

Heidi Gilstad

Obstetric ultrasound expertise as manifest in encounters between midwives and pregnant women

A case study from KwaZulu-Natal in South Africa

Thesis for the degree of Philosophiae Doctor

Trondheim, April 2012

Norwegian University of Science and Technology
Faculty of Arts
Department of Language and Communication Studies

Faculty of Medicine
National Center for Fetal Medicine,
Department of Laboratory Medicine, Children's and
Women's Health



NTNU – Trondheim
Norwegian University of
Science and Technology



**National Center for
Fetal Medicine**

ST. OLAVS HOSPITAL
UNIVERSITETSSYKEHUSET I TRONDHEIM

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To
Sandra
Matteus
Mie Elise
Marlene
and
Mikael

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Trondheim, September 2011, Heidi Gilstad

Synopsis of the thesis

In developed countries, most pregnant women have access to obstetric ultrasound in the course of their pregnancy. In developing countries, however, this is not yet a commonly available service for pregnant women. One of the reasons for this is that healthcare professionals have not been offered adequate training in the use of the technology. In 2004, an educational programme in obstetric ultrasound was offered to advanced midwives in KwaZulu-Natal in South Africa in order to build up sustainable ultrasound services to pregnant women.

The aim of this thesis is to describe and assess how the expertise of the advanced midwives who participated during the Educational Programme was manifest in their communication with pregnant women in ultrasound encounters, two years after they had completed the Educational Programme. The study focuses on the expert talk of advanced midwives when conveying information about pregnancy during an ultrasound examination in the clinic setting. The study assumes that the expert talk of the advanced midwives who are dealing with obstetric ultrasound is complex, since it includes traditional hands-on midwifery talk, as well as talk concerning information derived from obstetric ultrasound images. Moreover, the study assumes that the presence of the technology, the level of expertise, the contextual aspects and the interaction of the other participants influence the expert talk of the advanced midwives. By extension, each obstetric ultrasound encounter will be uniquely accomplished, which underpins the case-study approach undertaken in this thesis.

The primary material was a corpus of 13 video recorded obstetric ultrasound encounters of three different advanced midwives in rural hospitals in KwaZulu-Natal, South Africa, in 2006. The secondary material consisted of interviews, logs, questionnaires and assessments of the students who participated in the Educational Programme in 2004.

The analytic framework was inspired by the notion of activity type and activity analysis (Sarangi, 2010). The important analytic notions were frame, participant structure, roles and positioning and discourse types. The analysis included a structural mapping, an

interactional mapping and a thematic mapping. Moreover, selected examples of expert talk were analysed across the three advanced midwives.

The analysis showed that the encounters in this study constituted a hybrid activity type. The encounters were both clinical examinations and research encounters with an evaluative function. This hybridity had an impact in the participant structure and on the roles and positioning of the participants. Moreover, the analysis showed that the advanced midwives organized the ultrasound encounters as they were taught during the Educational Programme, but contextual aspects, such as compromised technology and duties in other departments in the hospital inhibited them to keep the structure systematically in all the encounters.

The study has demonstrated that the expert communicative system (Sarangi, 2010) of obstetric ultrasound is complex. In addition to taking into account the institutional and professional frameworks in their professional interaction, the advanced midwives displayed their communicative expertise in their interaction with the pregnant women. While conducting the physical examination, the advanced midwives, differentially, shared their immediate medical observations; they gave medical explanations as well as temporary medical conclusions in the course of the encounter. The advanced midwives had different strategies for communicating normality as opposed to abnormality and consequently for reassuring the pregnant women about the condition of their pregnancy. During the physical examination phase, some of the strategies for reassuring the pregnant woman were, for example, through online commentaries by including the pregnant women in the examination, through offline commentaries by explaining the reasons and implications of the findings, and through metacommentaries by preparing the pregnant women for what was happening during the examination. In this communicative multitasking, the advanced midwives displayed different kinds of procedural and propositional expertise. Communicative expertise is crucial for maintaining relational and ethical propriety in the obstetric ultrasound encounters. The knowledge derived from the study has implications for communication training in obstetric ultrasound.

I Background for the study

Each year, millions of women and children die from preventable causes. These are not mere statistics. They are people with names and faces. Their suffering is unacceptable in the 21st century. We must, therefore, do more for the newborn who succumbs to infection for want of a simple injection, and for the young boy who will never reach his full potential because of malnutrition. We must do more for the teenage girl facing an unwanted pregnancy; for the married woman who has found she is infected with the HIV virus; and for the mother who faces complications in childbirth. (Ban Ki-moon, September 2010: 2)

I.1 Introduction

The faces of the women and children who have died from preventable causes will never be seen again. However, as UN Secretary-General Ban Ki-moon urges in the quote above from the foreword in *Global Strategy for Women's and Children's Health*, the global community can and must do something to prevent the suffering of women and children from a disadvantaged background. In South Africa, as in many other developing countries, women and children die because of complications during pregnancy and childbirth. In their efforts to improve perinatal outcomes for women and children, political authorities as well as healthcare personnel must acknowledge that the reasons for perinatal deaths are multiple and complex. The challenges go beyond unwanted pregnancies and the risk of HIV transmission during delivery. Cultural and societal deficits that are more fundamental include illiteracy, poverty, poor sanitation and water supply, limited access to health care, and the lack of expertise among healthcare professionals. Expertise among healthcare professionals – more specifically the expertise of midwives who are dealing with pregnant women – is the focus of this study.

The object of study in this research project is the manifestation of expertise in the use of ultrasound technology by advanced midwives in antenatal care in one province of South Africa, KwaZulu-Natal. This research is motivated by the need, defined by professionals in the field of obstetric ultrasound, for a practice- and patient-centred approach to the processes of developing expertise in the use of ultrasound

Background for the study

technology. The present study was designed in connection with an educational programme in ultrasound technology for advanced midwives working in antenatal care in KwaZulu-Natal in South Africa, called the *Post Qualification Education in Ultrasound in Obstetrics and Gynaecology for Advanced Midwives* (henceforth called the Educational Programme).

Healthcare professionals dealing with pregnant women need to make use of knowledge about a wide range of clinical and social issues related to perinatal care. Perinatal care is the care of the mother and the fetus/baby prior to, during and after birth. This includes the ability to determine the progress of the fetus and the mother at each stage of pregnancy, and the ability to identify and to treat or refer onwards patients with perinatal complications, diseases and illnesses. Antenatal and prenatal complications refer to complications before birth, while neonatal refers to shortly after birth. Healthcare professionals dealing with antenatal care also need to have and to convey information about issues such as patients' rights, family planning, birth control, nutrition and other aspects related to the wellbeing of the pregnant woman.

The healthcare professional in this project, the advanced midwife, needs good communication skills and ethical awareness, as she is dealing with a vulnerable group of pregnant women and needs to manage the communication of delicate and complex issues. The advanced midwife's role as both medical expert and caregiver gives her authority with regard to the pregnant woman; this authority is particularly important to be aware of, and to use responsibly. To do her work effectively, the advanced midwife also needs the skill to use technological tools effectively, and this requires competence in mastering the tools. The use of ultrasound technology is a core feature of antenatal care in developed countries, and it has also become an important tool for healthcare professionals in South Africa. Equally important is the midwife's communicative abilities when interacting with the pregnant woman during the ultrasound scan.

To provide a background for the study, I discuss maternity care in rural parts of South Africa, first by offering a brief historical background about women's situation

during apartheid, then by focusing on maternal mortality and maternity care professionals. I offer this introduction to readers who are not familiar with healthcare in South Africa. Subsequently, I outline a pilot study that I conducted in Cape Town in 2002, and the major findings concerning maternity care in South Africa as described by the informants interviewed in that pilot study. I then present the umbrella project, “*The Post Qualification Education in Ultrasound in Obstetrics and Gynaecology for Advanced Midwives*”, and also refer to relevant studies that discuss experiences of implementing ultrasound technology in developing countries. Finally, I present the aim of the PhD project, the research questions and an outline of the structure of the thesis.

1.2 Maternity care in rural South Africa

During the apartheid regime in South Africa between 1948 and 1994, African women who were not white had few legal rights. Healthcare was used as an instrument of the apartheid policy (Price, 1986). According to Bernstein (1985), marriage and birth rates for African women were controlled by the government, while the Dutch Reformed Church tried to restrict the birth rate of African children during the apartheid era. An example was the provision of free family planning services for the African population in order to reduce the numbers of African children. Healthcare services, including maternity care, practiced segregation, with separate hospitals for white women and African women. Before 1960, most health services for black people in South Africa were run by missionaries, but during the 1960s and 1970s the government took over the health services and transferred some responsibilities to bantustans, i.e. homelands for different South African ethnic groups, in order for these to govern the health services through their own health department, minister and bureaucracy (Price 1986; Coovadia, Jewkes, Barron, Sanders and McIntyre, 2009).

Healthcare in South Africa has undergone major changes since the fall of the apartheid regime in 1994. However, according to Coovadia, Jewkes, Barron, Sanders and McIntyre (2009) there are still serious challenges:

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The public health system has been transformed into an integrated, comprehensive national service, but failures in leadership and stewardship and weak management have led to inadequate implementation of what are often good policies. Pivotal facets of primary health care are not in place and there is a substantial human resources crisis facing the health sector. The HIV epidemic has contributed to and accelerated these challenges (Coovadia, Jewkes, Barron, Sanders and McIntyre, 2009: 817).

There have been major developments when it comes to quality and resources in the primary healthcare system, including maternity care, but there is still a long way to go.

The South African Department of Health (1995) analysed health status, service delivery and utilization in South Africa and provided an overview of the situation of Maternal, Child and Women's health (MCWH) at that time. It reported that African pregnant women often suffer and die from common and preventable diseases. A large proportion of their incidence of illness and death occurs especially in rural areas when the normal processes of pregnancy and childbirth go wrong:

(...) we have an unacceptably high maternal mortality rate; this is especially so for black pregnant women in particular those in rural areas. (...) There is an ample record available to show that health services are often inappropriate, inadequate or inaccessible for mothers, pregnant women and children. (SA Department of Health MCWH-report, 1995.)

According to a comparison of maternal mortality ratios reported every five years between 1990 and 2008, South Africa is not making any progress in reducing maternal mortality. A statistical report, developed in collaboration between World Health Organisation (WHO), The United Nations Children's Fund (UNICEF), United Nations Population Fund (UNFPA), and the World Bank, confirms that in 1990, there were 230 deaths per 100 000 live births, and in 2008 the number had increased to 410 deaths per 100 000 live births (WHO, UNICEF, UNFPA, and the World Bank, 2010). The increase in maternal deaths may partly be due to an increased rate of HIV and AIDS in pregnant women.

The major causes of maternal death in 1999 were non-pregnancy related sepsis, complications of hypertension in pregnancy, obstetrical haemorrhage, pregnancy

related sepsis and pre-existing maternal disease (National Committee for Confidential Enquiries into Maternal Deaths, 1999).

The babies suffered the effects of maternal disorders – hypertension, sepsis, infections, haemorrhage, pre-term labour. The poor results continued in the years thereafter and in 2009 Pattison et al. reported:

During the period 1st January 2006 to 31st December 2007, 659,809 births and 25060 perinatal deaths were recorded on the national Perinatal Problem Identification Programme (PPIP) database from 244 PPIP sites. This represents 39.5% of all births in institutions using the District Health Information System (DHIS) for the denominator. All levels of care (Community Health Centres - CHCs, District, Regional, Provincial Tertiary and National Central hospitals) were well represented (Pattison et al. 2009: 1).

This confirms that the incidence of perinatal deaths of babies is still very high in South Africa. It has been documented that good antenatal care and improved services for delivery can reduce the incidence of these problems (SA Department of Health MCWH-report 1995, Pattison et al. 2005). The Lancet Neonatal Survival Steering Team (2005 and 2006) calls for action in order to achieve the Millennium Development Goal for child survival (MDG-4), and specifically emphasizes the prevention of neonatal deaths. Robert Pattison, the director of the Medical Research Council Infant Health Care Strategies Research, points out seven issues that can contribute to reducing infant deaths:

These are: policy makers and heads of health have to decide on and convey policy; heads of health and health-care managers need to convey policy and decide on strategy and messages for the community; health promotion managers need to provide consistent messages to the community; health-care managers need to ensure the community has access to health care; heads of health need to allocate resources to health managers as well as provide knowledge and skills; and the health-care provider needs to give care to patients as well as adequate information so that they can make decisions (cited in Baleta, 2011: 1304).

The final point in the citation by Pattison above, concerning the need to give care and adequate information to the patients in order for them to be able to make decisions themselves, is particularly relevant to my study, where I am focusing on the way in which they communicate and inform. Moreover, the citation by Pattison above points

Background for the study

out the importance of allocating resources as well as knowledge and skills to healthcare providers in order to improve the pregnancy services. Healthcare professionals with the adequate knowledge and skills are not easily accessible in South Africa. Since 1994, there has been a substantial decline in the number of healthcare professionals in South Africa (Coovadia, Jewkes, Barron, Sanders and McIntyre, 2009). One reason for this is that healthcare professionals are offered better-paid jobs in other countries and leave their positions at South African hospitals. This is a serious problem that poses a challenge to the efforts being made to renew the healthcare system in general and maternity care in particular. A recent WHO Health Report identifies this as a major problem in health service delivery, and states that the lack of a competent workforce means that the general health of the population becomes poorer and mortality becomes higher (WHO Health Report, 2006). However, some professional healthcare workers, such as midwives, are considered to represent a very stable part of the workforce both in rural and in urban hospitals.

The South African Government's strategy for improving maternal and perinatal healthcare includes improving the delivery of sustainable services for pregnant women by focusing on capacity building through the education and competence development of midwives.

Midwives are the backbone of the health care delivery system in South Africa. They are responsible for providing over 80% of antenatal care, and over 60% of delivery and postnatal care. The need to equip midwives with advanced skills is so crucial that a special category of midwives is being trained in South Africa, the advanced midwives (with skills in advanced midwifery and neonatal nursing science). These workers are often the only specialists in many rural areas, and have to care for complicated pregnancies. (Dr. R E Mhlanga, Chief Director, Maternal, Child and Women's Health and Nutrition, National Department of Health, South Africa, in a letter of support to the Educational Programme, 2002)

A one-year educational programme was set up in the late 1990s for training midwives to an advanced level. When the midwife completed the training, she was recognised as an "advanced midwife". Advanced midwifery is defined as follows:

ANPs/AMPs [Advanced Nurse Practitioner/Advanced Midwife Practitioner] promote wellness, offer healthcare interventions and advocate healthy lifestyle choices for patients/clients, their families and carers in a wide variety of settings in collaboration with other healthcare professionals, according to agreed scope of practice guidelines. They utilise advanced clinical nursing/midwifery knowledge and critical thinking skills to independently provide optimum patient/client care through caseload management of acute and/or chronic illness. Advanced nursing/midwifery practice is grounded in the theory and practice of nursing/midwifery and incorporates nursing/midwifery and other related research, management and leadership theories and skills in order to encourage a collegiate, multidisciplinary approach to quality patient/client care. (The National Council for the Professional Development of Nursing and Midwifery, 2008)

The advanced midwifery programme goes beyond patient care and traditional midwifery, and midwives are trained to perform additional clinical tasks and take on responsibilities that were previously undertaken by doctors. The education in advanced midwifery also deals with administrative and organizational issues.

In a pilot study in Cape Town in 2002, I conducted a number of interviews with South African healthcare personnel who were attending courses in basic and advanced ultrasound techniques. I interviewed 10 of the antenatal healthcare professionals, primarily obstetricians and gynaecologists, who were participating in a short course in the use of ultrasound technology. The informants were selected to represent differences in age, sex, ethnic origin, and the region of South Africa where they worked. The topics discussed in these interviews mainly related to the healthcare system in South Africa during and after apartheid, as well as institutional organization and staffing, focusing on antenatal care and obstetrics. We also discussed the use and implications of ultrasound technology in antenatal care, including the competence of ultrasound operators and patient perceptions of ultrasound examinations. Other issues that emerged during the interviews included the socio-economic situation of pregnant women and socio-cultural epidemiology associated with HIV/AIDS. The issues of communication with patients and providing information to patients were also reviewed, and the interview finished with a discussion about the training course that the healthcare professionals had attended immediately before the interviews. The informants reflected, for example, about the development of competence in ultrasound. They found the basic course to be quite

Background for the study

advanced, and emphasized the importance of extensive practical training. These interviews demonstrated an immense engagement on the part of the informants with regard to the broader contextual issues affecting antenatal care in South Africa. They also gave me insight into the day-to-day practices and resources available at the local hospitals, and an awareness of the health status of the population of pregnant women who attend the health facilities. The findings from the pilot study in 2002 in Cape Town provided background information about maternity care in South Africa that has been valuable for the present study.

The informants in the pilot study identified key reasons for the use of ultrasound in antenatal care in South Africa. The reasons are listed in italics below, followed by my explanations.

- *Defining gestational age.* The exact gestational age is unknown in 70-80% of the pregnancies in South Africa (Tegnander and Eik-Nes, 2003:6). Knowledge of the gestational age is a basis for management of a threatening premature delivery, defining growth restriction of the fetus and management around term.
- *Locating the placenta before delivery.* If the placenta covers the birth canal, it may cause serious risks to the pregnant woman and the fetus. With a ruptured placenta, the pregnant woman may experience severe bleeding and will need to get to the hospital immediately. Many pregnant women in South Africa live in remote places without transport, and it is often impossible for them to get to the hospital in time if they wait for the onset of labour. Maternal death is avoidable if an ultrasound investigation has located the placenta, and the woman at risk has been admitted to hospital before her labour begins.
- *Identifying the number of fetuses.* A greater risk of early labour and of prematurity is associated with multiple births. Early identification helps to optimize the surveillance of the pregnancy and the preparedness of both the mother and the hospital for the birth.

- *Providing adequate care for the pregnant women before, during and after delivery.* In South Africa, maternal complications such as ectopic pregnancy (the fetus is outside the uterus) are quite common. A ruptured ectopic pregnancy is life threatening for the woman, and requires emergency surgery. Ectopic pregnancies can be identified and confirmed in an ultrasound examination.
- *Testing for HIV/AIDS* is important during pregnancy in order to provide adequate treatment. According to a report from the Department of Health in South Africa (2007), one of the challenges in coping with HIV/AIDS is that pregnant women present for antenatal care late in pregnancy, or even only for delivery. HIV can be passed from mother to child during pregnancy (5-10%), during labour and delivery (10-20%) and during breastfeeding (5-20%). The baby is more likely to be infected if the delivery takes a long time. During delivery, the newborn is exposed to the mother's blood. Treatment of HIV for newborns should start immediately before delivery in order to have an optimal effect on the prevention of transmission of the disease through the blood during delivery (Department of Health in South Africa, 2007).

Experience has shown that pregnant women in South Africa, like pregnant women from industrialized countries, attend antenatal services because of their wish to see their fetuses on the screen. A programme that includes the distribution of information about ultrasound in antenatal care may motivate these pregnant women to access this service earlier. They may consequently also be tested for HIV/AIDS at the ultrasound examination, and if the test results are positive treatment can be started well before childbirth.

1.3 The umbrella project: an Educational Programme in ultrasound

The recognition of the high incidence of critical antenatal care conditions prompted the National Center for Fetal Medicine (NCFM) at St. Olavs University Hospital, Trondheim, Norway, to establish an educational programme in South Africa aimed at providing competence in ultrasound technology to midwives in rural areas. At a conference about priorities in perinatal care, held in Drakensberg in South Africa in

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2001, Professor Sturla Eik-Nes and midwife Eva Tegnander presented the educational model for obstetric ultrasound training used in Norway, and proposed that a similar programme could be developed for the African context. Since 1997, NCFM has served as a “WHO Teaching and Training Center for Ultrasound in Gynecology and Obstetrics” and such a programme fits well into their tasks.

In 2004, a training programme in the use of ultrasound in obstetrics and gynaecology was developed in collaboration with the Nelson Mandela School of Medicine (NMSM) in Durban, Kwa-Zulu Natal. The title of the programme is *Post-Qualification Education in Ultrasound in Obstetrics and Gynecology for Advanced Midwives* (henceforth referred to as “the Educational Programme”). The Educational Programme draws on the experiences of the lecturers at the National Center for Fetal Medicine in Norway. These lecturers have extensive experience in the use of and in the training of ultrasound in developing countries; they drew upon this experience as they devised the curriculum of the Educational Programme. The programme was also thoroughly discussed and modified in collaboration with professionals with expertise in obstetrics and gynaecology as well as in sonography at the Nelson Mandela School of Medicine at the University of KwaZulu-Natal in South Africa (Tegnander and Eik-Nes, 2003).

The aim was to train midwives who had previously received the certifications of advanced midwifery, and who were working in rural hospitals in the KwaZulu-Natal province and were using ultrasound technology in antenatal care. KwaZulu-Natal (KZN) is a province of South Africa with a mainly rural population. Distances are great and the level of healthcare service is mainly basic. For ultrasound examinations, most pregnant women from rural areas and outlying suburbs must be referred to hospitals in major cities.

The Educational Programme began in May 2004, with a group of 13 advanced midwives as the first cohort of participants. The course comprised both theoretical and practical learning, provided through lectures, bedside teaching, and practical training at the local hospitals. At the end of the course, the participants underwent a theoretical examination and a practical assessment.

1.4 Advantages and disadvantages of obstetric ultrasound

As part of evaluation of the Education Programme, the participants reflected on the advantages and disadvantages of using ultrasound in antenatal care in South Africa. It was striking that in their summaries of the advantages and disadvantages of ultrasound, the advantages mentioned were primarily at a medical level, whereas the disadvantages were primarily on a cultural or an institutional level. In what follows, some of the key issues mentioned by the participants are described.

The major advantages of ultrasound concerning medical and personal issues listed by the advanced midwives included: improved antenatal care through the identification of gestational age and the number of fetuses, locating the placenta, and identifying malformations. The midwives noted that the identification of gestational age made it possible to make a proper assessment of fetal growth. It also helped in preventing complications associated with post-term pregnancies, thus reducing the incidence of unnecessary induction of labour, and in deciding the date for elective caesareans. Some of the midwives focused on early definition of gestational age as an advantage because it could lead to early treatment and early referral for mother and child. It was mentioned that it was important to have exact knowledge of the gestational age if termination of pregnancy might be considered. The advanced midwives also focused on other issues relating to the preparation for delivery and the advantages of avoiding risks to the fetus by doing invasive tests.

The advanced midwives also mentioned that improvements in antenatal care helped prevent maternal death. Identifying severe conditions prenatally reduces the risk for both mother and child. For instance, ultrasound can help in identifying the location of the placenta; a placenta that is blocking the baby's exit before and during delivery may have severe consequences for the baby and for the mother.

The availability of information for the mother about the wellbeing and health of the fetus was also mentioned as an advantage, as was the fact that an evaluation of the health of the baby would provide information with which to determine how many times the pregnant women should present for antenatal care during pregnancy. The

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advanced midwives mentioned the socio-psychological benefits that might be gained through the use of ultrasound technology in antenatal care in South Africa. They suggested that such benefits included early bonding between mother and baby and between father and baby.

The disadvantages of the use of ultrasound in pregnancy care were also identified by the advanced midwives. One of the midwives mentioned that the focus of antenatal care, which was originally on both maternal and fetal health, had shifted, and that the major efforts were now directed at investigating the health and conditions of the fetus, while less attention was paid to the wellbeing of the mother. This change might be strengthened by the socio-economic fact that there was a limit to the time and human resources available to ensure that an adequate service was provided for the mother.

Other disadvantages mentioned were also related to cultural and perhaps religious dilemmas. One midwife stated that women might start hurting themselves and the fetus if they got the “wrong information”, for example that the sex of the baby was “wrong” or if the condition of the fetus was serious.

The midwives’ statements are descriptive and obviously represent their subjective opinions. Nevertheless, their reflections about advantages and disadvantages give us an indication about their perception on ultrasound in their particular professional context.

There are also other issues that are regarded as challenging in the implementation of obstetric ultrasound in developing countries. In the developing world, there has been a gradual increase in the availability of ultrasound machines in hospitals, but they are still far from being a common resource. The availability of local knowledge about how to use the machines is also limited. Several studies have shown that there is a positive attitude to the implementation of ultrasound in Africa because of its low cost (compared with radiology), mobility, easy maintenance and clinical potential (Palmer, 1993; Mindel, 1997). In their study in the North-West District of Botswana,

Tautz et al. (1999) found that most women viewed ultrasound as being beneficial, and that the healthcare staff also expressed very positive views about the use of ultrasound. However, Tautz et al. warned that while the diagnostic power of ultrasound was overestimated by the pregnant women, the less technological diagnostic activities of the antenatal care staff became underestimated; so the introduction of ultrasound would be accompanied by the challenge that the technology should not be over-used and that the quality and rational utilization of antenatal care and of onward referral guidelines should not be undermined. Tautz et al. argued that the indications for the use of ultrasound should be clearly specified within the specific context, and that communication with patients and appropriate information about the benefits and disadvantages of the ultrasound technology would be important both to avoid unnecessary fear on the part of the patient and to exclude unrealistic expectations about what could be achieved by the use of ultrasound in antenatal care.

Several studies emphasize the importance of understanding the deep structural and socio-cultural aspects that influence healthcare education and health communication aimed at preventing diseases (Alali and Nwosu, 2002). For this reason, it is helpful to ensure that the educational initiatives are grounded in the local community, and that the programme draws on the knowledge of local professionals and policy makers, to enable serious consideration of the social and cultural contexts of healthcare delivery. The group initiating the Educational Programme acknowledged that it was likely that they might encounter social and cultural challenges in their joint collaboration. Moreover, they recognized that they needed to know what new skills and information the advanced midwives would actually need from the Educational Programme, and what exactly would be relevant in their daily practice, especially with regard to health communication. The team from the NCFM also wanted to identify whether there were any features of the educational and communicative activity in obstetric ultrasound that might have relevance in other educational contexts. This interventionist programme is thus part of a larger scale educational initiative, some features of which may potentially be relevant to subsequent educational/training activities.

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The awareness of the challenges mentioned above was the context for engaging a communication researcher to take part in the South African-Norwegian collaborative project. I was recruited to the project through collaboration with the Norwegian University of Science and Technology (NTNU). I am by training an applied linguist and communication researcher. My first exposure to the field of fetal medicine and to South Africa was in the spring of 2002, when I was not yet employed at NCFM. I took part in an educational workshop in obstetric ultrasound organized by NCFM in Cape Town.

1.5 Aim of the PhD project

So far in this chapter, I have discussed some of the challenges South Africa is facing with regard to maternity care. One challenge is the provision of maternity care expertise. As already mentioned, in order to improve the obstetric ultrasound expertise of advanced midwives, an international group of healthcare professionals established the *Post-Qualification Education in Ultrasound in Obstetrics and Gynecology for Advanced Midwives*, referred to here as the Educational Programme. The fieldwork for this doctoral study was undertaken in 2006, and its major focus is the situated communicative practices of advanced midwives *two years after* they had completed the Educational Programme in 2004 in Durban. In other words, the present focus is not so much on the Educational Programme itself, but on the results of educational training two years later, in 2006, as evidenced in the advanced midwives' talk accompanying the use of the ultrasound technology in clinical settings at their local hospitals in KwaZulu-Natal.

The aim of this project is to examine how the professional expertise of the advanced midwives becomes manifest at the communicative level during ultrasound examinations. A descriptive focus on communication surrounding the use of ultrasound may provide valuable insight into the differential expertise of the advanced midwives, providing information that will be relevant for further development and evaluation of the Educational Programme.

1.6 Research questions for the present study

The purpose of this study is to gain insight into how the professional expertise of the advanced midwives manifests itself in their communication with pregnant women in ultrasound encounters.

The following research questions will guide the enquiry:

What characterises an ultrasound encounter?

At the outset, we need to know what an ultrasound encounter is and how it is structured as an activity type (Levinson, 1978). Are there particular patterns in the way an ultrasound encounter is structured? What characterises the participant frameworks? Is it possible to recognise particular patterns in the way the participants interact with each other, mediated by the ultrasound technology?

What discursive features characterise the talk of the advanced midwife during the physical examination phase?

To what extent do the discourse types (Sarangi, 2000, 2010) of online commentaries, offline commentaries and metacommentaries play a role in the management of professional expertise by three of the advanced midwives during the physical examination phase? To what extent is communicative expertise manifesting as part of the professional expertise of the advanced midwives?

What are the focal themes that emerge during the ultrasound encounters?

What are the focal themes (Roberts and Sarangi, 2005) drawn upon by three of the advanced midwives in their communication with the pregnant women?

1.7 The structure of the thesis

The thesis comprises nine chapters. The first two chapters (including the present chapter) provide an introduction to the contextual background for the study, to the socio-cultural context of South Africa and to the medical expert system of obstetric ultrasound. The next two chapters offer discussions about theoretical and methodological perspectives that provide the foundation for the analytical chapters

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that follow. The final chapter is a discussion of the main findings resulting from the study and their potential relevance. The following is a summary of each chapter.

The current chapter, Chapter 1, is an introduction to maternity care in the South African context. Among the challenges in pregnancy care in South Africa is the high rate of perinatal deaths of women and babies due to lack of pregnancy care expertise, especially in rural areas. An Educational Programme was established in 2004 to train advanced midwives from remote areas of KwaZulu-Natal in the use of obstetric ultrasound; the purpose was to help prepare advanced midwives to improve the pregnancy care services for pregnant women in the region. The aim of this thesis is to analyse the outcome of the training for three of the advanced midwives by looking at their communicative expertise in obstetric ultrasound encounters with pregnant women two years after they had taken part in the course. Finally in this chapter, I present the research questions of the study.

Chapter 2 is twofold. In the first part, I introduce obstetric ultrasound as a medical expert system, and discuss this in relation to its function in identifying normality versus abnormality, and in assessment of risk. I also discuss different reasons for doing ultrasound examinations at different stages in pregnancy. In the second part, I discuss the expertise required for healthcare personnel working with pregnancy care. Particularly relevant is the distinction between procedural and propositional knowledge (de Cossart and Fish, 2005). The use of ultrasound technology creates new demands in the development of professional expertise in obstetric ultrasound, and this is reflected in the Curriculum of the Educational Programme (Tegnander and Eik-Nes, 2003). I claim that communication and information-giving is an integral part of expertise (Sarangi 2010 b) for healthcare professionals working in pregnancy care, especially since the obstetric ultrasound technology allows pregnancy care professionals to reveal more information about the condition of the fetus. Obstetric ultrasound professionals must also be trained in obstetric ultrasound communication. In order to be able to educate professionals in expert communication in obstetric ultrasound, we need to know what characterizes communication in obstetric ultrasound encounters. This is what I will focus on in the analytic Chapters 5-8.

Chapter 3 is an introduction to the theoretical perspectives and the analytic toolbox necessary for understanding the dynamics of obstetric ultrasound encounters. The thesis is grounded on a discourse analytic approach to healthcare communication. The specific discourse analytic approach selected for this study is activity type and activity analysis. This chapter also includes an introduction to the key analytic categories that are associated with activity analysis, and the ones applied in this thesis: frames, participant structure, roles and positioning of the participants and discourse types. In particular, the notion of discourse types (online commentary, offline commentary and metacommentary) is introduced at length, supplemented by a brief discussion of the role of visual imaging in healthcare encounters.

Chapter 4 concerns the methodology (methods of data collection) and presents the contextual background to the interactional data that are examined in this study. The primary data are video-recorded ultrasound encounters between advanced midwives and pregnant women from rural hospitals in KwaZulu-Natal in 2006. Initially in this chapter, I introduce the participants and some characteristics of the encounters. I then refer to the secondary data, which consist of logs, interviews, questionnaires and assessments of students who participated during the Educational Programme in 2004. In addition, I discuss the paradoxes that may arise when the researcher has several roles, such as participant, observer and analyst, in an ethnographically grounded discourse analytic study such as the present one. Finally in the chapter, I reflect upon the data preparation and present the transcription system for verbal and nonverbal communication.

Chapter 5 is an introduction to activity analysis (Roberts and Sarangi, 2005; Sarangi 2010), and provides the structural, interactional and thematic mappings of the obstetric ultrasound encounter as an activity type. When studying expertise in healthcare settings, we need an analytic tool that can accommodate the complexity of the context. At the same time, we need to shed light on the particular and situated communication in the ultrasound encounter as an activity type. Through the mapping of an encounter into structural elements, interactional elements, and thematic elements, we can unpack the encounter into separate units that can be examined

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separately. The mapping of different levels enables us to pick out the elements that are relevant for understanding how expertise manifests itself during communication.

The structural mapping mapping resulted in a classification of the phases and the sub-phases in the obstetric ultrasound encounters. The interactional mapping indicated the tendencies of the distribution of discourse types and the thematic mapping resulted in a detection of the most recurring focal themes: normality, risk, worry and reassurance. The chapter comprises an elaborated version of the online commentary coding scheme as suggested by Mangione-Smith, Stivers, Elliott, McDonald and Heritage (2003) in Chapter 3.

The following three chapters are case studies of three advanced midwives, Nobuntu (Chapter 6), Nonkululeko (Chapter 7) and Nivedita (Chapter 8) respectively.

A case-study approach allows for an examination of the professional expertise at an individual level, and takes into account the fact that professional expertise manifests differently from one healthcare professional to another. Since the three advanced midwives attended the same Educational Programme, it would be interesting to explore the extent to which they display their expertise similarly or differently, and what might underpin the differences, if any. The analytic focus in the three case studies is the physical examination phase of the obstetric ultrasound encounter.

Chapter 6 discusses the professional expertise of Nobuntu at a communicative level. First in the chapter, the structural mapping of all the encounters of Nobuntu is presented in order to show the tendencies in how she organises the encounter in terms of phases and sub-phases. Then the physical examination phase of a typical encounter of Nobuntu is mapped interactionally in order to show the distribution and the addressees of the various discourse types. There is also a thematic mapping of the encounter. Secondly, the examination of Nobuntu's expertise is done through a close study of online commentaries, offline commentaries and metacommentaries in her expert talk during the physical examination phase of the ultrasound encounter. This is done in relation to the focal themes of normality, risk, worry and reassurance, and discussed in relation to selected examples from the communication between Nobuntu

and the pregnant women. These encounters are communicatively complex, since the pregnant women are Zulu-speaking, and the researcher speaks only English.

Chapter 7 is an examination of how the professional expertise of Nonkululeko is manifest in her expert talk with the pregnant women. Also here, the chapter starts with a structural mapping of all the encounters followed by an interactional mapping of the physical examination phase of a typical encounter. The focus in the interactional mapping is on the distribution of the occurrence of discourse types – online commentaries, offline commentaries and metacommentaries – and the focal themes of normality, risk, worry and reassurance. The discourse types and the focal themes are subsequently studied and discussed in light of examples from the video-recorded encounters with Nonkululeko. The pregnant women are Zulus, but understand some English.

Chapter 8 deals with the professional expertise of Nivedita as manifest through her communication with the pregnant women in her ultrasound encounters. Initially in the chapter, all the encounters of Nivedita are mapped structurally so as to display how she organizes the encounter in phases and sub-phases. Secondly, a typical example of the physical examination phase of an ultrasound encounter is mapped interactionally, in order to show tendencies regarding the distribution of discourse types and the addressees. This is followed by a discussion of how the discourse types and the focal themes of normality, risk, worry and reassurance are manifest in examples of Nivedita's communication with pregnant women during the ultrasound examination. Nivedita has some challenges with the technology, and this has an impact on her communication. All the women in Nivedita's clinic speak English.

Finally, Chapter 9 offers a summary of the study, discussions and suggestions for further research. I have shown that ultrasound expertise involves both propositional and procedural knowledge, and the embedding of the technology warrants particular demands with regard to the communicative expertise of the ultrasound operator. The ultrasound encounter as an activity type in this project is hybrid, and this has an impact on the participant structure as well as on the roles and positioning of the

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participants, including the co-present researcher. The hybridity lies in the fact that the encounters are both clinical examinations and evaluative research activity. The hybrid framework here is comparable with the educational settings that include, in addition to the pregnant woman and the midwife, also students or other participants.

2 Obstetric ultrasound expertise

2.1 Introduction

This chapter offers an overall perspective on obstetric ultrasound in pregnancy care.

Obstetrics is the medical discipline that deals with pregnancy, childbirth and antenatal care. *Ultrasound* technology is a visualizing tool that enables the healthcare professional to examine the interior of the human body. Obstetric ultrasound is as such a tool which enables the obstetrician to examine the maternal and the fetal anatomy.

Obstetric ultrasound is also an expert knowledge system that requires a particular form of expertise. In this chapter I introduce the medical discipline of obstetric ultrasound by drawing attention to issues that are particularly relevant to becoming an ultrasound expert, such as the purpose and applications of the technology as well as issues related to the teaching and training of becoming ultrasound literate.

After a brief overview of what constitutes obstetric ultrasound as an expert system in Section 2.2, I discuss the notions of normality and risk in relation to obstetric ultrasound in Section 2.3.

In Section 2.4, I discuss the applications of ultrasound technology in pregnancy care.

In Section 2.5, I offer an outline of the levels of expertise in obstetric ultrasound. I elaborate on different kinds of practice knowledge in Section 2.6. This is followed by a presentation of the main objectives of the Educational Programme in Section 2.7. and is supplemented by a brief overview of the thematic emphasis of the curriculum in Section 2.8. I also summarize the professional expertise of the midwives who are participants in the Educational Programme (Section 2.9).

Section 2.10 is the chapter summary.

