assumptions underpinning these methodologies are linked to the machine metaphor (Flood & Jackson, 1991 p. 36).

### **3.1.2 Complex-unitary problem context**

Approaches to be used in these problem contexts include: viable systems diagnoses, general systems theory, socio-technical systems thinking and contingency theory. The system under investigation will exhibit many features of a complex system. Many elements in close relationships within the situation display probabilistic behaviour which is difficult to predict. It is

considered that the system is open to the environment. The approaches assume that there is agreement about the objectives pursued. These approaches are linked to the organism and brain metaphors (Flood & Jackson 1991, p. 37).

### **3.1.3 Simple-pluralist problem context**

The recommended approaches for these problem contexts are: Social systems design and Strategic Assumptions Surfacing and Testing (SAST). In these situations issues are difficult to handle as participants differ on the objectives to be pursued. It is assumed that once this problem is overcome, all other matters will be easy to resolve. These approaches are based on the culture metaphor (Flood & Jackson 1991, p. 38).

### **3.1.4 Complex-pluralist problem context**

The methodologies recommended for use are Interactive Planning (IP) and Soft Systems Methodology (SSM). In these situations there is a lack of agreement about goals and objectives but genuine compromise is possible. The approaches offer guidelines on how to deal with the complexity of the design of desired systems, as well as the cultural and coalition elements of the political metaphor (Flood & Jackson 1991, p. 39).

### **3.1.5 Simple-coercive problem context**

Critical systems heuristics is recommended for contexts underpinned by the prison metaphor. This approach uncovers the politics within problem contexts, where different values, interests and beliefs exist and where groups within the situation try to use their power to force their strategy on others (Flood & Jackson, p. 40). It deals with the two basic human interests, technological (or work related aimed at economic advancement) and the historical humanistic interest (aimed at interaction and social processes) and introduces a third interest; the emancipatory interest (Jackson 2000, p. 32,33). The emancipatory interest deals with the human desire to free itself from domination and to decide on its own future through a process of free and open ('ideal speech') communication (Jackson 2000, p. 34). The Theory of Communicative Competence deals with the requirement for an 'ideal speech' situation (McCarthy 1973, Jackson 2000, p. 33).

### 3.1.6 Complex-coercive context

In these problem situations complexity may hide ‘the true sources of power of the various participants (Flood & Jackson 1991, p. 41). Methodologies need to concentrate on the sources of power of participants, the changes considered desirable within the organisational culture, the removal of biasness within the system and the relationship between organisational hierarchy and the wider society on issues such as class, race, sex and status (Flood & Jackson 1991, p. 41). We need to understand the principles of the psychic prison, domination and chaos or complexity metaphors.

Habermas moved away from human emancipation (dominated by instrumental reasoning aimed at economical gain) and concentrated on ‘emancipation through communicative action’ (Jackson 2000, p. 35). Postmodernism deals with the changes in cultures and society but also embraces a new theoretical position associated with complex postindustrial society. We are urged ‘to be tolerant of differences and of multiple interpretations of the world’... ‘there is no meta-theory that can reconcile or decide between different positions’ (Jackson 2000, p. 36). Postmodernism offers limited security and ‘thrives on instability.....and indeterminacy’ (Jackson 2000, p. 36). Little support is given to analysis or ‘laws of regularity’ and we are encouraged to accept the ‘disorder’ resulting from multiple perceptions (Jackson 2000, p. 38,40). Chaos and Complexity theory recognizes that ‘social systems are able to change and evolve over time’ (Jackson 2000, p. 82). They are not bound by fixed rules of interaction; the ‘non-linearity’ makes prediction impossible’. We need to identify patterns (Jackson 2000, p. 190).

‘Events are connected to other events – they occur in systems. Systems are sub-systems of larger systems. Relationships between variables rather than single variables become the primary object of study’ (Jackson 2000, p. 88).

Management is encouraged to concentrate on development and to recognise that there was little value in long term planning. They had to embrace change and manage the tension between the ‘legitimate’ (official goal directed) system and the ‘shadow’ (challenging) system. (Jackson 2000, p. 194). They needed to sustain the ‘edge of chaos’; the desired tension between ordinary and extra ordinary management (Jackson 2000, p. 194).

### 3.2 Grouping types of systems methodologies

Diagram 3-2 below provides a summary of the grouping of systems methodologies based upon assumptions they make about problem contexts. The relevant metaphors on which these methodologies were developed are listed for each group.

**Diagram 3-2: Grouping systems methodologies based on problem contexts**

	UNITARY	PLURALIST	COERCIVE
<b>SIMPLE</b>	<b>S-U</b> Operational Research Systems Analysis Systems Engineering Systems Dynamics	<b>S-P</b> Soft Systems Design Strategic Assumption Surfacing Testing	<b>S-C</b> Critical Systems Heuristics
<b>COMPLEX</b>	<b>C-U</b> Viable Systems Diagnosis General Systems Theory Socio-tech Systems Thinking Contingency theory	<b>C-P</b> Idealised Planning Soft Systems Methodology	<b>C-C</b> Emancipatory theory Postmodernism Complexity theory
<b>Metaphors Underpinning Methodologies</b>	Machine Organism Brain Team	Coalision Culture	Psycic prison Complexity Domination

(Adapted from Flood and Jackson 1991, p. 42).

### 3.3 Selection of research methodology

The aim of my research was to use a soft systems approach to gain knowledge about our existing student enrolment support systems and through shared discussions with staff performing the key functions, design an improved system, acceptable by all the participants affected by the functioning of the system. Woll, (Woll 1996, p. 1) writes, that the challenge of organizational

planning lay in the establishment of a process to determine the correct strategic directions the organisation had to take and then to get employees invested in putting the strategy into place to ensure a successful operation. No company could succeed if they had the correct strategy but could not put it into action. If it was possible to put it into action, however, you had a powerful system of strategic management in operation (Woll 1996, p. 1).

In the selection of a suitable methodology, I therefore needed to consider methodologies which would generate the required information and which would assure maximum participation of as large a group of people affected by the system as possible, as such participation and acceptance of the new plan would facilitate the implementation of the new system.

In considering the problem context to be investigated and matching that to the problem context classification matrix; which was based on system complexity and participant relationships in a research situation, my problem situation would fall in the complex-pluralist category (Flood & Jackson 1991, p. 35).

The system to be investigated was considered complex as its characteristics included a large number of elements, many interactions between elements, loosely organized interaction between elements which were probabilistic in their behaviour, a system evolving over time, sub-systems within the system were purposeful and generated their own goals and the system was subject to behavioural influences and was largely open to both the containing and the external environment (Flood & Jackson 1991, p. 33, 34, 39).

In our pluralist relationship situation, participants had basic compatibilities of interest, values and beliefs diverge to some extent, participants did not necessarily agree upon ends and means, compromise was possible, all members participated in decision making and participants in general acted in accordance with agreed objectives (Flood & Jackson 1991, p. 33, 34, 39).

On the six-cell problem context matrix, Jackson recommended that we chose either Interactive Planning (IP) or Soft Systems Methodology (SSM) for use in complex-pluralist problem situations (Flood & Jackson 1991, p. 39). The metaphors underpinning these methodologies were cultural as well as political. Ideas from the machine, organism and brain metaphors were also included (Flood & Jackson 1991, p. 150). The methodologies provided recommendations for analysis and intervention as their basis. Debating methods were aligned with pluralist contexts as



they could be helpful in providing a basis for mutual understanding and decision making (Mingers & Gill 1997, p 374).

For the design of an improved enrolment support service we aimed to apply a practical soft systems approach which would help us understand the underlying elements in our situation. A situation in which the research subjects themselves did not yet have a clear understanding of the real situation. We required a research method, which would allow us a deep understanding of problems in the existing systems as well as assist us to identify the transformations required for the new system. In our problem situation the researcher would not be an observer collecting information but an agent of change, directing interventions (Flood & Romm 1997, p. 30). The research situation would have to be considered holistically rather than trying to understand certain parts. The approach selected had to be the most suitable for this specific situation and the methodology might have to be extended by making use of aspects of other approaches. We required a soft debating methodology in this pluralist situation to ensure consensus was reached amongst a large number of participants on the new system to be introduced. We might have to include some boundary challenging elements in the more problematic areas where ownership of functions could be contested.

IP and SSM, were both aimed at bringing about greater understanding, identifying the transformations required to establish a better system, and at creating a shared planning process. Pluralistic issues were seen as integral with particular perspectives on the nature of the organization and when non-coercive disagreement is present, these debating methods could be helpful in providing a basis for understanding and shared decision-making.

Our choice of methodology was influenced by the guidelines for design communicated in the UKZN merger documentation (University of Natal 2003, a & b, S). We had been advised that in planning discussions members from the two original Universities would be equal partners and we could not maintain the status quo. We were encouraged to design a new holistic system for the merged institution. Personal differences and historical preferences had to be ignored and the planning done had to focus on the best system for the new institution. Political and cultural issues could be mentioned in the creativity phases, but had to be ignored once the boundaries and mission had been set (University of Natal, 2003 a & b, S).

The research project would be based on a real life situation, involving a multitude of staff members at different levels within the University and the end product should contribute to a shared understanding and a willingness to implement the developed procedures and accept the proposed structures for an improved student enrolment support service. A practical outcome we hoped for was the documentation of sets of University wide accepted and implemented procedures, simplified reporting structures, clear boundaries and communication flows as well as a shared commitment to the transformations which may be required to improve the existing system. It was important that members from all levels in our system participate in the research process to generate a better understanding and to add to the development of staff at lower levels.

Interactive Planning (IP) was selected as the preferred methodology. IP would allow us to consider the existing system in depth as well as to design a new idealized support system in terms of our brief. We had no clear understanding of what a 'new' office or improved service would entail and the onset of the research and could not identify the exact problems in the existing system. We wanted to gather as much information on the system from as wide an environment as possible. Through its Planning Board structure IP would allow staff members at all levels and across campuses to take part in at least the mess analysis phase which will contain discussions and considerations of the existing system. Different sub-systems would be considered across the University and it is possible to assign specific areas to the individual planning boards which would enable us to gather information from various sub-sections at the same time.

The principles guiding IP were most suitable to our situation as we were not allowed to remain in our current future. Our future changed completely when the two Universities merged. Sub-sections now dependent on each other had never worked together before and had never been part of the same system before. In the merger we combined a centralized system with a semi-centralised system and have never audited the system to align inconsistencies. We had to embark on a systemic investigation of our system as a whole and if required, develop a new ideal system to take us into the future.

The value of the project would not so much lie in the final product but in the sharing and understanding we hoped to generate throughout the debating sessions (Jackson 2000, p. 235). Taking part in discussions would help staff to get to know each other better and to understand how their actions in their sub-systems might affect participants in other subsystems (Jackson 2000, p. 236).

The step by step guidelines Ackoff provided for the mess analysis in this methodology would make it possible for the staff at the lowest levels to take part in the process. These staff members did not have the theoretical background or experience in planning for themselves. The practical guide Ackoff provided would assist their understanding and guide their contributions. The same members might not be able to take part in the whole process, but as many staff members as possible would be given the opportunity to contribute to the project.

IP complied with the requirements of a soft systems approach as it provided both a theory and a practical methodology for conducting the research (Flood & Jackson 1991, p. 144). Ackoff in his methodology provided guidelines for investigations into the procedural flows, income and expenditure and obstructions to developments of systems. This information was required by the Executive as part of the merger planning process and by using the IP approach we will be able to gather information on existing procedures from all campuses. Where differences existed we negotiated a best practice approach through shared discussion. The IP approach and examples of presentation/mapping would therefore assist us with the extraction, debating and recording of the results.

### **3.4 Idealised Planning (IP) methodology**

The philosophy underpinning Ackoff's Idealized Planning methodology (IP), is that a management scientist should not build mathematical models to predict the future, but rather assist the participants of an organisation to redesign a desirable future and to invent ways to bring it about. Planning should be continuous, holistic and participative. Its most original element is that the phases of the planning process should be centered round the idea of an idealised future. It endorses the principle that we must plan for ourselves in its philosophy and provides a set of practical procedures through which this is made possible.

Ackoff advocated wide participation and involvement in planning and design. It is an interactive process in which people's models of reality differ. In order to perceive the changes taking place in the world we needed a changed perception of the world and the nature of organisations. The changed perception will enable us to determine what type of planning approach is required by the new circumstances.

In IP, organisations are not considered as machines but organisations must be considered as responsible to themselves as well as to the wider system of which they are part. Organisations serve three sets of purposes: they are themselves **purposeful systems**, they contain other **purposeful parts** and they themselves **are part of a wider purposeful system** (Flood & Jackson 1991, p. 146). This changed perception of organisations requires a different kind of planning, reflecting the new way of thinking, namely 'interactive planning'. This type of planning is participative and allows others to plan effectively for themselves.

The five phases of IP structuring the research process constitute a systemic process. The phases may be started in any order and none of the phases or even the whole process is ever considered complete (Flood & Jackson 1991, p. 150). Learning and subsequent change is continuous and could be as a result of internal or external changes. IP is an ethical approach in which no inherent position is considered at the start. It focuses on broader issues and pushes the boundaries out completely (Ackoff 1981, p. 110-112). Once the desired future is defined, IP designs a system for that future.

IP will allow us to develop understanding, and through shared discussion, define the requirements to reach our ideal system. IP provides a high level of learning. It pushes limits out and can bring about a complete change. IP does, however, fail to take account of coercive situations in organisations. Ackoff's work is based on the assumption that participants share the same world view and are equally committed and willing to enter a participative design process (Flood & Jackson 1991, p. 158).

In the methodology the scope of the project is artificially limited and fundamental interests of clients are not challenged. By not broadening the scope, attention is not paid to aspects which could lead to conflict such as distribution of resources, rights and power of stakeholders, conflicts based on status and inequalities in organisations. IP can successfully be applied when there is 'no fundamental conflicts of interest between 'system', 'super-system' and 'sub-systems' which cannot be dissolved by appealing to the basic community of interest' (Flood & Jackson 1991, p. 158). Where structural conflict does exist, it can affect the way interactive planning is used and the results it hopes to bring (Flood & Jackson 1991, p. 159). IP is therefore not considered useful in coercive situations.

The 'mess analysis' phase of this methodology allows participants to collect information about the existing system. It is important that as much information as possible is shared in the creativity stage of the methodology as it is important for each member of the system to understand what is happening and why. Members need that information to feel less threatened by the changes and to enable them to take part in the shared planning process.

During the planning process participants need to develop a shared identity, based on a shared vision of what we would like to do and this shared understanding will enabled us to move forward. By using this information we can determine the requirements of our stakeholders and formulate our mission to meet those requirements in a unique way.

In the use of IP we have to understand that we are designing a new system, not tampering with existing systems to make them more acceptable or to retain the status-quo. IP is based on some principles of re-engineering which is defined as 'the fundamental re-thinking and radical redesign of business processes to bring about dramatic improvement in performance' (Hammer & Stanton 1995, p. 3). The key concepts in this definition of re-engineering emphasizes that our system has to make a dramatic leap in performance; that we have to consider the very root of our system (if it did not exist today, how would we design it?); we have to group related tasks together to create value for our customers; we have to consider how functions are performed. It is not the intention that we redesign our product, but we need to consider our processes (Hammer & Stanton 1995, p. 5). In re-engineering a radical new system construction is sought in which interrelated processes are performed in a way that would provide an improved service delivery to stakeholders (Hammer & Stanton 1995). IP should however not be confused with re-engineering methodology. In re-engineering and attempt is made to re-design processes, whiles in IP the emphasis is on the design of a new system. The new system will impact on processes, but those are not the key focus in the re-design exercise.

We need a changed perception of the world and to be able to understand the changes which have to take place. Only then will we have been able to determine what type of planning is required for the new circumstances. The changed perception could be brought about through an interactive process in which people's models of reality differed.

In terms of Ackoff's theory, the new system to be designed will in itself be a purposeful system, containing other purposeful parts, and be part of a wider system (Flood & Jackson, 1991, p. 146).

The system will be responsible to itself as well as the wider environment it forms a part of. This changed perception of a system requires a new kind of planning, reflecting the new way of thinking – ‘interactive planning’ (Flood & Jackson 1991, p. 146). This type of planning is participative and allows people to plan for themselves. We now had the opportunity to question previous plans in which we played no part or which we inherited from the two old systems as part of their culture and traditions (Hammer & Stanton 1995, p. 12).

In merger situations the application of Interactive Planning will enable us to share information and plan together for our new shared future. Mergers force organizations to consider their processes, the similarities or conflicts between their systems. Organisations are in flux during mergers, undergoing many changes, so it could be expected that staff in such situations would be more open to accepting changes and to the implementation of new ideas (Hammer & Stanton 1995, p. 12).

It is important to have management support during transformation exercises. Such support will ensure that, if feasible, new innovative systems and ideals could in fact be implemented (Hammer & Stanton 1995, p. 23). Leadership is expected to support transformation efforts from the very start of the process. Their support is important in the implementation stages when not all participants may be willing to accept changes. The ideal is that all members would be willing to change after continued debate and attempts at reconciliation.

‘Idealized design facilitates the widespread participation of all those who are potentially affected by the product of the design’ (Ackoff, 1978, p. 30). No special skills are required. The process is fun and everybody has a chance to think and learn about the system that is important to them. It enables them to become conscious of and express their stylistic preferences and ideals (Ackoff 1978, p. 38).

Many innovative ideas form part of an organizations ‘underground culture’ and staff might just have been waiting for an ‘official change effort to surface and share their concepts’ (Hammer & Stanton 1995, p. 24). A formal change effort will provide people who had no assurance before that their ideas would be considered, the opportunity and confidence to abandon their self-censorship, and raise their ideas in open debate (Hammer & Stanton 1995, p. 24). Staff had to understand that a problem was always more complex than what it appears to be at first. No idea

was complete (Hammer & Stanton 1995, p. 24). Through shared discussion more information is provided to assist with refining or extending of ideas.

Man is often the principal obstruction between himself and his future and this becomes apparent in idealized design (Ackoff 1978, p. 30). The IP design process is a powerful means of converting what seems impossible, to possible. The process is capable of mobilizing participants towards obtaining the idealized future. 'Designs produced by the idealized process are often mobilizing ideas, ones that extract commitment to pursue the apparently impossible' (Ackoff, 1978, p. 30).

Ackoff recommends that participants need initially only be involved in the part of the system that involves them. All people would, however, in the end learn how their part of the system interacts and influences others (Ackoff 1978, p. 31). This enables them to increase their understanding of the system, to learn, and this leads to personal development.

The 'separation of participants' and 'staggering of phases' principles could be used when it becomes evident that it will not be practical to include all applicants involved in the same planning process (Leonard & Beer 1994, p. 5, 6, 29). By applying these principles, the participants selected to work on the mess analysis will not also be working on the design team. Participants could also be working on different phases of the process at the same time, or stagger the phases over a period of time. To save time, relevant information required from sub-sections external to the area under investigation, can be obtained before the start of the planning exercise and introduced during the creativity stage to add to the learning process and to a better understanding of the system as a whole.

It is important to note that Idealized Design (IP) is 'as applicable to small systems as it is to large ones; it is applicable to parts of the system as well as the whole' (Ackoff 1978, p. 73). This principle could become valuable in our situation. Due to time constraints and distance between those affected, individual sub-systems could investigate their own processes and their information and idealized design proposals can be included as design units in the final design.

The IP planning process is continuous. No plan can predict everything in advance as the values of stakeholders change over time and this will require corresponding changes to any plan. IP is an ideal seeking design which desires an organizational design capable of rapid and effective

learning and adaptation. The methodology involves proactive planning; we move towards something and not reactively away from something. We needed to specify what we wanted and had to move towards it as effectively as possible. We need to define a mission statement as that would indicate the main business our system wants to be in (Flood & Jackson 1991, p. 151). In the case of mergers, this may differ from what the two individual systems were doing before the merger, or the shared system since the merger. The mission statement must also clearly state what effects (influence) the system wants to have on each class of its stakeholders and especially on the staff within the system (Flood & Jackson 1991, p. 150). 'Planning implies not only dealing holistically with a number of interacting problems, but also doing so with a prospective orientation' (Ackoff, 1978, p. 26). Proactive problem solving is embedded in the planning process. Each problem is seen as one in a set of interrelated problems and the set is treated as a whole (Ackoff 1978, p. 26).

Ackoff states that we can influence the future by what we do now. According to his philosophy interactive planners 'take into account the past, the present and the predictions about the future, but use these only as inputs into a process of planning aimed at designing a desirable future and inventing ways of bringing it about' (Flood & Jackson 1991, p. 147). In the mess situation problems are not solved or resolved.

Dissolving problems, the interactivist's solution, involves changing the system and/or the environment in which the 'mess', the 'set of interrelated problems', is embedded so that 'problems' simply disappear (Flood & Jackson 1991, p. 147).

Designers do not aim for an utopian design and it is recognized that no design will remain ideal over time. The product of an idealized design process is therefore not an ideal state or an ideal system, 'but an ideal seeking state or system' (Ackoff 1978, p. 27). The system will never be complete but will be revised and changed as more information becomes available. The designers of the new system may be constrained by a lack of knowledge and understanding. In an idealized state the designers will be able to learn from their experiences while at the same time adapting to changes in themselves and in their environment (Ackoff 1978, p. 27). An idealized system should therefore be flexible and capable of being changed easily to enable it to improve continually (Ackoff 1978, p. 27). A design can be improved and augmented by broadening and extending the functions or activities to cover more work or by adding new features (Ackoff 1978, p. 27).



It should be inherent in systems, old and new, that continuous change be sought as part of the operating principles. Only through continuous improvement, based on learning and research will we be able to remain a viable system and compare favourably with similar systems. We need to proactively seek improvement and speedy transformations to retain a competitive edge. Such improvements can be sought in product development, in policy refinement or delivery process.

The participants affected by a plan may react in different ways. Their reactions will be determined by how the solution/plan affected the pursuit of their own objectives. Their objectives must be understood to 'correctly anticipate their responses and the consequences of the solution' (Ackoff 1978, p. 32). Those with authority over others have to guard against assuming that they understood others and that they knew what their objectives were. Misunderstandings are common where there is a gap in cultures separating the problem solvers and those who will be affected by the solution (Ackoff 1978, p. 35). The best protection against unexpected responses to a proposed plan, is to involve those affected in the planning process. If we failed to obtain participation because we assumed others to be in conflict with us, we would 'virtually assure continuation of conflict if it exists' (Ackoff 1978, p. 38). However, an invitation to take part in planning could be seen 'as an act of conciliation – a demonstration of care and concern' (Ackoff 1978, p. 32). Conflict would arise if the action of one party was perceived as having a negative outcome on the action of another party. Should the outcome cause an 'increase in the value of the other's behaviour, it is seen as co-operation.' (Ackoff 1978, p. 39).

In their chapter on mergers and acquisitions, Cartwright and Hudson (Burke & Cooper 2000, p. 272), conclude that 'the degree of cultural compatibility between the two combining organizations has become an important factor in determining merger outcomes'. For them the success of a merger depends on 'successful integration of personnel, technical systems and organizational cultures (Burke & Cooper 2000, p. 269).

## **CHAPTER 4: BOUNDARIES, STRUCTURE AND PARTICIPATION**

### **4.1 Introduction**

The Universities of Durban Westville and Natal merged to form the University of KwaZulu-Natal (UKZN) on 1 January 2004. The merger required a shared student enrolment system for the new UKZN and this had to be in place on 1 January 2004 to manage the selection of the first intake of students to UKZN in January 2004. Before the merger, all sub-sections from the two Universities involved in student enrolment, took part in formal planning exercises (Task teams) and were required to design shared procedures. Where differences between existing systems were evident, management decisions were made or staff managing the processes relied on principles of best practice to guide the development of shared sets of procedures and working documents for the new University. In the changing and uncertain environment in which the enrolment system functioned at the time, it was required to make many changes in the shortest time possible to cope with new demands and to ensure continuous service delivery.

Further developments have, however, taken place within the UKZN environment since the merger. The organizational structures have changed, faculties have moved location, certain centralised functions devolved to Faculties or have transferred to other sections within the University in line with new executive management structures. Sub-systems interacting with each other during the enrolment process have also been subjected to their own internal restructuring exercises. The student enrolment system was, therefore, required to cope with internal challenges as well as changes within the University environment.

The UKZN structure was now, in 2008, in place and the enrolment system was experiencing a period of stability. It was now the appropriate time to reconsider the enrolment support system constructed at the initial stages of the merger in terms of subsequent developments and new challenges. We needed to determine if the system still satisfied the demands of the various stakeholders and at the required level. The aim of this study was to identify areas in which transformations were required to ensure that the current system remained flexible enough to cope with new developments in future and to retain a competitive edge. Feedback received from our clients indicated a degree of concern about overload and delays in certain areas of the system. A major concern was that the UKZN seemed to be losing good applicants to our competitors.

Management was of the opinion that we should introduce ways of working faster and smarter to enable the system as a whole to provide better support and to match the quality of service provided by our competitors.

The requirements for an 'ideal' student enrolment system were not evident at the beginning of the study. It was hoped that the desired properties would emerge through discussion and shared learning. The design process of an ideal system, therefore, depended on the different understandings and values the various participants would bring into discussions. It was hoped that the chosen research methodology (IP) would allow us to consider the complexity of our system as well as the different viewpoints of the participants (Flood & Jackson 1991, p. 39). The methodology allowed discussion between the various stakeholders and that would help us to consider our system as a mental construct (not contained by physical boundaries), consisting of a variety of interacting parts (Flood & Jackson 1991, p. 5). The interactions between the parts would not be constant, but would be subjected to continuous change. Through debate and maximum participation, we planned to develop a shared understanding of our processes and the transformations required to improve our system and to develop it in such a way that we would be able to cope with future developments.

The eventual plan would not be seen as final or complete. The IP planning process was continuous as no plan could predict everything in advance as the values of stakeholders changed over time and this would require corresponding changes to any plan (Ackoff 1974, p. 29). We did, for example, not yet know in detail what the introduction of NHEISA (University of Natal 2003, a & b), would require of our system. A development element, therefore, had to be built into our system to enable it to seek answers; an ability to learn (Flood & Jackson 1991, p.145).

In our planning process it was hoped that participants would design a desirable future for themselves and invent ways to make that happen (Jackson 1991, p. 143). A process had to be established to define the correct strategic directions for the system under investigation. We needed to reach an agreement on what the future of the system should be. The chosen methodology would facilitate stakeholder involvement in the planning process and in the implementation of the shared plan (Jackson 1991, p. 144).

The system to be investigated was a complex-pluralist system, consisting of various sub-systems spanning different sections and reporting lines. A large number of staff members performed these

functions and they were in constant interaction with each other (Flood & Jackson 1991, p.33). The success of an 'ideal' system would depend on the coordination and integration of the functions performed by the various sub-sections (Ackoff 1974, p. 51).

In the research exercise the boundaries of the planning process would be clearly defined. The emphasis would be on the main processes performed during the student enrolment process. Each process would be considered to determine if it were still viable in terms of policies, procedures and quality of service delivery. Obstructions to development would be identified as well as transformations required to improve performance.

## **4.2 Boundaries of research project**

The aim of the research project was to investigate the viability of the support system involved in the execution of the Student Enrolment Plan at UKZN. This Plan flowed from the 'Academic Plan' (qualifications offered and modes of instruction) and provided targets for student recruitment and admission. Numerical targets (numbers and attributes) were provided for each Faculty to meet the academic goals. Internal and external aspects, however, influenced the implementation of the Student Enrolment System, such as Government policies, subsidies received, overall and specific University policies (entrance requirements), requirements of professional boards, legal requirements, availability of financial assistance and the availability of on campus housing. The possible introduction of NHEAIS would also have an influence on the structuring of our enrolment processes and the design of our ideal student enrolment support system.

The support services provided in this system, were broken down into seven key processes. These processes and the sections involved in the processes were listed in Table 4-1 on the next page.

**Table 4-1 : Processes and sub-systems involved in student enrolment support**

Process	Sub-systems involved
Academic Planning and Student Enrolment plan	<ul style="list-style-type: none"> <li>- Academic Planning Office</li> <li>- Executive Offices</li> <li>- Quality Performance Unit</li> <li>- Faculties</li> </ul>
<b>Production of material</b>	<ul style="list-style-type: none"> <li>- Faculties, Public Affairs, Student Academic Administration, Fees, Housing, Student Funding centre</li> </ul>
<b>Recruitment</b> of prospective Students in terms of the enrolment plan	<ul style="list-style-type: none"> <li>- Schools Liaison</li> <li>- International Offices</li> <li>- Faculties/Schools/ Programmes</li> <li>- Alternative Access Programmes</li> <li>- Open Learning</li> <li>- Distance Learning Programmes</li> <li>- Individuals/students</li> </ul>
<b>Handling of enquiries</b> and requests for information and application forms	<ul style="list-style-type: none"> <li>- Applications and Information Office</li> <li>- Faculties, Access programmes, CAO</li> </ul>
<b>Processing of Applications</b>	<ul style="list-style-type: none"> <li>- Applications and Information Office</li> <li>- IT Development Office</li> <li>- CAO</li> </ul>
<b>Selection of students</b> in terms of the Enrolment Plan	<ul style="list-style-type: none"> <li>- Faculty Offices</li> <li>- Applications and Information Office</li> <li>- University Postal Services</li> <li>- Central Applications Office</li> <li>- Student Housing</li> <li>- Student Funding Centres</li> </ul>
Registration of qualifying students	<ul style="list-style-type: none"> <li>- Faculties</li> <li>- Student Fees</li> <li>- Student Housing</li> <li>- Student Funding centre</li> <li>- Student Academic Administration</li> </ul>

The first and the last of the processes in the tabulation, **development of academic and student enrolment plans** and the **registration of students**, were Faculty driven functions and were not included in our study. The sub-systems included in the research were those for which student enrolment made up a large percentage of their daily functions throughout the year. These processes were highlighted in red in Table 4-1 and included the **preparation of material**, **recruitment** of new students, handling of **enquiries** received, processing of **applications** and

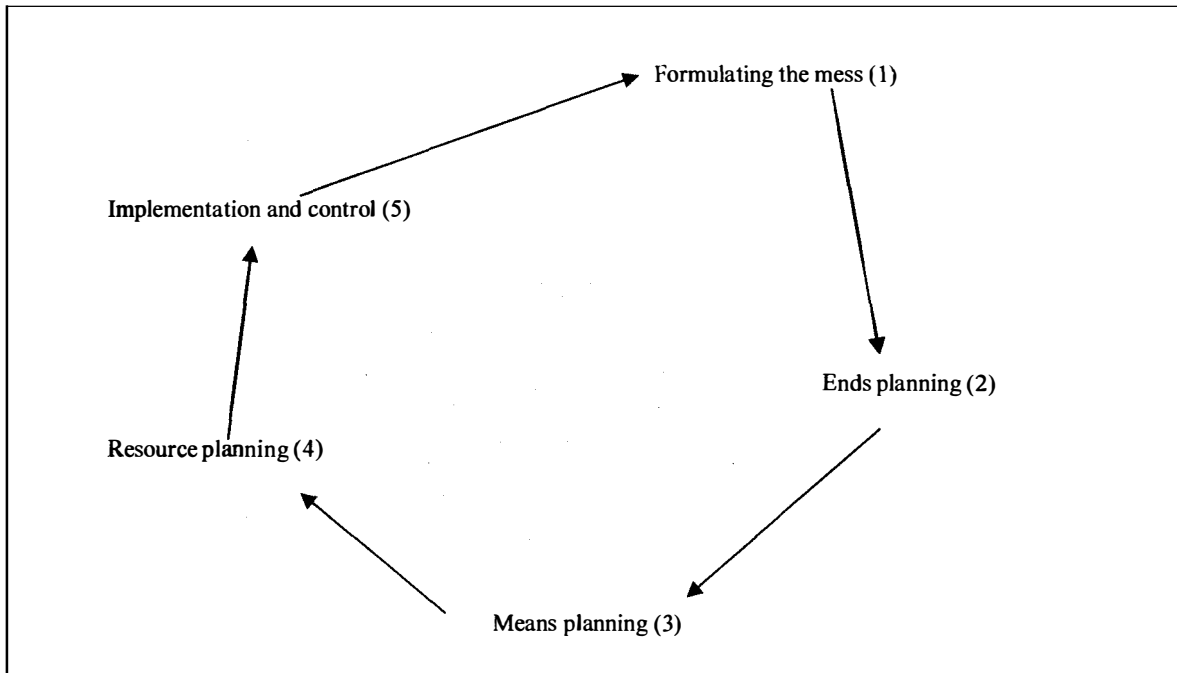
**selection of qualifying applicants.** A flexible and integrated IT system would form the basis of the enrolment support system but we did not concentrate on IT requirements in this study.

The enrolment support process was cyclical and internal and external communication formed the key to all processes. Feedback on the numbers of applications and categories of registered students provided an indication of the success of the Student Enrolment Plan.

### **4.3 Structure of research process**

In the IP methodology, Ackoff provided a step-by-step guideline for the investigation of an existing system and the design and implementation of an ideal new system. The methodology allowed for maximum participation of staff members in the planning process (Leonard & Beer 1994, p. 18). The benefit of the research would not be in the formulation of the 'ideal' plan itself, but in the discussions and learning which took place while participants were engaging in the production of the plan (Ackoff 1974, p. 48). The discussion and learning process would lead to 'job enrichment' and 'job enlargement' through the involvement in decision making (Ackoff 1974, p. 48). Participants were encouraged to plan for all parts of the system simultaneously and interdependently to assure coordination of processes and activities. Breadth in planning would be considered more important than depth and interactions between participants and sub-systems were more important than actions (Ackoff 1974, p. 29). Planning was required at each level of the system and planning for a sub-system at one level had to be integrated with planning at each of the other levels (Ackoff 1974, p. 29). Participants had to keep in mind that purposeful systems and their environments changed continuously and no plan could remain static but had to be adjusted continuously; this enabled the system to learn and adapt effectively (Ackoff 1974, p. 29).

The IP methodology was 'a system of activities' in which the planning process as a whole was made up of five interdependent phases (Ackoff 1974, p. 29). The phases could be performed in any order but Ackoff recommended that the planning process proceed as in Diagram 4-1 on the next page.

**Diagram 4-1: Five phases of the IP methodology:**

(Ackoff 1981, p. 74).

Within each of these phases the methodology required participants to follow certain steps. A summary of the activities to be performed in each phase was provided in Table 4-2 on the next page.

The methodology consisted of two main parts. The ‘mess analysis’ (Phase 1), in which information was collected on the position of the existing system and the ‘design’ (Phases 2-5) in which we dealt with the design and implementation of a new ideal system (Refer Table 4-2 on the next page).

Ackoff recommended that we involve as many participants as possible from different levels within the system in the research process. He further recommended that we separate the ‘information gathering’ team and the ‘design’ participants. The two processes could run at the same time, saving time and preventing the design team from being influenced by the constraints identified in the mess analysis (Ackoff 1981, p 164,165).

Table 4-2: Summary of IP Methodology

**IP methodology consists of the following steps:**

**Phase 1: Formulating the ‘mess’: the findings of three types of analysis (1-3) are synthesized in the reference scenario (4):**

**1. Systems analysis: considering the following:**

- structures and reporting lines
- processes and procedures
- instructions influencing the system
- sub-systems influencing the system
- financial aspects
- management style
- CATWOE
- SWOT

**2. Obstruction analysis**

- discrepancies in system
- conflicts on system

**3. Reference projections**

**4. Reference scenario**

**Phase 2: Design of idealized system**

**1. Ends Planning: including**

- mission statement
- desired properties of idealized design

**2. Gap analysis 1: comparing desired properties with existing system**

**3. Structure of proposed system**

- unconstrained design
- constrained design
- selection of design

**4. Gap analysis 2: comparing constrained and unconstrained designs**

**5. Gap analysis 3: listing gaps to be closed in the chosen design**

**Phase 3: Means planning**

**Phase 4: Resource planning**

**Phase 5: Implementation and control**



#### 4.4 Participation in research process

As Head of the University-wide Applications and Information Office at UKZN, I participated in the design of the initial merged UKZN student enrolment system. At the inception of the study, we became aware that our Office could no longer cope with the work load or the level of support required of us. From feedback received at CAO, admissions and recruitment meetings, it became evident that this concern was shared by other sub-systems within the student enrolment process. I discussed these concerns with the Director of Student Academic Affairs and communicated that I would like to do the required investigation as part of my private study. I announced my intentions to the staff members in our Office and indicated that I would appreciate their participation in the project. They were all willing to participate in the investigation and to share in the learning experience. These staff members formed the core of the research group but interested parties from other student enrolment sub-systems were invited to take part in both the information gathering and design phases of the study.

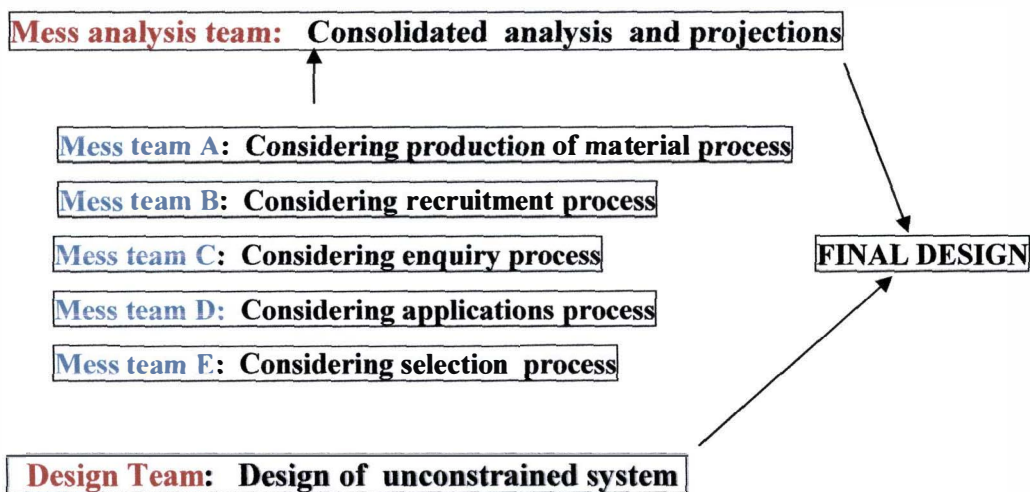
We applied the 'separation of participants' principle (Leonard & Beer 1994, p. 5, 6, 29) in our research process and formed a 'Mess analysis team' and a 'Design team'. In addition we formed five smaller analysis sub-teams. Each sub-team would collect information on the first five items listed under 'Systems analysis' in Table 4-2, for one of the five processes or sub-systems identified as sub-systems of the student enrolment system. These items included: structure and reporting lines, processes and procedures, instructions influencing the system, sub-systems influencing the system and financial aspects of the system. Their findings were reported to the Mess Analysis Team which prepared a consolidated report on these items for the enrolment support system as a whole. The Mess Analysis Team was also responsible for preparing a consolidated report on the management style within the sub-systems and the enrolment system as a whole. Based on the information provided by the five sub-teams, it prepared a SWOT and CATWOE analysis for the system as a whole. In consultation with representatives from the five sub-teams, the Mess Analysis Team prepared the obstruction analysis, reference projection and reference scenario for the enrolment system as a whole.

At the same time the Design team was requested to consider two improved designs for the system as a whole; the one unconstrained by existing obstructions (finances, policies, etc) and the other a constrained design, taking current limitations into account. (Ackoff 1981, p. 114). Once the two

designs were completed, the Mess Analysis Team and the Design Team combined to consider the information collected on the ‘mess’ as well as the elements and transformations recommended in the two designs. By concentrating on areas of difference between the unconstrained and constrained designs, the team was required to offer initiatives for closing the gaps. The final outcome of their discussion would be an ideal design with a listings of the transformations required of the existing system. This combined team was responsible for the selection of the ideal design, the Means Analysis (Phase 3), the Resource Planning (Phase 4) and Implementation and Control of the new design (Phase 5).

The task teams and their areas of responsibility are listed in Diagram 4-2 on the next page.

**Diagram 4 - 2: Task teams and areas of responsibility**



The staff members representing their sub-systems on the various task teams were from a variety of sections, across different campuses and reporting lines.

**Membership of Design team:** Staff members were invited from a variety of sub-systems within the enrolment system University wide. Staff members were mostly Heads of sections

from different campuses, who served at different levels within the organization and had previous planning experience and a basic understanding of systems theory. The design team was required to think 'outside the box' (Woll 1996, p.5) and consider alternative planning approaches. They had to specify the mission and ideal properties for an ideal system. They had to firstly consider a design unconstrained by the current structural and historical limitations. The only requirements were that the unconstrained design had to be economically viable and technologically feasible (Ackoff 1978, p. 27). Secondly, they had to design an improved system based on the current limitations.

**Membership of Mess analysis team:** Experienced staff members from each of the five sub-systems (processes) were invited to serve on this task team. Participants were from different campuses and served at different levels of the organization. The most experienced members from the five mess sub-teams A-E would be invited to join the coordinating Mess Analysis Team. This team would consolidate the findings arrived at by the five analysis teams, consider the obstructions to development within the current system, consider what the future of the existing system would be if we initiated no changes to meet the new demands and prepare a reference scenario for the existing enrolment support system as a whole.

These two task teams were initially formed during the planning for the merger. Heads of sections from corresponding sections within the two previous Universities met to consider existing practices. The academic sector was also represented. Due to time constraints and geographical separation it was not possible to involve all staff in the information collection and planning exercises at the time. Each sub-section was, however, represented on the task teams and nominated staff members serving on the task teams were tasked with gathering of the required information at each of the institutions. In the initial planning process common practices were identified and best practice accepted where differences occurred. For this research project, interested members from the two previous task teams were invited to take part.

**Membership of mess teams A-E:** Since the merger, procedures had been refined and amended to match the requirements of the merged institution, as well as new demands of clients and the external community. Staff members performing the functions in the enrolment system were now familiar with the requirements and it was now possible to involve more staff members, also those at the lower levels, in the information gathering exercise. Staff members with particular experience and expertise were also invited to take part in the process.

In the listing of participants on specific mess teams below, it should be noted that some sub-sections such as the Applications and Information Office was represented on all five mess teams whilst other sub-sections, such as School Liaison, only participated in mess teams A and B. The degree of participation in these teams correlated with the relevant sub-section's key functions and contribution to the student enrolment support function as a whole.

**Membership mess team A: Production of material:** The material used in the enrolment process was prepared by different sections within the University. Members from Schools Liaison, Faculties, Alternative Access Programmes, UKZN International and the University Applications and Information Office were invited to provide information to this process.

**Membership mess team B: Recruitment:** The recruitment function was performed by School Liaison, Faculties, UKZN International and Alternative Access Programmes. The recruitment function was supported by the Applications and Information office which provided application material used during recruitment exercises and information days. Members from all sub-systems were invited to provide information on this process.

**Membership mess team C: Enquiries:** The provision of information and application material function was mainly performed by the Applications and Information Office. Specific enquiries were referred to Faculties or the International Office. The mailing of prepared application material packages to prospective applicants and internal distribution of bulk material to Faculties and other campuses was managed by the University Postal Services. Members from all sections were invited to provide information on this process.

**Membership mess team D: Applications:** The processing of applications function was managed by both the CAO (undergraduate) and the UKZN University-wide Applications and Information Office (postgraduate, international, open learning, distance learning and specific programmes). The University's internal postal services and cashiers played an important roles in the receiving of applications and application fees. The department of Management Information assisted with the auditing of application information provided to Faculties for selection purposes. Members from all sections were invited to provide information on this process.

**Membership mess team E: Selection:** The selection function was performed by Faculties and the function was supported by UKZN International which provided information on assessment of international qualifications and the Applications and Information Office. The Applications and Information Office was responsible for the maintenance and development of system generated letters, the provision of material used in the selection process, running of reports and labels, as well as the packing and dispatch of selection packages for certain Faculties. Members from Faculties, UKZN International and the Applications and Information Office were invited to provide information on this process.

#### 4.5 Briefing of participants

Before the research could commence participants had to understand what their roles and responsibilities in the process would be. In the detailed approach they would be able to contribute more effectively if they understood the basic systems concepts embedded in the methodology (Woll 1996, p. 8).

The participants involved in the **mess analysis** had to understand that their contribution, based on their expert operational knowledge, would be valued and they had to agree that, as a group, they covered all the functional areas of the student enrolment process as a whole (Woll 1996, p. 5). Their knowledge and experience would facilitate the 'mess analysis' in which they were required to describe their current processes and reach agreement on a shared ideal system for UKZN. In addition, their knowledge would be of utmost importance for the synthesizing of the results in the reference scenario. A facilitator could be invited to join the groups to generate novel thinking, challenge the organisational culture and to manage interpersonal dynamics. Participants identifying organizational weaknesses would then be protected and encouraged to voice their concerns (Woll 1996, p.6-7). Their opinions would be of great value in the obstruction analysis. Participants had to develop a holistic view of the system under investigation and to be able to do that they had to consider three elements of the system (Woll 1996, p. 8-10):

- function (what the system did, its impact on the environment, its performances)
- structure (who did what and how different groups related) as well as
- process (methods and procedures used)

Supporting statistical data and general information would be collected in advance to ensure that team sessions would run effectively (Woll 1996, p. 15). Information received at official application, recruitment and publication feedback meetings would be added to the information provided by the mess task teams.

A synthesis would take place after each session, forcing participants to consider their findings and decisions. This synthesis would enrich their learning and commitment and ensure that the decisions and assumptions on which the decisions were made, were documented correctly (Woll 1996, p. 16).

Participants had to understand that the student enrolment system was a living system and that it depended on its interactions with the containing system and the environment for survival. Energy and information were exchanged through its open boundary. The life span of a living system (institution) was determined by its ability to accommodate the changes required by its environment. Small institutions often died because of their lack of ability to evolve over time (De Geus 1999, p. 5). Learning was considered the most powerful instrument of intelligent beings, allowing them to evolve from one phase to another (De Geus 1999, p. 4,5). An organization was considered a living system consisting of a hierarchy of other systems (De Geus 1999, p. 5). If we considered the hierarchy developed for Shell in the USA (De Geus 1999, p. 6) and adapted that for the student enrolment system, our hierarchy could consist of the individual (for example, the enquiries officer), the sub-system he belonged to (Applications and Information Office), the wider system the sub-system is contained by (Student Enrolment Process), the containing environment (UKZN) and finally, the community (KZN).

De Geus (1999, p. 9), considered such learning as 'the relationship of changing environments'. The learning taking place was by accommodation; internal structural changes were made to allow the system to exist in harmony with the environment, knowing that the environment would change over time (De Geus 1999, p. 9). He maintained that all institutions went through different phases in life and they could only go through these phases by learning by accommodation (De Geus 1999, p. 9). Institutional learning was often not a matter of choice but a basic instrument of the evolution process of the system (De Geus 1999, p. 10). In this process you could not separate the whole from the parts, for the whole 'precented' itself in the parts (De Geus 1999, p. 13).