2.2 The expert system of obstetric ultrasound

The human body has always been the object of examination in medicine, but the methods for examination have evolved; modern medicine has developed with the implementation of many different kinds of expert systems. Healthcare professionals have traditionally used “hands-on” methods to examine the body, sometimes making use of particular tools and medical devices. Whereas in earlier times the stethoscope was the way of getting information about internal parts of the body, today we have expert systems such as x-ray, ultrasound and magnetic resonance imaging (MRI).

An expert system is a complex technology-based system, designed for particular purposes and geared towards rationalizing medical work economically and in terms of medical output (Måseide, 2007). Expert systems enable systematic collection of data, for example, blood tests and mammography. They also aid the identification of anatomic structural normality and abnormality. Other examples of expert systems are software-assisted risk assessments, patients’ case records and official forms (Sarangi, 2005), as well as networks of professional experts and various decision-support systems. The medical facts generated through expert systems provide information that is considered useful from both a preventive and a curative point of view. Expert systems are useful in the identification of normality and abnormality, and in the assessment of risk.

The perspectives on what are the best methods for preventing illness or curing diseases are constantly being negotiated within medical practice and in society (Foucault, 1963/2003). In previous cultures and civilizations, the notions of fate, luck or the will of the gods were used in situations where today we would talk about risk. Our age is not more dangerous or risky than in the past, but the balance of risks and dangers has shifted (Douglas, 1985; Giddens, 1999; Beck, 1992). Today we have expert systems that enable us to assess risk and to take precautions to prevent risk from becoming a danger.

Risk assessment is an important focus in modern medicine. Medical technology is constantly improving and professional expertise in risk assessment is becoming more

specialized. In the management of pregnancy, we can distinguish between a medical assessment of risk on the one hand, and a socio-ethical assessment of risk on the other hand. Risk perceived from these two different perspectives is calculated in different ways (Getz and Kirkengen, 2003). While the calculation of risk for the clinician is a set of numbers, the calculation of risk for the pregnant woman is adapting to the idea that she may be carrying a compromised fetus. A situation that a clinician might estimate as only a low level of risk may be perceived emotionally by the pregnant woman as a high risk (Adelsward and Sachs, 1996). For the pregnant woman, the assessments of risk may increase her perception of risk, and may potentially create more worry than warranted. As Getz and Kirkengen point out, the ultrasound expert can never offer complete certainty to the pregnant woman about the wellbeing of her fetus, since the information interpreted and provided during an examination is always influenced to a certain degree by the expert's experience, expertise and behaviour. There is also a possibility that a medical professional may withdraw or withhold information that may be regarded as compromising for the patient (Getz and Kirkengen, 2003). The pregnant woman's perception of these factors may contribute to her increased perception of risk.

The increasing use of expert systems has consequences for both the knowledge and the activities of healthcare professionals. An expert system, such as obstetric ultrasound, is designed to capture and make available the knowledge of experts in a field (Shortliffe, 1986). This knowledge from medical findings is relevant in peer and professional discussions, and as documentation of the patients' medical history. Moreover, the increasing focus on defining normality versus abnormality, as well as risk assessments through expert systems, creates new demands on the communicative expertise of the health professional. The tasks of health professionals are not only to solve medical problems but also to communicate these to the often well-informed patients.

Communication and information giving is becoming increasingly important in the management of risk (Sarangi 2010). Dealing with all these different demands is thus an important requirement in the expertise of health professionals.

Sarangi (2010) suggests that healthcare interaction in professional and institutional settings can be described as expert communicative systems. Healthcare professionals

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relate to a set of tacit and explicit rules and levels of knowledge, and there may be tensions between different professionals on a communicative level concerning interpretations and decision-making. The perspective on health interaction as an expert communicative system enables us to perceive the complexity of variables influencing for example the understanding of risk, coping with uncertainty, considering the diagnosis and making decisions in healthcare encounters. Healthcare professionals need communicative expertise, or multifaceted interactional competencies, in order to manage the complexity of expert communicative systems.

Against this backdrop, obstetric ultrasound can be treated as an expert communicative system that aims toward identifying normality and abnormality, and toward assessing risk. An obstetric ultrasound machine is a sophisticated technological device used with the aim of improving the quality and usefulness of medical examinations in pregnancy care.

2.3 The notions of normality and risk in relation to obstetric ultrasound

Pregnant women come to the ultrasound consultation with mixed feelings: on the one hand, insecurity and worry; on the other hand, expectations about seeing their fetuses for the first time. They hope to be reassured about normality and fetal well-being. Pregnancy is a physical and mental state that influences the individual woman's perceptions about her body and her mind. The body of the pregnant woman is in transformation at many levels; the physical changes influence her bodily experiences and to various degrees her mental experiences (Ravn, 2004). Most women have an awareness of potential risk; they worry about it and seek to do what they can to protect their babies from illnesses and suffering.

Identification of normality and the diagnosis of abnormality has always been the aim for fetal diagnosis. Professional obstetricians working with fetal diagnosis base their definitions of normality on clinical, measurable, parameters derived from evidence-based research. An obstetrician refers to defined standards of normal development accepted in their community of practice.

Normality in the medical sense is a definition of a condition that is statistically within the range of the regular pattern. In obstetric ultrasound, organs that do not have diverging features and that are within the average range with regard to measurements are considered normal.

Normality in pregnancy can be measured clinically and scientifically, for example the values of blood pressure, blood sample tests, fetal and maternal growth. Such values are continually being compared to what is considered to be statistically within the range of normal. However, the perceptions of normality are also a social construction, and vary according to the cultural beliefs and the perceptions of the individuals involved. The notion of normality is not clear, objective and universal, but contentious even between contemporaries within the same culture, field and profession (Asch, 2001:300). While medicine would hold evidence-based research as providing objective proof about what can be considered normal and not normal, ethicists and social scientists would argue that social structures are decisive for what can be considered normal or not.

Michel Foucault (1977) discussed perceptions of normality, asserting that institutional and discursive trajectories label us as normal or not normal at all levels of human life, and that there are institutionalized judges who create the definitions of normality.

The judges of normality are present everywhere. We are in the society of the teacher-judge, the doctor-judge, the educator-judge, the 'social-worker'-judge; it is on them that the universal reign of the normative is based; and each individual, wherever he may find himself, subjects to it his body, his gestures, his behaviour, his aptitudes, his achievements (Foucault, 1977: 304).

Normality within this perspective is defined by institutionalized professional subjects making references to parameters within the discourse or community of practice. The medical professional is a judge who is basing her diagnosis on acknowledged normative medical parameters of that medical discipline. This observation extends to all healthcare professionals, including the advanced midwives, the subjects of study in this project. The advanced midwives have preconceptions about notions of normality which are informed by their professional practice.

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In addition to confirming normality, an aim of pregnancy care is to identify potential risks for the mother and fetus. For many years, one of the aims of preventative healthcare in pregnancy has been the identification of pregnancies that may be high-risk, and several classification systems have been developed to define which mothers might be at risk. The classification systems have included age, marital status, smoking, plurality, threatened miscarriage, previous low birth weight, previous stillbirth, maternal weight and height as categories for evaluation of whether there is reason to be particularly attentive in healthcare (Darcy, Watson, Rayner and Rowlands, 2004). The risks concern poor pregnancy outcomes, such as antenatal mortality, low birth weight and preterm birth. There are, for example, studies that suggest there may be an association between preterm birth and a range of different physical and social factors, such as economic and social adversity, multiple gestation, assisted conception, structural abnormalities of the uterus and cervix, serious medical, surgical or gynaecological conditions in the mother, stressful life events, perceived stress, poor psychological health, lack of family or social support, and tobacco and cocaine use (Berkowitz and Papiernik, 1993).

The perceptions of the healthcare professional about risk may be divergent from those of the pregnant women (Gupton et al, 2000/2006). While the advanced midwives are trained to perceive risk in the light of norms in the medical discourse, the pregnant woman is likely to have a more personal perception of risk.

Communicating the *concept* of risk is considered to be difficult for healthcare professionals. One of the informants from the pilot study in Cape Town 2002 expressed her concern as follows:

I think that the screening situations are very difficult. Because the whole idea of communicating risk....so if you are doing nuchal translucency, or finding soft markers, or whatever. I think that the patients we see often do not have the concept of risk. They can understand that the baby has a problem or it is normal. But the idea 1 in 200 is quite difficult to communicate. So I think that is the biggest challenge. In terms of actual abnormalities, that's less of a problem. But trying to communicate the concept of screening and risk is difficult. (Louise, Cape Town, 2002).

Louise emphasized that it is easier for a person to understand the difference between a result that is normal and one that is not than the calculation of a hypothetical risk to which the fetus might be exposed. Medical probability is abstract to most patients, perhaps because it does not necessarily concern them.

2.4 The applications of ultrasound technology in obstetrics and gynaecology

In antenatal care, ultrasound technology is a tool for surveillance of the fetus and the pregnant woman. Ultrasound in gynaecology is used to investigate the size, shape and consistency of the pelvic organs, including the uterus and the cervix in the non-pregnant woman. During an ultrasound examination during pregnancy, the operator will usually perform both an obstetric ultrasound and a general gynaecological ultrasound examination. The aim of this section is to describe the reason for the use of ultrasound technology in different stages of pregnancy: the most common second trimester scan, the early scan and the third trimester scan.

According to the WHO Manual on Diagnostic Ultrasound (Palmer, 1995), there are various reasons for doing ultrasound examinations at different stages of the pregnancy.

The compelling reasons for doing a second trimester (weeks 18-22) ultrasound examination are to establish the gestational age accurately, to diagnose multiple pregnancy, to diagnose fetal abnormalities, to locate the placenta, and to recognize myomas or any other unexpected pelvic mass that may interfere with pregnancy or delivery. This second trimester examination is offered routinely in most developed countries.

The motives for doing a scan earlier than 18 weeks, usually in the first trimester (12 weeks), are to confirm the presence and viability of the pregnancy, locate the pregnancy (intra- or extra-uterine), identify single or multiple pregnancies, and accurately estimate gestational age. In addition, one can exclude molar pregnancy and pseudo-pregnancy due to a pelvic mass or hormone-secreting ovarian tumour, and it is possible to diagnose myomas or ovarian masses that might interfere with normal delivery (Palmer, 1995).

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In early pregnancy, ultrasound has been used on clinical indication such as bleeding, pain, uterus suspected to be too large or too small, or any other clinical concern regarding the pregnancy. In the developed world, some countries offer a systematic ultrasound examination at 12 weeks, primarily for dating the pregnancy, detecting gross anomalies, and assessing the risk for chromosomal aberration (Nicolaidis, 2011).

The reasons for an ultrasound examination between weeks 32 and 36 are that this is the best time during pregnancy to recognize intrauterine growth retardation, to recognize fetal anomalies that were not detected in a previous scan, to confirm the presentation and the position of the fetus, to locate the placenta accurately, to assess the amount of amniotic fluid, and to detect and exclude possible complications, e.g. myoma or ovarian tumour.

Based on the discussion so far, we can conclude that the use of ultrasound technology in obstetric care has a range of potential applications depending on when it is used during pregnancy. It is worth noting that the pregnant women participating in three case studies in this thesis presented for ultrasound at different trimesters of their pregnancies (see Section 4.2.4, Table 4). The different reasons for using ultrasound require different levels of expertise in scanning and in interpreting the images. This point is discussed in greater detail in the following section.

2.5 Levels of expertise and training in obstetric ultrasound

The appropriate training of health personnel is instrumental for ensuring the effective use of ultrasound in antenatal care. There is at present no formal agreement internationally concerning the requirements and standards for the use and practice of ultrasound in obstetrics and gynaecology (Tegnander and Eik-Nes, 2003: 4), although there is full agreement on the general principles.

It is common to differentiate between three levels of expertise and referral in ultrasound in obstetrics and it has been recommended that training also be graded into three levels, which correspond to the levels of the referral services (Whitfield, 1993).

Basic *first-level scanning* should ideally be widely and immediately available wherever obstetrics is practiced. In the first-level training, the purpose is to:

confirm fetal life, to identify the number of fetuses and their presentation, to ascertain or at least to suspect when a major fetal malformation is present, to recognize polyhydramnios and oligohydramnios, to locate the placenta, to obtain fetal measurements from which to determine gestational age in early pregnancy and to estimate fetal size in later gestation, to make some assessments of fetal movements and occasionally to recognize such incidental findings as ovarian tumors (Whitfield, 1993: 252).

In second-level skills and facilities:

the proficiency includes the ability to detect and differentiate the various forms of early pregnancy failure, to comment on the various forms of early pregnancy failure, to comment on abnormalities and maturation of the placenta as well as its location, to make and interpret a full range of fetal measurements and observations of fetal activity, to perform a detailed inspection of the fetus to identify and assess structural abnormalities, and to assess the uteroplacental and umbilical circulations by Doppler velocimetry. (Whitfield, 1993: 253).

Most advanced, *third-level* expertise at regional (tertiary) centres provides the best foundation for organizing and continuing to develop obstetric ultrasound. In the third level, the candidates develop “*skills needed for a tertiary referral service at main centres*” (Whitfield, 1993: 253).

The expert knowledge of the advanced midwives included in this study is on a basic level, although the pregnant women present at different stages in pregnancy. However, as we shall see in the analysis, there are recurrent communicative issues, independent of the stage in pregnancy. Some of the communicative issues are context specific, such as the switch between English and Zulu. Other communicative issues are more general, and can occur in obstetric ultrasound examinations anywhere, such as the online commentaries accompanying the observations on the screen.

A single system of training and assessment of ultrasound competence is not desirable since there is a huge variation in the background, professional knowledge and skills, and the responsibilities and accountability of those carrying out obstetric and gynaecologic ultrasound (Whitfield, 1993: 254). “*Nevertheless*”, Whitfield continues, “*each*

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organization can and should learn from the ideas and the experiences of the others, and then modify its own arrangements accordingly where it seems best to do so”.

Whitfield’s suggestion that each community and each hospital develop their own practices, does not rule out the necessity for a standardization of training in obstetric ultrasound, especially on the basic level. A standardized curriculum can include focus not only on the application of the technology, but also on the communicative and the ethical issues related to the use of the technology, which is a crucial, but not highlighted as a competency requirement in training programmes. Communicative issues surrounding use of ultrasound technology are discussed in the analytic chapters of the thesis.

Already in 1985, the importance of training in the use of ultrasound technology was emphasized. The WHO Scientific Group on the Future Use of New Imaging Technologies (1985) stated that *“the difficulties of making an accurate diagnosis from ultrasound images are such that the purchase of ultrasound equipment without making provision of the training of an operator is contrary to good healthcare practice and is unlikely to be cost-effective”* (WHO-report 1985: in Palmer 1995: vii). According to the WHO Scientific Group, a general physician should work with ultrasound in an ultrasound department for at least one month full time, in order to achieve a minimum level of expertise. A minimum of 200 abdominal and obstetric examinations should be performed under supervision. The report further concluded that in order to be a competent sonographer, the physician should conduct ultrasound examinations for at least six months in a recognized centre: *“if non-physicians are to perform the examinations, they need to have had at least one year’s full-time training in ultrasound and preferably a background in radiography or nursing: they should always work under the supervision of an experienced sonologist”* (WHO-report 1985: in Palmer 1995: viii). In recent years, the requirements for a thorough training of ultrasound technology operators are even more important, because of the fact that the technology is much more sophisticated and available, and because of the ethical and communicative issues being raised in relation to technologisation of healthcare.

The teaching and training committee of the International Society for Ultrasound in Obstetrics and Gynaecology (ISUOG) has developed a proposal for minimum requirements of competence for ultrasound operators working in the field of obstetrics and gynaecology (ISUOG Education Committee, 1993). These requirements concern fundamental physical principles for ultrasound, obstetrics, gynaecology, and the organization of an ultrasound laboratory.

The Educational Programme provided for the midwives in this study draws on the basic requirements identified by several international organizations, including the International Society of Ultrasound in Obstetrics and Gynaecology (ISUOG), the American Institute of Ultrasound in Medicine (AIUM), the World Health Organization (WHO Technical Report Series 875, 1998), the United Kingdom Association of Sonographers (UKAS), and the Educational Programme in ultrasound in obstetrics for nurses/midwives at the National Center for Fetal Medicine (NCFM) in Trondheim, Norway (Tegnander and Eik-Nes, 2003). The Educational Programme was adapted to the South African context.

2.6 Different kinds of practice knowledge

The level of competence defined as the expected outcome for the participants of the Educational Programme corresponds with level 1 as described by Whitfield (1993). That specification is also relevant for the present study, as the empirical observations and the analysis of data are all related to the benchmark of level 1 expertise in the use of ultrasound. However, it may not always be easy to distinguish the different levels of competence at the communicative level in clinical practice, which is the focus of the present study. By classifying the types of practice knowledge necessary for practitioners of obstetric ultrasound, we can better understand the levels of competence. To do this, I draw on de Cossart and Fish (2005). On the basis of a study of their own and colleagues' work in surgical practice, they developed a map of practice knowledge that can be used for other professionals.

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Procedural knowledge

Skills, know-how, processes, procedures (related to clinical, managerial; educational research; organizational; Trust-level).

Propositional knowledge

Formal specialist theory, formal generic theory, knowledge of context, of education, of management, of organization, of profession, of society.

Procedural improvisation knowledge

How to use and adapt know-how safely to the given context.

Evidence-based knowledge

Knowledge of all appropriate research where relevant.

Propositional adaptation knowledge

Knowing how to reorganize factual knowledge/skills to respond to the given case.

Metacognitive knowledge

Knowledge of the structure of knowledge and higher-order ways of organizing knowing.

Professional knowledge and conduct

Knowledge of the traditions and the parameters of the practice of the profession and its legal framework.

Experiential knowledge

Knowledge gained from undergoing experiences and reflecting on them to make sense of them and learn from them.

Practice-generated knowledge

New knowledge created through undertaking, exploring, and theorizing an aspect of professional practice (can lead to new propositional and procedural knowledge).

Ethical knowledge

Knowledge of ethical and moral principles that guide all professional practice and that will shape the safe improvisation of procedural knowledge and the re-organization of propositional knowledge.

Sensory knowledge

All that knowledge, both procedural and propositional, that comes to the practitioner through the senses.

Self-knowledge

Accurate knowledge of own personal characteristics, values and beliefs, plus procedural capabilities and grasp of propositional knowledge.

Intuitive knowledge

Something we know or are moved to do but cannot (yet) give logical or evidential grounds for.

Insight/imagination

A sudden holistic grasp of an aspect of procedural, propositional or self-knowledge, or knowledge of others.

Table 1 A map of the practice knowledge for professionals (de Cossart and Fish, 2005: 202).

This map illustrates the complexity of elements in the professional practice knowledge of doctors (de Cossart and Fish, 2005). The interesting point in this model is the distinction between *propositional knowledge* and *procedural knowledge*, which is relevant for current purposes.

The *propositional knowledge*, or what Anderson (1983) calls declarative knowledge, is the knowledge of facts (Ryle, 1949; Higgs et al, 2008; de Cossart and Fish, 2005). This is knowledge that professionals obtain from studying their particular field scientifically, through lectures, theories, research, etc. The propositional knowledge informs practice. An example of propositional knowledge is *evidence-based* declarative knowledge concerning a particular scientific field. Propositional knowledge, or what Sarangi (2005: 7) calls “*what knowledge*”, becomes procedural knowledge through practical activity.

Procedural knowledge involves knowing how to act and how to do things (Ryle, 1949; de Cossart and Fish, 2005). Sarangi (2005: 7) calls this the “*how*” dimension of knowledge. Procedural knowledge is know-how acquired from experience of performing tasks. Procedural expertise on an institutional level has to do with practical issues in the clinical day-to-day work. The performance of a task becomes automatic and unconscious when it is repeated several times. If a health professional has seen one hundred patients with the same condition, s/he has some *experiential knowledge*. Experiential knowledge may be based on own experience or others’ experience that one consciously reflects upon, and includes both procedural and propositional knowledge. In addition, the good professionals are guided by what they call intuition or *intuitive knowledge*, which is knowledge that is not directly explicable. They are guided more by their experiential knowledge, than by their propositional knowledge.

Knowledge is not easily explicable, and there is a multiplicity of layers, both explicit and implicit, that are difficult to distinguish and explain. According to Polanyi (1967), tacit knowledge is knowledge which has been internalized but not verbalized, about how to perform a complex task. Polanyi emphasized that “*we can know more than we can tell*” (Polanyi, 1967: 4). He suggests that conceptual, sensory and perceptual information all contribute when we try to make sense of things.

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The professional must know how to operate the machine in addition to knowing the reasons for making it work. Some knowledge can be described formally in codes or described systematically in texts.

The expertise involved in obstetric ultrasound is a combination of what de Cossart and Fish (2005) called propositional knowledge and procedural knowledge. The ultrasound operator has to know how to deal with the technology, for example, knowing how to make the right adjustments of the images and how to orientate the transducer to obtain the required views. As stated in the Curriculum: “*much time and attention are devoted to the important understanding of spatial thinking based on the two-dimensional images provided*” (Tegnander and Eik-Nes, 2003:14). An understanding of how to think when interpreting two-dimensional images is an important prerequisite for doing ultrasound examinations. The more experience the ultrasound operator has in spatial thinking, the easier it is to read the image.

Moreover, the ultrasound operator must be able to make sense of what she sees on the screen according to her level of expertise. For example, an ultrasound operator on a basic level must be able to get a view of the uterus and the fetus(es), locate the placenta, and identify the different organs of the fetus. She must also know how to take different measurements and evaluate the amount of amniotic fluid, blood flow, etc. It is important to be familiar with the structures of a “normal” fetus, in order to be able to identify abnormal structures. While the skills needed for an ultrasound operator are theoretically based, it is the internalized knowledge developed through practical training that determines the quality of the examination. There are different levels of competence in obstetric ultrasound, and each of these levels has different professional implications, for instance relating to accountability, as well as institutional implications relating to infrastructural and legal issues.

2.7 The objectives of the Educational Programme

The main objectives of the Educational Programme were to enable participants to understand and practice basic level transabdominal obstetric diagnostic ultrasound in the first, second and third trimesters of pregnancy, to understand and practice basic level transabdominal gynaecological use of ultrasound, and to present high-quality ultrasound images. Together, these comprise a full level 1 diagnostic examination. Another important objective was that the advanced midwives should acknowledge and act on their responsibility to promote the provision of good quality care, both physical and psychological, for the pregnant woman examined, and to stimulate interest in quality assessment in diagnostic ultrasound (Tegnander and Eik-Nes, 2003: 8).

As discussed in the preceding section, the competence required for an ultrasound operator performing obstetric examinations is a combination of theoretical knowledge and practical work. Both these dimensions are covered in the Educational Programme. Specifically, the aims of this particular programme are to develop participants' knowledge of the various scanning techniques, to competently perform ultrasound examinations in obstetrics and gynaecology, to provide them with a theoretical understanding appropriate to diagnostic ultrasound in obstetrics and gynaecology, and to ensure that the practical skills required are developed to a competent basic level 1 in all clinical situations.

The overall aims of the Educational Programme are:

To develop the students' knowledge of the various scanning techniques used, so that they are able to competently perform ultrasound examinations in obstetrics and gynaecology

To provide the students with a theoretical course of study appropriate to diagnostic ultrasound in obstetrics and gynaecology

To ensure that the practical skills required of the students are developed to a competent basic Level I in all clinical situations

To develop the skills required to foster effective communication with professionals and patients

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To provide the students with a basic understanding of the physics for the safe use of ultrasound in various clinical situations

To give the students a basic understanding of the psychological impact of the diagnosis that might occur in some clinical situations; to master the care of the pregnant woman in such situations

To give the students an understanding of the basic organization of ultrasound in obstetrics and gynaecology to ensure an optimal use of the diagnostic potential for the patient

To stimulate the students to take an interest in the continuous development and evaluation of technical and clinical ultrasound to ensure that their patients at all times may benefit from the general progress

(Tegnander and Eik-Nes, 2003: 8) (Italics, my emphasis)

The objectives in italics, given their communicative dimensions, are of particular significance in this thesis. Patients are influenced by what healthcare professionals say, as well as by how they say it. The focus of the analytic chapters is on what and how advanced midwives communicate while doing the ultrasound examination.

2.8 Thematic emphasis in the Curriculum

In the Curriculum of the Educational Programme, the section on the theoretical¹ content of the course “*Diagnostic ultrasound in the second and the third trimester*” specifies the course content in terms of particular themes (Tegnander and Eik-Nes, 2003: 17-18).

These themes are a way to organize the different features of the fetal anatomy that advanced midwives review throughout the ultrasound examination. In the analysis, I refer to these themes when discussing the advanced midwife’s practice.

¹ In this section, the other objectives of the theoretical component of the Curriculum are not discussed. They include physics & instrumentation, diagnostic ultrasound in gynaecology and the first trimester, and organization and communication. These topics are mentioned where relevant in other chapters.

Theme	Subtheme
Normal fetal anatomy	<p>Overview: viability, number of fetuses, amniotic fluid quantification, placenta location, serious disorders, adnexa</p> <p>Head: shape of the skull, nuchal skinfold, cerebral ventricles, falx cerebri, cavum septi pellucidi, thalamus, posterior fossa and cerebellum, cisterna magna, choroid plexus</p> <p>Spine: ossification centres, skin covering and tapering of spine</p> <p>Thorax: lungs, ribs</p> <p>Heart: position, size, rhythm, four-chamber view, atrioventricular valves, septae</p> <p>Diaphragm</p> <p>Abdomen: stomach, liver, gall bladder, intestines, kidneys, adrenal glands, urinary bladder, anterior abdominal wall</p> <p>Limbs: legs with femur, tibia and fibula, feet and toes, arms with humerus, ulna and radius, hands and fingers, shape, echogenicity and movements</p>
Placenta, umbilical cord and amniotic fluid	<p>Placenta: location, echogenicity</p> <p>Umbilical cord: number of cord vessels, abdominal cord insertion</p> <p>Amniotic fluid: sonographic visualization, quantification</p>
Fetal presentation in the third trimester	Cephalic, breech, transverse
Fetal growth and well-being	Fetal biometry, assessment of growth and weight, biophysical profile
Compromised pregnancies	Multiple pregnancies, maternal diabetes mellitus, epilepsy, pre-eclampsia, intrauterine growth retardation, post-term pregnancies
Reporting procedures	Registration of fetal growth and weight, information to the clinician, and the primary doctor, referral procedures, writing papers, data collection, outline, quality assurance, documentation
Fetal biometry	<p>Measurements: biparietal diameter (BPD), head circumference (HC), abdominal circumference (AC), femur length (FL), assessment of fetal age</p>
Pathology	– blended in with the normal

Table 2 The course content in the Educational Programme concerning diagnostic ultrasound in the second and the third trimester

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Table 2 shows the requirements for ultrasound competence for advanced midwives when they perform examinations in the second and third trimesters. With regard to the course content, the focus is on the “*normal fetal anatomy*”, including an overview of the whole interior uterus and on the structures of the fetus: the head, the spine, the thorax, the abdomen and the limbs. It is the normality discourse that is highlighted, and the pathologies are, as noted in the Curriculum, “*blended in with the normal*”. The pathologies, i.e. the abnormalities, are presented as the opposite of the normal, and this is articulated when the advanced midwife identifies something that is “*abnormal*”.

Each of the anatomical structures identified as subthemes in Table 2 implies the existence of another level of more detailed subthemes. The advanced midwife must be able to examine the placenta, umbilical cord and the amniotic fluid, and to determine the presentation, growth and wellbeing of the fetus. The advanced midwife must be able to recognize several factors relating to compromised pregnancies. As well as knowing the ways to measure the fetus, the midwife must know the oral and written reporting procedures which are expected in her cultural and institutional context.

The ability to conduct a thorough examination of all the anatomical themes and subthemes is closely linked to the competence of the advanced midwife. The basic course should enable the advanced midwife to identify the normal and the abnormal, in accordance with the level 1 scan (see Section 2.4). The advanced midwife is not accountable for the diagnosis when there are abnormalities. If the midwife suspects an abnormality, she must refer the patient to the next level of expertise.

2.9 The professional expertise of the midwives

Midwives comprise the medical professional group studied in this project. Midwives are the target population for the Educational Programme, although other healthcare professionals routinely perform ultrasound examinations. The professional requirements for midwives are complex, and the midwives have a wide range of responsibilities and tasks. Fraser and Cooper (2005) present a definition of the midwife based on the International Confederation of Midwives (ICM) from 1972, which was later ratified by

the International Federation of Gynaecology and Obstetrics in 1991 (FIGO) and by the World Health Organization (WHO) in 1992:

A midwife is a person who, having been regularly admitted to a midwifery educational program, duly recognized in the country in which it is located, has successfully completed the prescribed course of studies in midwifery and has acquired the requisite qualifications to be registered and/or legally licensed to practice midwifery.

The midwife is recognized as a responsible and accountable professional who works in partnership with women to give the necessary support, care and advice during pregnancy, labour and the postpartum period, to conduct births on the midwife's own responsibility and to provide care for the newborn and the infant. This care includes preventative measures, the promotion of normal birth, the detection of complications in mother and child, the accessing of medical care or other appropriate assistance and the carrying out of emergency measures.

The midwife has an important task in health counselling and education, not only for the woman, but also within the family and the community. This work should involve antenatal education and preparation for parenthood and may extend to women's health, sexual or reproductive health and childcare. A midwife may practice in any setting including the home, community, hospitals, clinics or health units (Fraser and Cooper, 2005: 6).

This definition emphasizes the educational background necessary for midwives, and the responsibilities before, during and after delivery. Particularly relevant to the present study is the focus on the task “*to give the necessary support, care and advice and task in health counselling and education*”. This competence requires communicative sensitivity about which issues should be mentioned in the consultation, how and when.

As we saw in Chapter 1, the definition of advanced midwifery emphasized the complex responsibilities and knowledge of the advanced midwives. The definition from Chapter 1 continues with a focus on the advanced midwifery practice:

Advanced nursing and midwifery practice is carried out by autonomous, experienced practitioners who are competent, accountable and responsible for their own practice. They are highly experienced in clinical practice and are educated to masters degree level (or higher). The postgraduate programme must be in nursing/midwifery or an area which is highly relevant to the specialist field of practice (educational preparation must include substantial clinical modular component(s) pertaining to the relevant area of specialist practice).

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ANP/AMP [Advanced Nurse Practitioner/Advanced Midwife Practitioner] roles are developed in response to patient/client need and healthcare service requirements at local, national and international levels. ANPs/AMPs must have a vision of areas of nursing/midwifery practice that can be developed beyond the current scope of nursing/midwifery practice and a commitment to the development of these areas (The National Council for the Professional Development of Nursing and Midwifery, 2008: 5).

From the definition above, we see that the knowledge and practice of the advanced midwives is complex. Obstetric ultrasound is an additional competence that enhances their expertise. The interactional expertise (Sarangi 2010) required for midwives dealing with ultrasound is complex with regard to communicative sensitivity before, during and after the medical examination. In addition to supporting, caring and advising, they are counselling and educating during regular antenatal consultations, and they have to engage in information giving in relation to specialized tests.

2.10 Summary

The aim of this chapter was to provide an introduction to obstetric ultrasound as an expert system that is commonly applied in pregnancy care. The purpose of using the expert system of obstetric ultrasound is to examine the fetal and maternal condition during pregnancy (Section 2.2) with regard to normality and risk. However, the notions of normality and risk are not necessarily perceived equally by the healthcare professional and the pregnant women, and in Section 2.3, I discussed selected aspects concerning the notions of normality and risk in relation to obstetric ultrasound.

In Section 2.4, the different applications of obstetric ultrasound were presented.

The levels of expertise required for conducting an ultrasound examination range from basic to highly specialized. In Section 2.5, I offered an outline of the different levels of expertise.

In Section 2.6, I elaborated on the kinds of practice knowledge. The knowledge required for obstetric ultrasound literates consists of, on the one hand, propositional knowledge

derived from theory, research and text-books, and on the other hand, procedural knowledge – the practical hands-on bedside training with authentic patients.

The curriculum of the Educational Programme takes both procedural and propositional knowledge into consideration. The focus on practical hands-on training is as much emphasized as the theoretical issues. The main objectives of the Educational Programme were presented in Section 2.7, and I gave an introduction to the thematic emphasis of the curriculum in Section 2.8.

The educational background required for midwives was presented in Section 2.9. Especially relevant in relation to the present study was the emphasis on communicative sensitivity, since pregnant women may be considered vulnerable before, during and after delivery.

Based on the discussions in this chapter, I claim that communication and information giving is becoming increasingly important in pregnancy care, since the obstetric ultrasound technology makes it possible for pregnancy care professionals to reveal more facts about the condition of the fetus. In order to ensure the quality of communication and information giving to pregnant women during and after obstetric ultrasound, we need an understanding of what actually happens in the obstetric ultrasound encounters. This understanding becomes the focus of the analytic chapters. In Chapter 3, which follows, I approach the topic of professional expertise surrounding the obstetric ultrasound encounter from a discourse perspective.

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3 A discourse approach to professional expertise

3.1 Introduction

In the previous chapter I discussed the professional expertise of healthcare personnel working with obstetric ultrasound, focusing particularly on the education of the advanced midwives. In this chapter I discuss the socialization and discursive processes of becoming a professional expert, and suggest that the notion of activity type and the associated framework of activity analysis is a fruitful discourse analytic approach for examining professionals' communicative expertise in specific settings, including that of advanced midwives' encounter with pregnant women in the ultrasound clinic.

The first part of this chapter (Section 3.2) offers a discussion about socialization into expertise, and introduces the notions of "*professional vision*" (Goodwin, 1994) and "*community of practice*" (Lave and Wenger, 1991; Wenger, 1998, 2002). The second part presents the discourse analytic approach that is selected for the present study, activity analysis (Sarangi, 2000; Sarangi, 2010). Activity analysis provides relevant analytic tools that enables one to explore both verbal and nonverbal communication in a given activity type.

Activity type (Section 3.3.) is a theoretical notion introduced by Levinson (1992) to describe both the dynamics and the constraints that underpin goal-oriented human interaction. This notion has been revitalized by Sarangi (2000) as a framework for studying language use in institutional and professional settings. Activity analysis (Section 3.4.) is a way of engaging with professional discourse settings, especially to describe structural, interactional and thematic aspects of an activity type (Sarangi, 2010). The present study draws on activity analysis to make sense of the ways in which professional expertise manifests itself in a specific activity type, i.e, the ultrasound encounter.

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The analytic themes associated with activity analysis that are addressed in this thesis and are presented in this chapter (Section 3.5.) include: frames (Section 3.5.1), participant framework (Section 3.5.2), roles and positionings (Section 3.5.3.) and discourse types (Section 3.5.4). Frame is a relational concept, which describes the relationship between the participants and the contextual resources drawn upon in the situated communication. The participant framework refers to the communicative status of the participants in the situated encounter. The roles and positionings refer to the patterns of interaction mediated by the professional and social backgrounds of the participants in an encounter.

Finally in this chapter, I discuss discourse types in institutional encounters (Section 3.6). In this study, there is a focus on discourse types such as “*online commentary*” (Heritage and Stivers, 1999; Mangione-Smith et al, 2003), “*offline commentary*” (Sarangi, 2010), and “*metacommentary*” (Robinson and Stivers, 2001; Bateson, 1972; Cazden, 1988; Tannen and Wallat, 1993). I also discuss how discourse types accompany the demonstration of visual images of the physical body in the healthcare encounter (Peräkylä, 2006; Måseide, 2007).

3.2 Socialization into professional expertise

As discussed in Chapter 2, professional expertise is shaped in a process of acquiring knowledge about the relevant objects, such as the theories, the artefacts and the bodies of expertise that are specific to that particular field. In this shaping process, the professional practitioner develops a professional vision of what is relevant or not, in that particular field. Goodwin (1994) describes professional vision as “*socially organized ways of seeing and understanding events that are answerable to the distinctive interests of a particular social group*” (Goodwin, 1994: 606), and observes that the professional activity and the professional vision of practitioners are “*perspectival, lodged within special social entities, and unevenly allocated*” (Goodwin, 1994: 627). In other words, different professionals view the same matter with different eyes, in relation to their professional focus and priorities, and they communicate about the particular object of study in terms of their specific professional vision. In our case studies in the data analytic chapters, it will be

interesting to see how the three advanced midwives display differential expertise during ultrasound mediated clinic encounters with pregnant women.

Professional expertise is developed by people with common interests in “*communities of practice*” (Lave and Wenger 1991:101; Wenger, 1998). According to Wenger et al., communities of practice are “*groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis*” (2002: 4). Communities of practice are everywhere, and are integral to our daily lives. The important elements for the existence of a community of practice are a “*domain*”, “*a community*” and “*a practice*”, which means that there has to be a particular subject of interest that participants actively want to practice or discuss. Communities of practice are created in lay or professional contexts, where people come together with specific interests or goals in common. In the professional setting, communities of practice consist of practitioners who have common interests and expertise (Wenger, McDermott and Snyder, 2002) and who share common discursive interests within the field.

Wenger, McDermott and Snyder (2002) point out that our relations to communities of practice have to do with the extent of our involvement in the community of practice. We develop our identities in relation to the communities of practice with which we identify, as well as the communities of practice with which we do *not* identify. Wenger distinguishes between participation and non-participation. A person may have a peripheral connection to the community of practice, and this is a good point of departure for learning. Communities of practice have expert members, who are owners of the knowledge necessary for becoming an accepted member of a given community of practice, and novice members, who have not yet acquired the necessary knowledge. Along the continuum between experts and novices we can, according to Dreyfus and Dreyfus (1986), find five stages in the development of expertise: “*novice, advanced beginner, competent, proficient, and expert*”. Dreyfus and Dreyfus’s distinction has been influential for the understanding of professional expertise in many disciplines.