The participants had to understand that the true value of the research project lay in the learning generated during these discussions and not so much in the final plan (Ackoff 1974, p. 48). For an organization to learn effectively in a changing environment, the emphasis should not be on the retention of past lessons, but on the acquisition of new knowledge and alternative perspectives (Argyris cited in Batista 2006, p.1). Different types of learning would take place during the process. Flood and Romm described different layers of learning which had to be considered to ensure a holistic learning process (Flood & Romm cited in Flood & Jackson 1991, p. 313). In terms of their framework we would firstly be required to consider our processes and organisational designs. We would consider whether we were doing things right and if not, how we should be doing it. Questions asked at this level could lead to structural changes and radically improved sets of designs which would ensure improved efficiency in the system's performance (Flood & Jackson 1991, p. 313). Most learning in organizations takes place at this level. The learning is aimed at identifying and correcting errors (Argyris cited in Batista 2006, p.1).

At the second level of learning we had to realize that in a complex-pluralist (Flood & Jackson 1991, p. 39) system such as ours, the definition of ends (goals) and the means to obtain the ends, could be problematic, including various points of view. At this level, learning would take place by asking question such as 'Are we doing the right thing?' or 'How should we be doing it?' (Flood & Jackson 1991, p. 313). In this learning process the ends would be determined through processes of accommodation and reconciliation of different views. The means planning would be conducted through participative debate. Interventions would be agreed upon in a participative process in which designs and processes were 'debated and broadened through interpretive thought' (Flood & Jackson 1991, p. 313). The aim of learning at this level would be to clearly define the ends and means.

The third level of learning concentrated on 'fair practice' (Flood & Jackson 1991, p. 313). At this level we should ask 'Why should we do it' and 'How should be do it to ensure fair practice?' We should be taking into account the economy, the community and factors such as education. At the end of this process new ends and means could be set as a result of the discussions.

When we consider the first two elements of learning, the 'are we doing it right' and 'how should we it?' we are involved in 'double loop learning'. We would no longer be concentrating on the reflection and correction of the tasks to be performed but would be considering the choices between the 'what' and the 'how' at the same time. In this layer of learning the underlying

objectives and politics driving our functions are considered. A new consciousness needed to emerge as interventions looped between the two centres of learning (Flood & Jackson 1991, p. 315). This is the most significant level of organizational learning and would include the questioning of routines and everyday practices which might obstruct learning and development (Argyris cited in Batista 2006, p. 1).

The ideal would be if all three levels of learning are taken into account in a planning process. Flood and Romm (Flood & Jackson 1991, p. 316) referred to such an inclusive process as 'triple loop learning'. This process would display tolerance between all three levels of learning and would try to reflect the diversity therein. The how, what and why questions would all be considered and form the basis for responsible decision making. By considering each level of discourse, managers would be enabled to operate intelligently and responsibly. Their whole consciousness would become more than that of the sum of the individual parts (Flood & Jackson 1991, p 316).

Interactive planning was based on a principle of continuous planning (Flood & Jackson 1991, p. 145). Purposeful systems were living systems and their environments changed continuously, therefore, no plan could remain static but had to be amended continuously to accommodate the changes in its environment; the system had to learn and adapt effectively in order to survive (Ackoff 1974, p. 24). In our new design we would be required to allow for a development element, enabling our system to seek answers and to learn; a flexibility to change and adapt (Flood & Jackson 1991, p. 145). The aim would be to design a 'learning system' which continuously expanded its capacity to create its own future (Senge 2008, p. 1). Such a system obtained competitive advantages from continuous learning, both at individual and collective levels. This learning process would also involve a continuous process of unlearning, of forgetting old ways of doing things (Senge 2008, p.1). Our new design had to cater for learning opportunities which included the following (Senge 2008. p. 1,2).

- Personal mastery: continued learning by each individual expanding his ability to produce the results he desired in life, or were required by the system
- Mental models: development of an awareness of the required patterns of thinking within organisations and to constantly challenge them
- Shared vision: creating 'pictures of the future' that all members of the organization can identify with as their own.



- Team learning: learning together through dialogue and discussion to enable members to act more effectively as a team, compared to individual performances
- Seeing the organization as a whole with behavioural patterns separate from those of the individuals making up its parts

During the research project a type of non-threatening debate would be carried out to assist participants to reach consensus as they see each others points of view and come to learn from them (Senge 2008, p. 2).

## CHAPTER FIVE: RESEARCH FINDINGS

Idealized Planning provided us with a step by step methodology to be followed in the research process. The research process was conducted in two parts. The first part consisted of a mess analysis; an investigation into the current situation of our enrolment system and in the second part the information gathered in the mess analysis was used for the design of an improved idealized student enrolment system.

A vast amount of information was generated and documented during the research project. In this chapter, I will provide illustrative examples of the findings and refer to the detailed information contained in the appendices.

### 5.1 Mess analysis

The mess analysis contains an analysis of our system, the obstructions to development in our system and reference projections of the position our system would be in, in future, based on our current performance and if no changes were made in the environment. The information gathered in the three sets of analysis assisted with the development of a reference scenario; a synthesis of the results which provided a reflection of the current state the system was in.

Examples of the detailed reports prepared by the mess analysis teams are attached as **Appendices A-E**, p. 108 – 109. In the mess analysis it was confirmed that the functions required by the five main processes of the student enrolment system were performed by a multitude of staff members in different sections across all campuses of the University and these staff members reported to various line managers. A concern was expressed that there was no evidence of shared planning between the sections involved in the processes or of an overall responsibility for the student enrolment function. The selection of an applicant, for example, could require decisions on academic eligibility, housing allocation and the award of financial aid. The three sections involved in these processes often did their own segmented planning. This lack of holistic and continuous planning (Ackoff 1974, p. 29) and sharing of information, resulted in inconsistencies in information published, uncoordinated deadlines, deviating procedures and a duplication of functions. We found that, for example, the submission dates for residence and academic applications for returning students differed, but the dates were the same for new students. The closing date for submission of financial aid applications was a month before the closing date for

late academic applications. No provision was made for financial aid applications received after their 'early' financial aid deadline. These applications, however, still had to be processed as they formed part of the academic application form.

The management style and structure in some instances were not conducive for control over the implementation of decisions and ensuring that approved procedures were followed. This contributed to a further segmentation of processes, draining of resources, functions performed by untrained staff, delays in processes, incomplete student data on the information system and unprofessional service delivery. Sections mostly worked according to their own agendas and there was little evidence of holistic planning to ensure coordination and integration of all activities linked to the student enrolment function as a whole. We found that the International Office approached Faculties direct to negotiate new procedures for the handling of international applications. They developed new sets of correspondence to be used but the information contained in the new correspondence was not in line with the official selection letters prepared by the Applications and Information Office. Some Faculties were using the official correspondence while others had adopted the International Office correspondence.

Concern was expressed over the lack of integration in the recruitment process. Faculties felt that the existing recruitment process was not successful in providing qualifying applicants to their qualifications are embarked on their own segmented initiatives. The fact that we lost good learners to our competitors could also be linked to our slow response time. The late submission of information to be published in application material delayed our responses to enquirers. In addition, Faculties make limited use of the early selection facility. We were aware that our competitors made provisional or firm selections earlier in the year. It was felt that our scholarship incentives were no longer competitive. At other Institutions applicants were awarded scholarships based on the number of distinctions obtained, or their performance during Grade 12. The award of a scholarship served as an incentive to encourage them to register at a particular institution. At UKZN scholarships were awarded in April to the top applicants (on aggregate) who had already registered at UKZN.

Alarm was expressed over the impact on our resources by the large number of non-qualifying applicants entering our system via the Central Applications Office. With the limited staff available at UKZN and the slow response time of the information system we were no longer able to provide a professional service to our applicants. The system would not cope with a new

initiative such as the proposed NHEIAS which might have more requirements and which could bring even more applications into the system.

The five processes were seen as open systems influenced by instructions from various sections within the University and also from outside the University (Emery 1978, p. 8,9). Internal instructions flowed from Faculties, the Registrar, sections dealing with accommodation, financial assistance, tuition fees and branding. External instructions will include Government directives, requirements of publishing firms, National Postal Services and the Central Applications Office (CAO). The introduction of the National Senior Certificate (NSC) for example, was an external influence but we were required to revise our entrance requirements and adjust the coding systems used in ITS as well as in the CAO conversion tables.

A large number of sub-systems influenced the main processes. Sub-systems within the University included the UKZN postal services, the cashiers, the switchboard, Computer Services and many others. External influences will come from our competitors, Laser Facilities for printing of our letters, our publishers, the CAO, National Postal Services, sponsors, professional boards, students, learners and the community we serve. Our system was, indeed, a complex system and our functioning depended on the interactions of a large number of elements (Flood & Jackson 1991, p. 33).

The provision of resources for the system as a whole was problematic. Our processes were funded from the University budget and there was little opportunity for the generation of funds. Application fees were received for non-CAO applications but these fees were not made available for the development of the enrolment system. Limited advertising was sold in publications and sponsorship was sought for on-campus recruitment initiatives. Care was also taken to comply with the regulations of the National Postal Services to ensure that we qualified for mailing discounts.

On the whole it was difficult to obtain the required feedback or information for planning and development purposes. The outdated practice of only providing information directly linked to the performance of a specific job restricted staff's performance. At the information counter, staff required as much information as possible to enable them to provide quality service in changing or non-standard situations. It harmed the relationships between managers and sub-ordinates who feel excluded if information is kept from them. On the whole, it was felt that management

supported and contributed to the functioning of the system. The system was, however, not as viable as it should be due to a lack of co-ordination and integration between the different sections.

In the CATWOE analysis (**Appendix F**, p. 113) we identified a range of clients from both within the University as well as external to the University. Our clients range from learners to Faculties and include external organizations such as the Matriculation Board and the CAO. We provide a wide range of services to cater for different categories of clients. Most of our functions are, however, interactive involving a large number of people and we note that our clients are mostly also actors in our system with their own expectations and ideas (which may be conflicting) of the support services to be delivered by our system. The various actors in, and owners of, our system all had their own expectation of the system. This was reflected in their differing worldviews and represented the pluralism in our problem situation (Flood & Jackson 1991, p. 133). Staff in the Applications and Information Office, for example, wanted to consider the applications process as an 'independent' or dominant function which they owned, while Faculties considered the process as a support function, leading to selection and registration by Faculties..

The CATWOE analysis helped us to identify the transformations required for the improvement of the existing systems to ensure that we would be able to meet future demands. These transformations would drive the design of an idealized system and included the empowering (developing) of staff to deliver professional services, coordination and integration of processes, shared planning, implementation and management of the system as a whole, redundancy of resources to cater for peak periods and a flexible, fast information support system.

It was confirmed that parts of the enrolment process were 'owned' by different sections within the University and that no single office was responsible for the system as a whole. It was further noted that the viability of our system was dependent on the funding available, our ability to meet the needs of clients and to beat competitors, the implementation of Department of Education directives and our continued interaction with the CAO.

In the SWOT analysis (**Appendix G**, p. 115) it was agreed that we produced quality information material, such as the Undergraduate Prospectus, ran a professional call centre and enquiry desk, had procedural manuals and an integrated information support system. Our services were performed by qualified staff and we maintained good relationships with our clients. A weakness in the system was that our procedures were not implemented University-wide. The distribution of

financial aid application forms was problematic. Some Faculties followed the approved procedures and included the forms in the selection packages mailed to qualifying applicants while other Faculties required qualifying applicants to contact them before the form was mailed to them.

In general we struggled to obtain the information required for planning, training and publication purposes. We noted a lack of holistic planning and concern was expressed over the slow response time of our information system and in our responses to applicants. It was feared that the current resources would not cope much longer with the increase in applications received from the CAO. Our slow selections process could also result in us losing more qualifying applicants to our competitors. We did now, however, have the opportunity to review our processes and to concentrate on holistic planning, staff development, more cost effective procedures and ways of publishing our information. We needed to eliminate duplication of processes and simplify structures to facilitate management and development of the process as a whole.

We identified constraints to development within our system in the form of discrepancies and conflicts (Ackoff, 1981, p. 84) (**Appendix H**, p. 116). Some job descriptions for example, reflected that there were discrepancies in the way we said we pursued an end and what we actually did. In the Applications and Information Office, for example, job descriptions stated that enquiry addresses were all captured on the information system, while in reality, many envelopes were addressed by hand and the information was not captured on the system. We noted discrepancies in the delegation of duties, work loads and resource allocations. Most of these problems could, however, be eliminated through transparency and shared planning. Conflict between individuals occurred due to pressure of work and access to resources. A rising concern was staff's unhappiness with proposed changes to employment conditions.

Conflict was evident between units at the same or different levels when demands were made of a specific unit which may not have the authority to act. The main source of conflict between units, however, evolved when sections expanded their boundaries (such as the International Office) without consultation with the official process owners, thereby contributing to duplication and a blurring of responsibility.

In the CATWOE analysis we identified the transformations required of our system to assure its viability. If we, however, chose to ignore these needs, we would continue to publish our

information material late and the quality of the publications would be affected if the required information was not received in time for publication. We would also not reach our targeted numbers of qualifying applicants if the uncoordinated recruitment function was not addressed. Competing groups, such as the CAO, Schools Liaison, student groups and Access Programmes, would continue to target the same learners, duplicating the distribution of application material. The lack of statistical recording of material distributed during recruitment initiatives made it impossible to determine how many copies of material had to be printed for a following application cycle.

If we continued to allow untrained data capturers to input application data into the information system the quality of information will continue to deteriorate. This would impact on the UKZN statistical reporting function as well as on the workload of staff required to correct the errors. Incorrect or incomplete information would also continue to delay selection decisions. If the information system's response time did not improve, it was projected that we would continue to struggle to meet our data capturing deadlines (**Appendix I**, p. 118).

If Faculties continued to deviate from standard selection procedures, we would continue to provide conflicting or incorrect/incomplete information to applicants. Should Faculties also not speed up their selection process, UKZN might lose more good applicants to other institutions. The main concern though, was that if we did not address the overall planning for and management of our system, we would not be able to cope with the demands made of our system. If nothing changed in our environment, our operational lack of integration would continue and more sub-systems would develop/implement their own procedures, which would make the 'enrolment' process unmanageable.

The number of applicants received from the CAO was steadily increasing. On the tabulations in the reference scenario, **Appendix J**, p. 120, the total number of applications received via the CAO since 2001 was recorded. The blue line on the first graph reflected applications made to UKZN and showed a steady annual increase. The second graph indicated that the number of applications to UKZN had doubled since 2001. The high number of first choices made to UKZN reflected the increasing demand for places at UKZN.

UKZN had, however, capped student growth and the first year student intake would remain in the region of 10 000 students per year. The increased demand for places and the limited number of

places available would lead to more competition amongst applicants but would also mean that the number of students not placed would gradually increase. There was little opportunity for 'refused' applicants to be accommodated in access programmes. The need for entry far exceeded the availability of places and the selections to access programmes were included in the approximately 10 000 new undergraduate students admitted each year.

In addition to the CAO applications, the Applications and Information Office at UKZN processed between 12 000 and 13 000 (DMI statistics, 2006/2007) applications per year for admission to non-CAO programmes. Additional resources were required to deal with the non-qualifying applicants and this would place an additional burden on the University resources. The CAO's recruitment policy of unrestricted access to application material would continue to overload our system unless we can enhance our recruitment initiatives.

The University-wide Applications and Information Office on Howard College was no longer able to satisfy the need for application support required by all five UKZN campuses. The establishment of satellite offices on the Pietermaritzburg and Westville campuses was being considered. The growing need for access to open learning and distance learning programmes was also impacting on our system. If this 'growth' in applications was maintained, the current system would definitely not cope.

The UKZN ITS server was very slow and did not provide the support required. UKZN might have to invest in an alternative server provider. The system was at the time not able to process the large CAO upload files within the time available and would not be able to handle even larger files to be uploaded via the proposed NHEIAS.

The selection letter packing process had become cumbersome and could no longer be managed in the time allowed. The slowness of the National Postal Service in the delivery of mail, also contributed to selected applicants not receiving their mail in time. We had to consider alternative ways of communicating with selected applicants.

If no corrective action was taken to introduce transformations in our system and in its environment, the 'mess' would continue until the process became unmanageable. As reported in Appendix G (SWOT Analysis), our system was disintegrating due to overload, lack of training,



co-ordination, revision and control but mostly due to a lack of overall planning to ensure that we had the required resources in place to support an operation of this scale.

## **5.2 Design process**

The system to be planned for would manage the enrolment of new students at UKZN in line with the Student Enrolment Plan which steered the recruitment, application and selection processes of new students. The system would be actively involved in targeted recruitment and form part of the 'Public Face' of the University, dealing with prospective students, public, schools, the community, other tertiary institutions as well as Deans, Faculty staff, Directors and staff from other units within the University. The system would be involved in all processes leading up to the registration of new students. In the new design the problems identified in the mess analysis would be taken into account as well as the required transformations listed in the CATWOE analysis.

The system would serve as a 'filter', collecting information from within the University about qualifications and entrance requirements and condensing this information into a usable format in publications for communication to the community (Flood & Jackson 1991, p. 7). On the other hand, it would obtain application information from the CAO and applicants which would be processed, condensed and channeled into a prescribed information system format at UKZN, enabling Faculties to select qualifying students in line with their Faculty enrolment plans.

The system would check the quality of application information and monitor the offers made and registration numbers of first year students at the University to ensure that these were in line with the enrolment plan. By obtaining feedback on student registration statistics and input from our clients (internal and external to the University), our product, systems, our procedures and strategies would constantly be adjusted to guide us towards the ideal envisaged in the enrolment plan. Key elements to the viability of this system would be Executive support, required resources, skilled staff, adaptive procedures and a flexible information support system. The emphasis was on provision of quality service in the shortest time possible. Staff had to be equipped to provide informed assistance at all times and to be accountable for their quality of service delivery.

The mission to drive the new design for this system was defined as follows:

**The Student Enrolment Support system serves the University and its clients by providing professional support to facilitate the enrolment of students in line with the student enrolment plan.**

Desired properties were identified which would enable the new system to fulfill its mission (Appendix K, p. 124). These properties included: a coherent set of approved policies on all aspects of the processes, flexible and viable procedures for each process, the required resources to carry the work load at all times, market research to ensure that our product remained competitive, empowered staff performing functions within a learning system in which feedback determined developments, overall management of day to day functions as well as long term strategies and implementation of decisions and the evaluation and amendment of the system based on the feedback received. In the system these properties had to be seen as recurrent and had to be in place for each of the sub-systems (production of material, recruitment, enquiries, applications and selection) and for each of the functional levels (posts) to assure that they remain viable (Flood 1993, p. 116).

In comparing the desired properties with our existing structure we found that at the time information on the academic plan was not readily available for publication. Uniform procedures and policies were not implemented across the University and those in use might be conflicting or independent. There was no evidence of holistic planning in which feedback was used to develop a learning system. The process of implementation of decisions in the existing system was slow and not followed up; no action was taken to assure that non-conformers adapted the correct procedures. The response time for implementation of the required transformations and services delivery in general was too slow.

A further comparison with the existing system revealed that we had limited funding available for resources, training, research and development. Internal training opportunities were limited and often not suitable for our area of expertise. We had limited contact with competitors and it was difficult to evaluate our product as a whole. There was limited opportunity for promotion and no career paths had been developed. The information system in place had a slow response time and

was not adequate for a real time support service delivery. Delays in applications processing occurred due to cumbersome operating requirements and a slow server response time.

No holistic feedback facility was in place to drive the development of a learning system. Little communication took place with top management and the system as a whole seemed to be neglected. Sections within the support services were often in competition with each other and no single identity and understanding had been developed. In an ideal system, transformation would be applied in all sub-systems at the same time. Progress would be measured throughout the system and overall development would be evident sooner.

For the **unconstrained design** of the new system we recommended a centralized design, a single office called the Student Enrolment Office, incorporating all functions required for and the sections involved in the enrolment process. A centralized design would improve the flow of communication, holistic planning, implementation and management of decisions, processes and procedures, use of resources, feedback and development. The ownership of the processes would lie within a single system with clearly defined boundaries. A single reporting line would strengthen the position of the sub-system within the University as a whole. A single structure allowed for a quick response to changes required, multi-skilling, staff substitution, staff development and management empowerment. Direct access to a member of the Executive team, with a single enrolment focus, would ensure a quick turn around time on decisions required.

In this design it was proposed that the Student Enrolment Office as a whole reported to an Executive Dean, responsible for student enrolment and Alternative Access Programmes. It was further recommended that the Office be divided into three main sections: Planning & Publications, Recruitment & Admissions and Applications & Enquiries. In this structure all sections dealing with the enrolment of new students were drawn into a single unit; including entrant housing, entrant funding and scholarships. The detailed structure for this unconstrained design, as well as the functions allocated to each of the three sections, is available in **Appendix L**, p. 126.

The success of a centralized office would depend on management support, acceptance from the University community, access to key services, empowered staff (skills, understanding, equipment and information), open communication (access to shared information) and sufficient resources for daily functioning as well as functioning during the peak period. Sub-sections would no longer be

working as silos but the processes would be managed as different sub-sections of the enrolment process. The system would, however, not exist in isolation but would still require input from other sub-sections, from within (Faculties, Management Information, Registrar, Public Affairs, Procurement Office) and from outside the University (HESA, CAO, Government, Postal Services and Sponsors).

In the design of the executive structure for the merged UKZN, we had, however, laid the foundation for an organizational structure in which the different role players in the enrolment process had different reporting lines. The problems identified and linked to the different reporting lines in the mess analysis, remained after the merger. We had to consider the system /design at the time and make recommendations for changes to and within that structure to improve the overall functioning, management and auditing of the enrolment system as a whole.

In the **constrained design** we had to allow for an existing internal organizational structure at UKZN and links with external organisations. In addition, we had to allow for the fact that UKZN had agreed on the principles of decentralization and devolvement of administrative functions to Colleges and Faculties. In the existing structure the five key processes were performed by various sub-sections throughout the University's five campuses and across reporting lines. The basic division of responsibilities and reporting lines within the existing structure are reflected in **Appendix M**, p. 128.

In the current system the most common problems related to communication between the various sections, lack of information about system wide procedures and limited access to support services and resources. Corresponding functions were often found under more than one non-related sub-system. Examples were listed as the recruitment function (Faculties, Public Affairs and CAO) and the handling of international applications (Student Academic Affairs, Public Affairs and the CAO.) In post-merger recommendations it was envisaged that the liaison with the Matriculation Board in connection with matriculation exemptions would be the responsibility of the Application and Information Office but this function was still residing in the Office of the Registrar. The International Applications Officer residing in Public Affairs as well as the Admissions Officers located in Faculties were also involved in the assessment of non-South African qualifications and liaison with the Higher Education South Africa (HESA) Matriculation Board. According to the UKZN policy all non-CAO applications had to be submitted (in person or by mail) to the

University-wide Applications and Information Office for processing. There was, however, a demand from other campuses to have the application processing services extended and to establish satellite office on those campuses.

Working within existing constraints, the aim would be to bring structures on all campuses in line, to group together functional types and to provide equal access to services on all campuses. Geographical separation of campuses, size and unique needs had to be considered and allowed for in the design. We had to guard against being influenced by historical practices on specific campuses

Following Ackoff's recommendations (Ackoff 1981, p159), we proceeded with the design of three smaller units which were merged to form the final constrained design (**Appendix N**, p. 129).

**In design unit one** it was recommended that the International Applications Officer be moved from Public Affairs and Corporate Communication to the University-wide Applications and Information Office (AIO) to facilitate the applications/selection process of international applicants. These applications were often delayed at Faculties while they waited for assessment of international school leaving qualifications. It was felt that the Matriculation Board application function had to be moved to the Applications and Information Office and that the person responsible for advising applicants on application and exemption requirements and submitting the applications to HESA Matriculation Board (University-wide) also work closely with the International Application Officer, who would receive all international applications, make the assessment of qualifications and then forward the documentation to Faculties for selection.

In addition, the International Applications Officer was responsible for the updating of the International Application Guide which was linked to both the Undergraduate Prospectus and the Postgraduate Application Guide produced by the Applications and Information Office. Grouping the staff in one Office would facilitate the editing process.

**In design unit two** it was recommended that satellite Applications and Information Offices be established on the Pietermaritzburg and Westville campuses. Student Academic Administration currently provided student records and examinations support on three campuses:

Pietermaritzburg, Howard College (for Howard College and Edgewood) and Westville (for Medical School and Westville). The University-wide Applications and Information Office was based at Howard College Campus and had limited representation at the other two support campuses. In answer to campus needs and to provide easy access for clients, it was recommended that satellite offices be established.

It was important that these Offices have the same reporting line as the main Applications and Information Office on Howard College campus to ensure uniform procedures, training, non-duplication of functions, control over work load, implementation of decisions, sharing of information, etc. It was not envisaged that the two satellite offices would house large numbers of permanent staff as there would be no need for applications data capturers or selection letter packers on those campuses outside the peak periods. The staff in the satellite offices would be linked to the University-wide Call Centre telephone line and be equipped to answer any queries on the enrolment process as a whole (University-wide). They would be called upon to assist any campus should work pressure require. Certain University-wide functions might be delegated to satellite offices based on their work load and the experience of staff members. For efficient and effective performance by staff in all offices we needed to allow for capacity to perform the allotted functions at all times. Post levels had to be at an attractive level to attract quality staff with confidence and authority to liaise with Deans and Heads of other units and to negotiate the transformations required in service provision.

**In design unit three** it was recommended that the existing Schools Liaison Office (a University wide function) located in Public Affairs, be expanded to include the coordination and facilitation of all recruitment activities at the University. This function incorporate recruitment of local as well as international applicants, to standard and access programmes and at all levels of study. A coordinated plan will eliminate the current duplications of initiatives and reduce the waste of recruitment material. This office could also become involved in direct recruitment (early selection) and targeting of promising grade twelve learners.

When we compared the unconstrained and constrained designs for an improved system (**Appendix O**, p. 133), we noted that both systems promised a better integration of processes, less segmentation and improved control. They made provision for improved planning and maximum use of resources, allowing for clearer lines of communication, holistic feedback and staff development. Both systems would, however, be dependent on a flexible information system,

support from the executive and the required resources. In both designs the Applications and Information Office would, however, still be required to liaise regularly with the Office of the Registrar, the Legal Advisor, and Public Affairs.

The two systems differed in that the constrained system offered satellite offices which would require additional venues, staff and more resources. This system would still contain multiple reporting lines and associated problems and to a degree we would still find duplication within the system. The introduction of this system would require adjustments to the existing structure but could be established at a manageable cost. The unconstrained model in contrast promised a one stop shop with a new structure, a special venue and a single reporting line. It would be costly to relocate staff to this office but the office could offer promotions and career paths. This structure would reduce duplication of functions and it would be easier to regularize the work load and procedures. The constrained design did not offer the same overall management and control possibilities as the unconstrained design with its single management structure. In the constrained design we were able to eliminate a few reporting lines and realign functions but the five processes as a whole would still be performed by a variety of sections and on different campuses.

The constrained design would, however, be more acceptable to UKZN. It would be less costly to implement and would support the overall principles of decentralization and devolvment promoted by management. The constrained design would satisfy the requirements for an extension of our existing services to other campuses voiced by Faculties. The incorporation of the International Applications Officer and the collaboration between that Officer and the Matriculation Board function would also be welcomed by Faculties and the staff currently in those positions.

In the constrained model there was still little evidence of overall planning and management. By favouring this model we had to push its boundaries out towards the unconstrained design (Ackoff 1981, p. 115). We had to find ways and means of introducing overall management, planning and control into this design. Coordination and integration could, however, be obtained through the introduction of planning boards for each of the operational areas and also at Executive level for the system as a whole (Ackoff 1974, p. 51). Such planning boards could also assure consistency in the process and a high level of communication (Leonard & Beer 1994, p. 20). Please refer to

the diagrams in **Appendix P**, p. 134, for information on the implementation of the proposed Planning Boards.

Not all requirements for the new systems could be catered for within our chosen design. Our design elements would not cater for the information system requirements our system is dependent on, nor would it ensure that our system was accepted and implemented throughout the University. The outstanding elements required to close the final gap between the extended chosen design and the reference scenario were listed and in a means planning exercise we identified what the ideal would be and considered short term goals and intermediate objectives to reach those ideals. This list and our proposals on how to reach those ideals would be submitted to our management for consideration (**Appendix Q**, p. 136).

The actual implementation of our chosen design would largely depend on the availability of the resources to make that happen (**Appendix R**, p. 138). For the transfer of the Matriculation Board function we would not require additional resources as we already have an office and a staff member in place in the Applications and Information Office to perform that function. The transfer of the International Applications Officer may be more problematic. We would require an additional office and the relevant equipment but we could negotiate with Public Affairs and Corporate Communications to acquire the furniture, etc. The key element would be the change to her reporting line, the extension of her duties and the communication with Faculties to advise them of the availability of this new service.

Careful planning would be required for the introduction of the satellite campuses. At least one permanent staff member would be required for each office. Such a person was currently available on each of the campuses but they would require additional space and equipment to accommodate temporary staff and student packers during the peak periods. Temporary staff members were employed by the Applications and Information Office and housed at Howard College, but in the extended constrained design the satellite offices would accommodate some of the temporary staff members. Their salaries would still be funded from the general Student Academic Administration staffing budget.

The success of any new design would depend on its acceptance by the UKZN community and the success of the implementation process. By involving relevant staff members in this process we



had ensured that they were part-owners of the new design and this ownership should facilitate the implementation of the required changes. To facilitate our implementation, performance time-lines were developed for each process. The tasks to be performed were assigned to different months of the year and activities requiring funding were highlighted in red. The progress of implementation could be measured by checking performance against the time-lines (**Appendix S**, p. 160).

It was recommended that considered contemporary management theories to enhance our management processes. Introducing the principles of Total Quality Management (TQM) would assist us to evaluate our product and the system as a whole (Refer Appendix R). By checking our structure against the Viable Systems Model (VSM) we could ensure that all the channels and loops were in place to collect feedback from as wide a community as possible. This feedback would be used to evaluate the system as a whole and to determine the direction the system would take in future. It would help us to manage our system as a required learning system. Flood (1993, p. 119), however, urged us to pay special attention to the principles contained in socio-cultural systems thinking which advised that people acted and interpreted actions in terms of their own sets of constitutive meanings. We needed to influence people to think differently if we wanted them to accept the changes (Flood 1993, p. 123). Jackson advised that, regardless of the styles of management we adopted, we needed to promote two basic management ideas: how to design organizations as complex adaptive systems and how to allow individuals to take on the responsibilities required of them (Jackson 1995(b), p. 34).

## CHAPTER 6: CONCLUSION

In this chapter, I revisited the basic principles supporting IP methodology with reference to critique on IP theory, methodology, ideology and utility. I reflected on my research experience and the challenges faced in the application of IP methodology. A large amount of learning was generated about the viability of the existing student enrolment system and the transformations required in a new design to ensure that the system will cope with future demands. In closure I reflected on the aim of the research project and the degree to which the research objectives were met.

### 6.1 Idealised Planning Methodology

Ackoff's core message was that staff had to plan for themselves and develop ways to make their plans come true (Flood & Jackson 1991, p. 146). In a shared planning process we had to take note of the past, the present and predictions about possible futures of our system and use that information to design a desirable future. Participants were encouraged to reach for ideals and to invent ways to make that happen. This 'interactivistic' approach presented an alternative way of planning, aimed at dissolving problems by changing the environment in which they were found (Flood & Jackson 1991, p. 147). The approach was based on the principles of participation (of members), continuity (to address possible changes of values over time), holism (planning for the whole rather than individual parts), co-ordination and integration (made possible through the use of planning boards).

Methodologies (such as IP) in which a high level of participation is required, are often applied in complex situations where participants have different points of view (Leonard & Beer, 1994, p. 21). In such situations the staff members who would be affected by a plan had to share in discussions and in the planning process as that would enhance their understanding and create a learning opportunity. Through participation creativity would be generated, and a level of consensus would be reached amongst participants. Their concepts of feasibility would expand and that would ease the implementation of the design (Flood & Jackson 1991, p. 146). The planning process and the learning taking place were considered more important than the plan itself (Flood & Jackson 1991, p. 145,146). By involving many people we would ensure that as much information as possible was gathered. The actions of people were considered as value full and the objectivity of the results

could only be established if we allowed as many views as possible to emerge through open interaction.

Critics of Ackoff's philosophy, however, felt that stakeholders entered a planning process with different intellectual, political and economic backgrounds and it would be difficult to reach consensus. They believed that powerful people would dominate the process in coercive situations and that would prevent us to reach objectivity (Flood & Jackson 1991, p. 162). They felt that the results obtained would favour the powerful participants. Ackoff was however not concerned that powerful people might challenge the planning process (Flood & Jackson, 1991, p. 160). He suggested that we could use a professional planner to assist participants with the surfacing of their own ideals and values; to assist participants to plan for themselves (Flood & Jackson 1991, p. 149). Critics, however, maintained that the application of IP could only be successful if we considered a consensual situation. Such a belief would allow us to limit the scope of a project and not challenge the participants' fundamental interests, or different points of view (Flood & Jackson 1991, p. 161).

IP was considered as an ambitious attempt at handling complexity and problem situations facing modern organizations and the pluralism following from serving diverse stakeholders (Flood & Jackson 1991, p. 151). Critics maintained that participation might continue if sensitive matters are not debated, but that might wrongfully give the impression that stakeholders shared common interests. They felt that if the decision making rights of the powerful stakeholders, or uneven distribution of resources were questioned, conflict might emerge which could not be managed through interactive planning. In such situations stakeholders will not share interests and their values and beliefs might be in conflict. They might differ on ends and means and genuine compromise in the current situation would not be possible.

Ackoff, however, maintained that conflict of interest between 'system', 'super system' and 'sub-systems' could be dissolved by appealing to the basic community of interest. We had to make whatever changes we possibly could in the current situation. In complex situations we had to consider management first as they represented all stakeholders and the whole organization would benefit from changes at managerial level (Flood & Jackson 1991, p. 161). Ackoff further maintained that conflict at one level could be solved at a higher level, as long as there was agreement on the desired future. Critics felt that Ackoff did not address structural realities such as conflict (based on equalities) and power relationships. They believed that conflict could be

manipulated at an ideological level but that it was not possible if structural differences determined conflict (Flood & Jackson 1991, p. 159). Power relationships in organisations could suppress sensitive matters and some groups might, therefore, fail to present their own position clearly. Ackoff, however, was of the opinion that people themselves (their limited ability to think creatively and imaginatively) were the only obstructions between them and desired futures (Flood & Jackson 1991, p. 159).

According to Ackoff managers had to change their perceptions of the world and the nature of organizations. In the Systems Age, known for rapid change, organizations could no longer be managed as machines but had to be considered as consisting of interdependent and complex purposeful systems in which the emphasis was on learning and adaptation (Ackoff 1970, p. 4). We had to move away from analysis, reductionism and determinism, and concentrate on synthesis, expansionism and free will (Ackoff 1970, p. 3). The focus was on interactively dissolving problems or conflict and seeking consensus between different layers of stakeholders (Ackoff 1970, p. 7). We had to focus on the development of our organization and not on growth and survival.

IP assumes that an organisation's future depended on its own actions as well as on events in its environment. The methodology was applied most effectively in problem situations where

- an organization remained intact over time
- the management had maneuvering room
- there was a realistic opportunity to put learning into place and
- if the organizational culture was supportive of high levels of participation and a free exchange of ideas (Leonard & Beer, 1994, p. 20-22).

The methodology, further, required ample time and information for members to reap the full benefit of the exercise (Leonard & Beer, 1994, p. 22).

The methodology addressed a wide range of organizational problems by linking situations to specific metaphors. These links provided information on how to respond to problems in the systems age (Flood & Jackson 1991, p. 151). In the IP approach, most of the brain, culture and coalition metaphors were included; the brain metaphor introduced learning and adaptation, the stakeholders' different perceptions related to a pluralist political vision, coalition was brought about by a change in a shared organizational culture and led to maximum creativity. By

considering different stakeholder views, we emphasized the pluralist perspective (political situation) and the coalition metaphor. Ackoff's ideas helped us understand that a system was purposeful, contained other purposeful systems and was part of a wider purposeful system. His idea that an organization was a purposeful system, acting like a brain, supported the emphasis on learning and adaptation (Flood & Jackson 1991, p. 157).

Sushil (cited in Bevan 1980, p. 2) wrote that Ackoff 'presented a system of system concepts'; a behavioural classification of systems as state-maintaining, goal-seeking, multi-goal-seeking and purposive, and purposeful systems. 'Indirectly he gave a very important link between soft and hard systems thinking by relating to the achievement of goals' (Sushil 1994, p. 634). Ackoff's approach had been considered idealistic and experimental, with experimentalism evident in the nature of the philosophy and imagery. The basis of this experimental philosophy was the pursuit of ideals (Bevan 1980, p. 2). Ackoff rejected materialistic approaches and advocated

the primary importance of ideas and holism, not atomism; not machine-age thinking; systems thinking, analysis and prescription based on ideal seeking systems, neither 'liberal' nor 'Marxist' positions (Bevan 1980, p. 2).

His methodology did not strive for a static Utopia, specifying what the system should be like for all time (Flood & Jackson 1991(b), p. 6), but for an ideal seeking system, constantly changing to seek changed ideals (Bevan 1980, p. 2). Ackoff demonstrated the usefulness of IP as a practical systems approach in many situations. The powerful 'consensual' theory underpinning his work was seen as the reason for its success (Flood & Jackson 1991, p. 161).

## **6.2 Reflection on the application of IP in our research scenario**

IP methodology translated Ackoff's philosophy into practice and was based on the principles of participation, continuity, holism, co-ordination and integration (Ackoff 1970, p. 2). In this reflection, I linked our research experience to these principles.

### **6.2.1 Participation**

The initial mess analysis phase of the research project was conducted as part of the official merger task team brief. Information was collected from both institutions and this information was used to design shared processes and procedures to drive the student enrolment system for the new

institution. Experienced representatives were selected from various sub-systems at both Universities to serve on the 'mess analysis' Planning Boards. Staff not participating did, however, feel excluded and were not convinced that the chosen representatives had the knowledge or required depth of understanding to represent their own situations. They failed to understand that the emphasis was identifying similarities in general processes and procedural flows. The merger situation did, however, require change and learning and high levels of participation would have been useful.

In the initial discussions participants were reluctant to deviate from known processes and procedures and felt the larger institution was dominating the discussions although the merger brief clearly stated that we had to consider the institutions as equal partners. We could not prevent disagreement and conflict emerging in some discussions and as a result a few members left the information gathering teams.

Decisions made during the time of the merger forced staff members to accept that development would proceed along certain lines. Vital decisions made at a higher level, therefore, contributed to the elimination of a degree of conflict at our level and helped us focus on the processes at hand.

In this research process we reconsidered the information obtained for the merger and involved more participants in the information gathering stages. We tried to collect information from as large a group of participants as possible but proceedings were in some instances delayed by the unavailability of key members due to time constraints. We were able to involve staff members at the lowest levels and, although they did not have the theoretical background or planning experience to take part in the design process, they provided valuable information in the more mechanical (analytic) mess analysis phase.

The mistrust amongst participants evident in the initial information gathering had mostly disappeared and staff were willing to consider valuable elements in both pre-existing and current systems. The merger brought staff together and they were now sharing offices and procedures; they were, therefore, more willing to assist with the establishment of workable solutions. This shared interest enabled us to proceed with planning despite personal differences. Ackoff advised that for the planning process to be successful, we required an organisational culture of understanding and sharing and I believe we observed the development of such a shared culture during these discussions (Flood & Jackson 1991, p. 158).

Ackoff maintained that purposeful behaviour could not be value-free and that our procedures could only be objective if we included as many views as possible through open interaction (Flood & Jackson 1991, p.145). In our research we tried to understand why people viewed situations differently or supported specific assumptions. This shared understanding was required before we could develop a shared enrolment support system for the new University. By considering these different views we acknowledged the pluralism in our situation; staff came from different political perspectives and this represented the political element in our situation (Flood & Jackson 1991, p. 151). Consensus could not be reached in some cases and we had to proceed 'assuming' that consensus had been reached or had to fall back on decisions based on the principles of 'best practice'.

### **6.2.2 Continuity and holism**

The principles of continuity and holism embedded in the methodology were of specific importance to us. A shared ideal had been identified for the system at the time of the merger, but stakeholders still had different values. They had different needs to be fulfilled by the system and wanted to ensure that a new system would satisfy those needs. Flexibility, synthesis and constant development had to be maintained throughout our planning processes to facilitate learning and to ensure that all stakeholder requirements were accounted for. Expectations changed over time and our system had to be flexible enough to incorporate such changes. We realized that our plan would never be complete and that we had to work towards an ideal state which might itself change in the future to accommodate changes in stakeholder perceptions or in our containing systems.

In our complex situation, we were required to plan for as many sub-systems as possible at the same time. Our enrolment system included five key processes (sub-systems or purposeful systems) which were responsible for specific functions but they were interdependent and also dependent on interactions with Faculties and sub-systems dealing with student housing, funding, scholarships, fees, and many others. During our research, explanations were provided on why specific processes were supported or protected and this understanding assisted us in the design of flexible procedures. We had to identify which processes we could not change as they were contained (those prescribed by the containing system or owned by other sub-systems) and had to concentrate on areas in which we could improve our functioning. Changes in our system could affect all the sub-systems we were linked to and should not have a negative impact on them. In addition, our system interacted with external sub-systems such as the Central Applications Office at the same time. We had to

plan for the system as a whole and changes had to be introduced simultaneously to facilitate improvements throughout the system. Our improvements in one or more sub-systems, would only be considered desirable if the system as a whole would benefit from the changes.

Ackoff did not consider changes in the containing system once the design process had started, but we could not ignore the changes forced on our system, reporting lines, processes and the planning process itself, by changes within our containing system. The UKZN structures were constantly changing to accommodate new developments and demands. Decisions made at Executive level on preferred systems also guided our planning process. Changes were not only introduced to our system or sub-systems, but also to the sub-systems outside our system which we interacted with. This required us to continuously revisit our proposals to ensure that we could fulfill the required needs. Changes in our containing system required us to rethink the road to our 'ideal' on several occasions. In a way this also assisted us to perceive our system as a mental construct rather than a physical attribute affected by the continuously changing physical containing system.

### **6.2.3 Co-ordination and integration**

Most sub-systems involved in student enrolment were represented on the 'mess analysis' task teams but these representatives also formed part of their own sub-systems and had little time available to take part in our information gathering. In the first part of the research we, therefore, concentrated on the integration and coordination of processes under our 'control' and indicated where other sections were involved in obstructions to development or improvements in the overall enrolment process. Ackoff advised that you had to change what was possible in the existing circumstances and that is what we tried to do (Flood & Jackson 1991, p. 160). The design task team, however, accommodated further discussion with 'external' sub-systems. The inclusion of staff members from sub-systems outside the enrolment system provided a richer understanding of the individual processes and the ideal for the enrolment support system as a whole.

Horizontal coordination and vertical integration were the elements missing in most of our existing planning exercises. Sub-systems planned for themselves in great detail but often did not take cognizance of how their plans affected other sub-systems or the functioning of the system as a whole. IP provided us with the opportunity to introduce Planning Boards which Ackoff believed would improve our perceptions of coordination and integration (Ackoff 1974, p. 51). On a practical level the introduction of planning boards ensured that all sub-systems involved in the



enrolment process were represented in discussions and that planning would take place at more than one level at the same time. Staff at functional levels who were included in discussion at a higher level could act as gate keepers, reminding managers of the effect new decisions might have on operational areas at lower levels. If managers, on the other hand, were present at planning sessions at lower levels, they could provide the required ideological and strategic input required to dissolve problems considered as contained by staff at lower levels. By having representatives from different sub-systems serving on the shared Planning Board, we could assure that the needs of all sub-systems involved were addressed by a single body and at the same time. Such planning would facilitate the coordination and integration of interactions between all sub-systems involved in the student enrolment process.

### **6.3 Challenges in application of Idealised Planning (IP)**

The first challenge we were confronted with was the choice of research methodology. We had to ensure that the chosen methodology, IP, matched the problem situation. The success of the research process, or systems application, would depend on the fit between the method and the situation (Leonard & Beer 1994, p. 14). A systems approach was a strong tool if a big picture could be modeled as a viable whole; when we needed to ensure that the designs of different parts were properly aligned with the need of the whole (Leonard & Beer, 1994, p. 14)

Flood and Jackson's framework provided us with a grouping of problem contexts and we identified our situation as a complex-pluralist problem situation (Flood & Jackson 1991, p. 39). Our system was dependent on a large number of elements with many interactions between them. The participants in our system had a basic compatibility of interests but their values and beliefs could diverge. Idealised Planning was one of the methodologies recommended for use in complex-pluralist problem contexts (Flood & Jackson 1991, p 42). A systems application, such as IP, was particularly useful in our situation in which we had to consider the bigger system as a whole; we had to ensure that the designs of different parts were properly aligned with the need of the whole (Leonard & Beer 1994, p. 14). We could, however, modify our chosen design methodology to match a particular situation. IP, for example, shared assumptions with other systems models and could be used in conjunction with other models (Leonard & Beer 1994, p. 17). In our design process we used SSM diagramming techniques to present the idealized properties for the new design, while principles of TQM were used to demonstrate the variety of quality elements to be

monitored in the design. Principles of VSM theory assisted with the development of a control and feedback model for our proposed design.

IP methodology allowed us to handle the complexity of our problem situations and the pluralism which stemmed from the fact that we served diverse stakeholders, at the same time (Flood & Jackson 1991, p. 158). This characteristic made the methodology most suitable for the type of research we intended; an investigation of a complex problem situations acted on by various individuals and diverse stakeholders.

The success of the IP application depended on the participation of a large number of staff members and on the variety of perspectives they would bring into the situation. We had to include members from all levels of the organization in the process. The contributions from less privileged stakeholders had to be carefully monitored. They were not able to participate equally in the process as they entered the process with widely divergent intellectual, economical and political resources. Care had to be taken to ensure that members at lower levels were not excluded from discussions and that they had the opportunity to contribute at their level or in their functional areas.

It would have facilitated our process if professional planners had been introduced to guide the process. The scope of the research was too wide for an inexperienced researcher to manage. Ackoff felt that external consultants could also educate stakeholders about their need to change their traditional roles. In the Great Atlantic and Pacific Tea Company (A & P) planning exercise, external experts were, for example, called in to assist the Unions to move away from their traditional roles (Ackoff 1970, p. 17). A facilitator could have encouraged our participants to think out of the box and that would have enhanced their creativity. Facilitators could also protect participants to ensure open participation and control conflict situations.

Ackoff limited the scope of his projects by not challenging fundamental interests and, therefore, kept significant issues out of the debate (Flood & Jackson 1991, p. 158). He excluded significant issues from discussions (Flood & Jackson 1991, p. 158). It was, however, not always possible to keep elements of the political metaphor in its coercive (prison) setting out of our debates, (Ackoff 1970, p. 9) even though our planning was mostly based on functional processes and procedures. Ackoff suggested that we should accept their presence in the information collection stages but that we had to ignore these issues during the planning process (Jackson 2000, p. 244, 245). Conflict might, however, obstruct consensus which would cause delays in the implementation of the new

design. Disagreement in our process was mostly about existing structural positions rather than the processes to be performed: participants supported alternative models which would enhance personal positions and autonomy.

IP enforced that the success of any new plan would depend on our ability to manage the implementation. The implementation should not be obstructed by a rigid organizational culture or delays in, for example, IT development. It was vital in our research that participants agreed on the requirements of the new design as their acceptance would facilitate the implementation process.