3.3 Activity type

Professional communities of practice, that is professional practitioners with common discursive interests, are embedded in institutional encounters. Institutional encounters can be categorized as activity types, each with their prototypical characteristics.

Levinson describes an activity type as:

a fuzzy category whose focal members are goal-defined, socially constituted, bounded events with constraints on participants, settings and so on, but above all on the kind of allowable contributions (Levinson, 1992: 69).

An activity type can be considered an abstract situation definition, and involves particular elements that characterize the activity type in question. Participants in communities of practice (Lave and Wenger 1991:101; Wenger, 1998) conduct their practice within the frame of a recognizable activity type. Within an activity type, norms, rules and patterns influence the interaction between the participants. I consider the ultrasound encounter as an activity type because of the professional tasks and procedures that force certain affordances and constraints on the activity. The obstetric ultrasound encounter involves an ultrasound machine, a healthcare professional with expertise in applying the machine, and a pregnant woman. The participants adapt to the rules and patterns of that particular activity type.

Levinson's (1992) notion of activity type is based on Wittgenstein's notion of a "*language game*" (Sarangi, 2004). In a game, for example chess, there are particular rules and there are reasons for making the different moves, although they usually vary in each game. Wittgenstein proposes that this is also true of language games. There are semantic rules, with different functions. The reason why we recognize one language game from another is that there is a family resemblance between one social event and another (Wittgenstein, 1953). As Linell (2001) explains:

One crucial point [for Wittgenstein] was that linguistic actions are, by their very nature, embedded in more comprehensive wholes. Accordingly, an important argument for the concept of Activity Type, or language game, is that elementary utterances, communicative acts, cannot be fully understood without reference to this overarching concept (Linell 2001: 236).

Linguistic expressions and actions are understood in relation to the contextual framework in which they are located. In other words, we understand utterances in terms of the activity type in which they occur. However, as Wittgenstein (1953) also pointed out, the familiarity of a language game does not mean that the exchange of utterances includes a mutual understanding of the subject matter. There may still be misunderstandings in communication.

Sarangi (2000) revitalizes the theoretical concept of activity type and proposes a robust analytical framework for studying language use in institutional and professional settings (for example health and social care, job interviews, committee meetings, and court hearings). Sarangi argues that:

The notion of activity type appeals for various reasons; it takes into account cognitive, historical and genealogical dimensions, as it links these to interactional patterns and structural configurations. Unlike behaviourist and cognitive models which focus on the individual performance and mental scripts, activity type analysis removes the burden from the individual. However, agency (or “improvisation”, to use Erickson and Schulz’s (1984) term) is very much a part of Levinson’s own definition of activity type as being fuzzy. (Sarangi, 2000: 6).

A participant routinely relates to the explicit and implicit norms that govern an activity type and adapts to what are regarded as relevant contributions. It can be said that different activity types have certain prototypical characteristics that enable us to recognize an interaction as an example of a particular activity type, but there are still variations within the activity type; this allows participants to improvise. Analysing the activity type implies, on the one hand, studying stable patterns of activity, and on the other hand it entails studying social change within the institutionalized setting.

Against the backdrop of a prototype theory, Levinson moves away from an either/or categorisation, towards a categorisation of entities based on more/less along a continuum. For instance, not all legal proceedings or medical consultations are conducted in exactly the same way, but there is a prototypical form from which other versions can deviate, but not without activity-specific inferences/implicatures attached to such deviations. A notion of normality is thus presupposed in activity-specific behaviour, but this does not amount to fixedness

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and rigidity. Deviations from the focal points only make us rethink the potential boundaries and crossings between activity types (Sarangi, 2000: 7).

The prototypical form is a feature that enables us to recognize an activity type, examples of which include the service encounter, the university seminar and the ultrasound encounter. However, the same activity type has several different manifestations which do not proceed identically at all times. We will see instances of this variance in the ultrasound encounters discussed in the analytic chapters of this thesis.

3.4 Activity analysis

Activity analysis is one of several perspectives within the broad notion of discourse analysis (Sarangi, 2000, 2010). Activity analysis, combined with notions from theme oriented discourse analysis (Roberts and Sarangi, 2005), is the discourse analytic approach that inspires and informs this study.

Activity analysis enables us to reveal the stable patterns, while also identifying the dynamic components in complex communication situations. According to Sarangi (2010: 178): “*Activity analysis pays attention to the flexible nature of the relationship between form and content of a given encounter.*” Activity analysis offers tools with which to look at social interaction on different levels, whether on a micro or a relatively macro scale. Sarangi (2010b: 180) suggests several analytic features that constitute activity analysis:

- Mapping of entire encounters at structural, interactional and thematic levels
- Communicative flexibility in terms of activity types and discourse/interaction types
- Intergration of discorsal and rethorical devices
- Goffman`s notions of frame, footing and face work
- Gumperz`s notions of contextualization cues and conversational inference
- Alignment: sequential and normative
- Social and discourse role-relations

- Thich participation and thick description
(Sarangi, 2010b: 180)

Within this framework of activity analysis, a theme-oriented perspective is appropriate for studying communication in professional and institutional settings. Roberts and Sarangi (2005) explain that “*theme-oriented*” concerns both the analytic themes, such as frames and face work, and the focal themes, such as autonomy and risk. The analytic themes relevant dealt with in the analytic chapters are frame, participant structure, roles and positionings and discourse types. The focal themes relevant in the analytic chapters are normality, risk, worry and reassurance. A theme-orientation enables us as analysts to critically and systematically study the professional practices.

Moreover, Sarangi draws on the concept of thick description proposed by Geertz (Geertz, 1973:5-6, 9-10; Sarangi, 2005b), and argues that activity analysis should involve a thick description. In order to be able to generate a thick description of professional discourse, the analyst should seek to have thick participation in the professional domain, as was the case for this study. As Sarangi puts it:

“Thick description” can only be premised upon “thick participation”, and the notion of participation has to be taken broadly to include continuity of involvement and relationships with participants in temporal and spatial terms. Long term immersion in the research setting becomes a necessary condition, which is very synonymous with learning a foreign or second language in a bilingual or multilingual community for purposes of survival (Sarangi, 2005b:2).

A systematic way of compiling a thick description is by demonstrating the most prominent structural, interactional and thematic features of the encounter. In chapter 5, I deal with the structural, interactional and thematic mapping of the ultrasound encounters in this study. First, a structural analysis is undertaken to identify the distinct phases of the encounter. Secondly, an interactional analysis is done through a mapping of, for example, volume and distribution of talk, categorized retrospectively, depending on what emerges during the encounters. Thirdly, the thematic mapping identifies the recurrent focal themes in the encounters. Sarangi (2010) suggests that examples of focal themes in a medical discourse might include normality, responsibility, autonomy,

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choice, decision making, patient-centeredness, professional neutrality, symptoms presentation, delivery of diagnosis, voice of medicine, voice of life world, quality of life, coping, risk, reassurance, etc. The focal themes that are dealt with in the analytic chapters are: normality, risk, worry and reassurance.

3.5 Analytic themes in activity analysis

In this section, we look more closely at the notions associated with activity analysis that are specifically relevant to this project. The themes I draw upon in my analytic chapters include: frames, participant structure, roles and positioning and discourse types. These notions are described below.

3.5.1 Frames

The analytic concept “*frame*” has been described in various ways by various scholars across the disciplines². Frame is a relational concept, and refers to the dynamic relationship between human beings and the contextual resources that we draw upon in situated interaction. Human beings produce a human environment together, in interplay between socio-cultural and psychological issues. “*Man's specific humanity and his sociality are inextricably intertwined. Homo sapiens is always, and in the same measure, homo socius*” (Berger and Luckman, 1966: 69). The social context is an integrated part of the cognition, and we develop as human beings in interaction with other people. Different frames may be actualized in a given interaction, premised on social meaning-making between individuals. On the one hand, framing can be understood globally, referring to overall contextual aspects that define the situation or the activity. On the other hand, frames may be understood as knowledge schemas. The expectations and norms, including rights to speak and the rights to introduce topics in the situation, are implicit in the frame.

The meaning of language is interpreted in light of context. Language and context represent a whole, and it is not possible to interpret the meaning, unless it is related to the contextual relationship. This understanding of the notion of context is central in

² For a comprehensive discussion about the notion frame, see Deborah Tannen (1993:14-21).

dialogic perspectives on language and communication. However, as Duranti and Goodwin (1992: 2) note, the notion of context is difficult to define, and different perspectives would define context differently. One way of defining context is as a frame, or frames, that surround the focal, situated event (Goffman, 1974; Duranti and Goodwin, 1992).

In his *Essay on the Organization of Experience*, Goffman (1974: 21) described primary frameworks as being the schemata of interpretation of the individual. Primary frameworks are the experiences and knowledge that we draw upon to make things meaningful and understandable in the situation. The primary frameworks comprise the background knowledge of the individual. This knowledge may be organized as a set of rules and norms, or it may simply consist of intuitive perspectives or approaches. The primary framework refers to our expectations about the world, about people and about events prior to the situated interaction. When approaching a situation, we have certain preconceptions about what we can expect, based on our previous experiences and knowledge. These preconceptions are on both a theoretical level (declarative or propositional knowledge) and a practical level (procedural knowledge) (See Section 2.6). Our preconceptions influence the way in which we perceive and interpret the situation.

According to Goffman, different frames are drawn upon in the situated encounter:

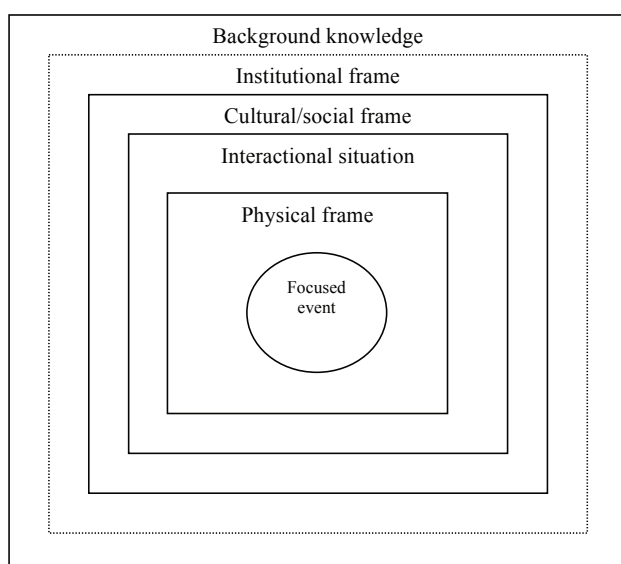
...these frameworks are not merely a matter of mind but correspond in some sense to the way in which an aspect of the activity itself is organized - especially activity directly involving social agents. Organizational premises are involved, and these are something cognition somehow arrives at, not something cognition creates or generates. Given their understanding of what it is that is going on, individuals fit their actions to this understanding and ordinarily find that the ongoing world supports this fitting. These organizational premises - sustained both in the mind and in activity - I call the frame of the activity (Goffman, 1974: 247).

Goffman proposes a frame structure consisting of different layers on a social and cultural level. There are, metaphorically speaking, different frames relevant to the situated activity. These framings of cultural and social issues, or institutional and

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professional issues, are actualized in one way or the other during the interaction in the situated encounter. In addition, the physical framework of the encounter (for example, the doctor's office) and the expert system applied in the interaction together create a layer of the frame structure that is to some extent relevant for the interaction. All these layers of frames, being either formal or informal, may be actualized during the situated interaction.

Vagle et al. have illustrated the metaphorical layers of frames described by Goffman (Vagle, Sandvik and Svennevig, 1993: 27)³:



Model I Metaphorical layers of Goffmans frames

The model is interesting because it illustrates the different layers of frames that potentially may have an impact on the situated talk. Goffman (1974) referred to “multiple frames” as a way of describing how an activity may be actualized within different frames at the same time: from the situated activity in a physical frame, in a particular situation of interaction, within a cultural or social frame and/or an

³ Translated from Norwegian to English by Heidi Gilstad (2011)

institutional frame that was associated with the background knowledge of the participants.

Using Goffman's notion of frame as a point of reference, Duranti and Goodwin (1992) suggest that there are four dimensions of context: "*the setting*", "*the behavioural environment*", "*the language as context*" and "*the extra-situational context*".

The setting is the social and the spatial framework within which encounters are situated. The setting of the ultrasound encounters described in this project consists of the physical room they are situated in, as well as the people and technologies that are co-present. The participants relate to each other and their surroundings with what Hanks (1992) refers to as a "*deictic system*". They use deictic expressions in conversation to refer to features in the context. Examples include "here" and "there". The change of personal pronoun, and consequently the change of addressee of the talk, is also a deictic reference. According to Hanks: "*the referents of deictic expressions are constantly shifting as the relationship between the utterance and the context changes*" (1992: 43).

Behavioural environment concerns the way in which the participants use their bodies and behaviour as a resource for framing and organizing their talk (Kendon, 1992). In the ultrasound encounters, the advanced midwives (and the pregnant women) orient to the pregnant body of the woman, and refer to it during the interaction.

Language as context is the way in which talk both invokes and provides context. In the ultrasound encounters, the participants may, for example, talk about premises in the context that influence the interaction, such as the competence of the midwives. The production of talk is shaped by context, but it also renews context (Basso, 1992; Gaik, 1992). An instance of this is the contextualization cue (Gumperz, 1982), a signal in the utterances referring to contextual aspects, for example when a healthcare professional explains that she is not allowed to conduct a particular procedure.

The categorization of context by Duranti and Goodwin (1992) resembles the categorization of frames by Goffman (1974), especially in the distinction between

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physical and abstract aspects influencing the talk. However, Duranti and Goodwin take this concept further, and emphasize that talk is not merely conditioned and limited by context. Instead, the production of talk is renewing the context. The context is not a static entity, but is constantly evolving, depending on the contributions and interpretations made by the participants.

The extra-situational context includes the background knowledge that extends beyond the local talk and its immediate setting (Cicourel, 1992). In the ultrasound encounter, the participants refer to institutional rules and regulations, or other socio-culturally derived issues.

Influenced by Goffman's notion of frame (1974), Tannen and Wallat (1993) developed a model for the analysis of interactive frames and schemas in healthcare interactions. They focused on the paediatric examination/interview, and introduced the term "*interactive frames*". They showed how the participants in the clinic had different understandings, values and principles. In the interaction, the participants had to reconsider and re-establish their values and maybe even the knowledge of the phenomena. In another study, Tannen (1993: 61) explained frames and schemas in relation to each other as an interaction of each individual participant's set of frames and schemas. She suggested that a mismatch between frames and knowledge schemas might trigger conflicts or misunderstandings between the participants in interaction.

Footing has to do with how the roles and relationships between the participants change during interaction. In his S-P-E-A-K-I-N-G-model⁴, Dell Hymes (1974) distinguishes between different kinds of participants, such as sender, speaker and addressor versus receiver, hearer and addressee. This understanding of participant structure was expanded by Goffman (1981: 124-157) through his notion of "*footing*". Footing describes how participants frame events, at the same time as they negotiate the

⁴ The SPEAKING model aimed to facilitate the analysis of components in verbal interaction. S-P-E-A-K-I-N-G is an acronym for Setting and Scene, Participants, Ends, Act sequence, Key, Instrumentalities, Norms, Genre (Dell Hymes, 1974)

interpersonal relationships and align with other participants in the situation. Goffman summarizes footing as:

1. Participant's alignment, or set, or stance, or posture, or projected self is somehow at issue.
2. The projection can be held across a strip of behaviour that is less long than a grammatical sentence, or longer, so sentence grammar won't help us all that much, although it seems clear that a cognitive unit of some kind is involved, minimally, perhaps, a "phonemic clause". Prosodic, not syntactic, segments are implied.
3. A continuum must be considered, from gross changes in stance to the most subtle shifts in tone that can be perceived.
4. For speakers, code switching is usually involved, and if not this then at least the sound markers that linguists study: pitch, volume, rhythm, stress, tonal quality.
5. The bracketing of a "higher level" phase or episode of interaction is commonly involved, the new footing having a liminal role, serving as a buffer between two more substantially sustained episodes (Goffman, 1981: 128).

Footing changes as the conversation proceeds, when the participants provide each other with different "*projections of self*". A change in self-projection can be signalled through contextualisation cues such as "*pitch, volume, rhythm, stress and other paralinguistic, lexical and syntactic cues*" (Goffman, 1981:128). The "*alignment*" involves both the exchange of turns in a turn-taking system, and the mutual understanding of the thematic focus of the participants (Sarangi, 2009:16; Stokes and Hewitt, 1976). According to Roberts and Sarangi (2005), footings concern the participants' attitudes towards their own and the other participants' expressions and the participants themselves. The personal involvement, the familiarity of positions and with other participants has to do with moral issues such as how people deal with each other.

A concept that is related to footing is Deborah Tannen's "*involvement strategies*". Tannen (1989) emphasizes that we make an impression of involvement when we are presenting ourselves and our topics in conversations. Involvement, uttered through emotional expressions, is a premise for interpersonal communication. We apply different kinds of strategies to create patterns of emotional expression, and Tannen emphasizes primarily that we have strategies for sound and meaning. Strategies for

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sound include rhythm, patterns based on repetition and variation of phonemes, morphemes, words, collocations of words and longer sequences of discourse and figures of speech (many of which are also repetitive figures). Strategies for meaning include indirectness, ellipses, tropes, dialogue, imagery, detail and narrative (Tannen, 1989). The involvement strategies are kinds of meta-messages for how the speaker presents herself and her topic, and how the listener relates and responds.

The term footing is relevant in relation to frame because it is a way of highlighting how the relationship and the positioning between the advanced midwife, the pregnant woman and the researcher all evolve during the consultation in the particular social and cultural context. This brings us to the next analytic theme, participant framework, which deals more explicitly with the communicative status of the participants in the situated setting.

3.5.2 Participant framework and structure

Goffman (1981) used the term “*participant framework*” to describe the status of the participants (speakers, listeners) in the exchange of turns and utterances:

(...) if one starts with a particular individual in the act of speaking – a cross sectional instantaneous view – one can describe the role or function of all the several members of the encompassing social gathering from this point of reference (whether they are ratified participants of the talk or not), couching the description in the concepts that have been reviewed. The relation of any one such member to this turn can be called his “participation status” relative to it, and that of all the persons in the gathering the “participation framework” for that moment of speech. The same two terms can be employed when the point of reference is shifted from a given particular speaker to something wider: all the activity in the situation itself. (Goffman, 1981:137).

In order to identify and understand a turn, we consider the context and the situation in which the participants are acting. The participants relate to the turns in different ways; their alignments and relationships take different structural forms that consequently influence their contributions in the interaction.

Goffman (1981) referred to different “*speaker*” and “*listener*” roles. The speaker role includes the “*animator*” who talks, the “*author*” who creates the content and the “*principal*” who is responsible for what is being said. The role of the listener is differentiated as follows: the “*primary addressee*”, the “*indirect addressee*”, the “*other ratified participants*” (the audience) and the “*non-ratified audience*” (eavesdropper). Bell (1984, 1997) suggested that “*addressees*” are those who are directly addressed; ratified participants, “*auditors*” are not directly addressed, but are ratified participants, “*overhearers*” are non-ratified listeners of whom the speaker is aware, “*eavesdroppers*” are non-ratified listeners of whom the speaker is unaware, “*referees*” are non-present individuals with whom speakers attempt to identify while they are speaking to addressees. I find these labels useful in order to describe the roles of the participants in the ultrasound encounter, where the advanced midwife was in charge, the pregnant woman was supposed to be the primary addressee and the researcher the auditor. As we shall see in the interactional analysis of the switch between Zulu and English and the participant status shift, the researcher was often the primary addressee.

The participant structure has to do with the relationship between the participants in the encounter, and how they position themselves and the other participants.

Philips (1983) applied the notion of “*participant structure*” with regard to verbal interaction in the organization of classroom activities. She proposed four kinds of participant structures: large group work, small group work, pair work or individual work. The distinction between different participant structures is considered pedagogically relevant in order to evaluate the social interaction and the impact on work processes of the students. Similarly, there may be different participant structures in medical encounters, depending on the purpose of the activity type. A medical encounter with several participants (patient, family, tutors or students) has a different participant structure to that of a dyadic encounter between doctor and patient. Likewise, the presence of technology, in our case the ultrasound equipment, will influence the participant structure obtaining between the advanced midwife and the pregnant woman.

3.5.3 Roles and positionings

Linell (2009) discusses the terms roles and positioning, and claims that the term role has connotations of being static, and is not an adequate tool for describing the dynamism in the activity. Nevertheless, Linell chooses to use the term role to indicate “*patterns of positioning*”, presuming that role can be perceived with the dynamic connotations it is supposed to capture. Linell emphasizes two primary features concerning the roles in interaction: roles refer to the overall pattern in the positioning of the participants, and roles have to do with the expectations that the participants are orienting towards (Linell, 2009).

Sarangi proposes a dynamic view on role, and argues that role is a better analytical notion than for example self, identity and status at the social interactional level in institutional and professional domains (Sarangi, 2010; Sarangi 2011). Sarangi draws on Goffman who maintains that: “*it is through roles that tasks in society are allocated and arrangements made to enforce their performance*” (Goffman, 1961:77).

Roles are transferred over time; there are multiple roles available to any individual within a given activity but some of these roles can be situationally ambivalent and conflicting (Sarangi 2011b: 78).

One person may have different roles according to the situation. An example is a doctor who can be both a clinical examiner and an administrative director at the department. The same person may also have competing roles in the same situation, for example a doctor in the patient encounter, where she has to be both a therapist and a pedagog.

Merton (1968:42) suggested that the social status is organised with a role- set, where each status is associated with several roles. An example of a single status role-set is the school teacher who has a set of roles towards different persons, for example the pupils, the colleagues, the parents and the school principal. A role-set is different from multiple roles. Multiple roles refer to the different statuses that a single individual has in different institutional and private contexts, such as an employee, a mother, a wife and a member of the soccer team. The professional practice of the advanced midwives

includes the roles through which they interact with the pregnant woman and the ultrasound technology, as well as the activities that they undertake during the consultation in particular and in the course of their work at the hospital in general. The role-set of the advanced midwives is complex.

Thomas (1986) distinguished between activity roles and discourse roles. The activity roles are dependent on the activity type, and the participants define themselves or are defined in relation to the other participants (Sarangi 2011b). Examples of activity roles are a chairperson or a patient. Discourse roles have to do with participant structures, and refer to the relationship between the participants and the message (Thomas, 1995; Sarangi, 2007b). A person produces and exchanges messages and positions herself discursively. Examples of discursive roles include a journalist interviewing a rock star on a television show based on a predefined manuscript with predefined subjects to discuss, or a police officer taking notes when a person is denouncing a criminal. The message is what is in focus. The notion of role is supplemented with social role (Sarangi 2010). The social role refers to the social relations between the persons. Examples of social roles are doctor and nurse, mother and child, husband and wife (Thomas, 1995; Sarangi and Candlin, 2010).

As we shall see in the analysis, the discursive roles, such as when the midwife is communicating the results for the pregnant woman, the activity roles, such as the midwife as a medical-record-taker and the pregnant woman as a patient and the social roles are interwoven in the practice of the advanced midwives.

Discursive positioning can be seen as the communicative activity that reflects the discourse role introduced above. Olaison and Cedersund (2008) studied storylines and discursive positioning in discussions about the care provided for elderly people in Sweden. The participants in the meetings about the need for home care were the elderly people themselves, their close relatives and their care managers. The participants used different storylines to identify and confirm their positions. Olaison and Cedersund suggest positioning to be understood as:

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something that is relational, i.e, it indicates the way in which categories derived from others are constructed in response to how participants position themselves either advantageously or disadvantageously. Participants in specific situated interviews prefer to assume some positions rather than others.
(Olaison and Cedersund, 2008: 146)

Olaison and Cedersund found that the participants position themselves according to social and psychological (intrusion, complement, right) versus material (financial, health condition, choice of person carrying out service, transport, etc) storylines. One way in which the patients would position themselves might be in relation to the moral order. Moral order positioning is, for example, towards institutional rules and, simultaneously, towards maintaining their own personal characteristics. Positioning is a communicative tool in social contexts, for example healthcare encounters.

3.5.4 Discourse types

Discourse types are the constituent elements of an activity type. According to Sarangi, a discourse type is a way of characterizing the forms of talk, for example medical history taking, promotional talk, interrogation or troubles telling (Sarangi, 2000). Other examples of discourse types are question and answer sequences (cross-examination, hyper-questioning, direct and indirect questions), question-response feedback sequences, formulaic speech such as “how are you?”, “what’s up?”, “what are we doing here?”, indexical language (over, out, over here, out there), reformulation, reporting and reported speech (Sarangi, 2007b). Examining activity types in terms of discourse types or interaction types is fruitful for understanding the dynamic nature of social interaction, especially in institutional and professional settings (Sarangi, 2009:15).

As suggested, discourse types are different modes of talk, or different uses of language patterns, which may be lexical units or interactional units. A single discourse type may have very different functions, depending on the activity type. An example is the question-answer sequence in the doctor-patient encounter, which has the function of medical history taking.

In the following section, I introduce a selection of discourse types which are prevalent in communication in clinical encounters, and in institutional encounters more generally.

3.6 Discourse types in institutional encounters

The ultrasound encounters represent an activity type in which the main task of the advanced midwife is to conduct a physical examination by means of ultrasound technology. In the search for relevant literature discussing communication in ultrasound encounters, I have not succeeded in finding studies dealing with ultrasound encounters as activity types, or studies that discuss what might characterize the communication in ultrasound encounters. In this section, I therefore offer a review of literature discussing the communication of healthcare professionals in domains other than obstetric ultrasound. These studies inform us about typical discourse types deployed by the healthcare professional during the physical examination, as well as from other settings, and they inform us about relational issues that may also apply to the ultrasound encounters.

The discourse types discussed here – the online commentary, the offline commentary and the metacommentary – inform the analytic chapters. These discourse types are intricately linked with frames, participant structures and roles and positionings that have been discussed above.

I particularly focus on the following discourse types: “*online commentary*” (Heritage and Stivers, 1999; Mangione-Smith et al, 2003), “*offline commentary*” (Sarangi, 2010) and “*metacommunication*” (Robinson and Stivers, 2001; Bateson, 1972; Tannen and Wallat, 1993). The studies examined are clinical encounters in the contexts of primary care, psychiatry and paediatrics. I also refer to two articles, by Peräkylä (2006) and Måseide (2007), which examine the encounters in which clinical staff show and explain to patients’ evidence from visual images such as X-rays, and relate these findings to the discourse types mentioned above. There are no studies in the midwifery context along these lines

3.6.1 Online commentary

With regard to physical examination in the primary care setting, Heritage and Stivers (1999) distinguish between two kinds of online communication: 1) online explanations of medical procedures and 2) online commentary, which is communication behaviour during which the health professional is describing what the doctor is seeing, feeling or hearing during the medical examination of the patient (Heritage and Stivers, 1999; Mangione-Smith et al, 2003). The online commentary does not involve explicit diagnostic evaluations or pre-diagnostic commentaries. A pre-diagnostic commentary may hint at a possible diagnosis, but it is not conclusive in the way that a diagnostic evaluation given at the end of the consultation is more likely to be (Heritage and Stivers, 1999: 1502). Heritage and Stivers suggest that online commentary may be characterized by five particular features: one is that the online comments are subordinate to the main activity of the examination and *occur while* the physician is doing the physical examination or *between the successive elements* in the examination. The second feature is that the online commentary is usually a *reporting of mild or absent signs of risk*, and works as a reassurance to the patient. Heritage and Stivers note that the absence of signs of risk is often modified with *evidential formulations*, through the use of verbs such as see, feel, appear, seem, or hear, which downgrade the claims (Chafe, 1986). The third feature of online commentaries is that they are presented either as reports *of observations* or as *assessments of what is observed*. The fourth feature of online commentary is that it is usually not addressed directly to the patient, and it is usually not responded to directly by the patient. The lack of response may be due to physical limitations, or due to the use of medical tools and expert systems that require a particular expertise to enable interpretation (Heritage and Stivers, 1999).

Mangione-Smith, Stivers, Elliott, McDonald and Heritage (2003) present an *online commentary coding scheme*, which describes the principal characteristics of the online commentary:

Communication behavior	Description	Examples
Occurrence of online commentary	Comments during the physical examination - prior to an official diagnosis - about the presence or absence of signs	<p>”There’s some pus on her tonsils”</p> <p>”This ear is quite red”</p> <p>”His chest sounds clear”</p> <p>”I don’t feel any swollen glands”</p>
<i>Problem online commentary</i>		
(i) Present sign	Online comment reports a sign which can be seen/heard/felt	<p>”Her ear is draining fluid”</p> <p>”There’s inflammation there”</p>
(ii) Problematic evaluation of a present sign	Online comment that negatively assesses an exam finding	<p>”His cough sounds pretty chesty”</p> <p>”Her lungs sound awful”</p> <p>”That ear looks terrible”</p>
<i>No problem online commentary</i>		
(i) Absent sign	Online comment reports that a sign cannot be seen/heard/felt	<p>”I don’t see anything in that ear”</p> <p>”I don’t hear any crackles in her lungs”</p>
(ii) Non-problematic evaluation of a present sign	Online comment that positively assesses an exam finding	<p>”Her nose isn’t too bad”</p> <p>”This is only a little bit red”</p> <p>”Just a slight wheeze today”</p>

Table 3 Online commentary coding scheme as suggested by R. Mangione-Smith, Stivers, Elliott, McDonald and Heritage (2003: 313–320).

We see here that the communication behaviour they describe includes: “*problem online commentary*” (present sign and problematic assessment of present sign), and “*No problem online commentary*” (when there is no sign, or when the assessment of the sign is not problematic). Mangione-Smith et al. (2003) suggest that the use of no problem online commentaries during the physical examination of the patient can be an efficient

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tool, for example, for doctors who do not want to meet the parents' expectations of getting antibiotics prescribed for their children.

The value of a coding scheme, such as the one presented above, is that we can use it to make sure that the coding is not ambiguous. Moreover, it may help the analyst to organize the analytic terms, in this instance the discourse type of online commentary, in relation to its sub-categories. Online commentary is, as we have seen, the talk that describes what the healthcare professional perceives while doing the physical examination. But this is not the only kind of talk during a physical examination. There is also talk that aims at explicating the propositional aspects of a condition. In the present study, the communication of the advanced midwives in encounters is coded with a focus on online commentaries, offline commentaries and metacommentaries (see Appendix D,E,F). In the next section, I discuss the discourse type that healthcare professionals may utilize when elaborating on propositional aspects of an identified medical phenomenon during the physical examination: the offline commentary.

3.6.2 Offline commentary

Communicative manifestations in medical physical examinations may include asking questions, issuing directives, giving advice and rephrasing recommendations. In addition, healthcare professionals describe what they perceive in a more propositional way, by providing facts and knowledge to support their claims and elaborate on their suggestions. Such communicative manifestations are not included in the analysis of Heritage and Stivers (1999) nor Mangione-Smith et al. (2003). Sarangi (2010) refers to these propositional elaborations as "*offline commentaries*", "*whereby the doctor steps outside the physical examination phase and offers explanations of various kinds*" (Sarangi, 2010: 89). Sarangi provides the following examples of offline commentary: "*children usually have this*"; "*sometimes, with this kind of bronchitis in babies, because the airways are already tightening because babies are small and it swells up, we run into little problems with breathing (...)*". Both the examples are explications that elaborate on the subject with propositional or experiential knowledge. The healthcare

professional takes an educational role when offering offline commentaries during the physical examination.

Sandra Ragan (1995: 185) discussed information giving in the context of obstetrics and gynaecology, and noted that one of the expected, and often critically important, outcomes in medical interaction is patient education. Patients and caregivers consulted the health professional in order to obtain information about their condition. Ragan suggested that patient education increases the patient's satisfaction with the interaction, and that it increases the level of compliance with a prescribed medical regime. However, educating the patient can be a complex task. The health professional must maintain the dignity of the patient by not undermining their perceived competence, as that can be perceived as a loss of face for the patient. The maintenance of dignity must be balanced with adhering to the medical goals of the interaction, which may include tasks such as examining, reporting, diagnosing and prescribing.

Ragan suggested two main issues which are important for patient satisfaction that are related to patient education: first, to overcome institutional barriers and transfer results and findings in a way which is understandable to the patients, and secondly to ensure that the physical examination is accompanied by patient education to avoid the situation becoming face threatening. This observation clearly relates offline commentaries as Sarangi (2010) argues.

The communication of the results of clinical investigations must be done in a way that is understandable to the patients. While health professionals are educated to know the medical terminology and the implications of a diagnosis, the patients may know neither the terms nor the implication of the terms used during the clinical encounter. It is thus a crucial task for healthcare professionals to be able to communicate their understanding of the patient's condition in a way that the patient will understand. In addition, the healthcare professional must ensure that the physical examination is not embarrassing or face-threatening for the patient. A gynaecological examination of the pelvis may in itself be embarrassing for a woman, since the pelvis is considered an intensely private

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area of the body. Ragan suggested that the education of the patient is essential in order to avoid the situation in which a gynaecological examination is perceived by the patient to be face-threatening.

In Ragan's 1995 study, the nurse assumes a pedagogical role through asking questions, issuing directives, and giving advice. She tries to save the patient's face by providing choices, for example by phrasing recommendations as suggestions and providing non-threatening rationales to support these suggestions. Ragan suggests that humour, empathy and relational asides are all used to diminish the possibility that the gynaecological examination will be face threatening. Ragan discusses the asymmetry in the role of the healthcare professionals as educators, and the role of the patients as students; she draws on studies from the classroom settings where there is a similar asymmetry between the teacher and the pupil.

3.6.3 Metacommentary

In this section, I discuss the notions of metacommunication and metacommentary. Since I have not succeeded in finding studies from healthcare on metacommentary, it has been necessary to look into other disciplines, such as psychology and educational sciences to find relevant studies on the subject.

The notion of metacommunication is well established in the literature. Gregory Bateson (1972) suggested that human beings have a sense of metacommunicative rules. We are continuously interpreting the situations we take part in, and the rules that govern that situation. Bateson claimed that by studying the evolution of metalinguistic (for example the verbal sound and the semantics of the word cat) and/or metacommunicative rules (for example "this is play") at a prehuman and preverbal level, he could gain insight into how human beings relate to metacommunicative signals. Metacommunicative signals are similar to Gumperz' contextualization cues such as pitch, volume, rhythm, stress and other paralinguistic, lexical and syntactic cues (Goffman, 1981:128) and their function is to frame the activity. Bateson suggested that monkeys were capable of some

degree of metacommunication about what may be allowed during play and what is allowed in combat:

I saw two young monkeys playing, i.e, engaged in an interactive sequence of which the unit actions or signals were similar to but not the same as those of combat. It was evident, even to the human observer, that the sequence as a whole was not combat, and evident to the human observer that to the participant monkeys this was “not combat.” Now, this phenomenon, play, could only occur if the participant organisms were capable of some degree of meta-communication, i.e, of exchanging signals which would carry the message “this is play” (Bateson 1972: 179).

Human beings use non-verbal and verbal language to provide metacommunicative signals. For example may the same discourse type have differential functions in the activity type, but metacommunicative cues or contextualisation cues, signal what the relevant interpretation of the message is according to the context.

Bateson elaborated the notion of metacommunication through his studies of psychiatric patients. To Bateson, the human mind consists of a set of psychological frames that have their particular functions and uses. Talking metaphorically about frames, Bateson suggested that one interprets the picture within the frame differently from the wallpaper behind the picture frame. The ability to include and exclude what may be relevant in a particular situation is metacommunication. On the one hand, the frame is metacommunicative, because the message that defines the frame tells the reader how to interpret it. On the other hand, every metacommunicative message is or defines a psychological frame. For example, the psychiatrist’s definition of his or her role and contribution in a therapy setting is decisive for what is allowed or is seen to be relevant contribution by the patient.⁵

⁵ The notion of frame from Bateson, and the understanding of the metacommunicative dimension, has inspired anthropologists, sociologists and linguist anthropologists, and it has also been useful in the development of artificial intelligence, cognitive psychology and linguistic semantics (Tannen and Wallat, 1993).

A discourse approach to professional expertise

Another perspective on metacommunication relevant to the present study is concerning the metacommunicative function of code-switching in relation to frames. Tannen and Wallat (1993) refer to the metacommunicative function of frames in paediatric examinations. In their examples, a doctor deals with different frames (the consultation, the examination and the video recording for research purposes) and she changes linguistic registers depending on which audience she is addressing. For example, when addressing a child who is being examined she uses paralinguistic cues of teasing, thereby signalling the metacommunicative function of the utterance. This resembles the code-switching in the ultrasound encounters of the present study where the advanced midwives switched between the different frames through code-switching, both in terms of language-switch and switch of nomenclature. The code-switching had a metacommunicative function.

Non-verbal communication also includes metacommunicative dimensions. Christian Heath (1986) studied non-verbal health communication, focusing on body movements, gaze, and the orientations of the participants towards each other and towards the technical equipment that may be being used. Through gaze and body movements such as pointing and nodding, the healthcare professional may signal what is going to happen to the patient. This requires that the patient has some expectations, or frames, about the healthcare situation in which she is taking part. If the healthcare professional, for example, points to the couch, the patient is likely to understand that she is expected to lie down. The non-verbal behaviour in the healthcare context is constrained by the norms and rules that are well-known to the healthcare professional. Whether the patient is able to interpret the metacommunication in the specific context depends upon her prior experience of healthcare encounters, and it also depends upon the way in which the healthcare professional frames the activity, verbally or non-verbally.

Cazden (1988) studied classroom discourse, and suggests that backchanneling in talk, with the use of interjections such as “mm”, is a response to the prior utterance of the other participant, and that these utterances are metacommunicative because they signal how the conversation is proceeding.

These are metacommunicative utterances - they comment on the discourse itself, and in doing so they are implicitly evaluative. To backchannel another's utterances requires that one perceives oneself as entitled to make meta-linguistic comments on how well the conversation is proceeding". (Cazden, 1988: 66)

The backchannelling described by Cazden is interesting in relation to the participant framework, in which the participants also position themselves through the backchannelling.

Relevant here is Stubbs' (cited in Cazden 1988) characterisation of eight kinds of metacommunicative talk:

1. Attracting or showing attention (example: Yeah, well come on now, you guys)
2. Controlling the amount of speech (example: Anything else you can say about it?)
3. Checking and confirming understanding (Do you understand, Stevie?)
4. Summarizing (Example: Well, what I am trying to say is...)
5. Defining (Example: Well, Brenda, does that mean anything to you?)
6. Editing (Example: That's getting nearer it)
7. Correcting (Example: (When the student has said that the meaning of *paramount* is "important") Yes, more than that, all-important.)
8. Specifying topic (Example: Now, we are talking about structures and all that) (Stubbs cited in Cazden 1988: 160-161)

Cazden noted that classroom talk is marked by asymmetry. The phrases quoted above are all utterances by the teacher, and students would rarely talk like this. The attempt to classify teachers' talk into metacommunicative categories is relevant for my present study. I will also classify the midwives' talk into metacommunicative categories.

Finally, Cazden (1988) refers to metacommunicative connectors in communication which allow us to refer to issues discussed previously, returning to a theme that the conversation has shifted away from. Examples of these metacommunicative connectors include: "*By the way...*", "*Speaking of....*" Or even "*I want to go back to what X was saying five minutes ago....*". According to Cazden, children do not use these kinds of connectors. However, these connectors are not uncommon in healthcare encounters.

A discourse approach to professional expertise

According to Robinson and Stivers (2001), clinicians are trained to preface and describe examinations verbally in order to inform patients about what is happening next and to reduce patients' uncertainty. Such preparatory commentaries are described in the literature as "*orientation about the flow of the visit (e.g. "First I will examine you and then you will have some tests")*" (Levinson, Roter, Mullooly, Dull, & Frankel, 1997: 555). These comments are different from the online commentaries described by Heritage and Stivers above (1999). While the online commentaries refer to what the healthcare professionals are seeing, feeling or hearing, the metacommentaries refer to what is happening, what is going to happen (prospective commentary) and what had happened (retrospective commentary). Metacommunication is an important communicative tool in healthcare encounters, enabling the speaker to step out of the here-and now-activity, and to comment upon what she is doing and saying. Examples of metacommunication in the dataset of this study are: "*Now, I am going to examine the heart*", which is a commentary referring to prospective action, or: "*we have looked at the heart*", which is a reference to retrospective action. In the analytic chapters, I refer to metacommunication in the obstetric ultrasound encounters as metacommentary, and distinguish between prospective metacommentary and retrospective metacommentary.

3.6.4 Visual images and discourse types

Online, offline and metacommentaries are triggered by the visual images that are generated in medical encounters. Måseide (2007) maintains that a substantial part of clinical activity is not conducted in direct relation to the patients and their bodies, but in relation to signs, marks and representations. Måseide refers to X-rays, supported by MR film and CT images, as examples of representations in medical problem solving. X-ray images represent patients and their health problems, and the doctor assesses the images. When discussing X-rays, healthcare professionals (usually doctors and radiologists) communicate by means of a mixture of pointing, using medical terminology and ordinary language, foregrounding what should be seen and leaving out what should be ignored on the X-ray. The purpose of the presenting and explaining in detail what is visible (and not) on the X-rays, in presentations to other healthcare professionals or to patients, is to establish a shared medical vision of the X-ray. The activity where several

participants orient simultaneously towards a visual image can be described as joint seeing. The visual images work as evidence in the assessment process of the condition of the patient. During the X-ray discussion observed by Måseide, the participants use a pen to point at the images, and they may accompany the pointing with comments such as “*Yes, well, first we look at the coronary side*”, “*you can see it there*” and “*we can see that it gives a bit of an impression in vena cava superior*”. These are all online commentaries as described by Heritage and Stivers (1999), inviting the other participants to look at a particular image. The visual images derived from the medical technology afford invitations to look at the representation of the patient’s body, and the discussion enables joint seeing. This is a salient feature of ultrasound encounters, as we shall see in the analytic chapters.

Peräkylä (2006) argues that physicians must be accountable, and provide some kind of explanations for the diagnosis that they provide, although the patient may not understand the explanations or the evidence provided. An example of such evidence is when a doctor holds up an X-ray image, and says in a straight assertion: “*Here’s (.) luckily the bone quite intact*” (Peräkylä, 1998). This is an online commentary with an assessment which refers to the evidence on the visual image. Peräkylä calls the relationship between the evidence and the conclusion the inferential distance between the two. In the case of the X-ray and the conclusion, the inferential distance is short.

According to Peräkylä, the evidentials are used when the inferential distance between the evidence and the conclusion is longer, for example when there is a temporal separation, i.e. a time gap between the physical examination and the diagnostic conclusion. As we shall see in the case of obstetric ultrasound encounters, the demonstration on the visual images is a way of showing evidence of the condition of the fetus and is given immediately to the pregnant woman, accompanied by the discourse types of online commentary, offline commentary and metacommentary.

3.7 Summary

The main purpose of this chapter was to introduce the discourse approach that is drawn upon in the data analysis section of this thesis, activity analysis, and to discuss what this approach may contribute in a study of the ways in which professional expertise is manifest in a clinical encounter.

The process of becoming an expert healthcare professional is a process of socialization into a professional discourse and a community of practice in which communication is crucial. Healthcare professionals communicate with tutors and colleagues on different levels, and just as importantly, they communicate with their patients. In healthcare settings, professional expertise is displayed through language, but also through the application of clinical tools for diagnosis and intervention, and through nonverbal interaction during the consultation. In order to grasp how the expertise of the healthcare professionals is accomplished in the clinical encounters, we must examine what they are saying and what they are doing while practising their professional roles. A discourse approach can usefully inform the study of professional expertise, because human actions and practices are constituted in discourse.

Early in this chapter, I discussed how becoming an expert is a social process that takes place within communities of practice (Section 3.2), often consisting of participation in specific activity types. Further, I showed how institutional encounters may be categorized into different activity types (Section 3.3). Each activity type has its own prototypical characteristics, and entails certain constraints on the participants. An ultrasound encounter is an example of an activity type. Through an activity analysis of the ultrasound encounter, it is possible to reveal interactional patterns and structural configurations (Section 3.4). It is also possible to study the communication dynamics of the participants within the framework of this particular activity type.

The chapter concluded with a focus on discourse types including online commentary, offline commentary, metacommentary, as well as the use of visual images in the

healthcare encounters (Section 3.5). This discussion provides a background for the analytic focus of analytic chapters.

4 Methods and materials

4.1 Introduction

In the previous chapter, I introduced the theoretical notion of activity type, and explained why activity analysis was selected as the preferred discourse analytic approach for the present study. In order to conduct an activity analysis, we need interactional data, for example video-recodrings that enable us to capture the verbal and non-verbal activity during the encounter. The purpose of this chapter is to present the data that are examined in this study.

The primary material of this study is interactional data that comprises video-recorded ultrasound encounters between pregnant women, advanced midwives and the researcher during site visits at three local hospitals in KwaZulu-Natal in South Africa in 2006.

Section 4.2 is an introduction to the methods of data collection; including the recruitments of informants (Section 4.2.1), the presentation of the informants, respectively the advanced midwives (Section 4.2.2) and the pregnant women (Section 4.2.3). The consultations are described with regard to reasons for, duration of and conclusions from the ultrasound encounters in Section 4.2.4. Section 4.2.5 offers a description of the ultrasound room and the available equipment. Informed consent was obtained from all the informants (Section 4.2.6).

In Section 4.3, the data material that offers supporting information about the informants and the context is introduced. This data is referred to as the secondary material and it is occasionally referred to in the study. The secondary material consists of interviews and questionnaires, logs (Section 4.3.1) and assessments from the Educational Programme (Section 4.3.2). In Section 4.3.3 I specifically discuss the assessmets of the clinical skills of the three main informants of the study, Nobuntu, Nonkululeko and Nivedita.

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The strengths and weaknesses of the data corpus is discussed in Section 4.4. In Section 4.5, the role of the researcher is in focus, and the paradoxes of the participating researcher are discussed in Section 4.5.1.

The data preparation in this project is discussed in Section 4.6. with a particular focus on the work with the video and audio recordings (Section 4.6.1). The transcription system is introduced in Section 4.6.2. Section 4.7. is the chapter summary.

4.2 Methods of data collection

In 2006, the leader of the Norwegian project team, Professor Sturla Eik-Nes; the midwife responsible for the Educational Programme, Eva Tegnander; the Chief Sonographer, Premla Moodley, and I all took part in visits to three of the midwives who had participated in the Educational Programme in 2004, at their local hospitals in KwaZulu-Natal. I made video and audio recordings of 12 ultrasound consultations, and interviewed each of the midwives after the consultations. The following sections of this chapter describe the informants and the consultations that constitute the primary data of the study. The names of the hospitals, the advanced midwives and the pregnant women who were observed for the purposes of this thesis are all anonymized for ethical reasons. For convenience, the midwives are called Nobuntu (case 1, hospital 1), Nonkululeko (case 2, hospital 2) and Nivedita (case 3, hospital 3).

4.2.1 The recruitment of the informants

The three advanced midwives were chosen as informants because they were the only participants from the 2004 training course who, two years later, performed ultrasound examinations on a daily basis. The other students from 2004 did not regularly use ultrasound, often because they did not have access to ultrasound equipment at their workplace.

The recruitment of the pregnant women as informants was made randomly at each hospital. All three hospitals had a queuing system for women waiting to be scanned. The first woman in line at the time the researcher was ready to begin the video

recording was asked to participate in the project and gave her informed consent (See Appendix C).

4.2.2 The advanced midwives

The advanced midwives were aware that they were being evaluated as participants in the Educational Programme in 2004. I was part of the team which organized the programme, and was associated with it as a researcher, though I was not directly involved in the administration, lecturing and practical training. The advanced midwives had all met me in 2004, and they had all agreed to fill in the questionnaires, to write logs, and to be video-recorded during an interview with me. During the site visit in 2006, the three advanced midwives were informed that the researcher wanted to observe the communication in the consultation, and they consented to the video recordings of the consultations. However, they did not know in detail what I, the researcher, actually wanted to appraise⁶.

All three of the advanced midwives who are the main informants in this study were experienced in the provision of antenatal care in rural South Africa.

Nobuntu, at hospital 1, was 47 years old and had worked for 10 years as a midwife and three years as an advanced midwife. She had already been working with ultrasound equipment for a year before the course, but at that stage she had no formal training in ultrasound. She had been taught by one of the doctors on how to detect the fetal heart as well as how to measure the femur length and the bi-parietal diameter (BPD) (Interview, *Nobuntu*, 2004). She worked in a hospital department where there were no sonographers. She explained that she was motivated to take the course in ultrasound technology because she spent considerable time waiting for doctors when there was a patient who needed an ultrasound scan. There were four doctors at the hospital, but the

⁶ At the end of the course, the competences of the advanced midwives were evaluated and they received their diplomas. They were informed that this doctoral study would have no impact on the formal assessment of their competence.

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researcher does not know their level of ultrasound competence. Nobuntu carried out the ultrasound examinations behind a curtain in the maternity ward. All the women in the encounters with Nobuntu were Zulu-speaking, and did not understand or speak English. She took her time with the examinations. Several women were waiting to have an ultrasound examination.

Nonkululeko, at hospital 2, was 51 years old, and had worked as a midwife for 12 years and as a registered nurse since 1983. She had been working with ultrasound for 11 years before the Educational Programme started, but the only formal training she had was in the form of a practical introductory course, without theory, for two weeks. It was the daily challenges of ultrasound use that had prompted her to enrol for the Educational Programme. She felt it was important to learn more about the use of ultrasound in order to diagnose pregnancy and multiple pregnancies, to locate the placenta, and to assess the amount of fluid and other abnormal conditions such as hydrocephalus (Interview Nonkululeko, 2004). She had one colleague with basic competence in ultrasound. The hospital where she worked was a referral hospital to which patients with conditions such as hypertension, twin pregnancies, and preterm labour were referred. There was a theatre for performing caesarean section, a postnatal ward, a nursery and an antenatal unit in her department. The ultrasound room was a separate room in the department, with a door. The room was set up as a consequence of Nonkululeko's participation in the Educational Programme. All the women in the encounters with Nonkululeko were Zulu. She was efficient in her work, and tried to speed the queue of pregnant women who were sitting outside the door, waiting to be called in for an ultrasound.

Nivedita, at hospital 3, was 40 years old and had worked for 20 years as a midwife. Nivedita was of Indian origin, and worked in a public hospital in the Greater Durban metropolitan area. She had not worked with ultrasound before she attended the Educational Programme; she only had an introduction to the uses of ultrasound three years previously. She was prompted to join the Educational Programme because of the unmet need in her unit for the skills to confirm diagnosis (Interview Nivedita, 2004) She worked in a district hospital, in an obstetric unit run by midwives, with only occasional visits from an obstetrician. Nivedita did not have any colleagues with competence in

ultrasound. Many of the pregnant women attending this hospital had already been to a general practitioner (GP) to scan the fetus before they came to the hospital. According to Nivedita, these GPs had only basic training and used ultrasound simply to exclude twin pregnancies and to identify the location of the placenta. All but one of the pregnant women in the encounters with Nivedita were of Indian origin. The other woman was African. The ultrasound encounter took place in a corner of a patient room, only separated by curtains from the other ongoing activities in the location.

4.2.3 The pregnant women

The pregnant women in *hospital 1* had a limited educational background. Two out of three were illiterate. They did not understand much English. Pregnant woman 1, *Lindiwe*, was literate; she could write her name on the informed consent form, and understood some English in addition to her native language, Zulu. Pregnant woman 2, *Mthunzi*, was illiterate; she signed the informed consent form with fingerprint. Her native language was Zulu, and she did not speak or understand English. Pregnant woman 3, *Jabulile*, was illiterate; she signed the informed consent with fingerprint. Her native language was Zulu, and she did not speak or understand English (Video recordings, KZN, 2006).

Nobuntu explained that most of the patients came from rural areas and that they still needed to be motivated to use their health facilities. They had been encouraged to book for and to attend the antenatal clinics. In general, in her conversations with the pregnant women, Nobuntu emphasized the women's right to information about the services provided at the hospital (Questionnaire, Durban, 2004).

At *hospital 2*, the educational level of the pregnant women was higher. The women could write their names on the consent form, and they all understood English, although they primarily communicated with the advanced midwife in their native language, Zulu. Pregnant woman 1, *Sibahle*, was a teenager who could speak and understand English. Pregnant woman 2, *Mbali*, spoke in Zulu. Pregnant woman 3, *Themba*, did not speak much at all. Pregnant woman 4, *Hlengiwe*, and pregnant woman 5, *Duduzile*, were both

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Zulu speaking, but were fairly quiet during the consultations (Video recordings, KZN, 2006).

Nonkululeko explained that at her hospital the typical pregnant woman would be a woman in her twenties who had been pregnant previously. Nonkululeko explained that during her conversations with the pregnant women, she took time to emphasize the importance of early booking of consultations for the pregnant women. In addition, she would talk about danger signs in pregnancy and the signs of labour (Questionnaire, Durban, 2004).

The pregnant women at hospital 3 were all literate and English speaking, several with English as their mother tongue. They all wrote their names on the informed consent form, and some asked questions about the purpose of the research project. I have called them *Salome*, *Nelisiwe*, *Dumisami* and *Amaka* (Video recordings, KZN, 2006). However, Nivedita estimated that about 35% of her patients were illiterate. In the questionnaire, Nivedita explained that the pregnant women attending this hospital were between 15 and 45 years old, generally with low socio-economic status, and there was a high incidence of illness (TB, STI, hypertension and HIV/AIDS). Nivedita believed that about four out of five of the women attending the antenatal clinic would test positive for HIV/AIDS (Questionnaire, Durban, 2004).

4.2.4 Reasons for, duration of and conclusions from the examinations

The pregnant women had a range of different reasons for presenting for the ultrasound examination (see Table 1). Some wanted information about the fetus or its measurements; others had been referred there from another antenatal clinic⁷, where a preliminary diagnosis of potential problems had been made.

The duration of the ultrasound consultations ranged between 12 and 55 minutes, depending on the midwife and the findings of the examination.

⁷ In South Africa there are different levels of acute hospitals, with different tasks and mandates. Pregnant women usually go initially to their local clinic, a primary healthcare centre or a private doctor, and they are then referred to a secondary or a tertiary hospital for an ultrasound investigation. Some patients, mostly those living locally, go directly to the referral hospital.

Advanced midwife	Pregnant woman	Reasons for examination	Conclusions after examinations (October 2006)	Duration (min:sec)
Nobuntu	Lindiwe	Felt no life of the fetus. Gravida 3.	Transverse position. Anatomy OK. Last menstrual period (LMP) 6 months. US gestation 20 weeks. Elective caesarean. Come back after 36 weeks.	43:27
Nobuntu	Mthunzi	Hypertension led to miscarriage in 4 th pregnancy. Gravida 5, Para 4.	Anatomy OK. LMP 5 months. US gestation 26 weeks.	38:15
Nobuntu	Jabulile	Referred from the clinic. Gravida 5.	Twins, both cephalic. Anatomy OK. LMP 32 weeks. US gestation 32 weeks. Wants tubal ligation after delivery.	55:20
Nonkululeko	Sibahle	Unsure about the dates. Palpation 23 weeks. Gravida 1.	Anatomy OK. US gestation 21 weeks EDD (estimated date of delivery) 26th Feb 2007.	25:00 (+ 10 min returned)
Nonkululeko	Mbali	No specified reason.	Twins; one is cephalic, the other is breech. Probably elective caesarean. Anatomy OK. US gestation 17/18 weeks. EDD 19th March 2007.	40:38
Nonkululeko	Themba	No specified reason.	Cephalic. Anatomy OK. US gestation 34 weeks.	11:58
Nonkululeko	Hlengiwe	Previous pregnancy experiences. Gravida 4.	Cephalic. Anterior placenta. EDD 28th March 2007. Estimated fetal weight is 1.85 pounds.	16:20
Nonkululeko	Duduzile	No specified reason.	Cephalic. Anatomy OK. Anterior placenta. US gestation 27 weeks.	14:52
Nivedita	Salome	Position of the fetus, worried it is breech.	Anterior placenta. Anatomy OK. Liquid OK. Cephalic. LMP 34 weeks.	32:47
Nivedita	Nelisiwe	No specified reason. Gravida 2.	Anterior placenta. Anatomy OK. Cephalic. LMP 7 months.	25:00
Nivedita	Dumisani	Position of the fetus. First baby breech. Gravida 2.	LMP 8 months / 33-34 weeks. Cephalic. Anatomy OK. Probably caesarean because of earlier caesarean.	26:33
Nivedita	Amaka	Sex of the baby, OK baby?	LMP 36 weeks. Cephalic. Anterior placenta. Anatomy OK. Tell friends to book early!	19:30

Table 4 Names, reasons, conclusions and duration of the ultrasound examinations

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The information in Table 4 was communicated during the encounters.

4.2.5 The ultrasound room and equipment

In rural *hospital 1*, the consultations took place in a cubicle in the labour ward, separated from the rest of the ward only by curtains on one side. There was no door that could be closed for privacy. There was a small window high up on the wall. Posters on the wall provided information about pregnancy and forms and tables for referral by the advanced midwife. The examination couch for the pregnant woman was in the middle of the cubicle. The ultrasound machine was situated in the corner, on the wall with the window, but away from the curtains.



Nobuntu sat next to the couch, in front of the ultrasound machine. She had the transducer in her right hand. With her left hand pointed at the monitor, she pressed the buttons on the keyboard and applied gel (*amafutha*). Nobuntu, the pregnant women and the researcher could easily have eye contact with each other, without turning their heads.

The ultrasound machine was an Aloka 1000; it was the only ultrasound machine in the hospital that worked. It was normally used by the doctors, but was transported from another department when the advanced midwife needed it. There was another ultrasound machine in the Maternity Department, but the transducer had been broken for a year, and had not been replaced due to financial constraints.

In rural *hospital 2*, the consultations took place in a room in the hospital that had a door to close for privacy. Outside the room, the pregnant women were lined up in a queue waiting to get in for an ultrasound examination.

The room had a window, a couch, an ultrasound machine, a washbasin, a table and a cupboard. The ultrasound machine stood in the middle of the room, and the examination couch was on its right, parallel with the wall.

Nonkululeko and the pregnant woman had eye contact, but Nonkululeko and the researcher did not, since the researcher was standing behind Nonkululeko. The pregnant woman and the researcher had eye contact, although the researcher was mainly looking through the viewfinder of the video camera.



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In *hospital 3*, the ultrasound examinations took place at the end of a large room with six beds, separated by curtains. There were five couches in the room, some of which were occupied by pregnant women.

Nivedita sat to the left of the couch, and had eye contact with the pregnant woman. The researcher stood at the end of the couch, and also had eye contact with the pregnant woman. Nivedita and the researcher did not have eye contact unless Nivedita turned her head towards the researcher. The machine was placed on a table with unstable legs, in a corner to the left of the couch. The table was small, and it was difficult for the advanced midwife to place the ultrasound machine in a position that made it possible for the pregnant woman to look at the monitor.



The ultrasound machine was a small portable machine, with which it was not possible to do measurements because the calibration was faulty. Although the ultrasound machine was not working properly, it was still used for imaging the maternal abdomen and the fetal structures.

The quality of the resources and the equipment available appeared to indicate differences in the perception at each hospital about the importance of the ultrasound examinations. As we shall see, the material and physical conditions, and especially the quality of the ultrasound technology, had an impact on the professional practice of the advanced midwives and on their interaction with the pregnant women.

4.2.6 Informed consent

All of the participants who participated in this project gave their informed consent. The informed consent forms were standard documents issued by the Department of Health in KwaZulu-Natal for use at the local hospitals (See Appendixes B and C).

The three midwives gave their consent to participate in the present research study, both in 2004 – before writing logs, answering the questionnaire and being interviewed – and before being observed in the course of their work at their local hospitals in 2006.

The pregnant women participating in the ultrasound encounters are not the main informants in the study, but the study would not have been possible without them. As pregnant women, they represent a vulnerable group with whom it is particularly important to interact with care and with respect, so that they will not be intimidated or offended. Some of the women were illiterate, a factor that called for particular attention with regard to obtaining informed consent. In those instances, the advanced midwife became the legally authorized representatives of the illiterate woman; in addition to obtaining the fingerprint of the pregnant woman, the advanced midwife signed the form to confirm the woman's willingness to participate in the study and to have her ultrasound encounter recorded by the researcher (see Appendix C).

4.3 The secondary material

The secondary material includes information obtained from the participants in the Educational Programme in Durban in 2004. The training provided in Durban was a one-week introductory course, with intensive theoretical lectures and hands-on practical training. Later there was a six-week course, during which two experienced Norwegian midwives, Eva Tegnander and Gerd Inger Lånke, and two South African lecturers, Premla Moodley and Logie Govender, trained the students daily in the use of ultrasound.

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The design of the Educational Programme enabled me to work with “thick description” (Geertz, 1973:5-6, 9-10) to obtain a holistic view of the experiences, needs and reflections of the participants in their socio cultural context.

A variety of research techniques were used, primarily qualitative methodological techniques such as interviews, questionnaires, logs and assessments. In the following sections, I briefly present the secondary material that is relevant for the present study. First, I present a brief summary of interviews conducted in relation to the study, I present the questionnaires answered by the advanced midwives and I summarize the content of the *logs* kept by the 13 advanced midwives in 2004. The reason for presenting the logs written by all of the members of the group is that the content of the logs gives an indication about how the advanced midwives, novices to ultrasound, perceived the Educational Programme. The shared voice of the participants reflects the concerns that they had at the end of each of the five days of lectures. Secondly, I present the *assessment* of the clinical skills of Nobuntu, Nonkululeko and Nivedita 6 months after the start of the Educational Programme. The reason for presenting the assessment of their clinical skills is that it indicates how the lecturers formally assessed the level of competence achieved by each of the advanced midwives after the course.

4.3.1 Interviews, questionnaires and logs

Interviews were conducted at several stages of this project. In a pilot study in 2002, I interviewed healthcare professionals participating in two different courses in ultrasound in obstetrics and gynaecology in Cape Town, South Africa. The interviews were informal and conversational (Patton, 2002: 342), and the theme revolved around antenatal care in South Africa. In 2004, I interviewed the 13 advanced midwives who were participants in the Educational Programme; the themes of these interviews related to the daily work of the advanced midwives, the socio-cultural context within which they worked, and their experiences during the Educational Programme. In 2006, I conducted three interviews, one with each of the advanced midwives who I observed during the ultrasound examinations. These interviews were also informal and conversational, mainly concerned about the advanced midwives’ own experience of the

actual ultrasound examinations which they had conducted while the researcher was present.

I also interviewed 10 health professionals at the hospital in Durban about their work, amongst them: the Head of Maternal Department, Professor Jack Moodley; a gynaecologist, Logie Govender; the Head of Department of Sonography, Premla Moodley, and the Head of the Polyclinic. The material from these interviews provided valuable background information about healthcare, and particularly about antenatal care in South Africa, as discussed in Chapter 1.

All the participants completed a *questionnaire* after their first week on campus, and a follow-up questionnaire two months later. The main findings from both the questionnaires were that the participants were enthusiastic about the Educational Programme and about the competence which they hoped to achieve. They expected their new skills to have a real impact on their work and on their capacity to provide the best possible service to the pregnant women under their care. They also reported that they had support from the management of their local hospital to register for the programme. In nine of the eleven hospitals, the managers had said that they could allocate time for the advanced midwife to do ultrasound scanning daily. However, some of the advanced midwives indicated that this was likely to vary, due to the level of workload in the ward. All the midwives reported that scanning assisted the clinical processes, by limiting the number of patients referred onwards.

The Educational Programme used several methods of *assessment*, including a written theory examination, a preliminary clinical assessment, a final individual examination, completion of a *Basic Obstetrics Programme Evaluation Form*, and, finally, a questionnaire. The results of these were made available to the researcher, which provided a perspective on the outcomes of the course.

Several logs were available as secondary material for the present study. The students wrote logs during the first week of the training, and one of the lecturers kept a log during the six weeks of training. In addition, I wrote detailed field notes.

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Every day during the week of theoretical and practical training in 2004, the students wrote open logs about the teaching activity each day. Each day of logs showed certain common topics, such as the practical aspects and ideas about the significance of using ultrasound. In the logs from *day 1*, some of the participants focused on what they had learned about the practical aspects of an ultrasound examination, such as how to hold the probe, how to use the buttons on the machine, how to maintain and clean the equipment, and information about the use of gel on the woman's abdomen. Some of the participants emphasized the potential for improving antenatal pregnancy care for women when mastering the uses of the equipment to detect abnormalities and identifying which patients should be referred to other hospitals. They also mentioned the possibility of reducing the doctors' workload when the advanced midwives were competent in the use of ultrasound. Both the logs and the oral feedback in the class indicated that the participants were enthusiastic about attending an Educational Programme that they regarded as very relevant for their professional development, thus contributing to their confidence and feeling empowered.

The logs from *day 2* more specifically concerned the content of the Educational Programme. The participants wrote in the logs that they were introduced to the use of measurements: biparietal diameter (BPD), mean abdominal diameter (MAD) and femur length. They practiced identifying the location of the placenta, fetal head, heart and limbs. Many of the participants emphasized their reflections about communication with the patients when scanning. The age of a pregnancy in relation to measurement was emphasized. Some of the midwives reported that they were surprised to learn that they should not reveal the sex of the baby unless the mother asked about it, and that they should only tell if they were absolutely sure. Some found the theoretical lectures quite difficult, and many of the participants were very happy to have received a summary of the previous day's lectures in the morning. Some wrote that they were pleased with the level at which the Educational Programme was pitched. One of the informants mentioned that it would be useful to have the content available on the Internet, especially the charts relating to measurements and to milestones in the pregnancy. In the logs after *day 3*, the participants wrote that they were pleased to have received a compendium with articles relevant to the course. The participants wrote in detail about

the theoretical issues. Some said that the programme was becoming more and more interesting every day.

Several of the participants found the material on the central nervous system (CNS) difficult. Physics was interesting and relevant but difficult, and one participant wanted more of that section to be available on the Internet. They also hoped that the lectures would be repeated and continued. Also on the third day, many of the advanced midwives stated that they were proud and happy to participate in the Educational Programme, and that they felt it would have a considerable impact on their daily work.

The logs from *day 4* and *day 5* mainly discussed the possibilities of finding relevant information on the Internet. The focus on the potential Internet solution is, however, not relevant to the present study as most of the advanced midwives had little access to computers and to the Internet at their place of work.

The interviews, questionnaires, field notes and lecture logs are only occasionally referred to in the present study. The main use of this secondary material was to help me, a communication researcher with limited knowledge about pregnancy care in South Africa, to gain insight into the socio-cultural context. All this information helped to provide me with insight into antenatal care in rural parts of KwaZulu-Natal. However, it was only when I arrived at one of the local hospitals in 2006 that I obtained a more realistic understanding of the conditions under which the advanced midwives worked.

4.3.2 Assessments during the Educational Programme

The requirements for the levels of competence to be achieved by the participants after Module I and Module II of the Educational Programme are defined in the curriculum, and several assessment methods are used to ensure that the participants fulfil the requirements. In addition to the theoretical training, the participants have to undertake extensive practical training, both at the university and in their respective hospitals:

In Module I, the theory will be applied to clinical practice of diagnostic ultrasound with guidance from a lecturer. At the beginning, the focus is on extensive hands-on training. Over time, students must be able to perform more

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and more of the examinations themselves. After the first six weeks, the students should be able to perform ultrasound examinations without assistance (Tegnander and Eik-Nes, 2003:12).

“Hands-on training” is the practical training with ultrasound technology involving an authentic pregnant woman. The lecturer tutors the student, and at times she puts her hand on the hand of the student when she is holding the transducer, in order to show her the correct angles and layers. Independent practical learning at the student’s place of work is also part of the educational process:

During Module II, the students should be able to work independently using the skills acquired from Module I. When they return to their home institutions (their normal place of work), students must be able to perform basic Level I ultrasound examinations on their own without supervision (...) A minimum requirement of 50 obstetrical ultrasound examinations for self-registration plus 20 examinations to be evaluated by a supervisor is set in this module to ensure sufficient practice (Tegnander and Eik-Nes, 2003: 10).

The students go back to their respective hospitals and practice the use of the ultrasound technology without any expert supervision.

The advanced midwives are, as we have seen, assessed several times during the Educational Programme by the lecturers, in hands-on training in an antenatal consultation immediately after the course, in an assessment one year after the course and in a final theory examination. One of these assessments concerns their clinical skills in ultrasound six months after the course had started.

4.3.3 Assessment of the level of clinical skills

As with the rest of their cohort, the clinical skills of the three advanced midwives in this study were assessed six months after the start of the Educational Programme. The assessment included a general comment as well as a grading on skills achieved in fetal anatomy in the 2nd and 3rd trimesters and competence in obstetric scanning techniques.

Nobuntu’s average score was 3, which can be described as: “*Satisfactory (Acceptable but improvement, additional guidance and practice still required)*”. In addition, the

evaluator gave a general comment: *“In charge of Labour Ward. Adv deliveries under no supervision from Drs. She is the only one in advanced midwifery. If she is off. Dr relieves. Log book 48 Good. Set-up good. Stages, Charts. Technique satisfactory. Spine and BPD more practice. ”*

Nonkululeko’s average score was 3 to 4: *“Satisfactory (Acceptable but improvement additional and guidance and practice still required)”* towards: *“Good (Performance at acceptable standard and at expected level)”*. The general comment by the appraiser was: *“Log book 41. Radiographer. Does scans. Radiographies scanning. Technique good.”*

Nivedita also achieved an average score of 3 to 4: *“Satisfactory (Acceptable but improvement additional and guidance and practice still required)”* towards: *“Good (Performance at acceptable standard and at expected level)”*. The general comment from the appraiser was: *“Busy. Exams DCT. Log book 42. Machine adjusted. GE Logic 100. Additional midwife legd for training (24 lltre sem?). Radiographer course at (anonymous). Concentrate - spine and measurements.”*

Nobuntu, Nonkululeko and Nivedita obtained similar average scores in the formal assessment at the end of the Educational Programme. This assessment, which was conducted by the lecturers, confirmed that the midwives needed more practice in order to provide an adequate level of service for the pregnant women. The assessment provided a preliminary indication of the competence achieved during the Educational Programme. A follow-up assessment of their practice was required to see whether, and how, the competences acquired during the programme were actually applied in the course of their daily work. The present study of their expert interaction gives a more thorough appraisal of how they use the knowledge about ultrasound technology they had acquired during the Educational Programme.

4.4 Strengths and weaknesses of the data corpus

A key strength of the primary material in this project, the video recordings, is the originality and completeness of content. The video recordings display interaction in ultrasound encounters in the socio-cultural environment of South Africa, more specifically in the institutional settings of rural hospitals in KwaZulu-Natal, and they show the complexity of cultural, institutional, technological and linguistic aspects of each encounter. Ultrasound education has only recently been introduced in this setting, and there are no known previous communication studies undertaken in a similar setting.

It is not easy for a communication researcher to obtain access to this quality of data in a setting such as these rural South African hospitals, both because of administrative obstacles and because of the challenges associated with geographical distances. The collection of data by means of video recordings for this communication study was realized because of the efforts made on the researcher's behalf by Professor Sturla Eik-Nes and the midwife Eva Tegnander. They contacted key persons at the selected hospitals, and were "door-openers" for the researcher's visits to the hospitals.

The weakness of the primary material is that ultrasound encounters varied in length and purpose, and they had different linguistic and interactional characteristics. Moreover, there were different kinds of technology and different levels of human resources at the hospitals, and this influenced the interaction in the encounters. It is thus not possible to compare the encounters directly, one to one. However, the aim of the study is not to systematically compare the different encounters, but to gain insight about the expert interaction trajectories of the three designated advanced midwives; the variations in the ways in which the encounters proceeded may be representative of their everyday work.

A strength relating to the combination of primary and the secondary data is that it is comprehensive, covering a wide range of types of material, such as video recordings, interviews, log assessments, and questionnaires. This allows the researcher to consult various sources of information, which may support or contradict any assertions or preliminary conclusions. This is a way of ensuring the ecological validity (Cicourel, 2007) of the study. The challenge associated with such a comprehensive array of data

sources is for the researcher to distinguish between what might be relevant and reliable, and what is not.

4.5 The role of the researcher

The story of the researcher in the present study is the story about an outsider's way into the field of fetal medicine and the socio-cultural context of South Africa. The aim of the researcher has been to understand and explain interactional issues concerning professional expertise in ultrasound in the socio-cultural context of South Africa. This has been a challenging and interesting task.

Since my employment at the National Center for Fetal Medicine (NCFM) at the St. Olav's University Hospital in Trondheim, Norway, began in September 2002, I have tried to orient myself to this particular field of medicine, and have familiarized myself to the potential communication and ethical challenges that one may face in the field. My work at the NCFM has given me the opportunity to participate in conferences and courses on ultrasound in obstetrics and gynaecology, and I have discussed a wide range of ultrasound-related topics with specialists in the field. I participate in the daily morning meetings at NCFM, where technical ultrasound issues and specific findings are discussed by doctors and advanced midwives. I have also observed a large number of ultrasound examinations conducted by both novices and experts at NCFM. In addition, I have been a pregnant woman myself; the first time in 1997, when I did not know what to expect of an ultrasound examination, and the second time in 2004, when I had been employed at NCFM for almost two years and was thus fairly well informed about fetal medicine. My third pregnancy was in 2009, while writing this thesis, and I was well informed about most pregnancy- and obstetric ultrasound-related issues. However, I have no practical expertise in working with obstetric ultrasound. I have never performed an ultrasound examination myself, nor have I operated the ultrasound machine to try and obtain 2D images by using the transducer. My background as a communication researcher makes me an outsider in the professional field of fetal medicine, but this has given me the privilege of freedom in defining, designing and conducting the present study.

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4.5.1 The paradoxes of the participating researcher

I was, as a researcher, present during all the ultrasound encounters in this study. There were mainly practical reasons for this. One reason was that the time available was limited, so there was no time to teach the advanced midwives how to use the video recorder. Moreover, using the video recorder would have changed the midwife's role in the encounter. It was considered a potential additional stress factor, which I did not want the advanced midwives to experience.

The immediate observations in the “here and now” situation differ from the observations made after several viewings of the video recordings. A researcher, through being physically present, can experience the physical surroundings, such as the temperature in the air, the different odours, and the visual impressions from the whole scene before and behind the camera. The researcher is also in a position to intervene or interrupt if necessary.