The IP process took a long time to complete; it was a systemic process and the methodology had to be followed rigorously. It required a synthesis of findings and decisions after each stage. Several months were required to involve enough participants adequately to gain the full benefit of such a study (Leonard & Beer 1994, p. 13). It was not always possible for all members to participate throughout the process and staff members who could make valuable contributions were lost due to time constraints.

If IP had to be used in a formal planning exercise, it would be best to limit the size of the project, set a specific period of time aside and to ensure that the research project had a high level of managerial support and input. A commitment was required which would ensure participation and implementation of the recommended changes). Months would be required to collect the required information and to ensure that enough participants were involved adequately to gain the full benefit of such a study (Leonard & Beer 1994, p. 13). If a systems model was applied the research process would normally have a slow start while information was collected but once the participants reached a shared understanding the pace of the planning process would increase. All information collected had to be considered to establish a common understanding of the elements and changes required of the system before the planning process could commence.

The process was delayed when we had to take changes in the containing system into account during the design stage. Ackoff advised that we should not consider external changes once the mess analysis was complete but this was not always possible in our study. Changes in the external environment drove the design in a specific direction.

Idealized design is meant to generate maximum creativity amongst all participants (Leonard & Beer 1994, p. 17). Constraints such as financial, or political or similar, should not restrict the

creativity of the design. Staff members were, however, so conditioned to financial constraints that it was difficult for them to ignore financial implications. Some staff members were also reluctant to take part in the design of a new system which could challenge their existing positions. The challenge was to make staff realize that we were reaching for an 'ideal seeking' design which would be constantly seeking to improve its own performance. Staff members were in some instances, however, so used to be 'planned for' that they struggled to perceive that they could change their own situations (Flood & Jackson 1991, p. 151).

#### **6.4 Learning generated**

Ackoff did not propose that we produce an utopia, specifying what the system should be, but rather that we try to create a system capable of learning and adaptation, constantly seeking to improve its own performance; the best 'ideal seeking system' the stakeholders could imagine (Ackoff 1970, p. 21). In our system many of our stakeholders were also our clients and there was a reciprocal dependency between us. We provided our clients with information in various formats and our existence was dependent on their need for this information and our ability to satisfy those needs. Stakeholder needs, however, changed over time, and we were required to make the corresponding changes to our system.

An 'ideal seeking system' should be able to

- identify and formulate problems, threats and opportunities,
- make decisions (what to do about threats and opportunities)
- implement decisions
- exercise control (monitor and modify actions to prevent repetition) and
- acquire and distribute information required to perform other functions.

(Ackoff 1970, p. 21).

The purpose of this research was to consider the existing student enrolment system at UKZN and based on that information, design an 'ideal seeking system' for the student enrolment function as a whole.

In our research we identified the key processes of the student enrolment system. We agreed that the processes we would concentrate on would be: production of material, recruitment, enquiries, application and selection. Each process was considered as a sub-system of the student enrolment

system. We considered each sub-system and reached a shared understanding on the following items for each sub-system:

- its structure and reporting lines
- the flow of procedures
- instructions influencing the process
- other sub-systems impacting on the sub-system and
- the financial aspects of the sub-system.

This analysis provided an understanding on what was done and how the functions were performed. The synthesis at the end of this process provided us with a set of documents and flow charts clearly outlining reporting lines, areas of responsibility and procedures to be followed in the execution of these functions. We considered how decisions from outside the sub-systems impacted on the future of a process and also how a sub-system's interactions with other sub-systems influenced its functioning or viability. By considering these elements we generated an understanding of why functions were performed in certain ways. It was agreed that these sub-systems had very little opportunity for the generation of funding and that they, as open systems, were completely dependent on their containing environment for the resources they required for their continued existence.

The management styles varied but it was felt that management mostly provided the support required by the sub-systems. Participants did, however, identify a need for involvement in the overall planning process for the enrolment system. It was agreed that existing planning exercises were lacking and that decisions were not implemented throughout the system or communicated to all concerned. Planning was done on a segmented basis for each sub-system and very little communication took place between sub-systems. It was felt that planning was not done in time and that changes were mostly only introduced in crises situations.

The CATWOE analysis allowed us to consider the system as a whole and to decide who benefited from the system. A large number of clients were identified both from within and external to the containing system. We provided a range of services to our clients and it was essential that our system should be flexible enough to accommodate changes in the requirements of our clients. A large number of actors performed functions within the enrolment system or liaised with our system. These actors had their own world views, and these determined their expectations of how

the system should perform or satisfy their needs. It was difficult to determine who the owners of the system or sub-systems would be. The system performed a wide range of functions and different people could claim ownership to different parts of the system. Problems were often experienced when one actor or client made demands on the system which had a negative impact on the general service delivery of the system.

Participants were aware of problems in the system as a whole. These problems could be at either functional level or in the development of the system as a whole. Problems could occur as a result of influences from outside our system. It was important for us to establish what the exact 'cause' of a problem was. This was not always easy to determine. Problems at functional levels could mostly be corrected within the particular sub-system but developments required to improve the functioning of the system as a whole had to be considered by all participants in the system. In the CATWOE analysis the main concentration was, therefore, on the identification of the transformations required of our system as a whole to ensure that service delivery could be improved and that the system could cope with future developments.

The participants considered the existing system and requested changes to ensure that members had the required power to act, that the system was run by means of centrally coordinated processes and procedures, that we conducted shared and coordinated planning, that we received the required training, information and resources to provide professional and informed service delivery, that our processes be supported by a flexible and accommodating IT system and that units be encouraged to work together for the benefit of the system as a whole. They felt that the current system was characterized by a lack of authority to act, a lack of coordination, integration and professionalism. Staff members received insufficient information and the IT system was restricting. Processes were segmented, resources were lacking and sub-systems were often in competition with each other.

The transformations required in the CATWOE analysis were echoed in the SWOT analysis. In the SWOT analysis participants identified opportunities for centralized coordination and integration, training, shared planning and feedback, development of a single identity, elimination of duplication and further developments to the IT system. The proposed introduction of NHEIAS, the early selection of applicants by competitors, wastage of resources, untrained staff, segmented procedures and our slow turn-around time were considered threats to our system.

The strengths of our system lay in the quality of staff and their commitment to try and make the system work. They are fully trained and familiar with existing processes and procedures. We do have a workable IT system and are fully integrated with the CAO application system. Our publications are of a high quality and contain the latest information on programme offerings and entrance requirements. The weaknesses of our system had already been identified but they related to segmented implementation of processes and procedures resulting in variations between campuses or Faculties, a less than responsive IT system, delays in IT developments, a draining of our resources, down time of the CAO system, lack of coordination of academic, financial aid and residence processes, an overload due to the increasing number of applications and lack of resources and the variety of reporting lines.

The obstructions to development in our system, considered as either the result of discrepancies or conflicts within our system, were documented and would be used to drive the transformations required of our system.

From the above it was clear that our existing system was in trouble and that we would not be able to cope with future demands if we did not make the required changes now. The increasing work load and demand on our resources would render the system unmanageable. The slowness of the IT system and the down time of the CAO system made it impossible for staff members to perform at the rate required. The uncoordinated recruitment initiatives would continue to drain our resources and bring more non-qualifying applicants into our system. The large number of late applicants would continue to cause a bottleneck at the beginning of each year. Many temporary staff members were appointed annually during the peak period to assist the permanent staff members. These temporary staff members did not have the required understanding of procedures, the interactions between sub-systems or IT systems and often provided incorrect information or captured incorrect application information on the student information system. This resulted in poor service delivery and a lack of professionalism.

We considered the negative picture described in the research scenario and considered what the aim of an improved system would be. We also listed the following essential requirements or desired properties for an improved design: clear policies and operational procedures, communication channels, resource acquisition and distribution, staff training and development, product research and development, a control and implementation facility as well as a monitoring and feedback element.

In the design process we had to ensure that these desired properties were accommodated. In our first design we did not pay attention to existing limitations, but designed an ideal centralised system we would have liked to replace our existing system with. The second design was limited by the current constraints imposed by the containing system. We did, however, manage to make suggestions for changes within the existing limitations. In the choice of the final design we had to consider the feasibility and cost of establishing a centralised office on one of the campuses. The University had, however, accepted a management system based on delegation and devolvment. It was unlikely that the Executive would support the introduction of a centralised enrolment office at this stage. We, therefore, had to push the boundaries of the constrained design out as far as possible to try and include as many of the elements of the unconstrained design in the constrained design. The final design was compared to the reference scenario to ensure that all the concerns raised had been addressed in the new design. If concerns could not be accommodated, they had to be listed and we had to consider means of working towards the attainment of those goals and objectives.

An important feature of the chosen design was the introduction of planning boards which would assure that all planning taking place would be coordinated and integrated. The new system needed to include a 'development' element. Planning had to take place on a continuous basis to ensure that learning would be generated to drive future development. Such development would ensure the viability of our system in future. In the implementation stage of our design we developed time-lines for each of the processes. The implementation process could be measured against these time-lines to determine its progress and needs for further adjustment.

The sets of document prepared during the research process would be provided to members of the enrolment system for reference purposes and as training material for new staff. The timelines could be used as year planners for our sub-systems, to monitor our processes as well as the implementation of new developments. Our design would never be complete. It is considered as an idealised design and would constantly change to incorporate new requirements of our clients.

## **6.5 Meeting of research objectives**

The aim of the research project was to use a systems methodology to investigate the viability of the existing student enrolment support system at the University of KwaZulu-Natal and to identify the changes required for the establishment of an idealized system.

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The application of Ackoff's Idealised Planning methodology in our complex-pluralist research scenario was particularly successful. We were able to pay attention to the complexity of our system as well as the pluralism present in purposeful systems (Ackoff 1970, p. 2,3). The methodology allowed us to consider the pluralism resulting from the fact that the system served diverse stakeholders at the same time (Flood & Jackson 1991, p. 158). The step by step methodology provided for the collection of information allowed the maximum participation we had hoped for (Flood & Jackson 1991, p. 144).

The information collected made us aware of elements in our system we had never before fully conceptualized. We were able to identify how our existing planning style blocked innovation in and development of our system. Effective planning had to be carried out systemically, documented and communicated to those involved in the delivery of the plan. Our plans often failed because they were not properly communicated and implemented. 'Cascading the business objectives through the organization and integrating them into individual employee's goals, can make a massive difference to the performance of a business' (Horizon 2006, p .3). We had to ensure that staff members understood the planning objectives and the role they were expected to play. If they had the required information, they would be able to make informed choices and decisions in the context of the total process, regardless of their levels within the system (Horizon 2006, p. 3).

The research alerted us to the fact that we could make changes to the environments in which we had identified problems. By changing the environment the problems may dissolve (Horizon 2006, p. 146). We now understood why problems existed and had identified possible ways to reduce breakdowns and overloads. In addition, we identified elements in the containing system or other sub-systems, which obstructed our development.

It was recognized that we could not cling to the past but that our system had to be flexible enough to deal with emergencies and demands for change (Flood & Jackson 1991, p. 145). Britton & Mc Callion emphasised that all modern organizations had to be able to deal with such developments ...'the pace of change has accelerated at an outstanding rate' (Britton & Mc Callion 1993, p. 1). Today all systems were required

to enhance their capacity to anticipate and lead change in order to remain respected and valued and be able to complete successfully in the marketplace. The process of effective planning is to clearly and actively define goals through discussion, visualization to create clarity, shared ownership and a strong desire to achieve those goals (Britton & Mc Callion 1993, p. 1).

We now understood that our system was open to constant influences from the internal and external environments and that these influences required temporary or permanent transformations of specific sub-systems or of the system as a whole. The research process enabled us to identify the transformations we had to implement in our system for it to cope with the demands for change or improvement and to remain viable. The process expanded participants' concepts of feasibility and that enabled them to participate in the planning process. Their understanding of why things had to change, and sharing in decisions on how things could be changed, would facilitate the implementation of the new design (Ackoff 1970, p. 14). Unfortunately the discussions did not generate more creativity in the design process. Staff tried to cling to existing structures; concerned that their participation in the planning of a new design would jeopardize their positions in their current structures. IP as methodology would not be successful if staff members taking part in the design process were insecure as was the case during our merger and post-merger situation.

Staff members did, however, reach some agreement through joint discussions and in our design process we emphasised the concepts of 'holistic and continuous planning'. Attention also had to be paid to the coordination and integration of all functions relating to the student enrolment process. These elements were sadly missing in the current 'mess situation'. We could, however, not reach complete consensus on all issues and if time allowed, it would have been beneficial to apply coalition / political driven methodologies to reach true consensus.

The research process confirmed our concerns that our existing systems would no longer be able to cope if we did not make the required changes. The basic processes and procedures were still applicable but the information system and other resources no longer allowed us to provide the required support and we had to develop ways of working faster and smarter to reduce the work load. The current system could no longer cope with the ever increasing number of applications submitted directly to the University and via the CAO. Our system would not be able to meet the demands of NHEIS should that facility be introduced.

In the consideration of the preferred design for an improved system, we revisited the idea of the establishment of a centralized Student Enrolment Office for UKZN. A centralized system would provide a single reporting line, better communication, better management of processes and control over implementation of decisions, procedures and developments. It was, however, considered that

such a centralised office would be very costly to establish and would require the relocation of a large number of staff members.

In the preferred design we allowed for the establishment of satellite Applications and Information Offices on the Pietermaritzburg and Westville campuses, a coordinated recruitment facility as well as a relocation of staff members dealing with international and Matriculation Board applications. The success of this design, in which we made use of a combination of University-wide offices as well as decentralized facilities in Faculties and on other campuses, would, however, depend on our ability to establish a process of holistic planning. In our design we made provision for the implementation of a number of Planning Boards on which members from different sub-systems would sit to facilitate the much needed coordination and integration of processes. Planning had to be considered as a continuous learning process and only if we established our system as a 'learning system' would it be able to proactively meet the future demands for change.

In closing it should be stressed that although the initial mess analysis part of this research project fed into the information collection process of the formal merger task teams, the subsequent research was done in my private capacity. The design process, in particular, was managed by a small group of participants and was not part of any official proposal for restructuring. The final design did, in fact, not reflect the latest developments in our containing system in which the Student Academic Administration section at UKZN was moved to the Office of the Registrar.

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1.1 Production of material process

Sub-systems involved in the production of material are highlighted in yellow:

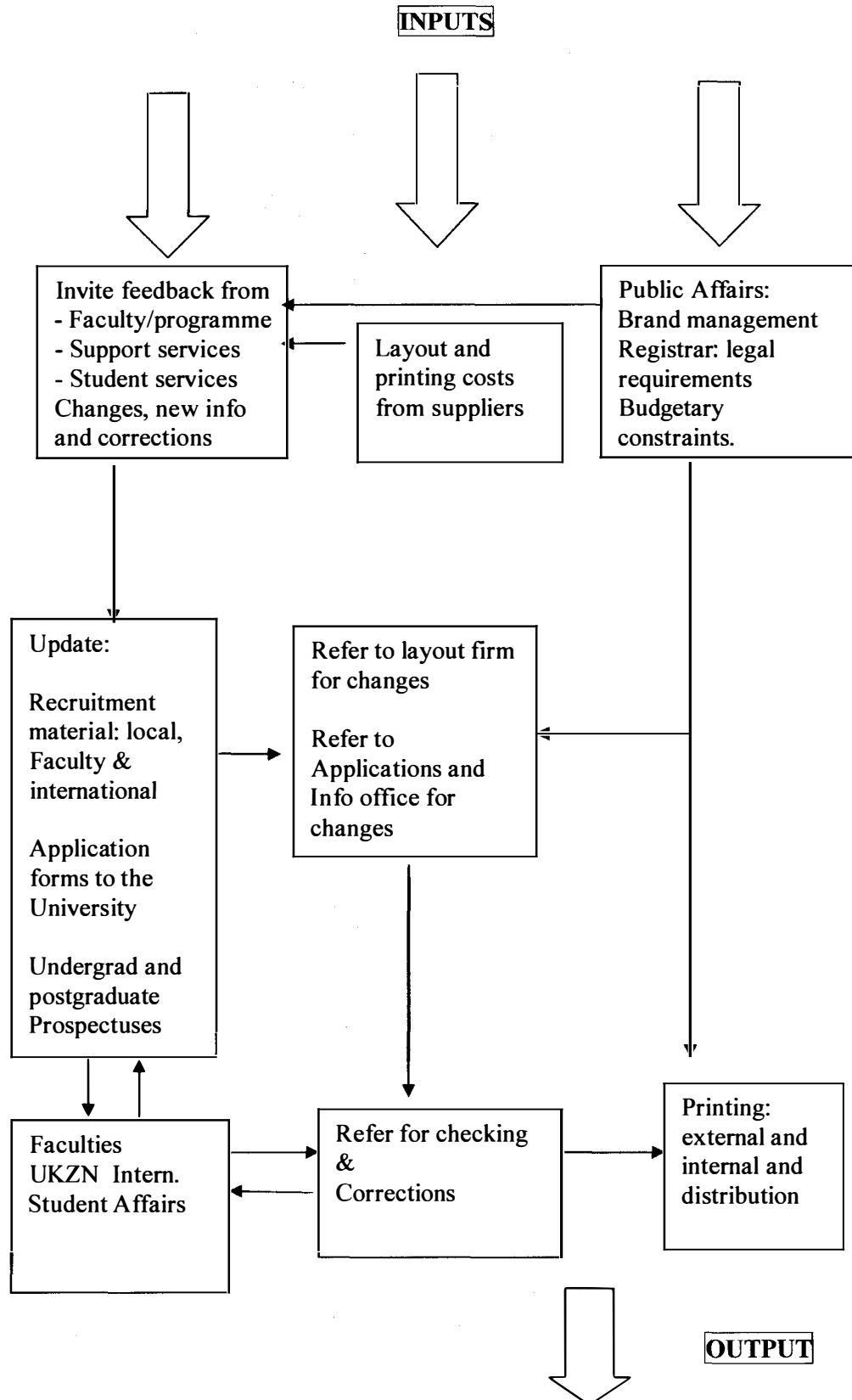
DVC Academic	Public Affairs	Executive Dean of Students UW	Executive Finance Officer	Administration	Registrar	Director ITD
UW	UW	Deans of Dudent CB	UW	UW	UW	
Director	Director	Director				
CB	School Branding	Housing Student	Student Cashiers Procurement	Registry	Legal Advisor	ITD DMI
AO AIO	Liaison	CB Funding	Fees CB UW	CB	UW	
FO UW	UW UW UW	CB Societies	CB			
Dept SAA		Student ISSO				
Student CB		Funding Sport				
Boards Time tables		Loans & CB				
Access		Scholarships				

Areas of Involvement:

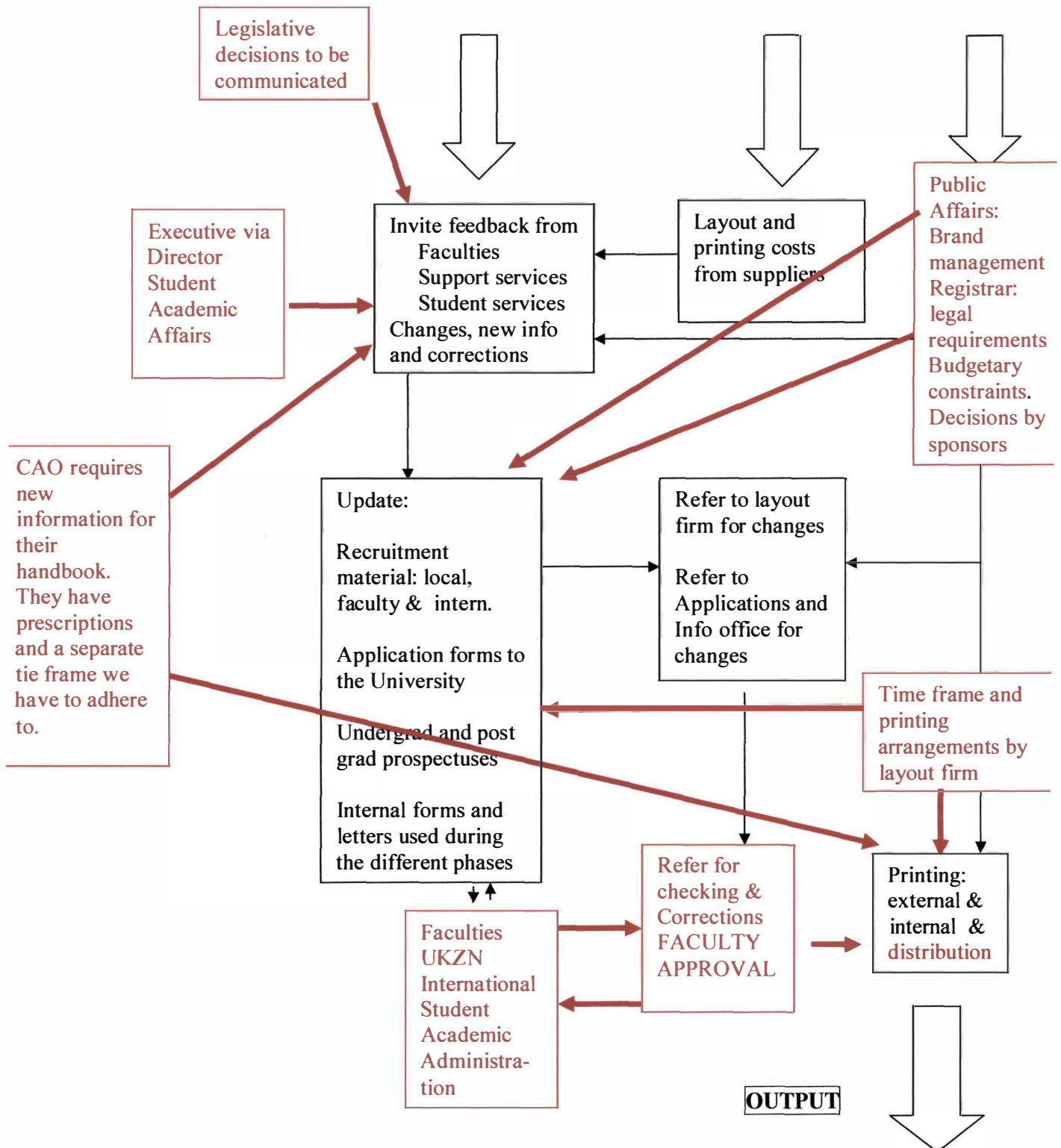
Handbooks	Application	Brochure	Guide	Rules	Info sheets	Info	Fees	Quotations	Approval of
Info sheets	forms			book		sheets	Booklets		legalities on
Course	Intremal				Guides				forms
codes lists	forms								
	PG Guide								
	Undergraduate								
	Prospectus								
	Time tables								
	Orientation								
	Registration								