The advanced midwife is conscious of the physical presence of the researcher, and may choose to relate to the researcher as a participant in the interaction. The present researcher is never invisible in the encounters under review. The notion “*observer's paradox*” was introduced by Labov (1972) and referred to how the act of observation can influence the human activity that is being observed. Labov suggests that we obtain authentic data only when we are not observing. Sarangi (2010) has discussed this perception, and talks about the “*participant's paradox*”, which refers to the activity of participants observing the observer. Although the observing researcher attempts to be “invisible” in the encounter, the other participants are aware of her presence, they observe her and will consequently be influenced by her presence. The “analyst's paradox” is the situation in which the participants' insights inform the analytic practice (Sarangi, 2010).

4.6 Data preparation

An important question is “*how much data is drawn upon, or not, in the analysis*” (Sarangi, 1999: 30). In the following pages, I reflect upon the work with the video recordings used in this project.

4.6.1 Video and audio recordings of interaction

In this project, the primary material consists of the video-recorded encounters between the advanced midwives and the pregnant women in 2006. The transcriptions of the video and audio recordings were made by the researcher a week after the recordings. The interactions were thus relatively fresh. The rough transcription was made after a single listening. The re-listening was done when conducting analysis. The recorded talk in Zulu was transcribed and translated by a native Zulu speaker, Zama Ntuli Scarafiotti.

In working with the video recordings, the first step was to listen to and observe the activity. On the basis of the preliminary observations, I wrote a context description of all the three different sites. The next step was to make a rough transcription of the talk-in-interaction of the different consultations. This was done by listening to the talk for a couple of seconds, depending on the number and complexity of the sentences, pausing the recording, and writing down the words said. This was the procedure used during the transcription of all of the interviews and consultations. After the rough orthographic transcriptions of the talk, I read the transcripts and started the process of sequencing the consultations in categories.

The work process with the primary material enabled me to make distinctions between different levels in the ultrasound consultations. On the one hand, we can distinguish between observable facts and contextual premises, including participants, time, goal, roles, activity, language and so forth. On the other hand, we can observe the interaction between the advanced midwives and the pregnant women, and see how they orient to these premises, and try to understand “what is going on” through a study of their talk-in-interaction.

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Roberts and Sarangi (2005) describe the stages pertaining to the analysis of audio- and video-recorded interaction. The first stage is the repeated listening to or viewing of the recordings. Roberts and Sarangi suggest that this leads to identifying the phases of the interaction, from small elements to a whole. The categorizing of different phases is achieved by examining the content, the prosodic cues (including intonation, rhythm, pausing), nonverbal cues and other markers. The second stage is the transcribing of the data. The level of detailing depends upon the transcribing conventions. The third stage is to examine the whole interaction again, and examine the outcomes. According to Roberts and Sarangi, another important source of interpretation, if it is feasible, is to consult the informants about the interaction. The final stage is the process of reading the transcripts several times in light of selected concepts from linguistic, sociological and cultural perspectives. The researcher may consequently decide whether to organize the study in the form of cases of whole interactions, or to make a comparative analysis of thematically distinctive data.

Video recordings are valuable for capturing the interaction in the ultrasound examinations. Heath and Luff (2000) argue that:

..without video-recordings of the "naturally occurring" events in the various settings, it would be difficult, if not impossible, to undertake analysis which examines the interactional production and co-ordination of work place activities, and the ways in which personnel use tools, medical devices and various features of the local environment to accomplish the actions in which they engage (Heath and Luff, 2000: 21).

However, in the study of ultrasound examinations, which includes not only the talk and interaction, but also the interpretation of the images on the ultrasound screen, there is a need for an even more complex video-recording system, which would also capture what happens on the ultrasound screen at the same time as the human interaction is recorded. A possible solution would be the use of a video recorder which had an additional function allowing the researcher to connect the ultrasound machine to the video recorder, where the ultrasound images appear on the same screen. This would simplify the interpretation task of the researcher, and would make it possible to capture more of the procedures and activities in the interaction. In this study, I was not able to interpret

all the aspects of the activity on the screen of the ultrasound. I dealt primarily with the interpersonal interaction. However, a further elaboration of the study of ultrasound examinations or fetal diagnostics might benefit from a facility for comparing the activity on the ultrasound screen with the interaction.

Cicourel (1992) talks about ecological validity of qualitative research, whereby the researcher is trying to convince others about the authenticity of the primary and the secondary data sources. I would argue that the video recordings might contribute to the credibility of the data sources by showing actual “evidence” of what has been going on in the interaction. However, this is not to suggest that this technique should be applied extensively in the observation of human interactions in order to “prove” or observe the activity from a researcher’s perspective. On the contrary, the video recordings should be used with caution.

There are several challenges associated with the use of video recordings as a research tool. These include the requirement that research standards must be maintained, the anonymity of the informants must be safeguarded, and the video recording should not take too much space and attention from the actual interaction. The presence of the video recorder may compromise the authenticity of the talk between the participants, even more than is usual when a researcher is present, because the informant is conscious that she is being recorded.

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4.6.2 The transcription system

The transcription system used in this study is inspired by the system designed by Gail Jefferson (2004: 13-31), which has been abbreviated and modified.

Symbol	Explanation
(name)	The name of a person or persons, clinic or a hospital, anonymized.
(.)	A dot in parentheses indicates a tiny gap, probably no more than one-tenth of a second. Several dots indicate a longer gap.
WORD	Capitals, except at the beginnings of lines, indicate especially loud sounds relative to the surrounding talk
()	Empty parentheses indicate the transcriber's inability to hear what was said. The length of the parenthesized space indicates the length of the untranscribed talk. When the inaudible talk is Zulu, this is marked: (inaudible Zulu). Parenthesized speaker designation indicates inability to identify a speaker.
(word)	Parenthesized words are possible hearings or speaker identifications. The translations between Zulu and English, and English and Zulu, are parenthesized, and the spoken utterances appear immediately before the parenthesis.
(())	Double parentheses contain the transcriber's descriptions and researcher's observations rather than, or in addition to, transcriptions.

Table 5 The transcription system, talk

In addition, the transcription of gaze and body movements is inspired by the transcription system used by Heath (1986: ix-xiv):

	The continuous line immediately above or below the transcribed talk and/or silence indicates that the party is gazing at the face of the co-participant. (...) If the fragment involves more than two persons, the person being gazed at is indicated on the line.
-----	The longer dashes are used to indicate that the party is looking at a particular object. Frequently, a series of lengthy dashes is accompanied by a description, such as “records”, “fingers”, “camera”, to indicate what object is being looked at. In this project the following descriptions: ___ ((Looking at the screen))_ and ___ ((Pointing at the screen))_ are recurring in the transcripts.
,,,,,,,,,,,,,,,,,,,,,	A series of commas indicates that the party is turning away from a participant
.....	A series of dots indicates that the party is turning towards a co-participant. In multiparty interactions, when one party moves his gaze from one person to another, the notation of dots and commas becomes ambiguous because the person is simultaneously moving away from one co-participant and towards another. On occasions, dots and commas are also used to capture gaze moving towards and away from particular objects.
-----	Close dashes are used to represent movement. They are accompanied by a description to indicate what type of movement it is. (...) If necessary, additional dashed lines above and below the transcribed talk are used to represent other movements in relation to where they begin and end in the talk and/or gaps

Table 6 The transcription system, gaze and body movements

The gaze and body movements of the participants in the ultrasound encounters are transcribed in the examples in order to provide the reader adequate contextualisation concerning the data setting. The data should ideally be presented in video filed on a CD attached with the thesis, but due to the research ethical requirement for confidentiality, this is not feasible.

4.7 Summary

The main purpose of this chapter was to present the data material examined in the study. The video recordings of the ultrasound encounters in three hospitals in KwaZulu-Natal in 2006 constitute the primary material which is analysed using the activity analysis framework in chapters 5, 6, 7 and 8.

In Section 4.2, I offered an introduction to the methods of the data collection. This included the recruitment of the informants (Section 4.2.1), the presentation of the informants (Section 4.2.2 and 4.2.3) and the presentation of the ultrasound consultations, both with regard to characteristics of each of the consultations (Section 4.2.4.) and with regard to the physical context and equipment (Section 4.2.5). Research ethics was maintained by obtaining informed consent from all the informants (Section 4.2.6).

In Section 4.3, I introduced the secondary data which is the supporting data that informs the study. The secondary data consisted of interviews, questionnaires, logs and assessments (Section 4.3.2. and 4.3.3), and constituted a knowledge base for the researcher, who was a novice not only to pregnancy care in South Africa, but also a novice to the field of obstetric ultrasound.

In Section 4.4, the strengths and the weaknesses of the data corpus was discussed, and in Section 4.5, I elaborated on the role of the researcher during the process with a particular focus on the paradoxes of the participating researcher (Section 4.5.1).

The final part of the chapter (Section 4.6.) offered a discussion of the data preparation of the video and audio recordings (Section 4.6.1) as well as an introduction to the transcription system (Section 4.6.2).

5 Analysis

5.1 Introduction

This chapter offers an activity analysis (Roberts and Sarangi, 2005; Sarangi, 2005; Sarangi, 2010) of the ultrasound encounters, through structural, interactional and thematic mapping. Using an activity analysis approach, I link analytic themes from linguistics and sociology to focal themes that are relevant to the professional domain of obstetric ultrasound, and examine what features characterize the ultrasound encounter as an activity type.

I first present a structural mapping of the ultrasound encounters (Section 5.2). Structural mapping is a tool for breaking down the totality of the ultrasound encounter into distinct phases and sub-phases of activity.

Secondly, I conduct an interactional mapping of the talk in the ultrasound encounters (Section 5.3). Interactional mapping requires a robust coding system that takes into account all the different features of the interaction. The coding system in this interactional mapping includes the following discourse types: online commentary (ONC), offline commentary (OFC), and metacommentary (MC). An interactional map complements the structural map. We cannot make sense of the participant and content structure of the encounter by referring only to the structural map. The interactional mapping helps to provide an indication of the positioning of the participants in the interaction system. I offer an elaborated version of the coding scheme of Mangione-Smith, Stivers, Elliott and Heritage (2003) that may be useful for scholars who are analysing talk in healthcare settings involving visualizing technologies.

Thirdly, I present a thematic mapping of the ultrasound encounters (Section 5.4). Thematic mapping builds on the interactional mapping, but rather than focusing on turn taking and turn distribution, it identifies what might be happening in the interaction with respect to a specific theme. Two of the prominent focal themes from the mapping,

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normality and risk, are discussed in relation to obstetric ultrasound. The identification of specific focal themes informs the analysis in the subsequent chapters 6, 7 and 8.

Section 5.5 provides a summary of this chapter.

5.2 Structural mapping of the ultrasound encounters

Most activity types have an overall structure within which the tasks and actions are organized. Such an overall structure may be categorized simply as an introductory phase, the main activity, and a closing phase. Alternatively, the structural analysis may be more complex, by defining each significant change in communicative events throughout the activity. A classification of the typical structural phases in primary care consultations was suggested by Byrne and Long (1976): relating to the patient, discovering the reasons for the patient's attendance, conducting a verbal or a physical examination, or both, consideration of patient condition, detailing treatment or further investigation and terminating the consultation. A simpler and more straightforward structure of an acute primary care encounter was identified by Heritage and Maynard (2006): the opening, presenting complaint, examination, diagnosis, treatment and closing. While Byrne and Long (1976) categorize the different phases by focusing on the communicative functions in their definition of the phase structure, Heritage and Maynard (2006) show categories that appear to be structurally chronological. Both ways of categorization may be useful, depending on the level of sophistication required. A phase structure is not linear. Elements from an early phase may occur during the physical examination, illustrating the complexity of a phase analysis. Sarangi (2010) illustrated how the general practitioner moved freely between the different phases in the clinical encounter concerning the prescription of antibiotics to children with upper respiratory tract infections. Nevertheless, phase identification is an analytic prelude that helps us to distinguish what is happening, and when, during a healthcare encounter. An activity analysis structural mapping represents a systematic way of distinguishing medical encounters into phases and sub-phases.

The structural mapping exercise described in this chapter reveals typical structural similarities within each of the ultrasound encounters in this project. The broad overall structural organization of phases in the ultrasound encounters is:

- the pre-examination phase
- the physical examination phase
- the post-examination phase

Each of these phases has sub-phases. In chapters 6, 7 and 8, I present the general structural characteristics of the ultrasound encounters. I have limited the focus of the interactional analysis to the physical examination phase of the encounter, specifically the sub-phases relating to preparatory routine, maternal anatomy, fetal anatomy and measurements. In this chapter, we will look at the common characteristics of the structural phases in the ultrasound encounters, including the pre-examination phase, the physical examination phase and the post-examination phase. I focus particularly on two aspects: the frame hybridity and the positioning of the participants.

5.2.1 The pre-examination phase

In this section I present, through a structural mapping, the main characteristics of the pre-examination phase, with examples from encounters by Nobuntu, Nonkululeko and Nivedita. The pre-examination phase in the encounters in this project includes the process of obtaining informed consent and the presentation of the participants.

Sub-phase: initial greetings

Initially in the encounters, the participants greet each other, and give each other recognition of the other's presence.

Sub-phase: informed consent

None of the pregnant women in the ultrasound encounters observed with Nobuntu is literate in English, the language used on the consent form. Although one of the women

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was able to write, she needed to have the wording which she used dictated by Nobuntu.

Example 1 is an excerpt from the video recording of the informed consent sub-phase.

Example 1 (Nobuntu and Lindiwe) Informed consent

1. The researcher: So, now the patient has agreed to participate, and she is signing the informed consent. Informed consent form for the hospital. ((Lindiwe and Nobuntu are standing beside the bed, and Nobuntu is showing Lindiwe where on the form to sign)). ((The researcher is making comments to the video camera)) And she is speaking Zulu. They are both speaking Zulu. She doesn't speak English. ((A newborn baby is crying in the background)) ((The talk between the advanced midwife and the pregnant woman is not audible))
2. Nobuntu: Photo ((Indicates on the form. Nobuntu starts spelling)) P-H-O-T-O ((Lindiwe writes "photo". Nobuntu takes the pen out of the hand of Lindiwe, makes some notes on the form and gives the pen back to the patient. Lindiwe writes her name on the form. They exchange words in Zulu that are not audible on the recording)) ((Nobuntu points on the form with her finger))
3. Nobuntu: Seventeenth ((Lindiwe writes)) and the tenth ((Lindiwe writes)) ((Nobuntu says something briefly in Zulu. Lindiwe fills in 2006 on the form and gives it to Nobuntu)) Thank you very much.

Nobuntu's principal task in this example is to help the pregnant woman to sign the informed consent form. Nobuntu gives instructions nonverbally, by pointing at the form, and verbally, by telling the pregnant woman about what she should write. Lindiwe does what she is told, and signs the informed consent form, tacitly trusting the information given by Nobuntu. Lindiwe is capable of writing alphabets and numbers.

In the other two of Nobuntu's ultrasound encounters observed for this study, neither of pregnant women was able to write their names. In the video, Nobuntu informs Mthunzi about the purpose of signing the consent form, and Mthunzi signs with fingerprint. In this instance, Nobuntu takes responsibility for confirming the authenticity of the fingerprint, and counter-signs the consent form. She also fills in other relevant information such as the name of the pregnant woman, her hospital number and the date. In the case of Jabulile, Nobuntu even holds the woman's hand, leading it first to the ink pad and then to the paper.

The examples above illustrate the literacy level of the pregnant women at this hospital, and provide an indication of the participant structure in the early phases of the ultrasound encounter. The discrepancy in the levels of literacy, knowledge and expertise between Nobuntu and the pregnant women is encapsulated in the embodied interaction.

Because of the low level of literacy on the part of the pregnant women, Nobuntu has considerable responsibility in the information giving process. She cannot assume that the women are well informed beforehand about the implications of the ultrasound examination. They may have been informed orally by other women in their community, or by healthcare professionals in the local medical unit, but since ultrasound examination is a rare and quite new phenomenon in this area, they are not likely to know in detail what it implies.

Moreover, the fact that the pregnant women are illiterate gives Nobuntu an authority during the encounter. Not only does Nobuntu possess the basic literacy skills of reading and writing; she is also skilled in the use of the technology, and she is a professional employed in a public institution. This discrepancy in literacy level is likely to have marked consequences for the participant framework (Goffman, 1974) of the encounter.

At Nonkululeko's hospital, some of the pregnant women participating in the encounters were literate, but on a fairly low level. A few of them could understand English, but at times Nonkululeko supported her explanations in English with words in Zulu. Although they could sign their names with a pen, Nonkululeko closely guided them about what to write.

All the women in the encounters with Nivedita were literate, and English was their mother tongue. Nivedita informed them briefly about the reasons for filling in the informed consent form.

Informed consent was required because the researcher wanted to record the ultrasound encounters for research purposes. The researcher was also present during all the encounters. An informed consent routine does not usually take place in ultrasound

researcher)) _ _ _ _ _ So I am going to do the estimation of the dates----((puts away the medical record))-----

6. The researcher: OK.

Here we have an example that illustrates the positioning of the participants in the presentation. Nonkululeko introduces herself, the institution and her task. This is a straightforward self-presentation, which does not emphasize what kind of professional affiliation she has, nor her role or her status at the hospital, where she is in charge of the ultrasound and has advanced midwifery skills. In fact, she plays down her professional role by simply saying she is “sister”. She presents herself, and goes on to present the identity of Sibahle. The question and answer sequence relating to identity highlights the interviewer role adopted by Nonkululeko. There is no doubt about her authority in this or in the subsequent encounters. In addition, the authority is confirmed by the directive instruction, “OK. Lie!”. The pregnant woman remains positioned as a follower of instructions.

The reading of the medical record has a part in the discourse, and can be considered as a separate sub-phase. However, in this project, the advanced midwives do not systematically read the medical record, which is why it is identified as part of the presentation sub-phase.

A second point about this example is frame hybridity. The switch between addressees may be a defining element when identifying the hybridity of frames. Nonkululeko presents Sibahle in a question and answer sequence, and addresses the researcher, saying that Sibahle is primagravida. The switch between the addressees in this example is an indication of the hybrid frame that Nonkululeko is dealing with. On the one hand, she talks to the pregnant woman about what is going to happen in the frame of the medical consultation, and on the other hand, she introduces the pregnant woman to the researcher, thus actualizing the frame of the educational research activity.

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5.2.2 The physical examination

The second phase in the ultrasound encounter is the *physical examination*. The physical examination, which is the core activity in the ultrasound encounter, consists of the following actions: history taking, agenda setting, presentation of case, talk about, and the action of, lying down on the couch and the application of gel, talk while doing an overview of the maternal anatomy, talk while doing an overview of the uterus, talk while doing an overview of the fetal anatomy and talk while doing the measurements/biometry. I divide the physical examination into the following sub-phases:

- Preparatory routine (history taking, agenda setting, presentation of case, lying down, application of gel)
- The examination of the maternal anatomy and the uterus (overview of gynaecology, overview of the uterus)
- The examination of the anatomy of the fetus (overview of the fetal anatomy)
- Measurements

The physical examination is dealt with in Chapters 6,7 and 8. Here I give an introduction to each of the sub-phases.

The marker for the start of the phase of the physical examination is typically when the advanced midwife gives instructions to the pregnant woman about how to lie comfortably on the couch, and about the application of gel, as in example 3:

Example 3 (Nobuntu, Mthunzi) Lying comfortably and applying gel

1. Nobuntu: _____((Looking at Mthunzi))_____Awuthi ukusondela ngapha kimi. Camela-ke. (Move closer to me please. Support your head.) ((Nobuntu puts paper on the lower part of the abdomen in order not to have gel on Mthunzi's underwear.))
2. Nobuntu: Ayabandake amafutha lawa engizokufaka wona. (I will put gel on your stomach and it's cold)
3. Mthunzi: Oh. (OK.)

The first sub-phase also consists of other preparatory issues, such as setting the agenda for the examination:

Example 4 (Nonkululeko, Sibahle) Agenda-setting

1. Nonkululeko: So, I am going to scan you to see how is the fetus. How does it lie. What is presenting. So everything that I can... whether it is outside or inside the uterus, I will try to see.

Moreover, the preparatory sub-phase also includes the pregnancy history-taking:

Example 5 (Nobuntu, Mthunzi) History-taking

1. Nobuntu: Sezingaki izinyanga? (How far are you in your pregnancy?)
2. Mthunzi: Ziwu-5 ngagcina ukuya esikhathini. (It has been five months since my last normal menstrual period)
3. Nobuntu: Wagcina nini ukuya esikhathini? (When last was your normal menstrual period?)
4. Mthunzi: Ngo-April. (It was in April)

The transition from the preparatory sub-phase to the sub-phase of the physical examination of the maternal anatomy is marked by the positioning of the transducer on the abdomen, with the focus on aspects of the maternal anatomy (uterus, bladder, placenta etc), and consequently with the explicit or implicit demonstration of the particular organ on the screen. For example, the overview of the maternal anatomy is marked by the advanced midwife moving the transducer and displaying the maternal anatomy on the screen (the bladder, the cervix etc) as in the example below:

Example 6 (Nobuntu, Lindiwe) Overview of the maternal anatomy

1. Nobuntu: Ok. _ _ _ ((Pointing at screen))_ _ _So what I see at the moment is the ----((Pointing at screen))----- bladder. The patient's bladder. No ----- ((Pointing at screen))----- extra-uterine pregnancy.

The sub-phase of maternal anatomy is characterized by the examination of the maternal pregnancy-related anatomy, which also includes an overview of the uterus; the

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visualizing of the uterus, including the fetal position; detection of the movements of the fetus; and identification of the location of the placenta.

Example 7 (Nobuntu, Lindiwe) Overview of the uterus

1. Nobuntu: Ok. As I have been looking through I have seen there is((Looking at video camera, smiles, turns her head back to the patient, then to the monitor)) only one single fetus. Let us see where to go now. It looks like a transverse. Look at ((Looking at camera))the head where it is.

The marker of the third sub-phase, overview of the fetal anatomy, is the zoom onto the fetus, and the systematic examination of each organ, as in the example below:

Example 8 (Nonkululeko, Sibahle) Overview of the fetal anatomy

1. Nonkululeko: Starting from the lower pole. You can see the head. The chest. The fetal heart the spine.... ((Pointing at the screen)) This is fine. The spine is intact (.). There is the spine. You can see the (...) of the spine. There is the T of the spine. Which means that it is not (...) You can also see the kidney. There is the kidney.

The next sub-phase, includes the fetal measurements/biometry. The marker for the measurements is the positioning of the cursor on one of the landmark organs that are normally measured. These are generally the femur, the head, and the stomach. Consider the following example concerning the measurement of the biparietal diameter of the head:

Example 9 (Nobuntu, Lindiwe) Measurements/biometry

1. Nobuntu: So, the BPD lies (.). Because when you measure BPD you have to get all the reference points, you cannot ...maxeri, cerebri, septum and diaphragm. Which are the points for BPD. And when we measure them (.) from outside-inside.

In example 10, Nonkululeko is measuring the head circumference and the abdomen of the fetus in order to find the gestational age:

Example 10 (Nonkululeko, Sibahle) Measurements/biometry

1. Nonkululeko: Then I am doing the measurements now. When you measure the head, you measure from the outer to the inner. And then you press sent? And then you move on to measure the head circumference again. In case (.) You measure the BPD. Then I measure the ..to move outer to outer. Outer to outer part of the head. ((Pushing buttons)) Then move on...to the abdomen now. And then when measuring the abdomen, there are also parameters that you look into. They must be used...they must be under the cord() They must be...there should be a landmark shown?

The marker of the end of the physical examination is when the transducer is removed from the abdomen of the pregnant woman for the last time.

5.2.3 The post-examination phase

The post-examination phases in the ultrasound encounters mainly include talk about the delivery, a summary of the findings, and farewells. The marker for the start of the post-examination phase is the moment when the advanced midwife signals that the physical examination has come to an end.

As in the pre-examination phase, positioning and frame hybridity are striking features of the post examination phase.

Sub-phase: talk about delivery

In the post-examination phase, Nobuntu, Nonkululeko and Nivedita typically prepare the pregnant women with regard to the delivery. The planning of the method of delivery may start as soon as the condition of the pregnancy is assessed by ultrasound.

Sometimes the discussion about delivery starts earlier, but this illustrates only that the phase structure is not rigidly linear. In the following example, which is considerably long, Nobuntu and Lindiwe discuss the proposed method of delivery:

Example 11 (Nobuntu and Lindiwe) Method of delivery

1. Researcher: It is her first pregnancy?
2. Nobuntu: _ _ _ _ ((Looking at the screen))_ _ _ _ This is her third pregnancy. She is previously the times two _____((Looking at the researcher))_____ .

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- Therefore this is going to be an elective caesar. ___ ((Looking at the screen))_ ___ And then she will do elective caesar. Angithi uyazi ukuthi uzohlinzwa? (You do know that you will have to have a caesarean section)
3. Lindiwe: Futhi? (Again!?)
 4. Nobuntu: Ehhe, Angithi wena usuhlinzwe kabili. (Yes, you have already had two surgical incisions...)
 5. Lindiwe: Kodwa ngani? (But, why?)
 6. Nobuntu: Eh? (Eh?) ___((Looking at Lindiwe))_____
 7. Lindiwe: Uyangiduduza nje kancane, kodwa angisabuzwa.....(). (It is somewhat better than having to go through the pain of labour.....()
 8. Nobuntu: ___ ((Looking at the screen))_ ___ Ngeke, ngeke sisi, wena nje sesizokunikeza i-date yokuthi uzobuya nini. (There is no way you're going to give birth through labour. It's impossible my sister. After I'm done we'll give you another appointment.)
 9. Lindiwe: Ngizokwenzani? (Why do I need to come another day?)
 10. Nobuntu: Sizokuhlinza. (The next appointment is your day at the theatre for your caesarean section) ___((Looking at the researcher))_____ I was just explaining to her that since she's previous caesar times two there will be no chance that will be given to her for trial of labour, she is just going to be done an elective Caesar because of two scars. ---((Shows two fingers))
 11. Researcher: OK. ()
- ((...))
12. Nobuntu: ___((Looking at Lindiwe))_____ ((Inaudible Zulu)) ((Explaining the position of the baby, indicating on the abdomen)
 13. Lindiwe: ((Inaudible Zulu))
 14. Nobuntu: It is still too early for her. Maybe the baby is going to turn down.
 15. Researcher: Mm
 16. Nobuntu: ___((Looking at the researcher))_____-----((stands up besides the couch))----- As she lies. As it is a breech position. It is a transverse----- pointing at the abdomen----- Because the limbs are here. The head is here. And the back is here. Down there. So, there is still chance for the baby to turn ((Lindiwe is getting up from the bed.))
 17. Researcher: Yeah.
 18. Nobuntu: ___((Looking at the researcher))_____So, we'll ask her to come back after 36 weeks. And then, to see whether the baby has turned or not.
 19. Researcher: Mm
 20. Nobuntu: Even if the baby hasn't turned, or the baby has turned, she will end up doing caesarean section.
 21. Researcher: Mm. Does she live close to here, so it is OK for her to come around 36 weeks?

22. Nobuntu: Yeah. She says that she has come today. We are going to ask her to come to the healthcare clinic. So that we can be able to book her earlier. That she comes back earlier before she starts labouring.
23. Researcher: Mm ((Lindiwe is sitting on the bed. Nobuntu is cleaning her abdomen of gel with a piece of paper)) ((Nobuntu gives Lindiwe a touch on the shoulder))
24. Nobuntu: Thank you very much. ((Translation from Zulu))
25. Researcher: OK. ((Nobuntu takes off the plastic gloves.))

The main purpose of the post-examination phase in this example is the planning of the method of delivery. Given the fact that Lindiwe has previously had two caesarean sections, it is inevitable that she will have to have another caesarean this time. Lindiwe tries to negotiate, and questions this medical fact (turns 3 and 5), but is firmly turned down by Nobuntu (turn 8), who is already planning the future steps in the surveillance of Lindiwe's pregnancy (turns 8 and 10). Due to the risk factor, the method of delivery will not be a normal vaginal delivery, but a caesarean section.

Her professional authority and expertise equips Nobuntu with the power to recommend the method of delivery for the pregnant woman, although she is not actually the clinical expert who will make the final decision, nor will she operate. The participant structure is unbalanced in relation to the knowledge about the preferred method of delivery. Nobuntu is evidently in charge, and Lindiwe is reassured that her pregnancy will be managed appropriately so long as she attends her antenatal appointments and comes to the hospital in good time for the planned caesarean.

The two frames of the ultrasound encounters in this study are evident here. Nobuntu switches between addressing Lindiwe and the researcher, and is thus switching between the frame of the medical consultation and the frame of the educational research assessment.

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Sub-phase: summary of findings, and farewells

The post-examination phase also includes a summary of the findings during the examination, and farewells. Mthunzi expresses relief that she does not have to wait for the doctor any more.

Example 12 (Nobuntu and Mthunzi) Summary of findings

1. Nobuntu: -----((Looking around in the room while talking))----- I think that we have done everything. We have measured the head. We have measured the AC, we have measured the femur length and _____((Looking at the researcher))_____then she was 26 weeks.
2. The researcher: 26 weeks?
3. Nobuntu: 26 weeks. -----((Putting back the transducer for the machine. Prints out another picture))-----
4. Nobuntu: This is a photo of her baby. To take home____((Talking to Mthunzi))_____
5. The researcher: Hm -----((Nobuntu cleans the abdomen))-----
6. Mthunzi: ((Inaudible Zulu))
7. Nobuntu: ((Inaudible Zulu, laughter))
8. Mthunzi: ((Inaudible Zulu))
9. Nobuntu: -----((Talking to the researcher while walking around the coach))--
-She says, she thanks a lot. Because she was just sitting there. Waiting for her doctor. She didn't know if she was going to be done with ultrasound or not. But when she sees she is done she really appreciates it, because she is not going to sit longer now waiting for the doctor to do the ultrasound for her.
10. The researcher: OK. ((Nobuntu is smiling)) -----((Mthunzi gets off the bed. Nobuntu stands at the end of the bed.))-----
11. Nobuntu: OK. ((Looks briefly in the journal. Closes the journal.)) ((Mthunzi puts on her clothes. Nobuntu makes some notes in the patient's journal))

In the post-examination phase, Nobuntu gives a brief summary of the findings concerning the gestational age of the fetus in turn 1, and implicitly confirms normality by not talking about risk or abnormality. The comments in turns 6 and 8 are not audible, but from the translation in turn 9, we understand that Mthunzi is relieved that she did not present at the hospital in vain. She may have previously experienced that there were insufficient resources for her to have an ultrasound examination. However, now she is happy that she does not have to wait any more. There is uncertainty whether the doctor will show up. The presence of the advanced midwife can be seen as a contrast to the

absence of the doctor, and reflects the staffing situation in rural hospitals in South Africa.

In this sub-phase, the advanced midwife would normally also enter the results in the medical record. However, in this study the advanced midwives are not doing this systematically, and the activity of entering the results in the medical record is therefore recorded under the general sub-phase: summary of findings and farewells.

5.3 Interactional mapping of the ultrasound encounters

Activity analysis includes interactional mapping of the situated interaction, in addition to the structural and the thematic mapping (Sarangi 2010). In the three figures below, we see an interactional mapping with a focus on the distribution of conversational turns in three representative ultrasound encounters.

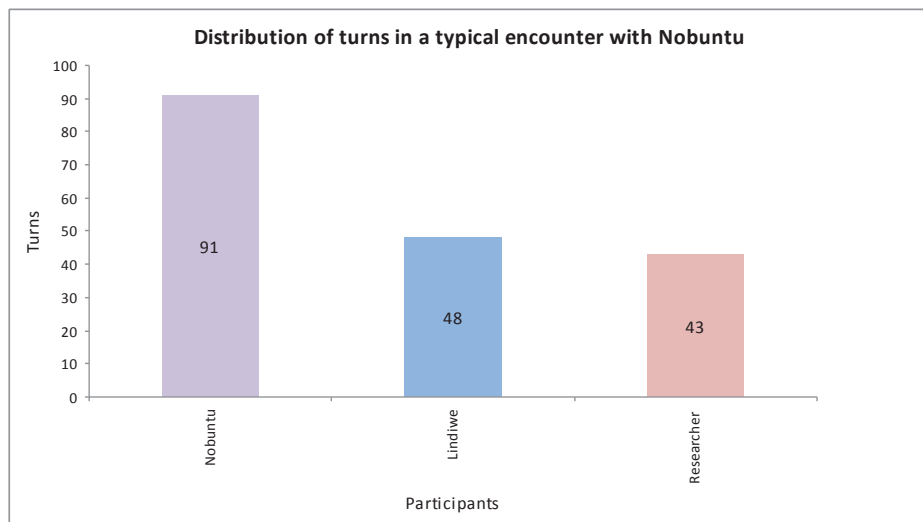


Figure 1 Distribution of turns in a typical encounter with Nobuntu.

The three columns represent the encounter between Nobuntu, Lindiwe and the researcher, in which Nobuntu has 91 turns, Lindiwe has 48 and the researcher has 43 turns. Each turn may be either long or short, for example a long online commentary, or a

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minimal response. It is striking in the first encounter that all three participants contribute with many turns.

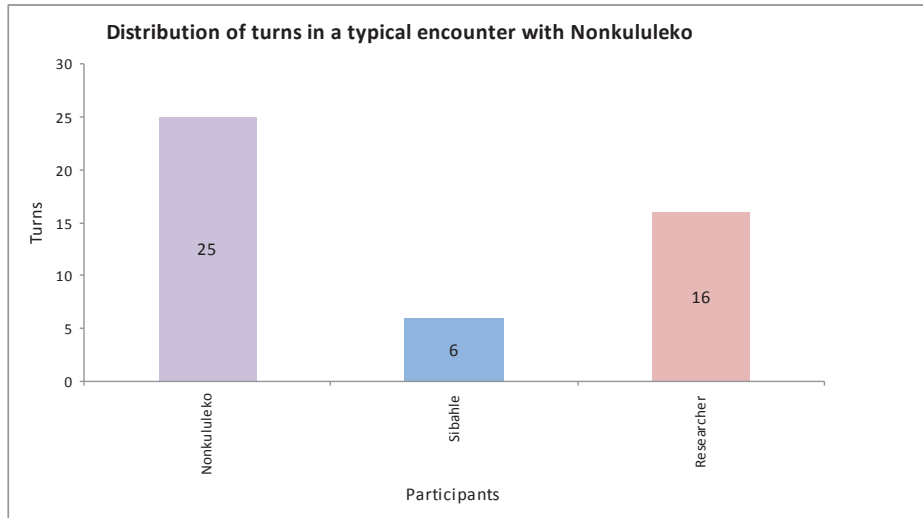


Figure 2 Distribution of turns in a typical encounter with Nonkululeko.

Compared with the first encounter, the second encounter, with Nonkululeko, Sibahle and the researcher, includes relatively few turns. However, it is striking that the researcher has more turns than the pregnant woman, Sibahle.

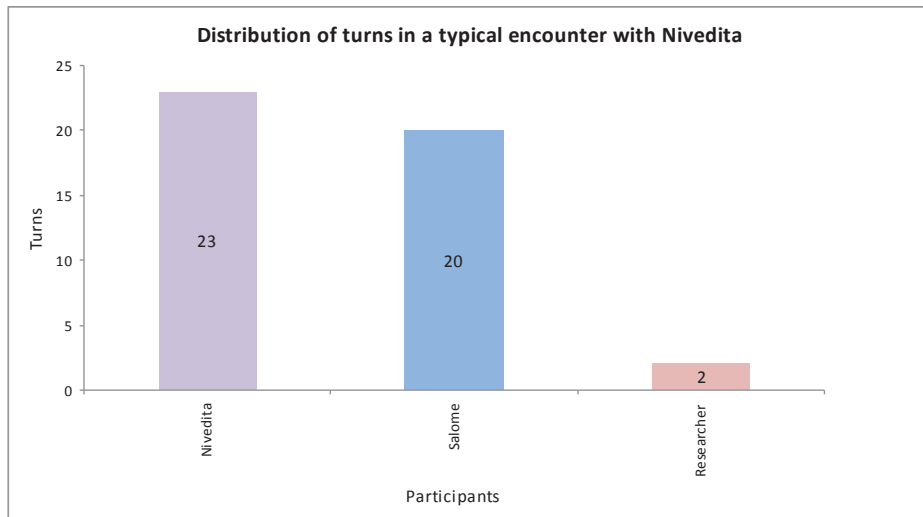


Figure 3 Distribution of turns in a typical encounter with Nivedita.

In the third encounter, Nivedita has approximately as many turns as Nonkululeko has in encounter 2, but here we see that the pregnant woman Salome has many turns, while the researcher is barely participating.

The interactional mapping of the participants' turns in the encounter provides an indication about the number of turns and how they are distributed among the participants. It also helps to inform us about the extent of participation by the researcher during the encounter.

However, an analysis of turn distribution will not reveal anything about what is being said, or in what way. Nor does it say anything about power relations in the interaction. It is not necessarily the participant who utters most turns who has most influence (Tannen 1993, Scollon and Scollon 1979).

A turn may be either short, for example a minimal response, or long, for example an extended monologue. In order to see the tendency of what the turns reflect in amount of talk, we need to do a mapping of the volume. Mapping of volume is an important part of the interaction analysis (Sarangi 2010). A mapping of the volume of turns is done by counting the words uttered in each turn. In the three figures below, we see how many words each of the participants uttered in a typical encounter with each of the three midwives.

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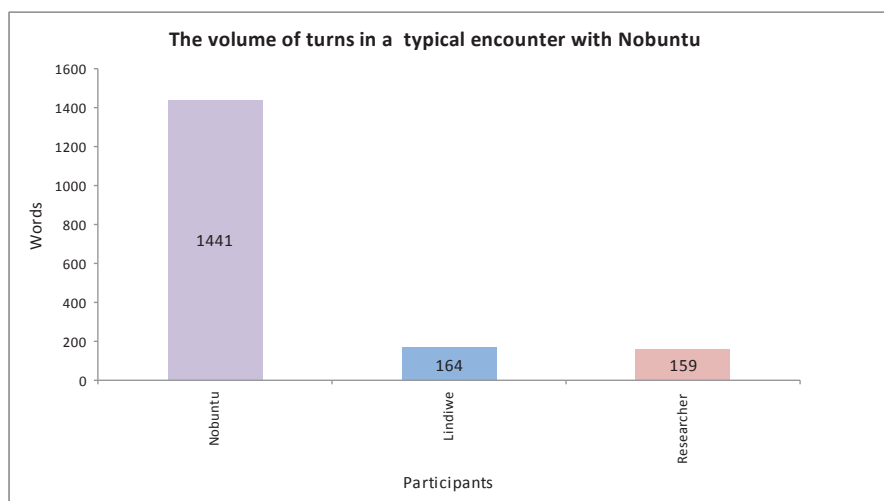


Figure 4 The volume of turns measured in a word count in a typical encounter with Nobuntu

The mapping of volume of turns illustrates that Nobuntu is the participant who talks most during her turns in the whole encounter, with 1441 words. In comparison, Lindiwe utters 164 words and the researcher 159 words.

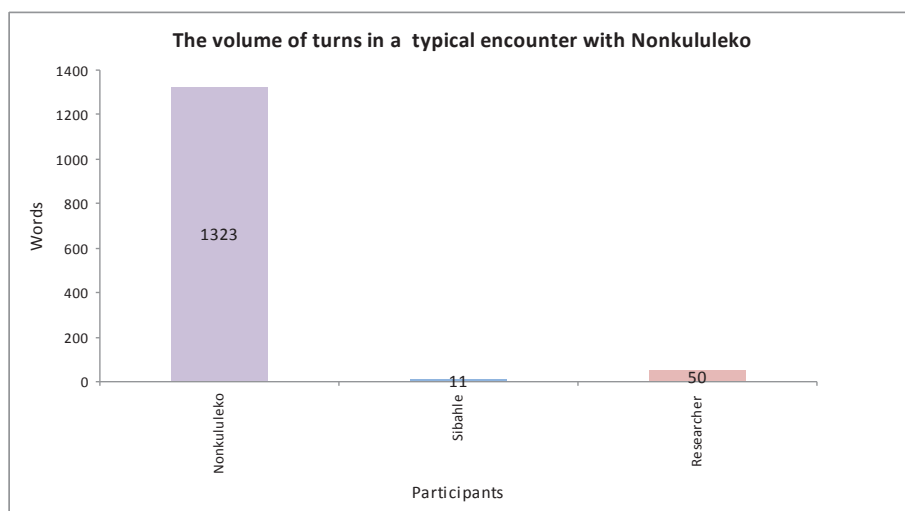


Figure 5 The volume of turns measured in a word count in a typical encounter with Nonkululeko

The mapping of the volume of words in the case of Nobuntu illustrates that Nonkululeko utters 1323 words during the encounter, while Sibahle hardly says anything, only 11 words. The researcher utters 50 words during the whole encounter.

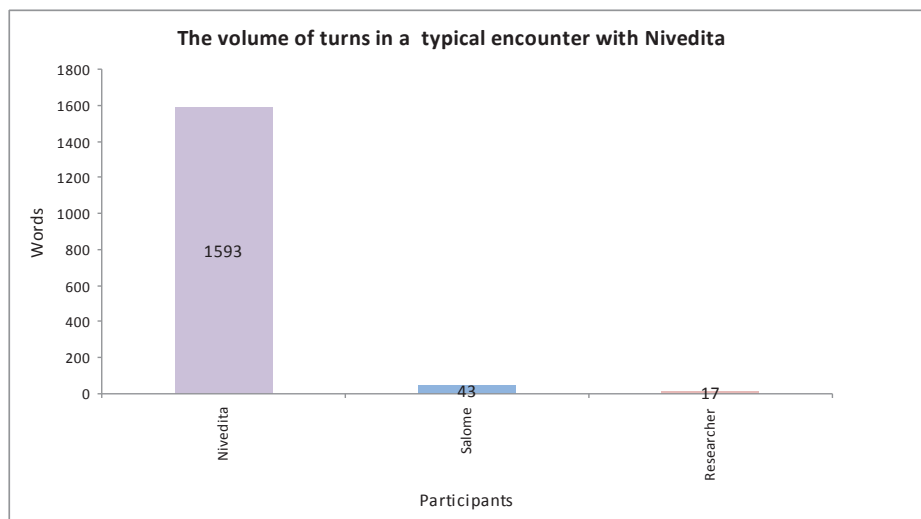


Figure 6 The volume of turns measured in a word count in a typical encounter with Nivedita

Also in the encounters with Nivedita, the advanced midwife is most talkative. Nivedita utters 1593 words. In comparison, Salome, who uttered 43 words, is a bit more active than Sibahle, who uttered 11 words in the encounter with Nonkululeko. In the encounter with Nivedita, the researcher is hardly saying anything, only 17 words.

5.3.1 Mapping of discourse types in ultrasound encounters

In this section, the interactional mapping is refined to include only the discourse types of online commentary, offline commentary and metacommentary as evident in the physical examination phase of each of the three encounters. The reason for selecting only these three discourse types is to see how they are realized by distribution and volume, before we closely analyse extended examples in chapters, 6, 7 and 8. Since the aim of the present study is to investigate the expertise demonstrated by the advanced midwives, I limit the mapping of discourse types to the utterances by the advanced midwives, and

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exclude the comments made by the other participants in the encounter. Each discourse type is labelled to give the reader an understanding of the frequency of the most prominent types of talk in the encounters

The discourse types mentioned below – the online commentary (ONC), the offline commentary (OFC) and the metacommentary (MC) – are discussed in greater detail in the analytic chapters. We also recall the introduction to these discourse types in the review in Chapter 3. Examples of each of the three discourse types are provided, before I show the frequency of their occurrence in three encounters, one with each midwife.

Online commentary (Heritage and Stivers, 1999) is the term used for the comments directly concerning what the participants are seeing on the screen, which are often accompanied by deictic references and joint seeing as mentioned in chapter 3. Below are some examples:

Example 1: “OK. So what I see at the moment is the bladder. The patients’ bladder. No extra-uterine pregnancy”. (Nobuntu, Lindiwe)

Example 2: “That is the bladder, which is intact. There is the cervix. There is the cervix. There is the liqua. There is the placenta. It is a bit low lying. But it is not covering a lot.” (Nonkululeko, Mbali)

Example 3: “What I show to you is the spine. This is the baby’s spine. When you are looking at top, you can see the ... That is the baby’s head. The white line there. ((making a circle on the screen with her finger))”. (Nivedita, Nelisiwe)

Offline commentary is the term used by Sarangi (2010) for comments that include an explanatory component with an educational function. These are utterances referring explicitly or implicitly to the expert knowledge required for performing ultrasound examinations, such as references to the curriculum.

Example 4: “So, whenever you are measuring the BPD, the head must roll over and we must be able to see the cranium all over”. (Nobuntu, Lindiwe)

Example 5: “and the placenta...the placenta is the baby’s afterbirth...the placenta is placed at the fundus...fundus means the top of your uterus. The fundus lies at the top”. (Nivedita, Dumisani)

Example 6: “You know the baby’s stomach like this (indicating on herself). When you have to measure the baby, you measure the head, the abdomen and the leg. The femur. So we take the three measurements, and we try to use those three parameters to say what the baby’s age is”. (Nivedita, Dumisani)

The *metacommentary* is the label for comments directed to the ultrasound operator herself or to the other participants about the activity.

Example 7: “What I am going to do now, is to do an overview of the uterus...” (Nobuntu, Lindiwe)

Example 8: “Let us see where to go now. Look at the head”. (Nobuntu, Lindiwe)

Example 9: “Ok we had a look at the spine. And we saw that it was fine. Now. What I am gonna do, I gonna allow you to see ((turns the US-machine entirely towards the patient))”. (Nivedita, Nelisiwe)

A turn is the usually regarded as the base unit for coding interactions. Within a turn, however, different discourse types may occur. I treat one chunk of utterance as a single whole if the parts are all of the same discourse type. The labelling of the discourse types is not straightforward. The procedure for identifying the discourse type is through a semantic evaluation of each turn, and by labelling it according to its most prominent characteristic.

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Figure 7 shows the distribution of discourse types in the utterances of each of the advanced midwives:

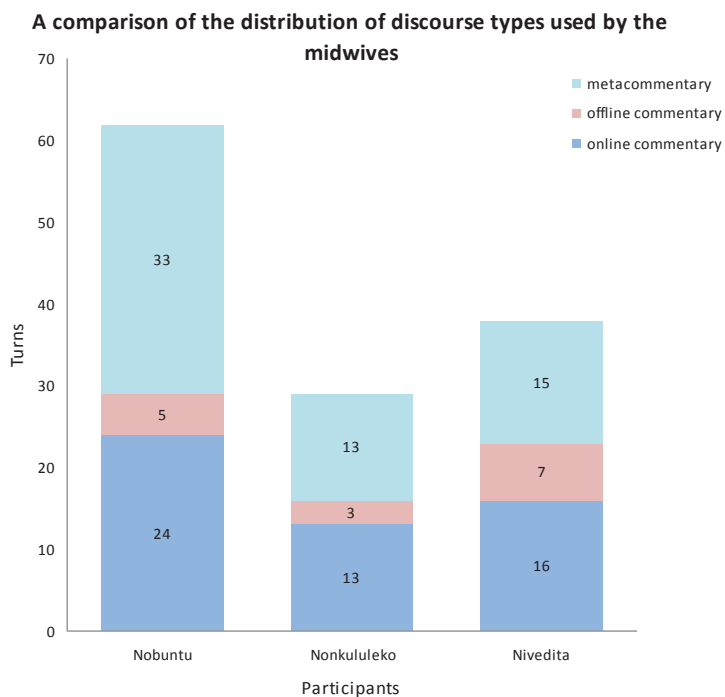


Figure 7 A comparison of the distribution of turns of discourse types used by the midwives during the physical examination phases in three representative encounters

Here we see the distribution of discourse types, respectively online commentary, offline commentary and metacommentary, as uttered by Nobuntu, Nonkululeko and Nivedita during the physical examination phase in three different consultations. The consultations chosen for depiction here are representative of the consultations by each of the advanced midwives, with regard to length, aim and findings.

What we see in the chart above is that Nobuntu utters more online commentaries and metacommentaries than Nonkululeko and Nivedita do, but the amount of offline commentary is quite similar across the three advanced midwives. The commentaries depicted above are directed both to the pregnant woman and to the researcher. In the

analytic chapters 6, 7 and 8, we look more specifically at the distribution of discourse types addressed to the different participants.

Let us now have a look at distribution by volume of the discourse types shown above, measured by the word count for each of the discourse types. The word count in the case of Nobuntu takes account only of the words in the language in which they are first uttered. This means that the discourse types explicitly uttered in Zulu and in English during the encounter are counted. The translations of the Zulu-talk into English that appear in the transcripts were done on basis of observations of the video recordings, and these are naturally not counted.

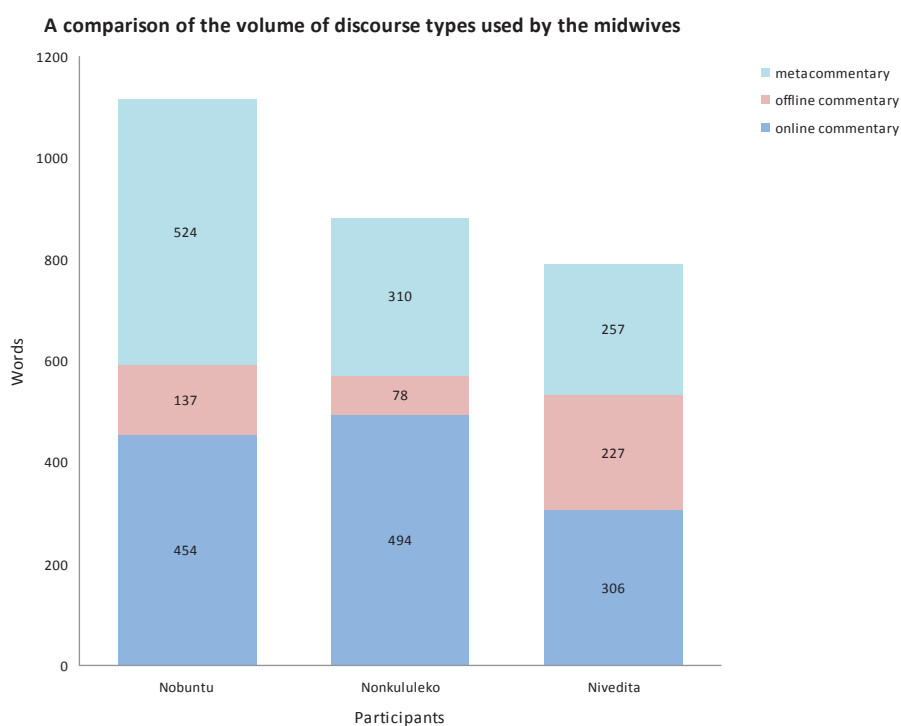


Figure 8 A comparison of the volume (word count) of discourse types used by the midwives during the physical examination phases in three representative encounters

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Here we see that online commentaries are the category of discourse type used most by the midwives during the ultrasound encounters. Online commentaries comprise 454 words in Nobuntu's talk, 494 words in Nonkululeko's talk, and 306 words in Nivedita's talk. The extensive number of words uttered as metacommentaries by Nobuntu is most striking: with 524 words expressed as metacommentaries, as opposed to 137 words as offline commentaries, and 454 words as online commentaries. Nivedita, who has problems because of the faulty ultrasound equipment, utters most offline commentaries; however she also has many words as metacommentaries.

The rough word count tells us that for a considerable proportion of the time, the advanced midwife is focusing on what is happening on the screen (online commentaries), without trying to educate (offline commentaries) or (re)frame the activity (metacommentaries). As we shall see in Chapter 6, Nobuntu is dealing with a complex linguistic situation, and this may be the reason why she provides a relatively great amount of metacommentaries. In Chapter 8, we learn that Nivedita struggles with an ultrasound machine which is partly broken; this may be the reason for the high number of words which she offers as offline commentaries and metacommentaries.

The notions of online commentary, offline commentary and metacommentary are quite general, and as we shall see in the analytic chapters, it is necessary to distinguish between sub-types of these discourse types. Online commentary includes the categories of utterance identified by Heritage and Stivers (1999) and by Mangione-Smith et al. (2003). I also add a further category, which is directly occasioned by the use of the visualization technology, namely the invitation to see. Invitations to seeing as part of the online commentary are absent in the types of medical examination discussed by Heritage and Stivers (1999). Invitations to seeing are neither possible nor necessary in the examinations undertaken by the general practitioners in their study. An ear infection cannot be shared. In antenatal care, the invitation to seeing is possible because there is the potential for joint seeing on the monitor because of technological affordances. The offline commentary includes pedagogical elaborations and explications concerning propositional issues. The metacommentaries refer to activity in three tenses: present activity, which I call online metacommentary (OMC), past activity, which I call

retrospective metacommentary (RMC) and future activity, which I call prospective metacommentary (PMC).

I have elaborated the coding scheme of Mangione-Smith et al. (2003), described in Section 3.6.1, and I have adapted it to the expert system of obstetric ultrasound. The table below represents my supplements. The reason for using examples from Tegnander (2006), is that these work well to illustrate nuances in the difference of level of detail since they all concern only one organ; the fetal heart. Some of the examples below are created for the purpose of illustrating the points in the Table.

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Communication behavior	Description	Examples
Occurrence of online commentary (ONC) Reporting	Online commentaries during the physical examination that reports without assessing	“I can see the heart.”
(Levels of sophistication of reporting)	Online commentaries with more detailed level of reporting without assessing	“I can see the position of the heart, I can see the rhythm of the heart, I can see the four chambers, I can see the sizes of the two atria, I can see the sizes of the two ventricles, I can see that the left ventricle forms an apex.” (Tegnander, 2006: 31)
	Online commentaries with highly detailed level of reporting without assessing	“I can see the moderator band in the right ventricle, I can see the two atrioventricular valves, I can see the two septa and the atrioventricular valves form an “offset cross” in the middle of the heart and I can see that the two pulmonary veins connect to the left atrium.” (Tegnander, 2006: 31)
Assessing	Online commentary accompanied by assessment	“I see the heart, and I see that it is ok.”
(Level of sophistication of assessing)	Detailed online commentary accompanied by assessment	“I can see that the position of the heart is in the middle of the thorax with the apex pointing left, which is the normal position. I can see the rhythm of the heart is regular with 150 beats a minute, which is normal.”
Invitations for seeing (IS)	Online commentary accompanied by invitation for seeing	“Can you see?”

	Online commentary accompanied by invitation for seeing with more detailed level of reporting	“Can you see that I am pointing at the heart and respectively the four chambers?”
	Online commentary accompanied by invitation for seeing with highly detailed level of reporting	“Now I am pointing at the two pulmonary veins that connect to the left atrium of the heart. Can you see?”
Occurrence of offline commentary (OFC)		
Explications	Offline commentaries referring facts	“The heart has four chambers”
Educational (more sophisticated explanations)	Offline commentaries referring facts in a more elaborate manner	“The heart occupies a third of the thoracic area.”
	Offline commentary referring facts in a highly detailed manner	“The rhythm of the heart is regular between 120 and 160 beats/minute. Short periods of bradycardia are normal in the second trimester of the pregnancy; bradycardia means that the heart beats at a slow rate”.
Occurrence of metacommentary (MC)		
MC (level of sophistication of metacommentary)	Metacommentary referring the present action	“I am just showing her the heart”.
Prospective metacommentary (PMC)	Metacommentary referring the coming action	“Now I will look at the heart”.
(Level of sophistication of prospective metacommentary)	Metacommentary referring the detailed level of the coming action	“I shall identify the position of the heart, the four chamber view, and measure the rhythm”.

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	Metacommentary referring the highly detailed level of the coming action	“I will compare the sizes of the two atria and the two ventricles, and look at the position of the tricuspid valve and the mitral valve in relation to the apex”. “Now I have seen the heart”.
Retrospective metacommentary (RMC)	Metacommentary referring the previous action	
(Level of sophistication of retrospective metacommentary)	Metacommentary referring the detailed level of the previous action	“I have identified the position of the heart, the four chamber view, and measured the rhythm”.
	Metacommentary referring the highly detailed level of the previous action	I have compared the sizes of the two atria and the two ventricles, and looked at the position of the tricuspid valve and the mitral valve in relation to the apex.

Table 7 Online commentary (ONC), offline commentary (OFC) and metacommentary (MC) coding scheme, Gilstad 2011

The value of such a scheme is that it helps healthcare professionals distinguish between different discourse types and between levels of detail in the communication with the pregnant women in the situated medical encounter. An awareness of these aspects of communication may be helpful in the preparations for information delivery to pregnant women when dealing with obstetric ultrasound technology. The scheme may also be useful in other medical disciplines dealing with medical technologies.

In the interactional mapping of the ultrasound encounters, we take into consideration the talk by all the participants: the pregnant women, the researcher and the advanced midwives, and the turn-taking between them. However, utterances by the advanced midwives comprise the main focus of this study, and that is the reason why I have mapped the discourse types pertaining to their utterances.

The interactional analysis above has provided an indication about who talks most, about what kind of discourse types are most frequent and about how many words are uttered within each discourse type. The study of discourse types gives a broad idea about what

is going on in the encounter. However, we need a more sophisticated level of thematic mapping to understand what is being said in any turn in the individual encounters.

5.4 Thematic mapping of the ultrasound encounters

In a systematic reading of the discourse types in the physical examination of the ultrasound encounters, the following focal themes are found to recur: *normality, risk and worry*. *Reassurance* emerges as the most common response to all three focal themes, and as an underlying aim of the consultation. When the pregnant women express worry, they are usually reassured by the advanced midwives. Moreover, the advanced midwife reassures as a way of preventing worry, by confirming normality and the absence of risk. Explicit reassurance is recurrent in the dialogue. In addition, the online commentaries about the condition of the prospective baby are, as such, a reassurance process, since the pregnant woman can see for herself what is appearing on the screen.

Let us take a closer look at the definitions of each of these categories, which will be discussed further in the analytic chapters:

Normality is a category describing talk that explicitly confirms the observed normality of the pregnancy in general, or the normality of specific organs. The incidents in this category are the occasions when the participants talk about “normal” or the absence of “abnormal”.

Example 13 (Nonkululeko) Normality

1. Nonkululeko: ((to the mother)) It is a live fetus. So, there are no abnormalities on the head. There are no abnormalities affecting the spine, and also the head. No spina bifida. Or other congenital abnormalities.

The goal of an ultrasound examination is to deliver an assessment of the condition of the fetus and the pregnancy as normal or not normal. The delivery of information usually happens iteratively in the course of the ultrasound examination. Delivery of a conclusion about normality or abnormality occurs in the talk when the advanced midwife confirms that she has examined an organ. Throughout the ultrasound examination, the advanced midwife provides repeated confirmation that organs look fine, and that they are

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developing as they are supposed to. We shall discuss various examples of the normality talk in the analytic chapters 6, 7, and 8.

The focal theme of *normality* is the goal of the examination, as a measure that everything is well with the woman and the fetus, and that she will be able to deliver without complications. Normality recurs in the talk during the encounters, either explicitly as a confirmation that everything is normal, or as a negation of abnormality. Normality is the measure during the delivery of results, although the term *normality* is not explicitly expressed. When the online commentaries include observations directly, for example: “The heart is beating”, this is a confirmation of normality of that particular organ, and the process of the examination can continue to the next organ. Underlying the notion of normality is awareness of the notion of risk. Although it is not often explicitly expressed during the talk, the notion of risk is interconnected with normality.

Risk is a category of talk referring to pregnancy as involving a risk that something may be wrong with the fetus or the mother. This category indicates that something may not be normal. Pregnancy can be perceived as a risky project on many levels, both medical and practical. Risk is what the discourse of medicine is working to prevent and to deal with. The education of a professional ultrasound midwife includes training in recognizing risks and in dealing with them through talk and through referral of the patient to a higher level of medical care.

Example 14 (Nobuntu and Lindiwe) Risk

1. Nobuntu:Udokotela muphi? (Which doctor did you consult?)
2. Lindiwe:Udokotela engambona ngifike khona lapha ekhaya, owathi kufanele ngize emafutheni khona ezoshekha inhliziyi nakhu ngingumuntu we-BP. Hhayi ukuthi ingiphethe ngoba ngikhulelwe, vele vele ngingumuntu wayo. (The one I consulted the last time I came to the clinic for a routine examination. He recommended an ultrasound since I suffer from morbid hypertension. I don't suffer from pregnancy-induced hypertension but rather morbid hypertension.)
3. Nobuntu:Vele umuntu wayo? (Oh, so you do suffer morbid hypertension?)
4. Lindiwe:Hhmm...ngiphethe i-treatment yayo. (Yes, I am on a treatment.)

The extract above provides an example of risk related to pregnancy in general, and the potential risk for Lindiwe, due to the fact that she suffers from morbid hypertension.

Risks may be associated with known maternal illnesses and/or risks associated with the condition of the fetus, for example the position of the fetus before delivery.

Example 15 (Nobuntu) Risk

1. Nobuntu: As she lies. As it is a breech position. It is a transverse. Because the limbs are here. The head is here. And the back is here. Down there. So, there is still chance for the baby to turn.

In this extract, we see an example of a finding that is important for the preparations for the delivery. If the baby is in a transverse position at delivery, this may cause complications, and a caesarean section may be needed. The risk discussed in the ultrasound encounter may be perceived risk or actual risk.

This focal theme may be initiated by the advanced midwife or by the pregnant woman. Pregnant women commonly present for ultrasound encounters with an underlying sense of worry that the pregnancy may not be developing normally, or with fear of other potential risks.

Worry is a category of talk that includes anxiety about pregnancy-related issues. The talk about the worry that the pregnant woman may feel is initiated either by the pregnant woman herself, or by the advanced midwife. Here, it is interesting to observe how the advanced midwives deal with the worry of the pregnant women during the ultrasound encounters.

In the example below, we see that it is the pregnant woman who initiates the talk about her worry.

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Example 16 (Nobuntu and Lindiwe) Worry

1. Lindiwe: Bengifuna ukwazi ukuthi inhliziyi yakhe ayishayi yini ngoba bengiphathwa isiyezi. (I wanted to know if the baby's heartbeat was normal because I had dizzy spells.)
2. Nobuntu: She said she was worried because of eh... she did not feel the baby moving for...Nini, kusukela nini, izolo? (You said you didn't feel the baby kicking since when,...yesterday?)
3. Lindiwe: Cha, ngeSonto. (No, since Sunday)
4. Nobuntu: For about a day. It was on Sunday.
5. The researcher: So, was that why she contacted the hospital?
6. Nobuntu: Yes, that's why. She thought the baby was not alive

It was because of her worry about the baby not moving that Lindiwe came for an ultrasound examination.

In the next example, it is the advanced midwife who initiates the talk about possible worry on the part of the pregnant woman:

Example 17 (Nivedita) Worry

1. Nivedita: Can you see that? That's...that is the heart beat. Ok? ((Pointing at the screen)) and these lines coming to meet....you don't have to worry, because it is reflection from the () Then it is usually... Can you see the head?

Indeed, Nivedita refers repeatedly in the encounters to the possibility of worry by the pregnant women, as in the next example:

Example 18 (Nivedita) Worry 2

1. Nivedita: What I am gonna do is...I am gonna look at what's happening, and don't get worried. As soon as I am ready, I will allow you to see as well.

A general impression is gained that online commentaries have the functions of expressing normality (and abnormality), and of reassuring the pregnant woman about the wellbeing of the fetus. The offline commentaries elaborate more about risk or hypothetical risk, and are associated with a display of propositional expertise. The

metacommentaries would appear to have the function of informing the pregnant woman about what is happening in the encounter, both with regard to the ultrasound screen and with regard to other aspects, such as caring for her comfort during the consultation. The function may thus be linked to reassurance at both a physical and a psychological level.

Let us now have a look at a mapping of the thematic distribution. The approach is to take the data as a point of departure, and to see which categories recur most frequently through the encounters. The thematic mapping is in terms of three discourse types: online commentaries, offline commentaries and metacommentaries. In the course of the thematic mapping, some thematic categories are identified as prevalent and thus as appropriate categories to use in the mapping of the encounters. In order to map the recurring themes in relation to the discourse types uttered by the advanced midwives, I had to interpret them in relation to the previous or subsequent turns. I came up with the following tendencies:

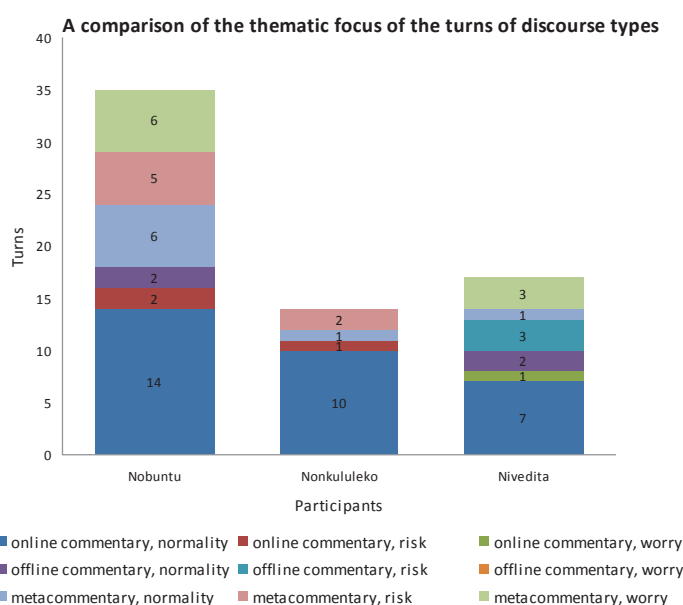


Figure 9 A comparison of the thematic focus of the turns of discourse types used by the midwives during the physical examination phases in three representative encounters

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It is striking that all three advanced midwives have normality as their primary thematic focus when providing online commentaries. Nobuntu has 14 online commentaries concerning normality; Nonkululeko utters 10; and Nivedita utters 7 online commentaries about normality. They also deal with normality in offline commentaries and metacommentaries, but rather rarely. Nobuntu and Nonkululeko are concerned with risk while giving online commentaries. Risk is also mentioned through metacommentaries by Nobuntu and Nonkululeko and through offline commentaries by Nivedita. Worry is mentioned by Nobuntu and Nivedita through metacommentaries.

It is important to note that the thematic mapping has been done on the discourse types used by the advanced midwives during the physical examination phase. Mapping of the themes in the turns of both the advanced midwife and the pregnant woman in the entire encounter (including pre-examination phase and post-examination phase) may have identified more instances of worry and risk, and of normality. As has been stated earlier, it is important to be aware that a thematic mapping exercise, such as the one shown above, can only show tendencies.

During the phase of the physical examination by the advanced midwives, normality is the most prominent focal theme associated with the three discourse types: online commentary, offline commentary and metacommentary. However, risk and worry are also recurring themes. These focal themes are not found to occur frequently in the thematic mapping, but as we shall see in the analysis, they have an impact on the previous and subsequent turns by the participants.

In the three following analytic chapters, the focal themes are normality, risk and worry. As mentioned above, reassurance is underlying in all three of these focal themes. *Reassurance* is a category that describes talk that is directly or indirectly intended to reassure the other person that there are no problems.

5.5 Summary

In this chapter, I have conducted an activity analysis following Roberts and Sarangi (2005) and Sarangi (2005, 2010), adapted to the data material in this project. This data material is complex, and it was necessary to make certain choices in order to limit the mapping, following the activity analysis framework. First, I mapped the encounter structurally (Section 5.2), and identified three general phases: the pre-examination phase, the physical examination phase and the post-examination phase. Each of these phases has its own sub-phases.

Secondly, I mapped the encounters interactionally (Section 5.3), with regard to distribution of turns, but also more specifically with regard to discourse types, frequency and volume. The recurring discourse types uttered by the advanced midwives are identified as online commentaries, offline commentaries and metacommentaries. I also presented an elaborated version of the coding scheme of Mangione-Smith et al. (2003).

Thirdly, in order to know what was the focal themes in the communication, I conducted a thematic mapping. The thematic mapping was linked to the discourse types uttered by the advanced midwives, seen in relation to the turns both before and after the specific discourse type. The thematic mapping revealed that normality, risk and worry are recurring themes, and that reassurance is an underlying theme connected to the three themes mentioned. We shall look more closely at the structural, the interactional and the thematic mapping in the encounters in the analytic chapters 6, 7, and 8.

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6 Case study I: Nobuntu

6.1 Introduction

This chapter focuses on the ultrasound encounters led by Nobuntu. The primary aim of this chapter is to understand how the professional expertise of Nobuntu is manifest at a communicative level in her interactions with the pregnant women during their ultrasound examinations. The research questions guiding the chapter are:

What aspects of Nobuntu's expertise manifest themselves through the following discourse types: online commentary (ONC), offline commentary (OFC) and metacommentary (MC)? How are these linked to the focal themes of normality, risk, worry and reassurance?

The chapter is organized in three main sections: Section 6.2. offers a structural mapping of all the encounters of Nobuntu and Section 6.3. offers an interactional mapping of one typical encounter. The Section 6.4. presents an in-depth account of Nobuntu's expert talk during the physical examination phase, including the sub-phases: the preparatory sub-phase, the maternal anatomy sub-phase, the fetal anatomy sub-phase and the measurements sub-phase. In the beginning of the chapter, I draw attention to the interactional mapping described in Chapter 5. I look specifically at the frequency and volume of the discourse types uttered by Nobuntu in one encounter in order to show the typical tendencies associated with her communication style. I also illustrate the distribution of the focal themes that were prominent in her communication during the physical examination in that particular encounter.

The rest of the chapter is organized in terms of the structural mapping described in Chapter 5, with a focus on the interaction during ultrasound encounters with four different pregnant women. In these encounters, Nobuntu functions in a complex linguistic situation. In this hybrid activity type, which is both a clinical encounter and an educational research setting, the Zulu-speaking pregnant women and the English-

Nobuntu

speaking researcher are both present. This forces Nobuntu to switch from one addressee to another, translating in the course of the physical examination. These linguistic challenges arise in addition to the medical tasks and expert interaction that Nobuntu has to conduct, which contribute to a complex scenario of expertise conduct.

6.2 Structural mapping of all the encounters

The structural mapping of the encounters of Nobuntu gives an indication of how she organized the encounters in terms of phases and sub-phases.

Phases/participants	Nobuntu-Lindiwe	Nobuntu- Mthunzi	Nobuntu-Jabulile
Pre-examination phase			
Sub-phase: initial greeting			
Sub-phase: informed consent	X	X (fingerprint)	X (fingerprint)
Sub-phase: presentations			X
Physical examination phase			
Sub-phase: Preparatory routine	X	X	X
Sub-phase: The examination of the maternal anatomy and the uterus	X		
Sub-phase: The examination of the anatomy of the fetus	X	X	X
Sub-phase: Measurements	X	X	
Post-examination phase			
Sub-phase: talk about delivery	X		X
Sub-phase: summary of findings, and farewells	X	X	X

Table 8 Structural mapping of all the encounters with Nobuntu

The communication between Nobuntu and Lindiwe in the beginning of the encounter is not transcribed because it was not audible on the recording. This may have been an introductory greeting and a presentation of the participants. However, there was no explicit presentation of the participant's altogether.

Nobuntu

Another observation about this encounter was that Nobuntu talked about delivery several times during the encounter, both in the physical examination phase and in the post-examination phase. This illustrates that there are no definite boundaries between the issues discussed during the encounter, and an issue can occur at different phases and sub-phases. The structural mapping can only be indicative for the structure, and open for debate.

In the encounter with Jabulile, where Nobuntu identifies a twin pregnancy, she doesn't explicitly talk about the examination of the maternal anatomy and the uterus. Nor does she talk explicitly about the measurements and the estimated date of delivery. This may be due to the fact that Jabulile nevertheless has to return for follow-up examination. However, an analysis of the activity on the screen indicates that she does perform the measurements of the twins procedurally.

6.3 Interactional mapping of a typical encounter

In order to illustrate the communicative style of Nobuntu, I have conducted an interactional mapping of one of her encounters with a pregnant woman.

The following chart shows the results of the interactional mapping of the discourse types online commentary (ONC), offline commentary (OFC) and metacommentaries (MC) uttered by Nobuntu during the ultrasound examination.

Distribution of turns in terms of discourse types in a typical physical examination phase

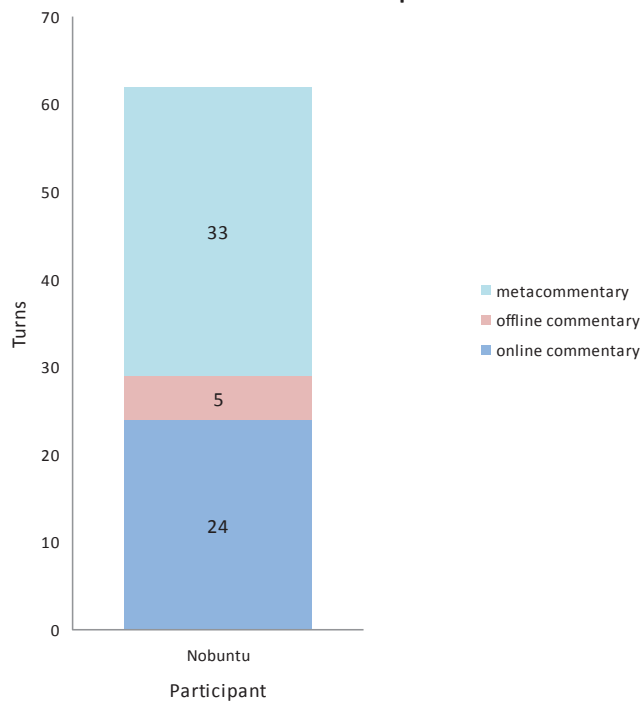


Figure 10 Distribution of turns in terms of discourse types in a typical physical examination phase with Nobuntu

Figure 10 show that the tendencies regarding the distribution of online commentaries and metacommentaries is a dominance of metacommentaries with 24 online commentaries and 33 metacommentaries respectively. The number of offline

Nobuntu

commentaries is low, with only 5 incidences. Now let us have a look at the volume of the discourse types by looking at the number of words used in the different discourse types:

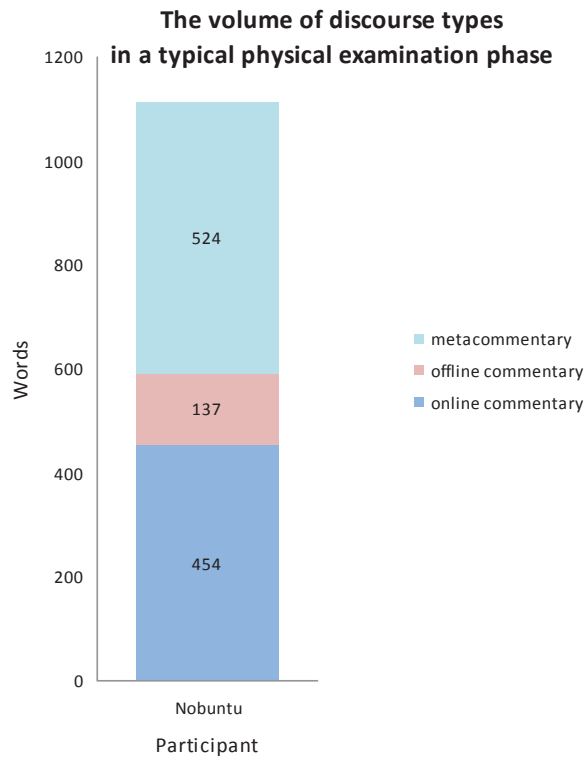


Figure 11 The volume (word count) of discourse types in the physical examination phase with Nobuntu

It is striking that the numbers of words used in the offline commentaries form a larger proportion in percentage of the whole than do the number of offline commentary utterances in terms of frequency. The metacommentaries predominate, with 524 words, while the online commentaries comprise a total of 454 words. This indicates that Nobuntu is mainly framing her activity, for example by switching between languages.