## Production of material: procedural flow chart

## APPENDIX B

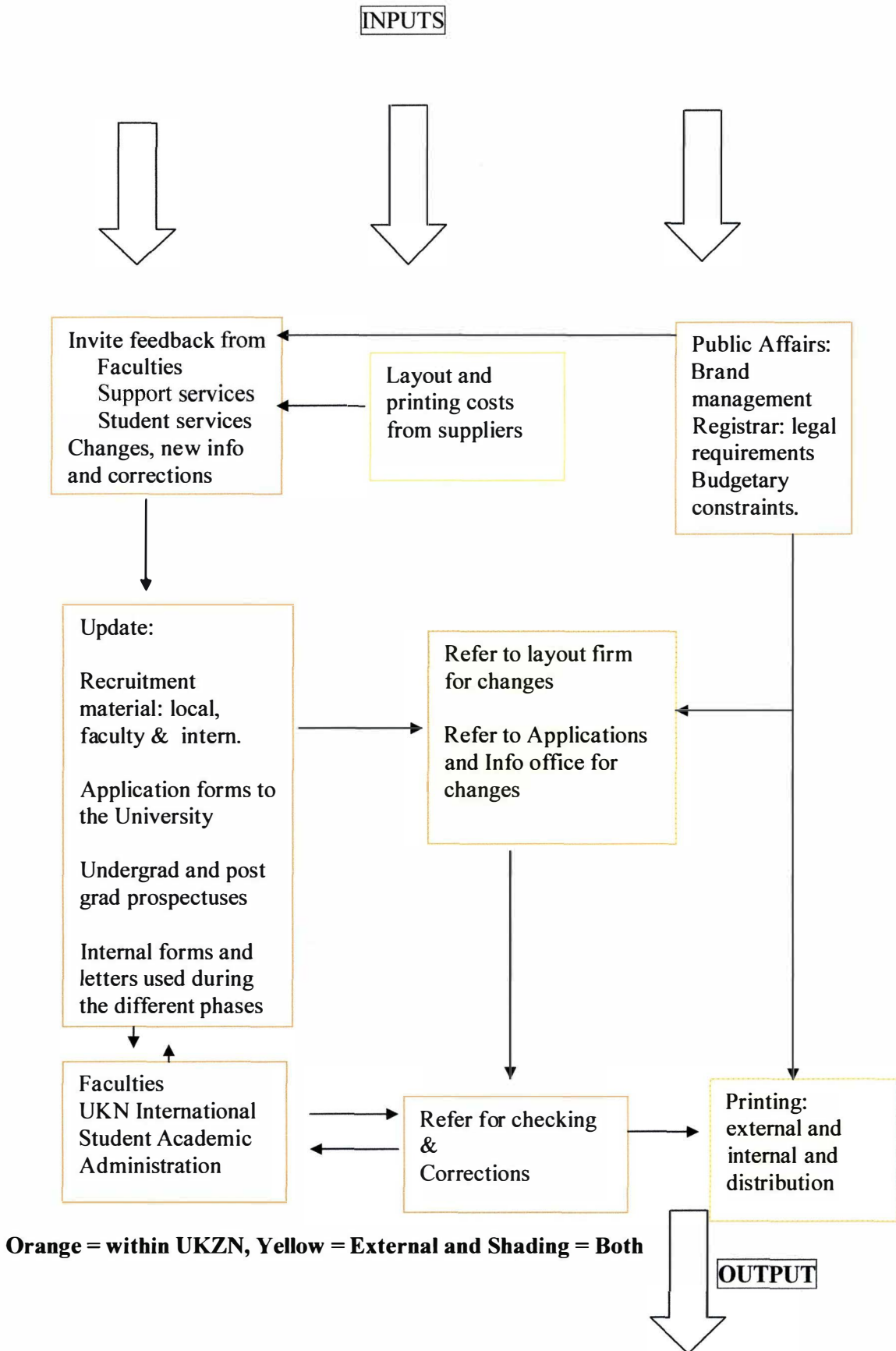




**INPUTS**

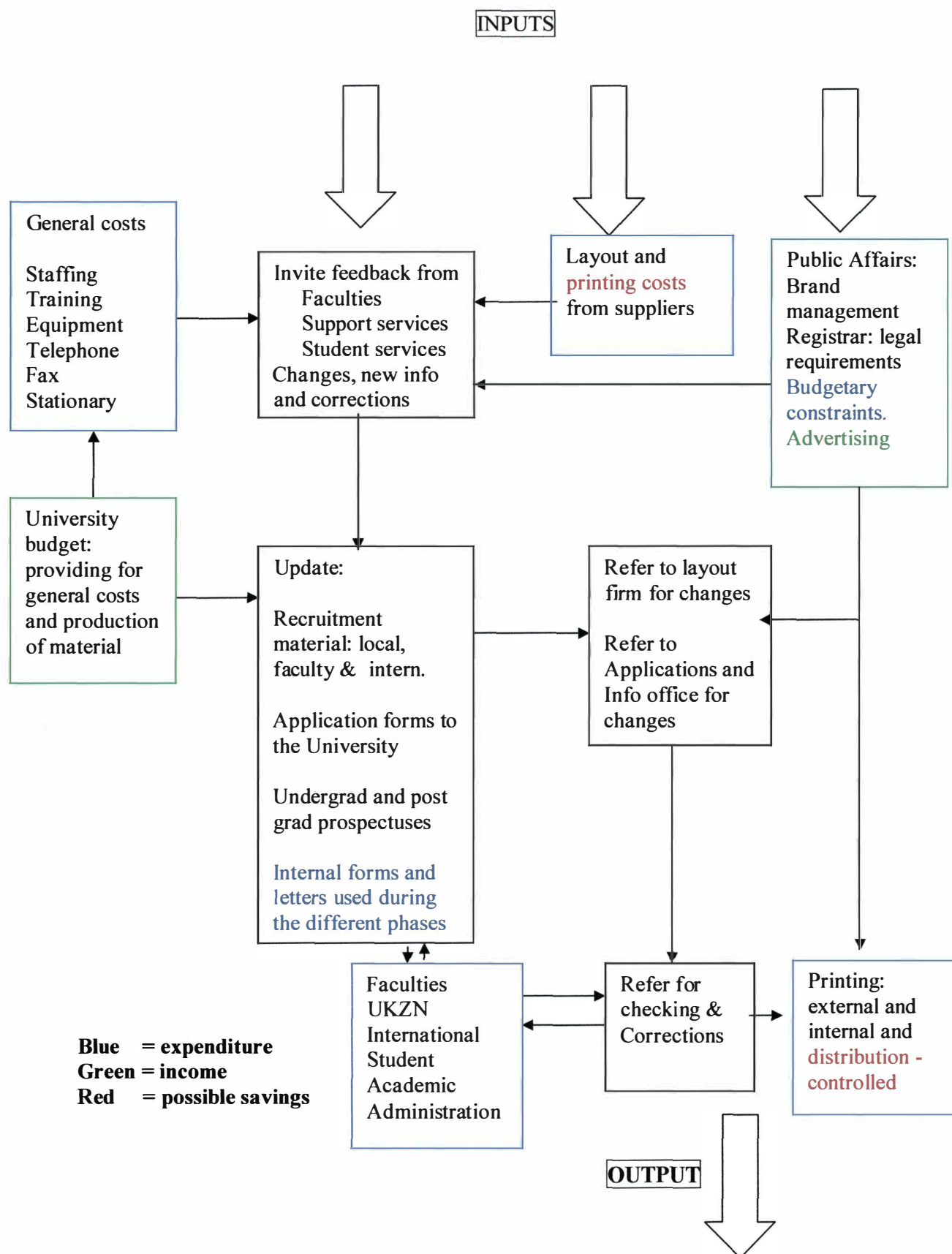
## Production of Material: Sub-systems influencing the process

## APPENDIX D



## Production of material: Income and expenditure

## APPENDIX E



<b>C</b>	-	Prospective students, enquirers, registered students, applicants schools, teachers/principals, Faculties, other sub-sections within the University, public, government departments.	
<b>A</b>	-	Applicants, School Liaison staff, policy development and planning staff, IT development staff, CAO/NHEIAS, Faculties, Applications Office.	
<b>T</b>	-	<b><i>Change from</i></b>	<b><i>Change to</i></b>
		Lack of authority	to power to act
		Lack of co-ordination	to centrally co-ordinated processes
		Lack of integration	to integration and shared planning
		Lack of professionalism	to professional & informed service
		Limited information	to redundancy of information
		Restricting IT system	to flexible & accommodating IT
		Segmented processes	to centrally controlled processes
		Shortfalls in material	to sufficient information material
		Competition between units	to working for the whole
<b>W</b>	-	<b>Applicants:</b>	- to be provided with professional assistance and quality information in the shortest time possible to assist with entrance .
		<b>Schools Liaison:</b>	- to be able to conduct professional cost effective recruitment in terms of the student enrolment policies.
		<b>Academic planning:</b>	- to facility the formulation of policy for academic development and the academic structure in term of market requirements, societal needs and instructions from central government.
	-	to promote quality assurance within the University by measuring our progress in terms of the laid down academic planning policies.	
	-	to communicate a student enrolment plan to marketing, faculties and the applications office to guide their operations and the registration of students at the University.	
		<b>IT Development:</b>	- to develop and maintain an interlinked user friendly student support system, satisfying clients as far as possible within the restrictions available.
		<b>CAO/NHEIAS:</b>	- to provide institutions and applicants with an integrated and professional systems based application service
			- to provide meaningful statistics on enrolment and application patterns
		<b>Faculties:</b>	- to be provided with quality information for applicants (system based via CAO and application office data capturers) and supporting documentation to enable them to offer places in the shortest time possible
		<b>Applications office:</b>	- to perform a coordinating function

between applicants and faculties by providing faculties with the information required for selection and

- by providing prospective applicants with meaningful information and supporting material, as well as with information on the processes and progress regarding their applications.

**O Academic Planning:** development of programme development policies, academic structure, defining student enrolment plan, measuring of progress in terms of policy

**School Liaison:** production of marketing material, defining of marketing strategies in terms of the enrolment plan and actively recruiting students.

**Applications office:** defining coordinated and integrated systems and procedures for attending to enquiries, processing new applications and managing uploads from the CAO to enable Faculties to make offers to applicants and to provide quality information to prospective as well as current students.

**E Wider University system** of which our sub-system is a part

Budgetary constraints, University mission, Competition and conflict between units, The Community we serve: economic (funding available/development) political (pressure groups/ demands for application material and access)

Social (service provision).

CAO/NHEAIS: prescription provided by Government and the procedures stipulated by CAO.

**SWOT analysis for system as a whole****APPENDIX G****Strengths**

Quality information material  
 Efficient and informed call centre  
 Professional staff, multi-skilled  
 Established processes  
 IT systems  
 Refined letter generation process  
 Experienced data capturers  
 Familiar with all CAO processes  
 Good liaison with Faculties

**Weaknesses**

Not all campuses use letter generation  
 Latest info does not reach call centre  
 Late submission of info for publications  
 Not all enquiry detail captures  
 Restrictions on ITS/CAO: codes  
 Unit: Struggle for identity; skills not recognized  
 Down time at CAO  
 Selection process not date driven  
 Segmented planning : University wide  
 Residence admissions process  
 Delays in awarding of fin aid  
 Delays in selecting international applicants  
 Not able to send our material to people who apply via the CAO  
 Staff not familiar with policies and procedures getting involved/making decisions  
 Not all material integrated  
 Not all marketing coordinated from central point  
 Different reporting lines

**Opportunities**

Student enrolment office  
 Central integration & coordination  
 Training  
 Shared planning: all involved  
 Auditing of application detail  
  
 One identity/office: one voice  
 Eliminate duplication  
 Further IT developments  
 Extend call centre

**Threats**

National Applications Office  
 Merger: procedures not all merged  
 Cost of publications  
 Competitors: offering places earlier  
 Acceptance of merged institution by community  
 Insufficient material available  
 Segmentation of process  
 Duplication of duties  
 Wastage of material  
 Turn around time  
 Untrained staff capturing

## Obstruction Analysis

## APPENDIX H

Constraints on development are found within a system. We need to differentiate between discrepancies and conflicts found in our system (Ackoff, 1981, p84).

### Discrepancies

**Organizational ends:** Discrepancies between what is preached and what is done. Access to policies or feedback is limited despite a policy of transparency. Published services are often not available.

**Organizational means:** The discrepancy between the manners in which we claimed we used to pursue ends, and those we actually used (Ackoff, 1981, p87): this was found in job descriptions, integration of support services, procedures and response times, recruitment and resources available, handling of international applications and CAO processes.

**Organizational resources:** (quality, quantity and availability of personnel, equipment, information, money, materials and energy. (Ackoff, 1981, p89)) Staff with public responsibilities were appointed at low levels. Despite praise from clients their efforts were not recognized. Unique post requirements were not acknowledged: staff were expected to improve qualifications and skills but those were not acknowledged in job descriptions. Valued resources were placed out of reach, e.g. re-appointment of temporary staff. Delays in IT development, replacement of equipment and development of material delayed our processes.

**Organizational structure and management:** Duties may be delegated but staff were not enabled to perform these duties. The conduct of certain staff members did not enhance the image of UKZN. Feedback reports were not acted on by management and functional boundaries were not respected.

**The organizations stakeholders and the environment:** We assumed that our product was the best and attracted students. We assumed that our academic development process was in line with societal requirements. The question was asked if applicants merely chose UKZN because we were the closest University? (Ackoff, 1981, p90).

### Conflict

**Conflict between individuals is evident where** personal problems/agendas reduced the ability of individuals to perform their functions. Conflict might arise due to misunderstanding, work stress or when ration tension was evident. Problems arose when procedures or official reporting lines were not followed. Clients also made demands and threats if they could not be accommodated.

**Conflict between individuals and the system (institution) or parts of:** Conflict arose when an employee was unhappy with regarding or about changes to employment conditions.

**Conflict within units:** Work pressure did not allow staff to attend courses or take leave at the same time. Staff attending lectures might not be able to attend due to work pressure. Staff might be reluctant to work over weekends (University wide events) or over time. We might have difficulty in prioritizing functions if demands were made at the same time.

**Conflicts between units at different levels:** Demands were made for processing of applications without payment of application fees or for fees to be refunded. Both decisions should involve the Finance Officer. Application fees were payable by all as those were handling fees and certain groups should not be singled out for special treatment. Staff allocations in all sections had to be brought in line with their work loads.

**Conflict within the (system) institution as a whole:** Sections expanded boundaries without consultation, reporting lines were not acknowledged, consultation times were not client friendly, staff recognition and promotions were lacking, style of communication between staff members were not always acceptable.

**Conflict between the corporation and external groups:** The community's demand for access, housing and funding was not in line with the availability of places and resources. Lack of information about the CAO process lead to the misconception that UKZN staff members were not involved in the undergraduate application process. The work load expected of staff within this process at UKZN was not acceptable and did not compare with the load of other staff members at the same levels in other sub-systems.



**Report on reference projections****APPENDIX I**

After consideration of the five sets of reports submitted by Planning Boards C-G, the following reference projections were made:

**Production of material:** Funding allocated for the production of material will soon not be sufficient to provide copies for the increasing number of applicants. Funding and material is becoming available too late and this will result in us losing applications. The uncoordinated production of material will lead to an increase in conflicting information published without proper University branding. The cumbersome process of obtaining quotations and order numbers will continue to delay publication processes. UKZN needs to address its reputation as a bad payer as that influences our relationships with suppliers.

**Recruitment:** If no recruitment plan is enforced we will continue to recruit students whom we cannot accommodate due to their academic standard, places, funding and accommodation available. We will also continue to duplicate efforts. Recruiters require training to ensure that correct information reaches our clients. If we offer deserving learners places at first contact we will improve our reputation but we need to be able to offer the same incentives as our competitors to attract students.

**Enquiries:** The enquiry process needs to be synchronized to eliminate duplication and delays. The number of enquiries are increasing and we record requests electronically. Enquiries can be captured at point of receipt but packed from a single office. This will eliminate capturing bottlenecks. Material must be available for packing. We will continue to lose applicants if we do not work faster. A better working relationship has to be established with the CAO for handling of enquiries as UKZN material does not reach applicants requesting material direct from the CAO.

**Applications:** The CAO and UKZN staff allocations need to be reconsidered. If the overload on staff is not addressed it will lead to burn-out and resignations. Correct, clear information is not reaching all applicants. An increase in non-qualifiers is clogging the system and delay selections of qualifying learners. We have to find ways to eliminate non-qualifying applications. We will not be able to cope with all the telephone enquiries if application numbers continue to increase. The internal data capturing process requires attention. The current IT system is slow and cumbersome.

**Selections:** If our processes and closing dates (academic, residence and financial aid) are not in line we will not be able to make correct selections. If Faculties do not follow the same selection procedures, we will continue to provide conflicting or incorrect/incomplete information to applicants. If sections supplying information material for the selection packages continue to undersupply or to submit material late, SAA will continue to carry the cost for additional copies made and the packing process will still be delayed. The early selection process should be further developed to enable us to keep up with our competitors. Scholarship packages and recruitment strategies should be revisited to ensure that UKZN attracts good applicants. If not these applicants will continue to accept offers from our competitors. The University community should become more aware of application/selection procedures to limit misinformation provided to applicants.

**Reporting lines:** As sections report to a variety of Executive members it is vital that holistic planning is done at managerial level to ensure that the enrolment process as a whole is coordinated and integrated. This will ensure overall development.

**Procedures within our systems:** Correct procedures should be recorded, communicated and enforced to facilitate processes. Currently processes are not managed from a central point and sections often deviate from approved procedures. This leads to confusion, misinformation and incomplete information on the IT system

**Instructions to our system:** Instructions should apply to the system as a whole and should be beneficial to all sub-systems: new instructions often disrupt other processes. Official reporting lines should be followed and instructions must be provided in writing to avoid miscommunication and to ensure implementation.

**External and Internal Influences:** Influences on our system must be managed properly. Demands from sub-systems should not be allowed to have a negative impact on the functioning of the system as a whole or of other sub-systems.

**Income and Expenditure:** We need to find ways to generate funding to enable us to replace outdated equipment and to allow for staff training and development. Our needs are not covered by existing funding and our situation will deteriorate if it is not addressed.

**Management style:** Management should be more transparent, consultative and inclusive. Decisions must be made on actual information. This will reduce the climate of mistrust and lack of transparency. Staff needs to be assured that they have the support of management. Attacks on and victimization of staff must be addressed.

**Resources: Staffing, venues, funding and equipment:** Most sub-systems dealing with applications are under resourced and this causes delay and frustration. We work with insufficient equipment and the situation will become worse if applications continue to increase.

## Reference scenario

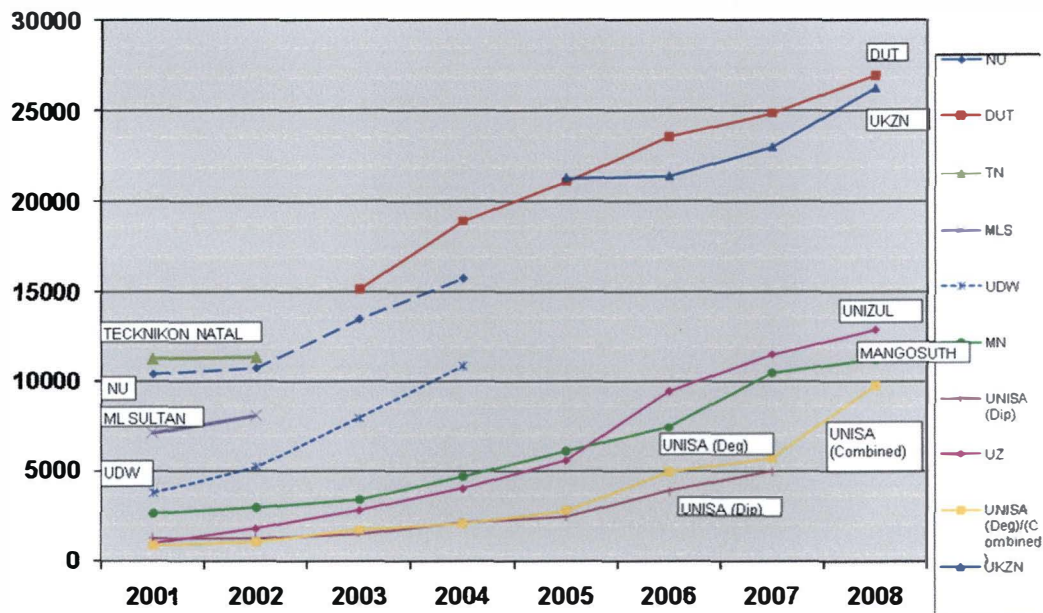
## APPENDIX J

If nothing changed in our environment, our operational lack of integration will continue. More sub-systems will develop/implement their own procedures, which will make the 'enrolment' process difficult to co-ordinate. Segmented training will continue, which may result in more data capturing errors, and more incorrect information reaching our clients.

Non-adherence to submission dates for inserts in publications will continue to make it impossible to have publications available early in the year, thereby allowing our competitors to retain the competitive edge. If we continue to produce marketing material in an un co-ordinated way incomplete or incorrect information will reach our clients. If the culture is sustained of not providing the AIO enquiry desk with the latest information, the staff will always be at a disadvantage and not able to provide quality service to all categories of customers.

The number of applicants received from the CAO is steadily increasing. On the tabulations on the next page, the total number of applications received from the CAO since 2001 is reflected. The blue line on the graph below reflects applications made to UKZN via the CAO. The UKZN applications almost match those to DUT but it should be remembered that DUT has both a January and a July intake. The applications to UKZN have to be handled in a single intake at the beginning of the year. On the second table it should be noted that if we add the NU and UDW application for 2001 we reach a total of 14 266. This total should be compared to the 2008 total of 26 288 applications made to UKZN. The total has almost doubled. On the second graph it is shown that the number of first choice applications made to UKZN exceeds to total first choices made to DUT despite their two intakes per year. This places a higher demand for places on UKZN. (Statistical information obtained from CAO as part of institutional audit data: April 2008)

APPLICANTS PER INSTITUTION AS AT 28 FEB

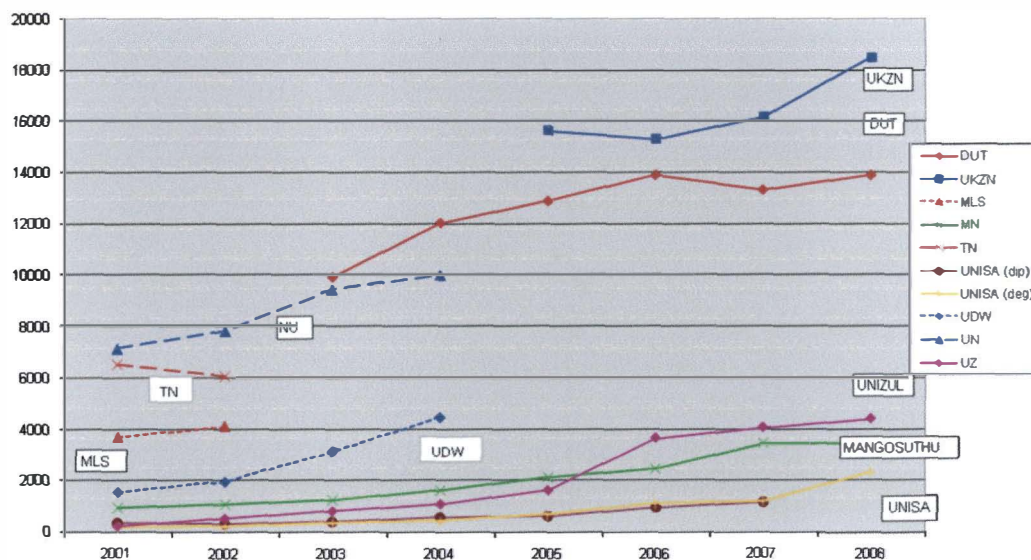


(Knock 2008).

APPLICANTS ALL CHOICES	2001	2002	2003	2004	2005	2006	2007	2008
NU	10438	10776	13544	15769				
UKZN					21310	21413	23013	26288
DUT			15187	18940	21122	23586	24907	27005
TN	11295	11383						
MLS	7170	8104						
UDW	3828	5270	7969	10887				
MN	2674	3004	3468	4748	6142	7464	10504	11288
UNISA (Dip)	1313	1309	1591	2163	2505	3933	5038	
UZ	1007	1823	2856	4063	5622	9502	11572	12971
UNISA (Deg)/(Combined)	876	1098	1750	2103	2835	5001	5742	9621

(Knock 2008).

First choices by institution 2001 - 2008



(Knock 2008).

UKZN has however capped student growth and the first years intake stands at about 10 000 students per year. The numbers of applicants being offered places will therefore remain the same while the number of applicants we are not able to place will increase. The increased demand for places and the limited number of places available, will lead to more competition amongst applicants. On the first graph it is indicated that application numbers to the merged UKZN has grown from 21 310 (2005) to 26 118 in 2008. (See table). If we consider that the number not placed in 2006 was  $21\,310 - 10\,000 = 11\,310$ . In 2008 this number has grown to  $26\,118 - 10\,000 = 16\,118$ . In four years the total of refused applications has grown by  $16\,118 - 11\,310 = 4\,808$ .