The ultrasound encounters in this project are hybrid, since they are both clinical encounters and constitute part of an educational research environment. Nobuntu and the

other midwives orient themselves to two different addressees: the pregnant woman, and the researcher. Let us have a look at the distribution in frequency of the three discourse types – ONC, OFC and MC – when Nobuntu orients herself to two different addressees:

Distribution of turns of discourse types to addressee

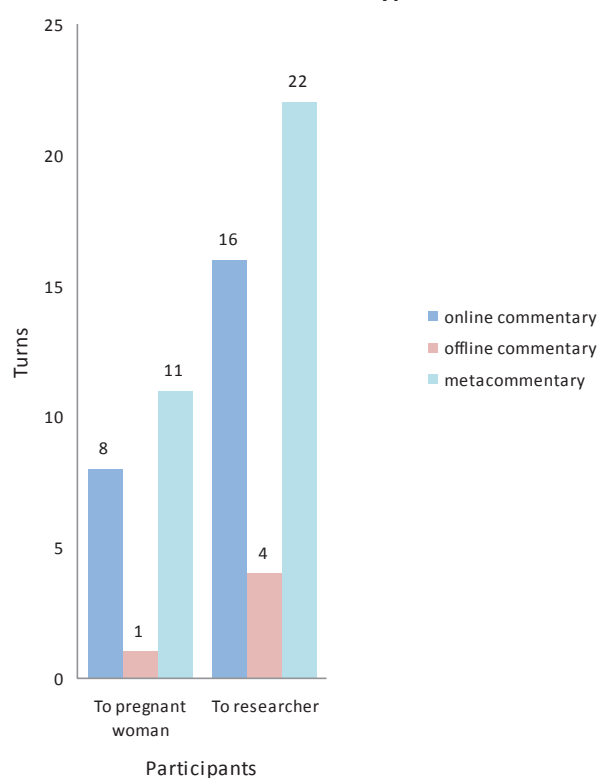


Figure 12 Distribution of turns of discourse types uttered by Nobuntu to addressee

The tendency we see is that Nobuntu orients herself significantly more often towards the researcher in this typical example of ultrasound encounter than she does towards the pregnant woman in her utterances in all three discourse types. In Nobuntu's encounters, the attribution of which of the two other people present is the addressee is not ambiguous, since Nobuntu speaks Zulu to the pregnant woman and English to the researcher. However, in the encounters by the other midwives, gaze and body

Nobuntu

movements become more important clues to take into consideration in identification of the addressee.

Let us now break down the frequency of utterances to the addressees and see what the tendency is after a word count.

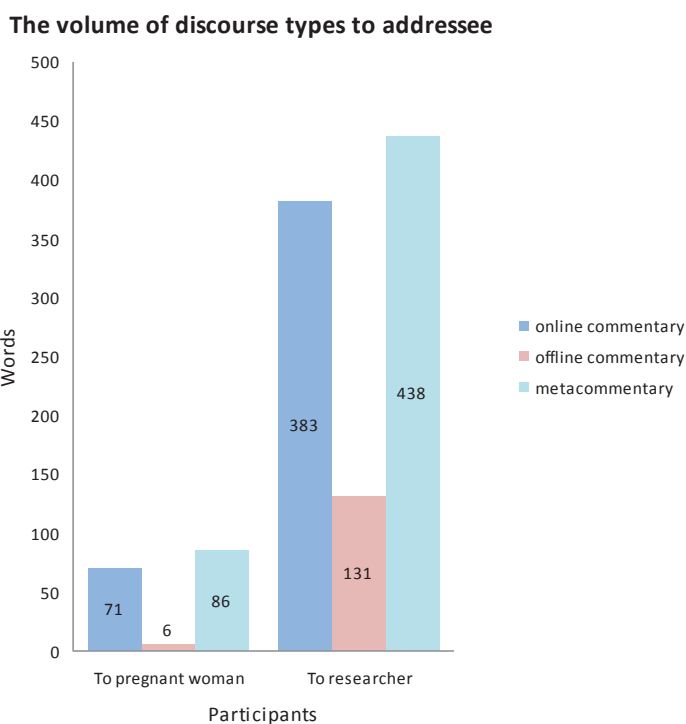


Figure 13 The volume (word count) of discourse types uttered by Nobuntu to addressee

Here, Nobuntu expresses most of her commentaries, in all discourse types, to the researcher, in English. She talks and involves the pregnant woman, but to a far lesser extent. The high volume of online commentaries to the researcher is especially striking. It is evident that the presence of the researcher is strongly influencing Nobuntu's behaviour in her work.

Now let us see how the discourse types are distributed with regard to focal themes in this typical example of an ultrasound encounter.

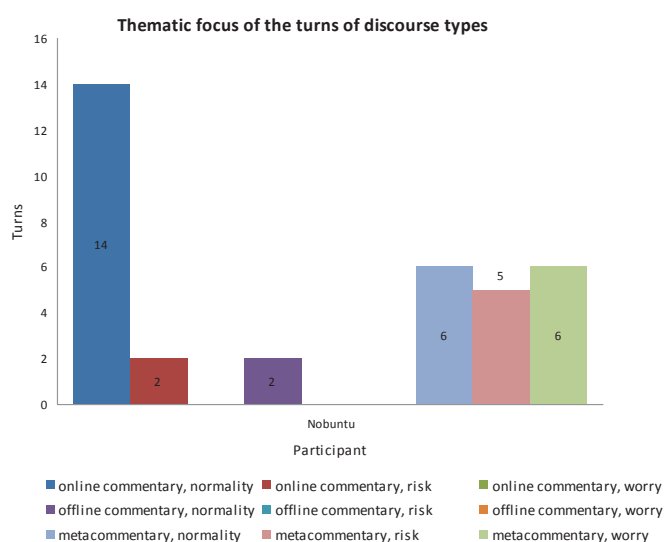


Figure 14 Thematic focus of the turns vis-a-vis discourse types in a typical physical examination with Nobuntu

Here we notice that Nobuntu typically talks about normality, using online commentaries as well as offline commentaries. She also mentions risk in online commentaries.

Interestingly, Nobuntu does not focus on the worry of the pregnant women in her online and offline commentaries, only in the metacommentaries. Nobuntu also deals with normality and risk through metacommentaries.

There is a discrepancy between the frequency of discourse types in the Figure above and the number of discourse types in the distribution of focal themes (Figure 9). The reason for this is that themes other than normality and risk also occur in the metacommentaries and offline commentaries, but these are of such a limited frequency that they do not feature on the chart, and they do not occur in the other encounters with Nobuntu nor in any of the encounters of Nonkululeko and Nivedita. Moreover, the discourse type of metacommentary is talk about the ultrasound activity and what is

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happening ‘here and now’, and it does not easily lend itself to clear attribution to a single focal theme.

An interactional mapping such as demonstrated above, where the focus has been on frequency and volume of discourse types, on frequency and volume of addressee and on frequency of focal themes, gives us an idea of the tendencies of how the encounter proceeds interactionally. Interactional mapping as well as thematic mapping are useful when comparing different situated encounters of the same activity type. It may be of value in pointing out specific characteristics in the communication style of a single health professional, as well as demonstrating how communication varies between different healthcare professionals. Moreover, interactional mapping and thematic mapping are useful tools when studying encounters where there are perceived communicative challenges, but where the participants are not able to identify why. In the chapters that focus on Nonkululeko’s and Nivedita’s encounters, we conduct a similar mapping exercise in order to show characteristic tendencies in their respective communication styles.

In order to grasp what is actually being communicated during the encounters, we have to go into depth, and analyse the communication closely through extended examples.

6.4 The physical examination phase

The physical examination phase includes the core activity of the ultrasound encounters, namely the clinical examination by means of ultrasound. In this section, the expert interaction by Nobuntu during the physical examination is analysed in detail. Expert interaction includes communication with other participants, mainly the patient, as well as the practical and technical procedures carried out by the health professional during the ultrasound encounter. Let us keep in mind the map of practice knowledge for professionals devised by de Cossart and Fish (2005), described in Section 2.6, as we discuss the expert interactions by Nobuntu. It is particularly interesting to observe how the propositional and procedural knowledge, as well as other types of knowledge, are manifest in the physical examination phase, through the different discourse types. Is

there a difference in how the propositional knowledge and the procedural knowledge are distributed in the different discourse types? How are the focal themes managed in the display of procedural or propositional expertise? What kind of expertise is required for reassuring the pregnant woman about normality?

6.4.1 The preparatory sub-phase

In Chapter 5, we defined the preparatory sub-phase of the physical examination to include history taking, agenda setting, presentation of case, lying down and the application of gel.

How is the expertise of Nobuntu displayed in the interaction in the preparatory sub-phase of the physical examination? In the example below, we see the interaction between Nobuntu and Mthunzi:

Example 19 (Nobuntu and Mthunzi) Preparatory sub-phase

1. Nobuntu: Sezingaki izinyanga? (How far are you in your pregnancy?)
((Nobuntu helps Mthunzi lie comfortably. Right hand under the head. Left hand straight along the body.))
2. Mthunzi: Ziwu-5 ngagcina ukuya esikhathini. (It has been five months since my last normal menstrual period)
3. Nobuntu: Wagcina nini ukuya esikhathini? (When last was your normal menstrual period?)
4. Mthunzi: Ngo-April. (It was in April)
5. Nobuntu: _____((Looking at Mthunzi))_____Awuthi ukusondela ngapha kimi. Camela-ke. (Move closer to me please. Support your head.) ((Nobuntu puts paper on the lower part of the abdomen in order not to have gel on the underwear.))
6. Nobuntu: Ayabanda-ke amafutha lawa engizokufaka wona. (I will put gel on your stomach and it's cold)
7. Mthunzi: Oh. (OK.)
8. Nobuntu: Ayabanda-ke. (It's cold, heh.) ((Nobuntu puts on plastic gloves. Applies gel on the abdomen of Mthunzi. Sits down on a chair next to the bed. Takes up the transducer and starts to work. Distributes the gel with the transducer on the abdomen.))

This example illustrates three different actions in the preparatory sub-phase of the physical examination: lying down, history taking and the application of gel.

Nobuntu

Turns 1- 5 mark the history-taking and eliciting of information from the pregnant woman about the date of her last menstrual period (LMP) as a way of determining the age of the pregnancy. While eliciting this information, Nobuntu does other preparatory work; she helps Mthunzi to lie down comfortably, and she starts preparing the abdomen for the visualizing technology by applying gel. She informs Mthunzi in turn 6, in a metacommentary, about what will happen: “Ayabanda-ke amafutha lawa engizokufaka wona” (I will put gel on your stomach and it’s cold). This metacommentary is prospective; it points to an action and experience to come. Through her talk and action, Nobuntu displays procedural expertise about what should occur before the physical examination can start.

Moreover, the ultrasound equipment must be prepared before the physical examination can take place. Although most ultrasound machines are similar, Nobuntu is not familiar with the use of this specific one, and at the outset she faces problems. The next example illustrates that institutional factors, such as the quality of the technology, have an impact on the advanced midwife’s capacity to conduct her tasks.

Example 20 (Nobuntu and Mthunzi) Restarting the machine

((Nobuntu turns the machine slightly, towards herself.)) ((On the screen a form appears))

1. Nobuntu: -----((Pointing at the screen))----- So I have to fill in the patients’ name. That’s where I have to put the patient’s name. Ubani igama lakho? (What is your name?)
2. Mthunzi: uMthunzi (Mthunzi) ((Nobuntu writes the name on the screen. The form disappears from the screen. The midwife turns off the machine and restarts it again. An image appears on the screen.))
3. Researcher: Do you have to restart it every now and then?
4. Nobuntu: Oh, it’s ID No. Oh, let me start it afresh. _____((Looking at the researcher))_____ I beg your pardon. No, no I made a mistake that’s why. ((Smiling))
5. Researcher: Oh, yeah.
6. Nobuntu: There’s no number there. -----((Looking at the patients’ journal.))----- There is no number there. -----((Turning back to the US machine.))----- -----((Looking at the screen. Fills in the date.))----- Hm. It’s difficult with the computer. I want to move this. Let me forget about this. -----((Pointing at the screen))-----In fact I was going to write the

patient's name, age, sex, date of birth for her and then the grav and the para.....()

Sometimes it's tricky. I want you to go away! () It's running away. I don't know where to move. ((Concentrating on the buttons and the form)) It wouldn't go away now. It is turning away. Doesn't want to move. ((Laughing)) Yikho umshini ungasavumi ingoba usubonile. (The timing could not have been more perfect, at least you've seen your baby.)

7. Mthunzi: Hawu. (No...)
8. Nobuntu: Usufile umshini wabantu. Ngaze ngawubulala unshini wabantu. (Goodness, the machine is broken, I broke the machine.) I think I will switch it off. I want to clear up this thing. -----((Turns off the machine))---
--- We are not used to computers _____((Looking at Mthunzi))_____ We normally go for scan _____((Looking at the researcher))_____ not to write information.
9. Researcher: Mm
10. Nobuntu: This is why it is giving me some problems. -----((Turns on the ultrasound machine))----- and now.....That one was excellent. -----((Points to the other ultrasound machine that has no transducer and raises her thumb upwards))----- But now it is broken, we cannot use it.

This example demonstrates some of the challenges for Nobuntu in displaying her expertise in the situation, which includes different actors and several artefacts. As we see in turn 2, Nobuntu has to restart the machine because the image disappears from the screen. Later, in turn 8, she is worried that she might have broken the machine. She is not accustomed to the technology which she is using, and has to improvise while preparing the machine before the physical examination. The ultrasound machine that Nobuntu was accustomed to using had a damaged transducer, which had not been replaced since it was broken a year earlier. The machine she is using in this project was borrowed from another department. Nobuntu has limited experiential knowledge about the use of this particular model, and finds herself in difficulty when using the machine.

Let us have a closer look at the types of utterances in the example. Nobuntu starts in turn 2 with a metacommentary: "So I have to fill in the patient's name. That's where I have to put the patient's name". This is a self-directed prospective metacommentary, which is indirectly also addressed to the researcher within the educational research frame. In turn 4 she switches footing, and demonstrates her insecurity about the ultrasound machine. In turn 5 she utters another prospective metacommentary, "Oh, let me start it afresh", and

Nobuntu

in turn 7, a retrospective metacommentary: “In fact I was going to write the patient’s name, age, sex, date of birth for her and then the grav and the para”. Both the prospective and the retrospective metacommentary inform the other participants about what Nobuntu is doing. The laughter in turn 7 may be a signal of her worry about how to handle the technology.

In turn 6, Nobuntu displays worry since she cannot handle the graphical user interface of the machine that requires her to fill in the patient information. Although most ultrasound machines are quite similar in functionality, filling in the electronic form is something Nobuntu is not used to. We notice her frustration about not managing to move the cursor in turn 6. By the end of the turn, she addresses Mthunzi in a more worried tone: “Yikho umshini ungasavumi ingoba usubonile” (The timing could not have been more perfect, at least you’ve seen your baby). This indicates to me that her level of worry is increased because she feels she is being assessed by the researcher. Worry is thus not only something experienced by the pregnant women, but also by the advanced midwife.

In the utterances constitutive of turn 8 – “I think I will switch it off. I want to clear up this thing. ((Turns off the machine)) We are not used to computers; we normally go for scan, not to write information” – Nobuntu switches pronouns. The switch from using the first person singular “I” to the pronoun first person plural “we” may be a way of drawing attention to institutional and collective habits, and of letting go some of the personal responsibility for not managing the technology. It is not her fault, and everybody has the same problem. By drawing the attention to the fact that there are other professional habits, she is doing work to save her own expert face.

The researcher gives several minimal responses which simply confirm her attention to the previous turns, for example turn 5, “Oh. Yeah”, and turn 9, “Mm”.

Moreover, in turn 8, Nobuntu expresses, with Mthunzi as the primary addressee, the worry that she might have broken the machine: “Usufile umshini wabantu. Ngaze ngawubulala unshini wabantu (Goodness, the machine is broken, I broke the machine)”.

She avoids telling the researcher. For Nobuntu, her credibility as a competent ultrasound technician is at stake.

6.4.2 Examination of the maternal anatomy and the uterus

The examination of the maternal anatomy and the uterus is the moment in the encounter when the transducer and the ultrasound technology are first used. The expert talk that accompanies the ultrasound technology examination has some specific characteristics, such as the use of certain discourse types. In this and in the next sub-phase, the focus is on what characterizes this talk. The marker for the start of this sub-phase is the focus on the maternal anatomy, for example the bladder, cysts, or the cervix.

During her examinations, Nobuntu does not make a clear distinction between the sub-phase of the overview of the maternal anatomy and the sub-phase of the overview of the uterus. The two sub-phases frequently overlap. In the example below, which happens to be quite typical, the focal theme is normality of the maternal anatomy, and the main discourse type is online commentary (ONC), with invitation for seeing (IS) and metacommentary, especially prospective metacommentary (PMC). Nobuntu does not report abnormalities, nor the absence of abnormalities, and she does not touch explicitly upon risk. The expertise displayed is procedural, supported by online commentaries about what is happening on the screen.

Example 21 (Nobuntu and Lindiwe) Online commentary

1. Lindiwe: Mingaki-ke iminyaka? (So how old is the baby then?)
2. Nobuntu: Angithi ngizokutshela uma sengibonile, kuzofanele kubone mina kuqala. ((Smiling))(I will tell you once I have seen it. I will have to see it first.)
3. Nobuntu: Do you want((Turning towards researcher)).....me to interpret what do I see?
4. Researcher: Yes, that would be nice. -----((Nobuntu turns back to look at the monitor))-----
5. Nobuntu: Ok. _ _ _ ((Looking at the screen)) _ _ _ So what I see at the moment is the -----((Pointing at screen))----- bladder. The patient's bladder. No -----((Pointing at screen)) ----- extra-uterine pregnancy. Then I will do the (overview) Mm. I am seeing the placenta. ((Video recording zooming in on the monitor, then out again. A noisy car is passing by outside)) Ok. As I have been looking through I have seen there is((Looking at video

Nobuntu

camera, smiles, turns her head back to the patient, then to the monitor)).....

only one single fetus

6. Researcher: Mm
7. Nobuntu: Let us see where to go now. It looks like a transverse Look at((Looking at camera))the head where it is. I can see the heart: four chambers. -----((Pointing at screen))----- () It is moving. Just showing her the profile((Looking at the researcher)).....
8. Nobuntu: Okay. Ikhanda lakhe leli sesike salibona. Nakhu uma sibuka ngapha, asibone ukuthi sizokwazi yini ukumubona ebusweni... (Okay, this is the baby's head, we have already seen it. Let's see whether we can look at the baby's face when we move this direction.) Let me see whether we'll be able to see the face. Indlu yakhe la ehlala khona umntwana. Nayi-hymen yomntwana, kukhona umntwana angithi lapha phakathi. (This is the uterus, here is the amniotic sac, and the baby matures in there.) Uyabona? (Can you see?) -----((Pointing at screen))----- Bese kuba inhliziyo, uyayibona inhliziyo yomntwana, uyayibona inhliziyo yomntwana ukuthi iyashaya, uyayibona sisi...uyayibona? (This is the heart, can you see the baby's heart, can you see the baby's heart beat, can you see it?)
9. Lindiwe: Ehhe, ngiyayibona. (Yes, I can see it.)

What we see here are mainly online commentary, in the sense described by Heritage and Stivers (1999). Nobuntu is reporting what she sees on the screen, as in turn 5: "So what I see at the moment is the bladder. The patient's bladder". The reporting is followed up by an assessment of what she has reported: "No extrauterine pregnancy". This resembles the assessments connected to online commentaries as suggested by Heritage and Stivers (1999). In turn 5, the addressee is the researcher and the online commentary serves more as a display of expertise to the researcher than a reassurance to the pregnant woman. There is no response from Lindiwe after turn 5, and this may be the reason for why there is a minimal response from the researcher instead. This is also true of the online commentary in the rest of turn 5, "As I have been looking through I have seen there is only one single fetus", directed at the researcher. The choice of English, as well as the nonverbal aspects of communication such as body movement and gaze directed at the researcher and the camera indicates that Nobuntu's primary addressee is the researcher. However, independent of the addressee, we see that the online commentary embodies reporting and assessing (Heritage and Stivers, 1999: 1503) of what Nobuntu sees on the screen at that moment.

Unlike the online commentaries discussed by Heritage and Stivers (1999), not all the commentaries in this example are reporting or assessing. There is also the occasioning of an invitation to seeing during the online commentary. Nobuntu, following her online commentary identifying the four chambers, orients to the pregnant woman, inviting her to see what the midwife has identified in turn 8: “Uyabona?” (Can you see?). The language switch indexes changes in participant structure. Nobuntu encourages Lindiwe to look at the screen, and Lindiwe confirms. The invitation for seeing may function as a way of including the pregnant woman in the examination, and as a way of showing evidence of the fetus to her. However, the pregnant woman may not make sense of what she observes on the screen unless she has an accompanying explanation in the form of an offline commentary from the advanced midwife. The advanced midwife gives a straight assertion as online commentary in turn 8, followed by IS: “Bese kuba inhliziyu, uyayibona inhliziyu yomntwana, uyayibona inhliziyu yomntwana ukuthi iyashaya, uyayibona sisi...uyayibona?” (This is the heart, can you see the baby’s heart, can you see the baby’s heart beat, can you see it?) Here there is no explicit assessment, and the organ as a whole is named “the heart” rather than any identification of the four chambers of the heart. The term “heart beat” is to be heard as an implicit normal assessment. She extends the online commentary, sometimes with more elaboration than in other cases, with an offline commentary (OFC): “Indlu yakhe la ehlala khona umntwana. Nayi-hymen yomntwana, kukhona umntwana angithi lapha phakathi”. (This is the uterus, here is the amniotic sac, and the baby matures in there). The online commentary in turn 8: “This is the uterus, here is the amniotic sac” is followed by an offline commentary: “the baby matures in there”. The function of the offline commentary here is pedagogical, and teaches the pregnant woman where the baby matures and grows.

As we see in the example above, the invitation for seeing is a communicative resource for elaboration, whether it is formulated as an online commentary or an offline commentary. The invitation to see, and the joint seeing accompanied by explanations, enables Nobuntu to display expertise and her own understanding of the ultrasound process. At the same time she is also recruiting Lindiwe in that understanding, by showing evidence and thus reassuring her. The invitation to see, when accompanied by

Nobuntu

online commentaries, helps the pregnant woman to better understand the status of the pregnancy.

Some discourse types are comments about what is going on in the interaction, and I have identified these in Chapter 5 as metacommentaries (MC). This is partly reflected in the dependence on the technology in order to be able to give an assessment of the condition of the pregnancy or of the fetus, such as the prospective metacommentary (PMC) in turn 2: “Angithi ngizokutshela uma sengibonile, kuzofanele kubone mina kuqala” (I will tell you once I have seen it. I will have to see it first.). In the following analysis, I make use of the label ‘prospective metacommentary’ to describe turns that refer to an action that is going to happen. The prospective metacommentary may be self directed, but may also be directed to other addressees, as in the example above (turn 2), where Lindiwe is the primary addressee. The utterance, “then I will do the overview”, also has the status of a prospective metacommentary. Prospective metacommentary can be formulated as a question as in turn 3, where the researcher is the primary addressee: “Do you want me to interpret what we are saying?”. This prospective metacommentary is a marker for a shift of frame, from the frame of the clinical encounter to the frame of the educational research. The shift of frame demonstrates the hybrid nature of the encounter.

I tentatively suggest that a metacommentary embodies an initiative towards a shift of frame. More concretely, MCs initiate and close discourse types. Nobuntu frames her actions for the other participants through prospective metacommentary by telling the patient what she intends to do next, and by offering a translation for the researcher.

The primary focal theme here is normality of the maternal anatomy. Nobuntu does not report abnormalities or the absence of abnormalities, and she does not touch explicitly upon risk. However, the pregnant woman explains that she came for the ultrasound because of her worry about the condition of the fetus. Being able to see the heartbeat for herself, and listening to Nobuntu’s online commentary, was sufficient to reassure her that the fetus was healthy. The process of reassuring about normality is mainly done by conducting the process of finding the relevant organ, and showing the evidence on the

screen. This is an example of procedural expertise that triggers talk about normality and reassurance.

6.4.3 Examination of the anatomy of the fetus

After the gynaecological examination of the pregnant woman, especially the uterus, the advanced midwife begins to concentrate on the anatomy of the fetus. The focus in the following section is the display of expertise by Nobuntu when she is examining the fetal anatomy. The transition marker from the previous phase to this one is when the examination starts to concentrate on details of the fetal anatomy. As in the discussion of sub-phases 2 and 3, we focus here on the talk accompanying the ultrasound scan. Again, in the example below, which is typical, normality is the focal theme. The discourse types we need to pay attention to are primarily online commentaries, including invitation for seeing, and metacommentaries. Together they demonstrate Nobuntu's procedural expertise.

Example 22 (Nobuntu and Lindiwe) Normality confirmations

1. Nobuntu: Small baby -----((Turns the monitor slightly towards Lindiwe))-----I am just showing her the profile.
 _____((Looking at the researcher)) _____-----((Pointing at the screen))-----
2. Lindiwe: Ooh ((Smiles))
3. Nobuntu: Hey, it is running away. ((Tries to move the monitor but hesitates and moves on with the transducer)) Nobuntu: So -----((Pointing at screen))----- You can see the black. You can see the four chambers. -----((Pointing at screen))----- The abdomen. -----((Pointing at screen))-----The thoracic cavity,((Looking at researcher)).....the ribs, the neck. -----((Pointing at screen))----- Hey, this baby is moving! ((Inaudible Zulu))-----((Pointing at screen))----- ()
4. Lindiwe: OK
5. Nobuntu: The spine is intact. And then we take the anterior. OK. Let me go back here and see.
6. Researcher: What did the patient ...what did the patient ask?
7. Nobuntu: I beg your pardon?
8. Researcher: What did the patient ask? She said something, so I just wondered what
9. Nobuntu: OK. She said, she doesn't see what it is.
10. Researcher: No.

Nobuntu

11. Nobuntu: And I have to show her that this is the fetal head
12. Researcher: Yes
13. Nobuntu: This is the heart, this is the whole body. And then she understands. When she sees the whole body she sees that this is the baby.

In the extract above, Nobuntu's observations are straightforward online commentaries that confirm normality when she is examining the fetal anatomy. Lindiwe is the primary addressee until turn 5. Nobuntu accompanies the pointing at the screen with online commentaries about the normality of what can be seen (turn 3): four chambers, thoracic cavity; and (turn 5) the spine is intact. The invitation to see and the online commentary are both uttered in English, but Lindiwe smiles and seems to understand. The pointing also contributes to her understanding about what is going on. The procedural knowledge is displayed through the straightforward online commentary accompanying the activity on the screen.

Then the researcher intervenes in turn 6 and becomes the main addressee. In the turn-taking sequence (6-14), there are several metacommentaries. Nobuntu explains her activity in prospective metacommentaries, for example: "Let me go back here and see" (turn 5) and "I have to show her that this is the fetal head" (turn 11). The question by the researcher (turn 6 and 8) is a metacommentary about what is going on in the encounter. The online commentaries and metacommentaries by Nobuntu display the managing of the tasks of the physical examinations through the application of procedural knowledge.

Later in the same consultation, normality continues to be the primary thematic focus. The following example is somewhat more complex than the previous one, and the themes of worry and reassurance are more explicitly articulated than in the previous example. The expertise displayed is mainly procedural, since Nobuntu explains what she is seeing on the screen, without elaborating it with offline commentaries. The main purpose of this example is to see how Nobuntu deals with Lindiwe's worry.

Example 23 (Nobuntu and Lindiwe) Worry

1. Nobuntu: Those are the four chambers you can see it?-----((Pointing at screen))----- the diaphragm, the four chambers of the heart, -----((Pointing at screen))----- the stomach, the ribs... Uyabo? (Can you see ?)((Talking to Lindiwe))
2. Lindiwe: Hhmm, ngiyabona. (Yes I can.)
3. Nobuntu: You can see the profile.....((Talking to the researcher))..... ----- ((Pointing at screen))----- Nabu ubuso, it's in the profile -----((Pointing at screen))-----((Talking to Lindiwe))..... (This is the baby's face, it's its profile) Nabu ubuso, nawu umlomo, nanka amehlo, nali ikhala nali ikhanda. (Here is the face, that's the mouth, the eyes are here, this is the nose and here is the head. Uyambona? (Can you see your baby?)
4. Lindiwe: Hhmm. Ngiyakhululeka. (?). (Yes, now I feel better because I can see the baby.)
5. Nobuntu: You couldn't see a thing ((Laughing)) You couldn't see a thing. (to Lindiwe))..... Awukakhathali (Are you feeling tired yet?)
6. Lindiwe: Cha. (No) Ngisazombona udokotela? (Do I still have to see the doctor?)
7. Nobuntu: Ehhe usazombona. (Yes you will see the doctor after this.) () The position that she is adopting, I don't think it will allow me to do the BPD ----- ((Moving transducer)) -----
8. Researcher: Mm
9. Nobuntu: _ _ _ _ _ ((Looking at the screen))_ _ _ _ _ Try to see. Kukhona okunye ofuna ukukwazi njengoba usumbonile? (Is there anything else you'd like to know now that you have seen the baby?)
10. Lindiwe: Bengifuna ukwazi ukuthi inhliziyoyakhe ayishayi yini ngoba bengiphathwa isiyenzi. (I wanted to know if the baby's heartbeat was normal because I had dizzy spells.)
11. Nobuntu: She said _____((Looking at the researcher))_____ she was worried because of eh... she did not feel the baby moving for... _____((Looking at Lindiwe))_____ Nini, kusukela nini, izolo? (You said you didn't feel the baby kicking since when, yesterday?)
12. Lindiwe: Cha, ngeSonto. (No, since Sunday)
13. Nobuntu: _ _ _ _ _ ((Looking at the screen)) _ _ _ _ _ For about a day. It was on Sunday.
14. Researcher: So, was that why she contacted the hospital?
15. Nobuntu: Yes, that's why. She thought the baby was not alive
16. Researcher: OK.
17. Nobuntu: _____((Looking at the researcher))_____ She said that the last kick, she felt was on Sunday. So yesterday there was nothing and even today. Now she's happy that the baby is alive because she can see the baby moving. With the ultrasound it shows that she's quite active.
18. Researcher: Mm.

Nobuntu

19. Nobuntu: So, she was afraid today. But now she knows that the baby is alive because she can see the baby is moving. She sees that it is quite active.
20. Researcher: Mm
21. Nobuntu: Now, I think she didn't know that with an ultrasound you are able to see _____((Looking at the researcher))_____ the baby's hand, everything... _ _ _ _ _ ((Looking at the screen))_ _ _ _ _ Quite different ((Putting on more gel on the abdomen))

This example shows how Nobuntu deals with Lindiwe's anxiety. Nobuntu is continuing the online commentary about the anatomical features of the fetus in turn 3: "Nabu ubuso, nawu umlomo, nanka amehlo, nali ikhala nali ikhanda" (Here is the face, that's the mouth, the eyes are here, this is the nose and here is the head), and Lindiwe is invited to see: "Uyambona?" (Can you see your baby?). Nobuntu points at the screen and switches from pointing at the different details of the fetal anatomy. Lindiwe confirms that she is reassured by having seen the baby with her own eyes in turn 4: "Hhmm. Ngiyakhululeka. (Yes, now I feel better because I can see the baby)". The worry that her fetus might be dead, which the expectant mother brought to the encounter, and which was referred by Nobuntu in turn 11 and 19, is replaced by reassurance. Although reassurance is not explicitly the purpose of the online commentary, the effect that it has on Lindiwe is that she feels better. At turn 6, Lindiwe wonders whether she has to see the doctor, and this is followed up by Nobuntu with a confirmation that she has to see him again later. This reference to the doctor informs us about the institutional role occupied by Nobuntu. The advanced midwife identifies and confirms problems in the pregnancy, but the doctor is consulted for a more detailed diagnosis and to make decisions about medical issues such as the timing or method of the delivery.

Lindiwe confirms that she presented for an examination of the pregnancy because of her worry (turn 10), but she is now reassured that the baby is alive because she has seen the evidence that the baby is moving. Notice here that Lindiwe in turn 12 focuses on her desire to see the baby's heartbeat, but Nobuntu focuses on the movements of the fetus. Normality is confirmed by Nobuntu by the visualization of the fetal anatomy and the movements. The worry that the patient had had for several days is gone. The expertise required of the advanced midwife in using ultrasound for visualizing movements is very basic.

The communicative expertise, such as the ability to include the pregnant woman in the examination process is a category of expertise that is not mentioned by de Cossart and Fish (2005), but it is demonstrated here, for instance in the pointing at the screen, and by accompanying the examination with online commentaries and invitations to see (turn 3). The communicative expertise is taken for granted by de Cossart and Fish in their model. This is discussed further in Chapter 9.

We notice that Lindiwe did not have much prior knowledge about what it is possible to identify on the screen with the help of ultrasound. This may indicate for us that the provision of oral information about the examination to the pregnant women prior to the ultrasound encounter is important, especially in a cultural context where a large proportion of the female population is illiterate.

The previous examples had normality, worry and reassurance as their thematic focus. The worry of the pregnant woman was dealt with by showing her by means of ultrasound that the fetus was alive. In the following example, we see that Mthunzi came with a more specific, clinical reason for her worry, which was that the fetus might be affected by the fact that Mthunzi suffered from morbid hypertension.

Example 24 (Nobuntu and Mthunzi) Morbid hypertension

1. Nobuntu: ----((Pointing at the screen))----- Uyabona-ke ukuthi inhliziyo ila ngaphansi (Can you see this part here, the heart is underneath this area) ---- ((Pointing at the screen))-----
2. Mthunzi: Iyona-ke udokotela akhale ngayo. Ingakho ngifuna ukubona ukuthi inhliziyo ishaya kanjani. Kodwa ngiyabona-ke ukuthi ishaya kahle. (Oh, that's what the doctor was concerned about. I also wanted to see if the baby's heartbeat is normal, but I have seen that it is normal.)
3. Nobuntu: Udokotela muphi? (Which doctor did you consult?)
4. Mthunzi: Udokotela engambona ngifike khona lapha ekhaya, owathi kufanele ngize emafutheni khona ezoshekha inhliziyo nakhu ngingumuntu we-BP. Hhayi ukuthi ingiphethe ngoba ngikhulelwe, vele vele ngingumuntu wayo. (The one I consulted the last time I came to the clinic for a routine examination. He recommended an ultrasound since I suffer from morbid hypertension. I don't suffer from pregnancy-induced hypertension but rather morbid hypertension.)
5. Nobuntu: Vele umuntu wayo? (Oh, so you do suffer from morbid hypertension?)

Nobuntu

6. Mthunzi: Hmm...ngiphethe i-treatment yayo. (Yes, I am on a treatment.)

This example illustrates on the one hand Nobuntu's ability to demonstrate normality and on the other hand Mthunzi's elaboration of the reasons which had prompted her to have an ultrasound examination. Mthunzi is the main addressee. In turn 1, Nobuntu focuses on the heart and in an online commentary she invites Mthunzi to look at the screen: "Uyabona-ke ukuthi inhliziyu ila ngaphansi?" (Can you see this part here? The heart is underneath this area.)

The invitation to see (IS) with the explication by Nobuntu (turn 1) and the confirmation by Mthunzi (turn 2) illustrate that Mthunzi understands the implications of the condition of the heart. She explicitly confirms that she understands that it is normal, because the heartbeat is normal (turn 2). Mthunzi responds to the visual image with information about the fact that she suffers from morbid hypertension (Turn 4). The online commentaries with the invitation to see are prompting Mthunzi to talk about her own health, and thus to provide information about a condition requiring surveillance during the course of the pregnancy and the delivery. The confirmation of normality is thus a critical discursive moment that generates relevant information to the advanced midwife for the care of the pregnancy by the antenatal team.

The worry that Mthunzi experienced before she came for the ultrasound examination, and because the doctor had been worried about the condition of the fetus since she suffers from morbid hypertension, is now turned to reassurance that the fetus is healthy. The ability to show evidence of normality, which reassures Mthunzi, requires that Nobuntu has adequate procedural knowledge, and in addition that she is able to provide a convincing explication. The communication is decisive for the reassurance of the pregnant woman.

In the next example, the thematic focus is risk. Mthunzi confirms that her morbid hypertension has had fatal consequences for previous pregnancies.