These are however not the only applications handled by UKZN. Some applications are made to UKZN direct. These are from applicants to Post graduate, non-degree, Open Learning and non-CAO Programmes and include applications from international applicants and returning students. These applications are also increasing and annual figures provided by Management Information indicate that the 12 000 to 13 000 applications are processed by the Applications and Information Office per year in addition to the CAO applications received from the CAO.

The annual increase in applications, via CAO and UKZN direct, places a higher work load on staff in the enrolment process. Costs for temporary staff, stationary, information material and postage will increase every year. A fully equipped Call centre is considered by UKZN to handle the increase in telephone calls. The additional resources will mostly be required to handle the increased number of non-qualifiers. These applications enter the system mostly via the CAO and UKZN has no control over them entering the system.

The increase in applications from the CAO has not been allowed for in UKZN staff allocations. Staff numbers are often determined by totals of registered students or selected applicants and not in terms of the number of applications to be considered. Student numbers have been capped, so the totals of registered students have remained more or less the same, but the almost 100% increase in CAO applications since its first intake has doubled the work load for all involved.. The University-wide AIO is no longer able to satisfy the requirements of the five UKZN campuses. The establishment of satellite offices on the Pietermaritzburg and Westville campuses is currently being considered.

UKZN is encouraging postgraduate enrolment and teaching by other than full-time contact mode. The different modes of teaching require a unique student support system but support services have not yet embraced the new concepts. No changes have been made to allow part-time candidates access to support services.

The current ITS system at UKZN is very slow and does not provide the support required. Data capturers are no longer able to meet deadlines and staff tracing student numbers and decisions are often embarrassed when they cannot assist clients. The system is not able to process the large CAO upload files within the time available, resulting in incomplete or no uploads. If no upload is received we cannot provide student numbers to clients for payment of acceptance fees and we are also not able to print selection letters. We should consider a new format for the upload file and ways of improving the system's response time. The development of a special capturing screen, similar to that used by the CAO, must also be investigated.

The selection letter packing process has become cumbersome and can no longer be managed in the time allowed. We have no venue available to accommodate the increasing number of student packers and bulk material. We need to look at new ways of communicating with selected applicants. Refusal letters are already printed and mailed from an off-campus facility and we could consider a similar system for selection letters.

The UKZN recruitment and marketing strategies were questioned. It was felt that recruitment was segmented and that there was no control over information provided to the community. The CAO 'recruitment' was not in line with the recruitment strategies of the University as the CAO distributed information without restriction. The message about our entrance requirements is not reaching the applicants.

If no corrective action is taken to introduce transformations in our system the 'mess' will continue until the process becomes unmanageable. Our system is disintegrating due to overload, lack of training, co-ordination, revision and control but mostly due to a lack of equipment to support an operation of this scale.

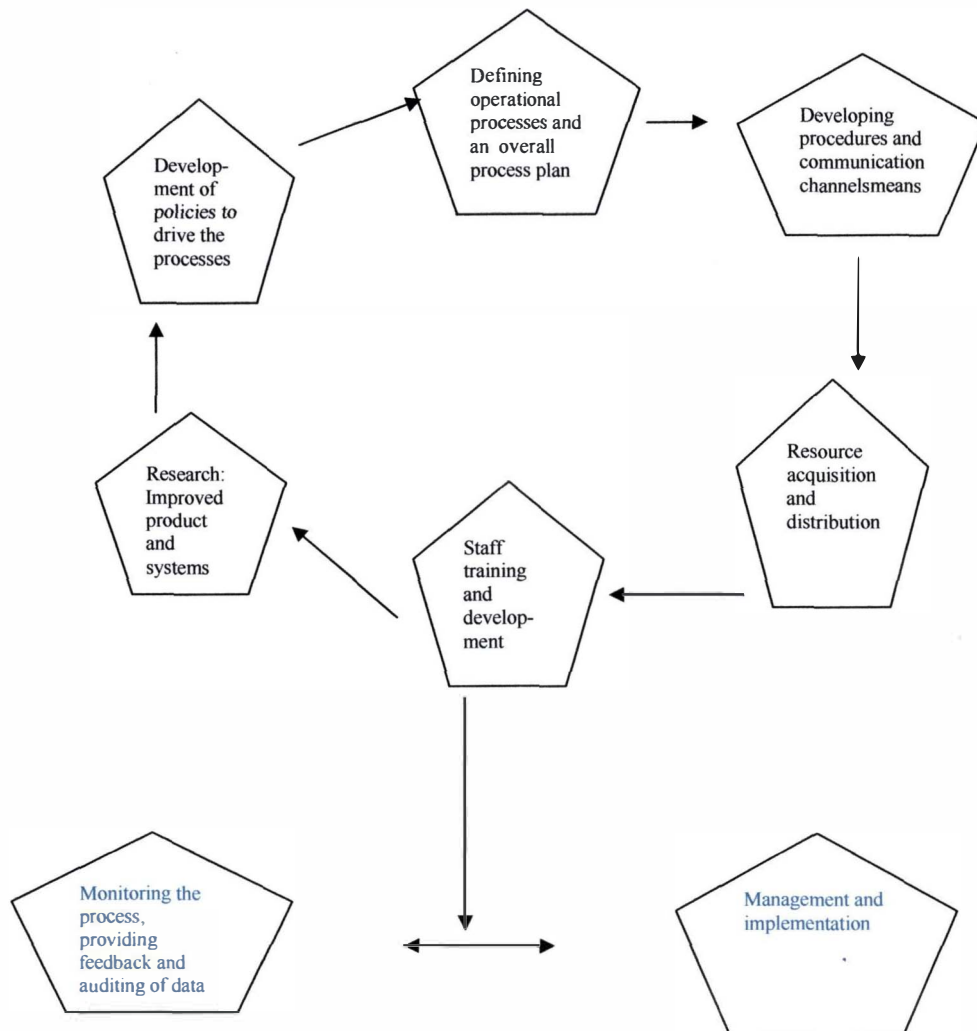
In this current structure the problems relate to communication between sections, lack of implementation of procedures, limited access to support services and resources. Corresponding functions are often found (or even duplicated) in different non-related sections; examples are: the **recruitment** function (Faculties and Public Affairs): handling of

**international applications** (Student Academic Affairs, Public Affairs, CAO as well as International Student Support Offices), **Matriculation Board applications** - assigned to the Applications Office but residing in the Registrar's Office but the International Applications Officer (Public Affairs) as well as Admissions Officers (Faculties) are also involved in the assessment of non- South African qualifications and liaison with the HESA Matriculation Board. Currently all **non-CAO applications** are forwarded to the University-wide Applications and Information Office on Howard College for processing but there is a demand for similar services on other campuses. Smaller Faculties are running and packing their own selection letters but the bigger Faculties still rely on the Applications and Information Office to print, collate, pack and mail their letters. In Pietermaritzburg the campus based Records Office assists with the preparation of packages for new students.

## Desired properties of the idealized design

## APPENDIX K

Borrowing from the principles of Soft Systems Methodology (SSM) (Flood and Romm, , P1546) the following desired properties were identified to drive the system:





The properties in the circle indicate the key activities required for the operation and the two properties outside the circle represent the control functions.

All properties are recurrent and has to be in place for each of the sub-systems (production of material, recruitment, enquiries, applications and selection) as well as for each of the functional levels (posts). The properties can be considered in any order and for our system the properties identified will entail the following:

**Policy development:** policies on enrolment of students, Human Resources (recognizing unique needs), allocation of resources (allowing for redundancy), operation and development of IT system (and response time), auditing and feedback, management, publications, communication, procedural development and implementation, development, research, liaison (internal and external). The policies should make provision for immediate needs as well as long term strategies.

**Definition of processes:** description of processes for each of the sub-systems linked to form a coherent whole; paying attention to integration and co-ordination..

**Development of procedures:** agreed upon flexible and viable procedures to be developed and documented for each process. Implementation of procedures must be monitored.

**Resource acquisition and distribution:** including staffing, funding, equipment, space, a competitive, flexible and user friendly IT system, information, etc. Sufficient resources should be available at the time required plus additional availability for peak periods.

**Research:** to ensure the system's viability by sustaining a demand for our product (qualifications, services, skills); research products offered by competitors and make adjustments as required to retain a competitive edge. Research alternative sources for competitive resource delivery.

**Development:** assure the system's viability through change and adaptation; develop a learning system by using feedback to measure the suitability of products and to drive adjustments. Staff development is required to sustain an informed work force, able to deliver and develop required services delivery through use of modern technology. Greater understanding will encourage initiative and development to systems. Training should both job-focused and general to ensure that staff members are empowered to act in any situation.

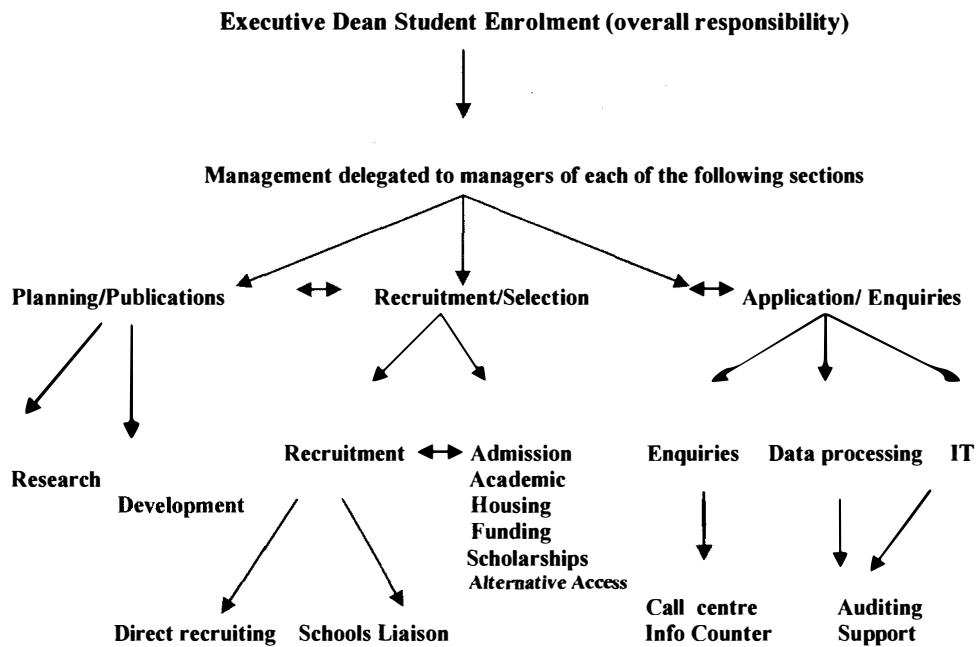
**Management and implementation:** involving overall management of the processes to ensure that decisions and procedures are implemented. Project plans for the processes can be mapped on time-lines, reflecting tasks and progress required. Short term goals, objectives as well as long term ideals will require managements.

**Monitoring, feedback and auditing:** considering feedback (external and internal) which will evaluate our product, services, response time, flexibility of procedures, implementation of structures and plans, quality of information, success of the enrolment plan and community support. Feedback will determine the status of the current status and identify areas in need of adjustment, development and further training. Progress in each process can also be measured against the time-lines. The final evaluation will be of the system as a whole.



## APPENDIX L

## Proposed UKZN University – wide Centralized Student Enrolment System



**In this centralized structure responsibilities will be distributed as follows:**

**Executive Dean Student Enrolment:** University-wide overall management and planning, liaison and communication to promote the services offered by this Office. Negotiating decisions, resources allocation (budget, staffing and equipment), cooperation at highest level, training and career development.

**Planning and Publications:** communication with clients (internal and external), development and implementation of plans, developing different modes/channels of communication (in person, correspondence, telephonic, electronic, web); production of University-wide information material; actively involved in market research.

**Recruitment and Admissions:** direct recruitment throughout the year as well as School Liaison and Faculty recruitment activities, targeting specific groups of applicants identified in the Student Enrolment Plan. Selecting suitable applicants (including offers to residence and of financial aid packages or/and scholarships for local and international applicants, access tests and alternative entry. Staff members provide a one stop service to applicants during the

enrolment phase, a quick turn around time, access to relevant staff members and information, assessment of non-South African school qualifications.

**Enquiries and Applications:** public face and IT support: Call Centre and Information Desk providing information on processes and sub-systems involved, based on a shared information system; receiving visitors and controlling access to staff members, dispatching application material. Dealing with enquiries in a variety of formats, process applications received at UKZN, manage CAO uploads, correct application data, run reports (letters, labels, statistics and listings), identify system needs, propose developments, participate in maintenance of information/validation tables, provide training and IT support services.

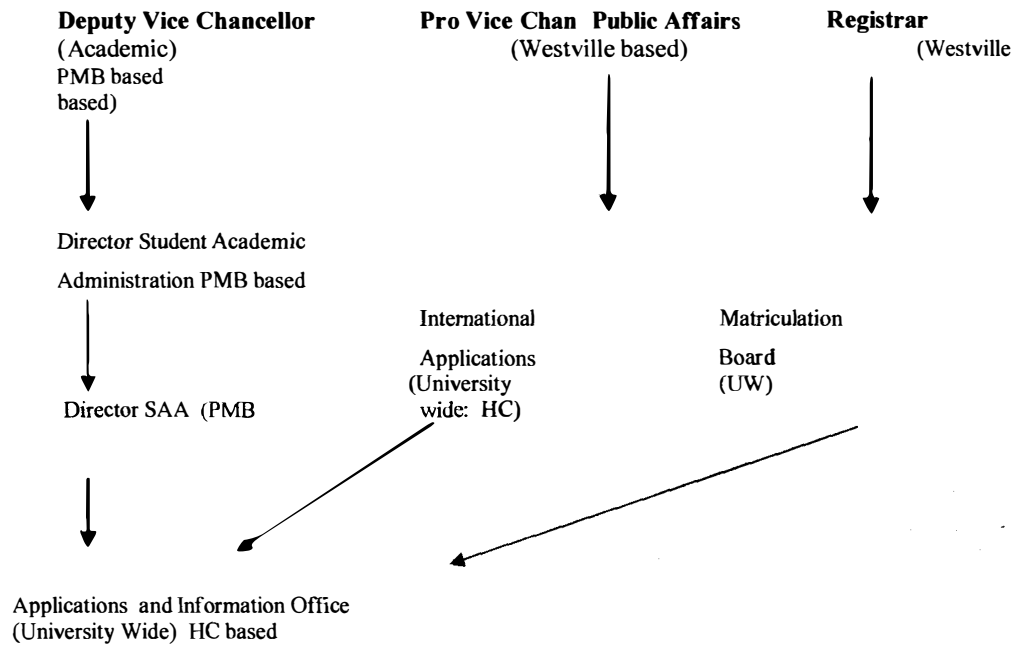
## Vice Chancellor

Sections involved in processes, reporting lines and functions:

DVC Academic UW	Director Public Affairs UW	Executive Dean of Students UW Deans of Students CB Directors UW	Executive Finance Officer UW	Administration UW	Registrar UW	Director Computer Service: UW
Deans: CB or cross campus Recruitment Selection Publications Director SAA UW Applications Publications System support and CAO	School Liaison UW Branding UW UKZN International UW	Housing CB Student Funding UW and CB Loans Scholarships ISSO Sport/Societies	Student Fees CB and UW Cashiers CB Procurement UW	Registry CB	Legal Advisor UW	ITD CB DMI UW

Handbooks	School Liaison brochure	Housing rules	Fees	Mailing	Approval of	Audit reports
Info sheets	International guides	Info sheets	Booklets	Deliveries	legalities on	IT development
Course code listings	Branding	Sport and society information	Quotations		forms and letters	Running of letters
Recruitment	Recruitment	Financial aid forms	Receipts			CAO uploads
Application forms	Parent day invitations	Orientation programmes				Registration cards
Internal forms						
Undergrad Prospectus						
Postgrad guide						
Selections						
Processing Applications						
CAO liaison						
CAO uploads						
Data correction						
Enquiries						
Selection letters						
Registration cards						

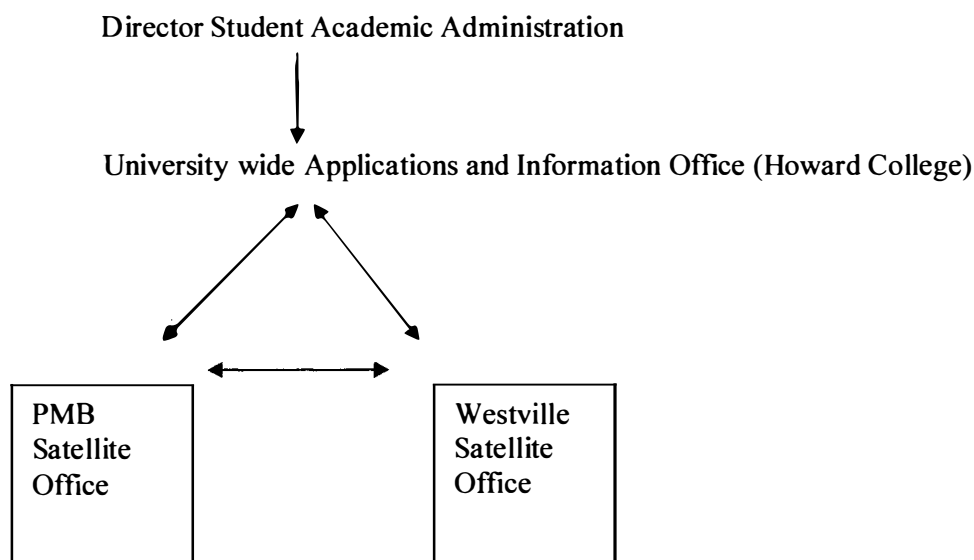
Red: Divisional/Section heads  
 UW: University wide responsibility  
 CB: Campus based responsibility

**Constrained design****APPENDIX N****Design Unit 1**

Moving the Matriculation Board and international applications functions back to the Applications and Information Office will simplify the structure and reduce the number of reporting lines and ensure a cohesive whole for processing of applications. The Applications and Information Office will however still be required to liaise regularly with the Office of the Registrar, the Legal Advisor, and Public Affairs.

**Design Unit 2: Introduction of satellite offices**

It was proposed that satellite Applications and Information Offices be established on Pietermaritzburg and Westville campuses to bring service delivery in line with the current Student Academic Administration structure.

**Proposed structure and reporting line:****The satellite offices will be responsible for:**

- Capturing of address detail of enquiries received on that campus
- Assisting in manning of the UKZN applications call centre
- Collation and dispatch of selection packages
- Capturing of applications in peak periods
- Receiving personal callers
- Advising on application and selection procedures
- Providing application material to callers
- Arranging campus visits for school groups
- Liaison with University-wide office; re material
- Assisting with collation of new material for publications
- Participating in University-wide events

The telephone lines in the satellite offices will be linked to the main call centre line and should be able to answer any queries, University-wide. They will be called upon to assist any campus in emergencies or should work pressure

**The University-wide Applications Office on Howard College will retain the following functions:**

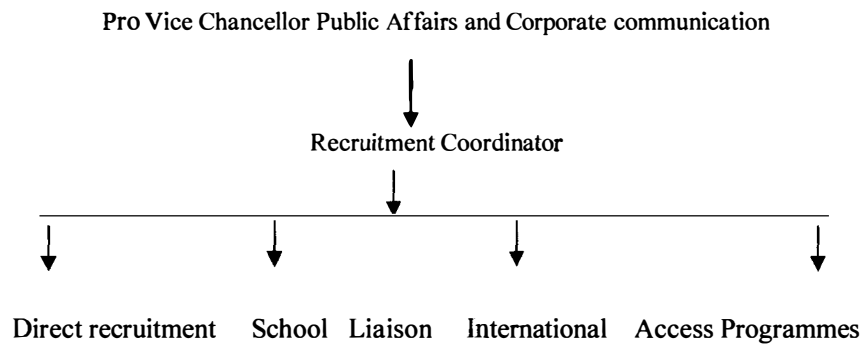
- Howard College campus based activities as listed for the satellite offices
- Systems and correspondence development
- Publications and application forms
- Internal forms used in selection process
- Liaison with CAO

CAO uploads, correction of errors, creation of codes, maintenance of conversion table  
 Bulk data capturing  
 Bulk enquiries and mailing of application packages  
 System support: letters, listings, registration cards, labels.  
 Qualification assessment  
 International applications  
 Matriculation Board applications and liaison  
 Overall management of the Enquiries and applications functions  
 Development of procedural manuals  
 Training  
 Maintaining a CAO user database  
 Planning and liaison with other sub-sections

Some functions may be delegated to satellite offices based on work load and experience of staff members. For efficient and effective performance in all offices we will need to concentrate on developing staff capacity.

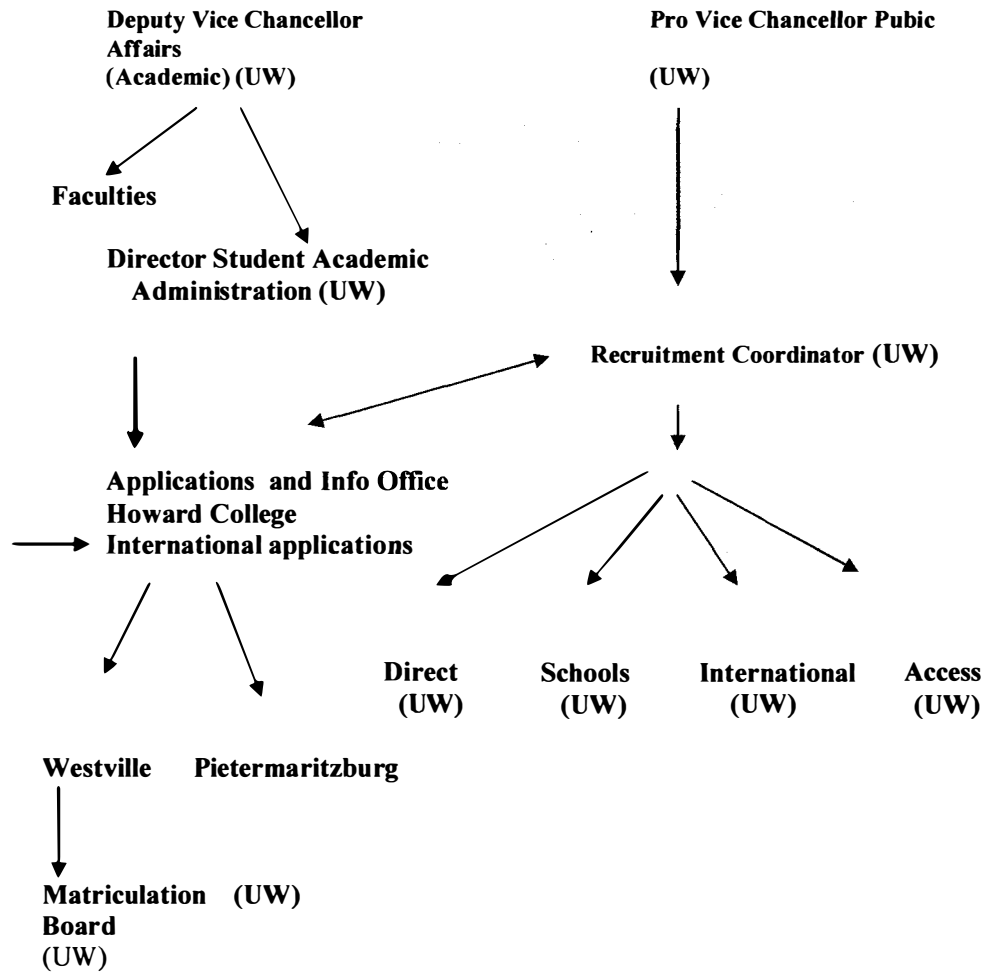
### **Design Unit 3: Coordination of recruitment activities**

It is further recommended that the existing Schools Liaison (A University-wide function located in Public Affairs) be expanded to include the coordination and facilitation of all recruitment activities at the University. This will ensure that correct information reaches prospective applicants (local and international) and that duplication is limited. This office could also become involved in direct recruitment (early selection) and targeting of promising grade twelve learners. See proposal on the following diagram:



#### Design unit 4: Constrained design

Design units 1, 2 and 3 were combined to form the final constrained design.



**Comparison of unconstrained and constrained designs****APPENDIX O****Similarities**

Better integration of processes: enquiries, application sand recruitment  
 Less segmentation improves control and opportunities for implementation  
 Promote holistic planning  
 Maximum use of resources  
 Clearer lines of communication  
 Opportunity for holistic feedback  
 Promoting learning and staff development  
 Dependant on a flexible IT system  
 Promoting improved communication and access to information  
 Promoting support for system by Executive  
 Require additional staff and equipment

**Differences**

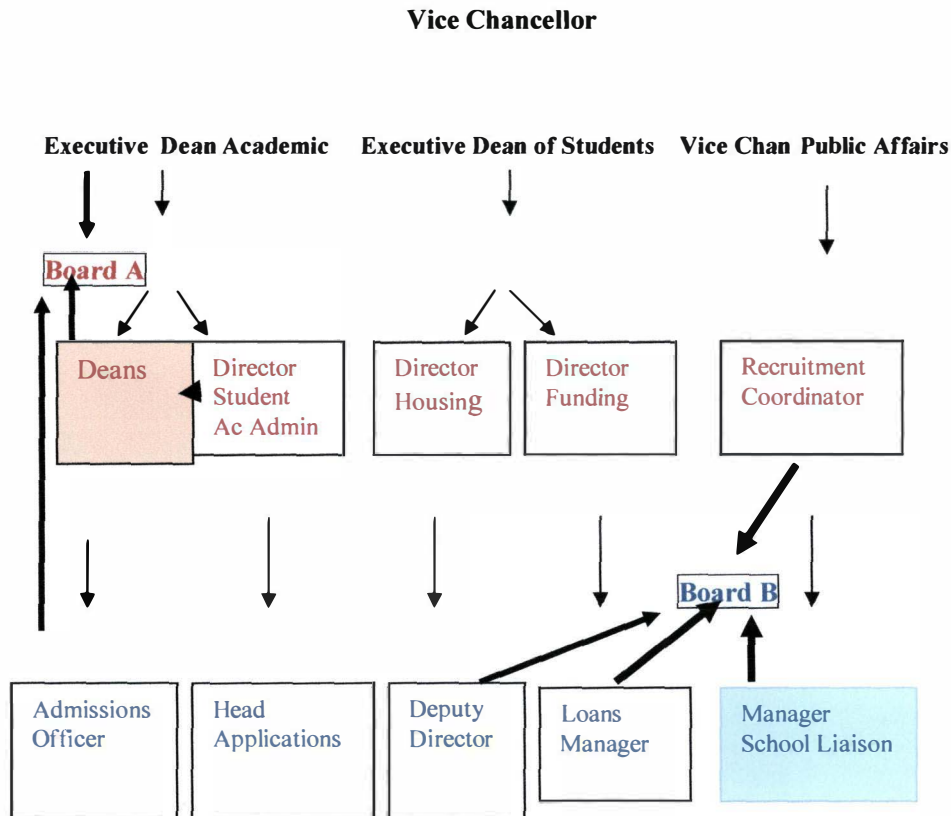
<b>Unconstrained design</b>	<b>vs</b>	<b>Constrained design</b>
Centralised one stop office		Satellite offices
Single reporting line		Multiple reporting lines
New single large venue		Existing plus some new venues
New structure		Adjustment to existing structure
Career paths		Limited promotion opportunities
Costly to implement		Manageable implementation costs
Limited additional staff		Staff required for satellite offices
More even work/staff ration		Existing ratio will remain
Reduce duplication of functions		Duplication will continue to some extend



## Introduction of Planning Boards

## APPENDIX P

### Planning Boards A and B

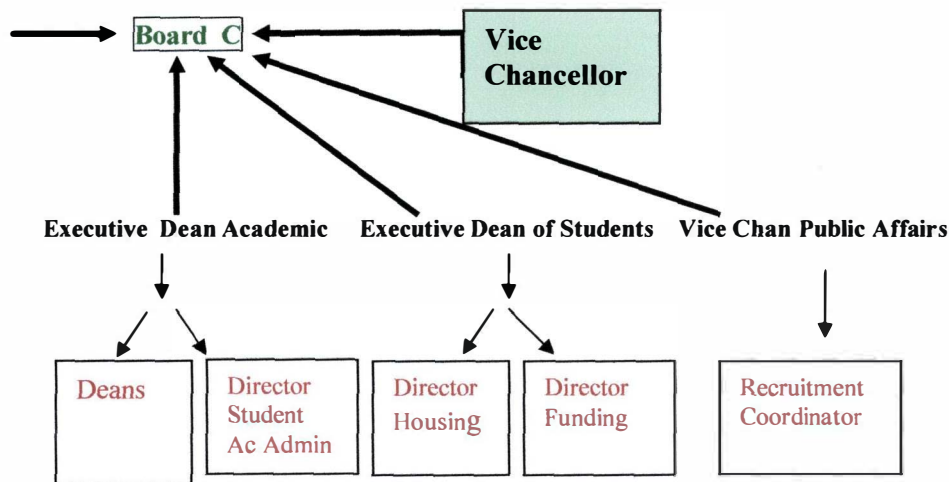


In this diagram the Dean has a Planning Board A. On this Board his direct superior will be sitting plus the staff reporting to him. In addition some relevant people on the same level will be invited to sit on his Board. In this case we could call this a Faculty Admissions Planning Board. The Executive Dean will be on the Board, the Dean, the Admissions Officer reporting to the Dean, the other Directors involved in the selection process, such as Student Academic Affairs, Housing and Student Funding.

The School Liaison manager has a Planning Board B on which his direct superior will be sitting, the staff in his office, plus members from sub-systems at the same level, or representatives from those sub-systems.

### Planning Board C

The viability of our system will however benefit by the introduction of a coordinating Planning Board at the highest level which will be managing the enrolment process as a whole. In the unconstrained model such management is possible within the single centralized office but in the constrained design, with different reporting lines, we need to ensure that the required communication and liaison takes place to integrate and coordinate all policies and procedures. This has to be done at the highest level to ensure implementation on all campuses. This will be the Vice Chancellors Planning Board on which the highest officer bearers will sit and to which external specialists may be invited. Representatives from specific areas may also be invited to deliver input. See diagram below:



## Means Planning

## APPENDIX Q

In this section of the proposed plan we have to consider ways and means to close the gaps listed under 6.2.6 and 6.2.7. We need to identify goals, objectives and ideals to be put in place and worked towards to close the gaps and force our actions towards the desired design.

### Policy, process, procedural development and implementation

**Ideal:** To establish a student enrolment website containing all policies, processes and procedures linked to student enrolment. This will be updated regularly, according to feedback and new developments and be available to all to assure transparency and provide staff with an easy reference tool. It will include areas of responsibility and accountability as well as ideal lines of communication.

**Objective:** To bring together all existing policies, processes and procedures; to consider them for inconsistencies, applicability in terms of the current academic development and student enrolment plan. To develop policies, processes and procedures to cover gaps identified under goals.

**Goals:** To gather information on existing policies, processes and procedures from all sub-systems involved in student enrolment. To consider them and identify gaps where we require development.

### Opportunity for research and development

**Ideal:** To have sufficient resources and opportunity available to actively pursue the development of our products and the most feasible ways of performing our functions. To be able to consider services offered by competitors and to adjust our offering to match or improve those services to make us more reliable.

**Objective:** To identify areas in need of improvement when compared to the offerings of our competitors. To identify means to close this gap and to work as a team to improve our product. To identify new areas in which we could make a contribution. To develop support systems to facilitate any new developments within the system as a whole. This would include requests for systems developments which will facilitate our process as a whole.

**Goal:** To identify the services/products we offer. To collect information on the services/products offered by our competitors. To identify areas within our system in need of improvements and/or further development. To identify problem areas in the student information system in need of change or development.

### Generation of funding and resource allocation

**Ideal:** To have the system as a whole adequately and well resourced with redundant capacity for use during peak periods and in emergencies. Resources would refer to equipment, material, variety of programme offered, information available, staff, knowledge and skills, funding, etc. A system in which creditors are paid regularly and where the budget is allocated to cover actual cost as well as development.

**Objective:** To develop a strategy for improving resource allocation and availability within the system. To replace equipment on a regular basis to prevent break downs during peak periods. To ensure that policies /procedures are in place to ensure that the system is adequately resourced to cope with the work load and service provision required. To establish a fund for funding of entrant processing activities and publications separate from the funding available for returning student activities.

**Goal:** To identify areas in which we are under resourced. To separate “like to have” items from essential items.

#### **Development of staff training and development plan. Career paths**

**Ideal:** To have an accepted staff development plan in place catering for formal training needs, general staff development and acquisition of skills allowing for multi-skilling and personal development. To allow for staff redundancy and appointment of temporary staff during peak periods.

**Objective:** To match training needs to training programmes available and identify the gaps. Assist the staff training and development office at UKZN with the development of additional training initiatives. These could be sub-system specific or more general. Formulate possible career paths and identify promotion possibilities. Develop a schedule for training and a staff evaluation and reward system.

**Goal:** Collect information on training programmes available to staff at UKZN. Determine basic training needs for each post. Differentiate between formal training and on-the-job training needs. Identify staff desires to attend training courses external to UKZN.

#### **Information system**

**Ideal:** To have a flexible, fast user friendly information system in place to enable us to provide the required service in real time. This service should also have the required redundancy for peak periods and to cope with new development such as the NHEIAS.

**Objective:** To award contracts for the required developments to the system and have the work done.

**Goal:** To identify the needs, find approval for the developments from management and secure the required funding to pay for the developments.

**Resource Planning****APPENDIX R**

In specifying additional resource requirements for our improved system we need to consider different types of resources and these will include: funding, staff, venues, furniture, connectivity (telephone, fax, e-mail, LAN, signage, storage and access to venues. The resource requirement for the four proposed changes can be summarized as follows:

**1. Move of International Applications Officer to the Applications and Information Office:**

**Budget:** Salary of staff member; International applicant publications, additional telephone, mail and fax costs.

**Venue:** A suitable venue with clear signage and easy access has to be acquired close to the Applications and Information Office on Howard College campus.

**Connectivity:** the staff member will use existing ITS (LAN), international telephone line, internet and group wise. CAO access will have to be obtained as some international applications reach us via the CAO.

**Furniture and equipment:** if agreement cannot be reached on the transfer of existing furniture from Public Affairs we will need to acquire a desk, high back chair, two visitors chairs, a filing cabinet, a PC and printer. The Officer will have access to existing photocopy and fax facilities.

**2. Move of Matriculation Board function to Applications and Information Office.**

No additional resources will be required as this function will be performed by an existing staff member and shared with the International Applications Officer.

**3. Coordination of recruitment activities**

The coordination function can most properly be performed by the existing Manager of School Liaison in Public Affairs in which case no additional resources will be required. Should the introduction of an incentive plan and the appointment of full time recruiters be approved we will require:

**Budget:** to provide for salaries, vehicles, incentives and recruitment material

**Venues:** an office for each recruiter in Public Affairs and access to a committee room and storage facility

**Connectivity:** ITS, Web, CAO, Telephone, internet and group wise access will be required. Access will be required to shared fax and photocopy facilities

**Furniture and equipment:** a desk, high back chair, two visitors chairs and a filing cabinet will be required for each office. Each recruiter will require a laptop computer and access to a shared printer.

**4. Establishment of satellite Application and Information Offices on Pietermaritzburg and Westville campuses**

**Budget: salaries:** 1 full time plus six month temp on PMB. One full time, one half day, plus temps in bust period on Westville. (Must allow for salaries of student packers in January). **Equipment:** As specified below. The budget should be redundant and make provision for emergencies, such as new developments required by the containing system or as a result of legislature. In the initial budget provision should be made for maintenance and minor enhancements to the venues allocated.

**Venues:** Each satellite office must have reception area, a data capturing area, an office. In addition Westville campus will require an office for the matriculation board Function. These offices must have access to storage facilities and large venues with packing tables. Clear signage is required.

**Connectivity:** ITS, Web, CAO, Telephone, internet and group wise access will be required. Access will be required to shared fax and photocopy facilities

**Furniture and equipment:** sufficient desks, office chairs and visitors chairs have to accommodate the needs of both permanent and temporary staff.

## Implementation and Control

## APPENDIX S

This phase involves assuring that decisions made are carried out; it determines who is to do what, when and how. Decisions implemented are continually monitored to ensure that plans are realized and the desired results achieved. The outcome is fed back into the planning process so that learning is possible and improvement devised.

In the development of the final structure for the design it was recommended that the management of the system would be ensured through the use of a number of process planning boards. It was proposed that the overall management of the process be assigned to a Vice-Chancellors Planning Board. Each member of the Board will take responsibility for the input of a specific sub-system and be accountable for its performance. Within the system as a whole, functions may be performed across sectional boundaries and more than one task may be performed within a specific sub-system.

In the enrolment system key processes start at different times of the year. All funding and resource requirements do not have to be available at the same time. For our five main processes we developed time-line diagrams on which the activities for each of the five processes are mapped. These time-lines will enable us to run the functions as separate projects. Activities highlighted in red on the time-lines require funding and the funding as well as other resources indicated, must be available at the onset of the activities. Some cycles are shorter, start at different times and some processes may ever overlap. Trained staff and a redundancy of equipment must be in place at the start of each cycle to avoid breakdowns, delays and bottle necks. This will have training and funding implications. The processes mapped on the time-lines include functions performed at both the Howard College Office and the two satellite offices.

Funding requirements should be considered and money be made available at the onset of the activity. Negotiations cannot start at the beginning of the activity as that will delay the process. Staff appointments have to allow for training periods. Staff has to be fully trained at the onset of the stage to minimize delays and ensure meeting of deadlines. Equipment has to be available and be maintained throughout all stages. Funding has to be available for immediate repairs or replacements. Equipment in use has to be serviced/replaced regularly to avoid breakdowns and products of diminished quality during the peak periods. Arrangements for space requirements have to be finalized before a specific stage is commenced. Annual reviews of all processes and stages will give direction of changes required and will point out where delays occurred. The mapping of activities and resource allocations on time-lines will assist with the implementation and auditing process. Any task member can track performance on the time lines and it will be easy to measure performance against these specifications. Designing the time line in agreement with the staff members involved will ensure their commitment to the schedule and they will be able to continue with the process and structure their own activities by referring to the mapping provided.

The time-line for the application process is provided on the next page.

## Applications time-line

September	October	November	December	January	February	March	April	May	June	July	August
Capturing semester 1 Applications to non-CAO Undergraduate Programmes as well as Postgraduate And International Applications	Capturing semester 1 applications to non-CAO undergraduate programmes as well as postgrad And international applications	Capturing non-CAO late applications and post graduate applications	Capturing non-CAO late applications and post graduate applications	Capturing walk-ins as well as postgrad applications	Capturing part-time applications	Capturing part-time applications	Capturing semester two applications	Capturing part time postgrad and sem2 applications	Capturing sem 1 applications to non-CAO undergrad	Capturing sem 1 applications to non-CAO undergrad	Capturing sem 1 applications to non-CAO undergrad
Employment & training of contract data capturers.		Capturing transfer applications	Capturing transfer applications	Correction of errors.	Capturing walk-ins	Capturing semester two applications	Capturing part-time applications	Correction of CAO information to bring in line with UKZN information	as well as postgrad and international applications	as well as postgrad and international applications	as well as postgrad and international applications
Managing CAO uploads	Managing CAO uploads	Managing CAO uploads	Managing CAO uploads	Managing CAO uploads	Managing CAO uploads	Capturing short term international applications and International School applications	Revising and adjusting CAO conversion table	to bring in line with UKZN information	Commence Managing CAO uploads	Managing CAO uploads	Managing CAO uploads
Printing reports and Labels	Printing reports and Labels	Printing reports and labels	Printing reports and labels	Printing reports and labels	Printing reports and labels	Printing reports and labels	Requesting new codes on CAO & UKZN	CAO user group meeting	Correcting errors for Hemis	Correcting errors	Correcting errors
Call centre	Call centre	Call centre	Call centre	Call centre	Call centre	Call centre	Call centre	Call centre	Call centre	Call centre	Call centre



It will however, not be sufficient for the management of our processes to map activities and measure progress against the time-lines. We need to consider developments in management sciences to assist us with the management of a multi faceted system made up of both standardized mechanical processes and large numbers of staff members. In our system we are combining staff from different backgrounds and uniting sub-sections with varied outputs into an overall system. A variety of management philosophies are available to assist us and these are based on either traditional or contemporary management and organizational theories.

Traditional management approaches are based on the machine metaphor; allowing us to break tasks down into parts and seek the best ways of performing them. Management in these approaches consists of planning, organizing, commanding, controlling and co-ordinating. This type of management will be required for the more mechanistic processes within our system. The beurocratic hierarchy in these cases defines the lines of legitimate authority and power. The implementation of quality through coersive means suggests a measure of a political vision. This style of management was what we suggested for the unconstrained model: a system of checking, enforcement and better control.

This approach is however not supported by modern management theories and will not be beneficial for our process as a whole and we will have to turn to the principles imbedded in modern management theories for guidelines on management of complex human activity systems such as ours.

The Total Quality Management model (TQM) focuses our attention on our customers from internal or external to the organization; interactions with both sets of clients must be handled in the same way. We need to take note of our external customers needs at all times. There needs to be an agreement; a shared ideal to strive for but the external customers need not always determine the process as funding and competing needs will play a role in what we can deliver. Machine type activities have quantitative measures and our ability to meet these requirements could be measured against specifications of durability, reliability, accuracy, speed, method of delivery and price. Qualitative specifications are however more appropriate in the service sector. (Flood, 1993, p45) In service organizations the principles of product delivery at the lowest cost or in the shortest time are often neglected.. At lowest cost implies that there should be no unnecessary loss or waste in time, effort or material in product or service delivery. Our system should also not accept standards falling below the agreed expectations. (Flood, 1993, p47) Agreements between us and our clients may be either formal (business-like) or informal (established through interaction). Informal agreements develop through interaction and are as important as formal agreements. They must be assessed and well managed as they contribute either positive or negative elements.

What applies specifically to our system is that we need to find comprehensive ways of dealing with complex sets of interacting issues, involving everyone at all levels; all have to accept accountability for their actions. This philosophy urges us to achieve a guarantee of internal stability (control). The aim will be to communicate relevant information to assess how well the system is performing. Information is received from co-ordination, from audit, intelligence and policy. The control function interprets policy decisions and implementation, allocate resources for implementation, and auditing of all functions.

Quality is defined as "meeting customers' (agreed) requirements, formal and informal, at the lowest cost, first time every time." (Flood, 1993, p42) TQM promotes a total

involvement in quality of everyone, at all levels and across all functions, ensuring that quality is achieved according to the requirements in everything they do. The idea of 'total' brings a systemic meaning of wholeness in which quality cannot be guaranteed without involving the whole organization. Everyone is required to manage their own jobs. TQM promotes an idea of continuous quality improvement, driving defects out of the system (Jackson M C, 1995, p.33). TQM builds on the idea that a system is an interactive network of communication and control. TQM does not pay particular attention to the design of an organization (Jackson MC, 1995, p. 33) but maintains all organizations operate at different hierarchical levels but are vertically integrated to form a whole organization with properties.

The Viable System Model (VSM) of management introduces two unique ideas in management. **Viability** is the result of a well-constructed approach to organising five main management functions as a 'viable system-in-focus' and from the employment of **recursion**, a special type of hierarchy. Recursion explains that a viable system in focus is a systemic part of a less focused viable system and contains in itself viable systems. (Flood & Jackson, 1991, p. 90) In the VSM the management process is seen as having five main functions: implementation (what the system is doing and the first point at which quality is checked), co-ordination (ensuring that no part of the system can fail), control (aiming for internal stability through communication of feedback and adjustments), intelligence (assists when control cannot obtain the required information; the learning function) and policy (if information provided by intelligence has long term effects policy will make the required changes; set the identity of the system). (Flood & Jackson, 1991, p. 92) Here quality and viability are complimentary concepts in management.

The model introduces participation as a channel for bargaining over resources between 'implementation' and 'control'. (Flood, 1993, p116) Recursion means that the whole can be found in each of the parts. Recursion promotes autonomy giving parts as much independence as possible given the constraints for coordination and control of the whole.

Vertical loading is encouraged; loading responsibility to the 'lowest level' at which it can be managed. This element is often lacking in our current management approach. We may even on paper suggest that certain functions are delegated to the lowest level but management in reality still controls it. In VSM task formulation is encouraged and people have responsibility over their work. They determine their customer's need and how to best achieve those. Job grouping is encouraged to bring together efforts that are logically related.

Organisation through recursion replaces the traditional hierarchical tree. It brings together work activities in a logical and effective manner: every job must add value, everybody must be informed (this encourages participation), the focus is on prevention of problems and the emphasis is on measurement and quality, a culture of continuous improvement is encouraged through which creativity is promoted, an intelligence and learning function is introduced and sufficient relevant real-time information must be available.

**In socio-cultural systems thinking** human beings make interpretations of things that are happening; their decisions and further actions are based on these interpretations. (Flood, 1993, p 119) Sets of action concepts have been worked out to describe actions and the rules and practices are themselves made sense of in terms of constitutive meaning. It is in terms of this constitutive meaning that humans speak and act. (Flood,

1993, p120) We interpret actions of people according to a shared set of social rules and practices, and underlying constitutive meaning. This socio- cultural reasoning has entered management systems; socio-cultural systems will shape human behaviour and determine what is correct or incorrect behaviour.

Introducing changes or trying to establish a different organizational culture means influencing people to think and act in a particular way. A quality culture requires a certain type of behaviour. Believing that people will automatically accept and act according to a new set of social rules, is optimistic. People cannot be coerced as there must be an underlying constitutive meaning that makes the rules and practices of the quality approach meaningful to employees and not just for the manager. (Flood, 1993, p123) Everyone must have a share in the quality concept; human needs must be satisfied.

Whichever style, or combination of management styles we adapt, we have to ensure that we cover the two basic management ideas promoted by systems thinking: how to design organizations as complex adaptive systems and how to allow individuals to take on the responsibilities required of them. (Jackson, 1995, p34) Application of the principles of TQM and VSM will introduce an auditing function for our new design which is mostly lacking in our existing management style, while the socio-cultural principles warn us that changes will not be effectively implemented unless we manage to develop a process of communication and planning to foster the development of shared ideals and expectations. The style we adapt should also be flexible and accommodating to deal with developments or changes to the system required by feedback we re



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28 FEBRUARY 2009

MS. A VAN SOELEN (981206818)  
APPLICATIONS AND INFORMATION OFFICE,  
STUDENT ACADEMIC ADMINISTRATION

Dear Ms. van Soelen

**ETHICAL CLEARANCE APPROVAL NUMBER: HSS/0044/09M**

I wish to confirm that ethical clearance has been approved for the following project:

*"A systems approach to the design of an idealized Student enrolment support system for the University of KwaZulu-Natal"*

PLEASE NOTE: Research data should be securely stored in the school/department for a period of 5 years

Yours faithfully

*Phimba*  
.....  
MS. PHUMELELE XIMBA

cc. Supervisor (Sharnim Bodhanya)  
cc. Mrs. C Haddon

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