Example 25 (Nobuntu and Mthunzi) Risk

- ()((Nobuntu sits down. Puts on more gel.)) ((Works with the measurements. Pushes buttons)) ((Somebody is talking behind the curtain))
1. Nobuntu: Ok. ----((Putting on more gel))----- ()
 2. Nobuntu: No. It is really....((Working on measurements)) ...
 3. Mthunzi: ()
 4. Nobuntu: I'm sure uyajabula ukubona umntwana wakho. (I'm sure you are very happy to see your baby.)
 5. Mthunzi: Hhmm. (Pardon?)
 6. Nobuntu: Ngithi, I'm sure uyajabula ukubona umntwana wakho. (I'm saying that I'm sure you are happy to see your baby.)
 7. Mthunzi: Yebo, sewuyazi ukuthi uphila kanjani. (Yes, I am relieved to know that the baby is healthy.)
 8. Nobuntu: Sekungowesingaki lo? (This is not your first child, is it?)
 9. Mthunzi: Oka-5.....(No, this is my fifth child.)
 10. Nobuntu: Kwabaphilayo? (You mean the ones who are alive?)
 11. Mthunzi: Bawu-3 abaphilayo omunye sewashona. Kwadilika iZulu, saphunyuka isisu. (I have three alive children and the fourth pregnancy was a miscarriage.)
 12. Nobuntu: Ngabe owesingaki-ke lo? (So this would have been your...?)
 13. Mthunzi: Ngabe owesix-ukuba baphila bonke. (This would have been my sixth child if all of them were alive.) Sona asizange sisizwe yilutho. Mina ngangihlezi ngithi ngiqhuba isisu, ngasibona ukuthi hhayi. (?) (Halfway through my fourth pregnancy I felt that something was wrong.)
 14. Nobuntu: Kusho ukuthi akazange akhule kahle umntwana. (That means the baby did not mature very well.)

In a question-and-answer sequence, Nobuntu confronts the themes of normality and risk. In turn 6, Nobuntu asks what Mthunzi feels about seeing her baby, and in turn 7 Mthunzi confirms that she feels reassured. However, she had previously experienced a miscarriage and this actualized the awareness about risk in the present pregnancy. The issue of risk is returned to by Nobuntu (turn 10), who asks about the number of Mthunzi's living children. Mthunzi confirms the potential risk when referring to previous miscarriages (turns 11 and 13). Nobuntu responds to the elaboration by Mthunzi with an offline commentary about fetal growth (turn 14). This comment has the function of both explaining and reassuring the expectant mother about the difference between this pregnancy and the one which led to a miscarriage.

Nobuntu

In the discussion above, I have presented typical examples that have illustrated normality talk during the consultation; we have also seen how the advanced midwife dealt with the worry of the pregnant woman in relation to her morbid hypertension. In the following example, we shall see how a more complex pregnancy, a twin pregnancy, is commented on. We shall see that Nobuntu successfully identifies a twin pregnancy, and how she communicates the implications of the twin pregnancy. She first says she identifies a singleton pregnancy, though she later recognizes that it is a twin pregnancy. The identification of twins requires experience. Novices typically face problems in the identification of how many fetuses there are in the uterus. The next two extracts together comprise an ongoing dialogue, which has been split into two separate examples for the sake of readability. Nobuntu's talk accompanies the process of identifying the number of fetuses. We see how her process of confirming a twin pregnancy is communicated to the other participants in the ultrasound encounter.

Example 26 (Nobuntu and Jabulile) Twins

((Jabulile pulls down her traditional skirt, which is very tight. Nobuntu starts working with the transducer again. She puts it in the lower part of the abdomen.))

1. Nobuntu: It is difficult! ((Putting away the transducer and tries to pull down the skirt again)) ((Nobuntu is again trying to use the transducer, and captures an overview of the abdomen.))
2. Nobuntu: _____((Looking at the researcher))_____It is a single fetus...
3. Researcher: Hm
4. Nobuntu: It is a single fetus, and it's vertex, ----((Pointing with the transducer on the abdomen))---- you can see the head here _____((Looking at the researcher))_____. The baby is alive, you can see the fetal heart, and the heart is moving ----((Flipping her fingers to imitate heartbeat))-----. I'm just going to explain it to the mother. _____((Looking at Jabulile))_____ Laleka-ke mngani wami, _ _ _ _ ((Looking at screen))_ _ _ _ njengoba sibuka la, ubukeka eyedwa umntwana, uyezwa? unengane eyodwa. Njengoba simbonile eyedwa nje, uyaphila. Noma ubona engathi zimbili? (Listen my friend, as we can see here it seems you are carrying a single fetus, do you understand? The one that we've seen is healthy. Or, do you think there are two of them?) Awuthi ngibheke kahle, ngathi zimbili... (Let me see carefully, it seems there are two fetuses)
5. Jabulile: _____((Looking at Nobuntu, smiling))_____Hhayi bo!.. (Oh no! really?)

6. Nobuntu: -----((Pointing at the screen))-----Iyaphila, nayi inhliziyo, nayi inhliziyo, uyayibo? (Your baby is healthy, here is the heart, and can you see it?)-----((Pointing at screen))----- Nanti ikhanda uyilibona? (Here is the head, can you see it?)
7. Jabulile: Angiyiboni... (No, I can't see.)
8. Nobuntu: -----((Pointing at the screen))----- Ikhanda nali, lento ewu-round... (Here is the head over here; this big round thing is the head)
9. Jabulile: Ngiyalibona, yilo leli elikhulu...oh. (I can see it, this big round thing...)
10. Nobuntu: Ikhanda ileli eliwu-round.... (The round thing is the head)
11. Jabulile: Oh... (Okay)
12. Nobuntu: Nawu umqolo. (This is the spine...) ()
13. Jabulile: Yini engathi unekhanda elincane (How come the head is so small...)
14. Nobuntu: Akulona ikhanda, ilapha okuphuma khona umchamo. (This is the bladder not the head)
15. Nobuntu: _____((Looking at the researcher))_____ She wants to know what this is...this is a bladder
16. Researcher: OK.
17. Nobuntu: -----((Pointing at the screen))-----Nanka amehlo la. Noma kungabonakali kahle kodwa amehlo lawa, uyezwa? (Here are the baby's eyes, even though it's not very clear, but these are the eyes, do you understand?)
Eyi! Ubophile...Uthi ngizokwazi ukulikala leli' khanda lengane yakho?
(You've worn your skirt tight, I wonder if I will be able to measure your baby's head...)
18. Jabulile: Uthi kunjani? (I didn't hear you, what did you say?)
19. Nobuntu: Uthi ngizokwazi ukulikala? (Will I be able to measure it?)
Ubophe isidwaba sathi nje ngci... (You have tied your traditional skirt very tight...)--((tries to push down the skirt))---- Cishe kwangconywa. (Almost better now...) ((Shouting to some women making much noise while cleaning behind the curtain.)) ((A baby is crying.)) ((Changes modus of the screen to half image)) ((Concentrating in silence)) ()

Initially, Nobuntu addresses the researcher with an online commentary that there is a single fetus (in turns 2 and 4). However, when she explains this finding to Jabulile while continuing the examination of the uterus, she realizes that there may be another fetus (turn 4). She is switching from an observation, confirming that there is one fetus, to questioning about a potential twin pregnancy. She tries to involve Jabulile, encouraging her in turn 6 to jointly look at the screen in order for her to see the evidence herself. While giving online commentaries about what she sees on the screen, she also reassures Jabulile that the condition of the fetus is healthy: "Iyaphila, nayi inhliziyo, nayi

Nobuntu

inhliziyo, uyayibo?” (Your baby is healthy, here is the heart, and can you see it?). The assessment: “your baby is healthy” accompanying the online commentary: “here is the heart is followed by an invitation for seeing: “can you see it?” This is an example of the assessment accompanying the online commentary as suggested by Heritage and Stivers (1999). The invitations to see, in the whole sequence from turn 4 to turn 12, involve Jabulile in the process. Joint seeing is not unproblematic. Here Jabulile says she can’t see, and she mistakes the bladder to be the head, which triggers fear: “how come the head is so small?” After disclosing her first suspicion about the presence of twins (turn 4), Nobuntu shows evidence (turn 6) that the first fetus is healthy. The initial information, which is potentially worrying for Jabulile, is immediately followed up by reassurance that the baby appears healthy and normal.

Nobuntu is switching between orienting to the researcher with online commentaries in turn 2 and 4, via a metacommentary signalling a switch in addressee and switch of frame: “I’m just going to explain it to the mother”, to orienting to Jabulile in turns 4-14. With the metacommentary in turn 15: “She wants to know what this is...this is a bladder”, she switches back to the frame of the educational research and to the researcher as primary addressee.

Example 27 (Nobuntu and Jabulile) Reassurance

20. Nobuntu: ----((Looking at the screen))-----There’s something that I’m...I’m catching here... -----((Pointing at the screen))----- Do like this -----
((Transducer following the left side of the abdomen))----- OK. -----((Moves transducer from below the abdomen and up to the right side of the abdomen))-
-- Nansi inhliziyo yengane, nansi intamo yakhe bese kuba ikhanda. (Here’s the baby’s heart and here is the neck and then the head) Kunelinye ikhanda la, uyalibo? (There’s another head in there, can you see it?)
21. Jabulile: Uyaguquka..... (Is the baby turning?)
22. Nobuntu: Nangu la... (Here it is...) -----((Pointing at the screen))-----
23. Jabulile: Owesibili?...Hhayi, angifune ma-twins... (Is it the second one?)
No I don’t want any twins...)
24. Nobuntu: Ehhe.. (Yes.)
25. Jabulile: Hhayi bo, ngeke kuphume ama-twins la, ngiyawesaba, ngiwesaba kabi. (No way! I cannot give birth to twins, I’m scared of them, and I’m really scared...)
26. Nobuntu: _____((Looking at Jabulile))_____((Laughing))_____

- ((Looking at the researcher))-----I am just saying to her...-----
 ((Adding gel on the abdomen))-----I am not sure...there is something I
 have seen...I thought it was a single baby...But when I see it properly, I see
 two fetal hearts. -----((Indicating two with two fingers))-----
27. Researcher: Two fetuses?
28. Nobuntu: -----((Looking at the screen))-----This is the first. -----
 ((Indicating on the screen. Moves the transducer from the left side to the right
 side to get the image of the other fetus. The head appears)) ----- Maybe look at
 the head. -----((Pointing at the screen))-----That's the head. And we move
 here, and there is another _____((Short glimpse at the researcher before
 turning back to look at the screen))_____There is another one.
29. Researcher: ((Laughing)) another
30. Nobuntu: _____((Looking at Jabulile))_____They are both facing
 down. Awuthi ngibone ukuthi zingaki lezingane zakho ezisiswini (Let me
 see how many babies you have in your belly...)
31. Jabulile: Hhayi, hhayi....Musa ukungishayisa ngovalo...
 (No!...No!...Please don't scare me...I'm really terrified now...)
 _____((Smiles, turns her head towards the camera, turns her head back to
 the screen.))_____
32. Nobuntu: _ _ _ _ _ ((Looking at the screen))_ _ _ _ _ Angikushayisi
 ngovalo, ngikutshela into engiyibonayo. Angithi siyabona sobabili, nawe
 uyangibonisa. Ngikutshengisa ikhanda. Nami angiso phela ukuthi.....ngithi
 ngibona sengathi.-----((Pointing at the screen))----- Khona kuyenzeka
 ukuthi ngingaboni kahle njengomuntu osafunda... (I'm not trying to terrify you,
 I'm just telling you what I see. We are both looking at it and you are
 confirming what I see and I have shown you the babies' heads. Well, I'm not
 saying that I'm completely certain which is why I said, "it seems"...At times I
 don't see properly because I'm still learning...) .
33. Jabulile: _ _ _ _ _ ((Looking at the screen))_ _ _ _ _ Hhayi, ngibona
 ukuthi uyabona. (No, I'm sure you can see properly)

Nobuntu repeatedly expresses, with Jabulile as the primary addressee, that she is not sure whether there are twins or not (turns 4, 20, 30). It is not until turn 26 that Nobuntu addresses the researcher with the suspicion that there are twins, and she shows evidence to the researcher by indicating to her on the screen where the heads of the fetuses are in a metacommentary in turn 26 and in an online commentary followed by metacommentaries in turn 28. Nobuntu seems to express uncertainty about the finding when talking to Jabulile. When talking to the researcher, she expresses her findings in a more confident manner, although allowing herself to be uncertain.

Nobuntu

Jabulile is not pleased with the information that she is carrying twins. In fact, she states that she does not want twins (turn 23) and she expresses fear of having twins (turn 25). Nobuntu tries to compensate for Jabulile's worry by showing her evidence on the screen about the two foetuses (turns 20, 32). In turn 32, Nobuntu switches from displaying the evidence to consoling Jabulile about her worry. This switch can also be seen as a marker for the frame switch and signals the frame hybridity of the encounter, since she reveals for Jabulile that she is still learning (turn 32). This comment explains why the researcher is present in the encounter, and signals that they are dealing with a hybridity of frames. The most prominent focal themes in the example above are normality and worry, and, implicitly, reassurance. Normality is manifest in the online commentaries of Nobuntu where she displays the fetal anatomy for Jabulile (as in turns 4 and 6). Worry, as a thematic focus, is manifest when Jabulile is receiving the information about a twin pregnancy (for example as displayed in turns 23, 25 and 31). Nobuntu does not respond immediately to Jabulile's worry, perhaps because Jabulile is laughing, and she continues to explain to the researcher what she has identified (turn 26). She seems eager to display her finding, and thus her expertise, to the researcher.

Reassurance, as a thematic focus, is manifest in the confirmations of normality, but even more in the response to Jabulile's worry. In turn 32, Nobuntu focuses explicitly on reassuring Jabulile about what her intentions are (not to terrify), and she tells her what she sees.

6.4.4 Measurements

The measurement (biometry) of the fetus is linked to the examination of the fetal anatomy. The advanced midwife often does the examination of the fetal anatomy and the measurements simultaneously, and the more experienced they are, the easier is this multi-tasking.

The calculation of due date may be based on the last menstrual period (LMP) or on ultrasound measurements, following predefined parameters of femur, biparietal diameter, head circumference and abdominal circumference. There is not always a good

correlation between the results obtained from these two different methods of calculation, and this may cause worry rather than reassurance for the pregnant woman. It is a challenge for the advanced midwife to communicate this in such a way that it does not create unnecessary worry on the part of the pregnant woman. The following two examples are typical and straightforward, and the third example illustrates that it is somewhat more challenging to communicate measurements and their correlation with the date of the woman's last menstrual period.

In Example 28 below, Nobuntu tries to obtain reliable information from Lindiwe about the date of her last menstrual period.

Example 28 (Nobuntu and Lindiwe) Measurements

1. Nobuntu: That's the femur ((Looking towards the camera)) ((Pushing buttons to do the measurements)) Se go no? Zingaki izinyanga? (How far are you in your pregnancy?)
2. Lindiwe: Six. (Six months)
3. Nobuntu: Ziwu six? (Six months?)
4. Lindiwe: (?)
5. Nobuntu: Wagcina nini ukuya esikhathini? (When was your last normal menstrual period?)
6. Lindiwe: Ngo-May. (It was in May)
7. Nobuntu: Waya ngo-May? (Did you bleed normally in May?)
8. Lindiwe: Ngaya usuku olulodwa, ngingathini, ngaya ngokuqoqwa ngosuku, kwangaphela ngisho usuku. (I did for a day, in fact it was not even a full day.)
9. Nobuntu: Kwangaphela ngisho...? (You said it was not...?)
10. Lindiwe: Usuku, kwathi nje co co mhlampe ama-hour ambalwa kwangaphela ngisho usuku. (It was not a full day, the bleed was just a few drops which lasted few hours and it stopped before the end of the day.)
11. Nobuntu: Ngaye u-May? (That was in May, is that right?)
12. Lindiwe: Yebo. (Yes)
13. Nobuntu: Buka-la, uyabo? (Look! Can you see this?)
14. Lindiwe: Hmm...Angiboni nokuthi yini le (Yes, but I don't even recognize what I'm looking at.)
15. Nobuntu: (?)
16. Lindiwe: Iyangizelisa enathi ngingabuka ngala. (The screen makes me sleepy, it's better when I look away.)
17. Nobuntu: Uthe ziwu-six... (You said it's been six months since your last normal menstrual period?) ((Nobuntu turns the attention towards the screen again by pointing at it and does some measurements))
18. Researcher: Could you translate, please?

Nobuntu

19. Nobuntu: I beg your pardon?
20. Researcher: Could you translate, please?
21. Nobuntu: Oh. For you?
22. Researcher: Yes, please.
23. Nobuntu: I was just asking her when her last normal menstrual period was. I'm just checking if it correlates with what I'm saying now. She's not sure but she thinks, according to her, to her that it's six months. So I have to measure the (.). the first one was 9.39 , that is () weeks
24. Researcher: Yeah. So she knew her last menstrual period?
25. Nobuntu: She is not sure, but she thinks ...according to her, she thinks she is six months.
26. The researcher: Mm

The focus of this example is for Nobuntu to display her expertise when estimating the date of delivery, as she tries to align the date of the last menstrual period with the ultrasound evidence of gestational age of the fetus. During the physical examination phase, Nobuntu found an incompatibility between the information given by the pregnant woman and the measurements done with the ultrasound technology. In the example above, we see how Nobuntu is trying to find a balance between trusting the information given by the pregnant woman, who has personal knowledge about her bodily experiences, and trusting the information provided by the use of technology about the development of the fetus for estimating the date of delivery.

Nobuntu communicates with the pregnant woman about her last menstrual period as a method for deciding the age of pregnancy. Turns 1-12 constitute a question-and-answer sequence, resembling a history-taking sequence in medical consultations. The questions that comprise history taking must be asked in order to provide the necessary contextual background in which to understand the patient's presenting situation. In the course of the question and answer sequence, the patient may inform the health professional about worries, observations and problems that she may have. Nobuntu's intention is to gauge whether the last normal menstrual period (LMP) correlates with the measurements gleaned from the use of ultrasound technology. Lindiwe thinks that, with reference to LMP, the gestational age is six months. There appears to be a discrepancy between this reported LMP and the date-for-age fetal measurements. To ascertain the reliability of the information from Lindiwe, Nobuntu wants to know if the bleeding was normal (turn

7). Lindiwe confirms, as a self-assessment, that there were only a few drops of blood, over the course of a single day. This volume of bleeding does not necessarily indicate that the duration of the pregnancy has so far been only six months, as a show of blood is not uncommon early in pregnancy. It is probable that the calculation of the age of the pregnancy based on these drops of blood as the LMP is not accurate. The pregnancy may be older. The discussion in this example about the date of the LMP illustrates the uncertainty women may have about the actual date of the LMP, though the date is important for establishing the history and status of the pregnancy. Uncertainty about the date of a woman's LMP is especially common in developing countries, due to the prevalence of teenage pregnancies, poor nutrition, illiteracy and inadequate health services.

A second point concerning this example is to demonstrate the participant structure and potential challenges associated with making joint seeing happen. Nobuntu turns Lindiwe's attention towards an image on the screen with an online commentary: "Buka-la, uyabo?" (Look! Can you see this?) in turn 13. She wants to align with Lindiwe in her interpretation. However, Lindiwe does not understand what she sees on the screen, and she says that she gets sleepy. The attempt at aligning is thus not reciprocated by the addressee. There is no joint seeing, and thus no joint interpretation. The midwife and the pregnant woman would be expected to have converging interests. Nobuntu wants to draw attention to the images on the screen, but this attempt to include her is rejected by Lindiwe. Lindiwe suffers from dizzy spells, and the sight of the screen may have increased her discomfort. Nobuntu's invitation to engage in joint seeing on the screen is thus unsuccessful. Lindiwe cedes to Nobuntu all the authority of interpretation, and accepts her own limitations because she is not equipped to interpret for herself the images on the screen.

As we see in the next example, Nobuntu returns to the question of the LMP later in the ultrasound consultation with Lindiwe, when she has problems with taking the measurements because the baby is moving. The approximate date of the LMP provided by Lindiwe the first time she is asked is six months ago. Nobuntu corrects the dates after identifying the fetal measurements by means of the ultrasound.

Nobuntu

Example 29 (Nobuntu and Lindiwe) Correcting dates

1. Lindiwe (inaudible Zulu)((Turning towards Nobuntu)).....
2. Nobuntu: Ok. She is tired now. () (Inaudible Zulu) _ _ _ _ ((Looking at the screen))_ _ _ _ _ So at the moment the baby is lying like this -----pointing on the abdomen with the transducer-----, it is lying facing upwards. Lying transverse. Because the head is somewhere here----pointing with the transducer----and the limbs are here----((Pointing with the transducer)) ---- Look here ----((Pointing at the screen))----she is turning. But what I have seen:((Turning towards the researcher)).....I have seen the placenta. I have seen the baby. Then I have seen the placenta...where it is, the cord (...) and the spine that is intact. The anterior abdomen. Which is very much important. And then I have seen the...heart. Which have four chambers. And I have seen the diaphragm to show that it is separating the abdomen cavity together with the (...) cavity-----((Counting at her fingers while talking))-----((Turning towards the researcher))...And the liqua seems to be normal at this age
3. Nobuntu: ((Turning towards the screen)).....And the cord is having three openings, which is two arteries and one vein.....((Turning towards the researcher))..... So the only thing that is difficult to get is the AC and the femur length. That is between 21 and 20 weeks
4. Researcher: Twenty?
5. Nobuntu: Twenty weeks. ----- ((Pointing on the wall above her, where there are some tables)) ----- A normally I refer to my ((Pointing)) because we use one to say 17 weeks we have to measure the BPD. And then if we lose it, say for instance like she. She is 18 weeks, and then the BPD is 46 millimetres ((Video camera zooming in to table on the wall with all the measurements: week, BPD, femur, MAD, AC, HC)) Which is close to 20 weeks.
6. Researcher: So, it is quite in accordance with her data then?
7. Nobuntu: I beg your pardon?
8. Researcher: The gestation is quite in accordance with her own
9. Nobuntu: Yeah
10. Researcher: She thought 6 months and you say...
11. Nobuntu: More or less (.) 5((Looking at the screen)).....
12. Researcher: Five months?
13. Nobuntu: Yes, five months. ((Inaudible Zulu)).....to Lindiwe.....
14. Lindiwe: ((Inaudible Zulu))
15. Nobuntu: She thought five months
16. Researcher: Mm
17. Nobuntu: So, the BPD lies (.) Because when you measure BPD you have to((Turning towards the researcher)).....get all the reference points, you cannot ...maxeri, cerebri, cavum septum((Turning towards the schemes on the wall)).....and thalamus.((Turning towards the researcher)).....which are the points for BPD. And when we measure them (.) from outside-inside. And then we make it ()

18. Researcher: Mm
19. Nobuntu: ((Inaudible Zulu))((Turning towards the screen, then Lindiwe)).....
20. Lindiwe: ...((Turning to her back))...
21. Nobuntu: Can I just the last time see if I can get the BPD (.) Oh, there we((Turning towards the screen)).....are. We nearly got it, but we can see the ()
22. Researcher: Mm
23. Nobuntu: So, whenever you are measuring the BPD, the head must roll over and we must be able to see the cranium all over ((a woman in the labour ward is singing)) ((Nobuntu puts more gel on the abdomen.)) ((Nobuntu speaks in Zulu to the singing woman, who stops singing))

The main point about this example is that it shows that the technology is given more credibility than the reported date of the last menstrual period by Lindiwe as a method for estimating the age of the fetus. As a consequence of the measurements taken through the use of the ultrasound technology, Lindiwe instead corrects her approximate dates, eliminating potential suspicion about the abnormal growth of the fetus.

Nobuntu has taken most of the measurements of the head circumference, the abdominal diameter and the biparietal diameter in order to give an estimated date of delivery, but she struggles with the abdominal circumference and the femur (turn 3). She displays procedural knowledge (de Cossart and Fish, 2005) in turn 5, referring in an offline commentary to the tables on the wall, and explaining to the researcher how she does the measurement. The estimated date determined from these measurements does not match Lindiwe's first report of the date of her last menstrual period (in the previous example). When Lindiwe is confronted with the ultrasound measurements, which show approximately 20 weeks of pregnancy (turn 3), she says she could be five months pregnant (turn 14-15). She is modifying the information about her own last menstrual period to make it accord with the information derived from the ultrasound measurements. The ultrasound measurements thus challenge the pregnant woman's lay knowledge.

Another point about this example is that it illustrates that Nobuntu's level of expertise is quite sophisticated. In turn 3, she confirms in an online commentary that the cord has

Nobuntu

three openings, something that is quite difficult to visualize. Nobuntu addresses the researcher, and in turn 17 that is an offline commentary she identifies the key features of the fetus for measurement, using specific medical terminology: “Plexi”, “cerebri”, “cavum septum” and “diaphragm”. She is drawing on the medical discourse, more specifically the curriculum and the medical nomenclature that she has learned (de Cossart and Fish, 2005). Moreover, Nobuntu also explains how she does the measurements:” And when we measure them (.) from outside-inside.” This is also an indirect reference to the curriculum.

Turn 21: “Can I just the last time see if I can get the BPD”, is a metacommentary signalling the hybridity of frames. She addresses the researcher with a question about what she should do. This turn illustrates how she in the frame of the medical examination is influenced by the frame of the educational research.

The next example, involving Mthunzi, is somewhat more complex than the previous ones, as it shows that there is a tension between the methods of establishing the age of the fetus. The main point about the following example is to demonstrate that the lack of correlation between the two methods of measuring, based on LMP or by ultrasound, may cause worry rather than reassurance. Pregnant women may feel pressed to correct their dates of LMP, as in the case of Lindiwe above, for defining the age of the pregnancy. The lack of correlation challenges the credibility of the pregnant woman; the professional may suspect that she does not keep track of the date of her LMP, or even worse that she is deliberately giving the incorrect information in order to cover secrets.

Example 30 (Nobuntu and Mthunzi) Correlation LMP and ultrasound

1. Nobuntu: ----((Standing next to the coach))-----____((Looking at the screen))_____OK. The BPD. The sides....the other side.... Konje zingaki izinyanga? (How far are you in your pregnancy again?)
2. Mthunzi: Ziwu-5 eyigcwele eja-six le. (I am five full months pregnant and this is the sixth month.)
3. Nobuntu: Njengoba ingqasha kalula kangaka... (The baby is really quite active!)
4. Nobuntu: Kodwa indala lengane kunezinyanga ozishoyo. (This baby seems big for a five month old.)

5. Mthunzi: Angiyazi, kodwa lomuntu uthinta ngala uyizwe isibhakela ngala. (I'm wouldn't know anything about that, but the minute you touch me here the baby moves very quickly and punches me on other side.)
6. Nobuntu: Indala kunalokhu okushoyo, lengane. Ikhanda nali likhulu nje uyalibona? (This baby is older than five months; the baby's head is really big. Can you see it, her?) -----((Pointing at the screen))-----
7. Mthunzi: Angazi ukuthi umuntu uyoyiteta kanjani (Well, I wonder how I will give birth to such a big baby.)
8. Nobuntu: Uzozitetela ingane yakho. (You will be just fine.)
9. Mthunzi: Hahyi bo! (You think so...)
10. Nobuntu: I explaining to her that she says she's five months but the head of the baby does not look like a five months one. It is seemingly older than that, even though she says that she is...
11. Researcher: OK
12. Nobuntu: Nali ikhanda lengane yakho uyalibona? (Here's the baby's head, can you see it?)
13. Mthunzi: Ehhe. (Yes.)
14. Nobuntu: Hhmm, uyalibona? (Can you see it?) Let me measure again.
15. Mthunzi: ((Inaudible Zulu)) ((Noise in the background))
16. Nobuntu: ((Inaudible Zulu)) -----((Pointing at the screen))----- (Pointing at the heart) You can see the heart. Four chambers. ((Nobuntu sits down. Puts on more gel.)) ((Working with the measurements. Pushing buttons)) ((Somebody is talking behind the curtain)) OK. ((puts on more gel))

In turns 1-3 in this example, noticing is followed by questions and assessments. The talk about normality is actualized in turns 4 and 7, and the fetus is classified as large for its age. This makes Mthunzi worry about the delivery (turn 7). There is no offline explanation of why the baby is big, but there is a kind of dispute. We see in this question and answer sequence that Mthunzi is fairly sure about her last normal menstrual period, which was in April (the recordings were made in October). Mthunzi confirms that the pregnancy is five full months old and that this is the sixth month. Mthunzi's personal knowledge about her body is given relevance in the interaction. However, this personal knowledge is questioned. The task of Nobuntu is again to see if there is a correlation between the ultrasound measurements and the last menstrual period as reported. After having conducted the measurements, she asks again about the last menstrual period, because her findings show that the fetus is older than what the mother has indicated.

Nobuntu

The advanced midwife confronts the information from the pregnant woman with the information she has gained through her own expertise, repeating the measurements of the head in order to find the age of the pregnancy.

In turn 9, Nobuntu articulates, in English, doubts about the validity of the information given by Mthunzi. However, she attempts to do the measurements again, thus demonstrating propositional adaptation knowledge (de Cossart and Fish, 2005) by re-evaluating the information assembled through her own skills, in response to the conflicting evidence from the mother. At the same time, she displays ethical knowledge in turn 14: “Hhmm, uyalibona? (Can you see it?) Let me measure again”, demonstrating flexibility and humility about the stated wishes of the pregnant woman. Nobuntu takes seriously the information received from Mthunzi, and instead of discounting it, and relying more on her own ultrasound measurements, she does the measurements again. In this context, Nobuntu is acknowledging Mthunzi’s lay expertise about her own pregnancy. By repeating the measurements, Nobuntu may also be demonstrating that she questions her own procedural expertise in doing ultrasound measurements.

This is another example of the fact that there may be differences between the mother’s estimate and the clinical, ultrasound-informed calculations of the age of the pregnancy and consequently the estimation of the date of delivery. Nobuntu has to deal with these two methods of calculating the estimated date of delivery, and has to balance between the information given by the pregnant woman and the information she interprets from her own measurements, in order to reassure the pregnant woman. Excessive growth or, conversely, growth restriction are both indicators of abnormal progress of the pregnancy. Nobuntu switches between giving online commentaries (turns 6, 12), and dealing with the information given by Mthunzi. In a sense, in such instances of uncertainty, both procedural expertise and propositional expertise have to be combined to offer reassurance.

6.5 Summary

The primary aim of this analytical chapter was to draw attention to how the professional expertise of Nobuntu is manifest on a communicative level. The primary object of analysis was the phase of the physical examination of the pregnant woman during the ultrasound encounter. As we recall, the physical examination consisted of the following sub-phases: the preparatory phase, the phase of the examination of the maternal anatomy and the uterus and the phase of the examination of the fetal anatomy and the measurements.

The analysis focused particularly on how the expertise of Nobuntu manifests itself through discourse types online commentaries, offline commentaries and metacommentaries as related to the focal themes normality, risk, worry and reassurance. In the first main section of the chapter, the structural mapping gave an indication of the phases of sub-phases in Nobuntu's encounters and the interactional mapping of a typical ultrasound encounter demonstrated the frequency and volume of discourse types in the expert talk of Nobuntu. As we saw, online commentaries seem to be prevalent during the physical examination phase, accompanied by invitations to see.

The participant Nobuntu oriented to most was the researcher – at times online commentaries resembling offline commentaries and metacommentaries. This can be seen in relation to the fact that the linguistic situation in which Nobuntu found herself was complex, requiring her to switch not only languages, but also frames in order to deal with both the pregnant woman and the researcher. The frame hybridity was given prominence because it also entailed the language switches and translations.

In the second section, I discussed the expert talk of Nobuntu. The professional expertise of Nobuntu was identifiable on a communicative level, through an examination of her use of various discourse types. In the preparatory phase, when taking the pregnancy history, and when preparing the pregnant woman both to ensure that she was lying comfortably and with regard to application of gel, the questions about the patient's previous pregnancy history elicited important information that was relevant for the physical examination. Through a series of metacommentaries, Nobuntu prepared the

Nobuntu

pregnant women for the physical examination. Moreover she explained in metacommentaries to both of the participants how she dealt with the particular ultrasound machine that she was accustomed to. The metacommentaries were both prospective and retrospective.

During the phase of the overview of the maternal anatomy and the uterus, the online commentaries often included an invitation to the pregnant woman and the researcher to engage in joint seeing. This action helped to include the pregnant woman, and functioned as reassurance, since the pregnant woman then could see for herself that the fetus was alive. Moreover, she informed and educated the participants with selective use of offline commentaries. She displayed her procedural expertise in the metacommentaries, during which she was providing information about what was going to happen. The metacommentaries, both the prospective and the retrospective ones, initiated and closed the different discourse types. There was a connection between the sophistication of the online commentary and the sophistication of the procedural and the propositional knowledge. There was also a link between the offline commentary and the propositional knowledge, and there was a connection between the metacommentary and the procedural (and implicitly the propositional) knowledge. I discuss this link more thoroughly in Chapter 9. Let us keep also these points in mind when we analyse the expert interaction by Nonkululeko and Nivedita.

The fact that the technology was present in the medical examination facilitated the involvement of the pregnant women in seeing the condition of the fetus. Seeing on the screen was accompanied by the expert talk of Nobuntu. This talk was usually in the form of online commentaries. The iterative talk of explaining what was happening on the screen, preparing for what the advanced midwife would do next, and explaining the implications, all contributed to the normalization of the pregnancy, which in turn reassured the pregnant women that there was minimal risk. However, the iterative commentaries may also have created temporary false reassurance, since although the initial findings confirmed that everything was normal, in the next instance something may have been seen to be not normal. This false reassurance must generally be dealt

with before or in the closing phase, when the final findings are communicated to the pregnant woman.

Measuring the fetus in order to determine its gestational age is part of the investigation of the fetal anatomy, and an experienced advanced midwife does these two tasks simultaneously. Measurement requires a combination of procedural and propositional expertise. Nobuntu dealt with the discrepancy between the dates estimated from the two different methods of estimating the delivery date: the date of the last menstrual period, and the ultrasound measurements. We saw how Nobuntu managed to juggle between, on the one hand, the dignity of the pregnant woman and, on the other hand, trust in the technology.

Although the ultrasound technology is a resource in the clinical examination, it may also be an obstacle to communication, for instance if the health professional is not used to it, or if the machine breaks down. As we saw in the case of Nobuntu, the problems with the equipment draw the attention of the advanced midwife away from the pregnant woman, and towards the technology itself. Metacommentaries from the healthcare professionals help the pregnant women to understand what is going on in such a situation.

Nobuntu

7 Case study 2: Nonkululeko

7.1 Introduction

This chapter describes how Nonkululeko's professional expertise is manifest during the physical examination of the pregnant woman. As in the previous chapter, I investigate how the advanced midwife articulates her expertise through the discourse types of online commentary (ONC), offline commentary (OFC) and metacommentary (MC). The primary thematic focus, as before, is on normality, risk, worry and, implicitly, reassurance. The research questions guiding the chapter are: What aspects of Nonkululeko's expertise are manifest through the discourse types of online commentary, offline commentary and metacommentary? How are these linked to the focal themes of normality, risk, worry and reassurance?

I initiate the chapter by offering a structural mapping of all the encounters of Nonkululeko in Section 7.2. Then I return to the topic of the interactional mapping in Chapter 5, but here the focus is exclusively on the interactional patterns demonstrated by Nonkululeko in one of the encounters. The mapped encounter is representative of the encounters led by Nonkululeko in this study. The intention is to show the tendencies in frequency and volume of how Nonkululeko uses each of the discourse types – ONC, OFC and MC – and to see how she orients to the co-present participants. I also discuss the thematic focus of the advanced midwives during the encounters.

I then discuss the expert talk of Nonkululeko during the physical examination phase, inclusive of various sub-phases: the preparatory phase, the examination of the maternal anatomy and the uterus, the examination of the fetal anatomy and measurements. I discuss typical examples first, and move to more complex and non-typical examples afterwards.

Nonkululeko

7.2 Structural mapping of all the encounters

As mentioned in the previous chapter, the structural mapping of the encounters gives an indication of how the advanced midwives organized the encounters in terms of phases and sub-phases. Below we see the tendencies in how Nonkululeko organizes the encounters in terms of phases and sub-phases.

Phases/participants	Nonkululeko-Sibahle	Nonkululeko-Mbali (twins)	Nonkululeko-Themba	Nonkululeko-Sibahle (returned)	Nonkululeko-Hlengiwe	Nonkululeko-Duduzile
Pre-examination phase						
Sub-phase: initial greeting		X				
Sub-phase: informed consent	X	X	X		X	X
Sub-phase: presentations	X					
Physical examination phase						
Sub-phase: Preparatory routine	X	X	X	X	X	X
Sub-phase: The examination of the maternal anatomy and the uterus	X	X	X		X	X
Sub-phase: The examination of the anatomy of the fetus	X		X		X	X
Sub-phase: Measurements	X	X	X	X	X	X
Post-examination phase						
Sub-phase: talk about delivery		X				
Sub-phase: summary of findings, and farewells		X	X	X	X	X

Table 9 Structural mapping of all the encounters with Nonkululeko

Nonkululeko had a systematic approach to the encounters, and organized the encounters similarly. However, it is striking that Nonkululeko did not explicitly refer to the examination of the anatomy of the fetus in the case of Mbali. This was due to the fact that Nonkululeko identified a twin pregnancy, and this made her concentrate more on the examination rather than explaining what she observed. In the post-examination phase, she spoke about the delivery of the twins. She did not talk about delivery in the other encounters.

In the case of Sibahle, Nonkululeko was called from the Labour Ward to help during a delivery, and she had to rush from the obstetric ultrasound encounter before she could conclude with the results from the measurements. As a consequence of this, Sibahle had to return another time to have the measurements done.

Nonkululeko

7.3 Interactional mapping of a typical encounter

Continuing in the same manner as with the case of Nobuntu, I present the frequency and volume of the three discourse types as manifest in one of Nonkululeko's ultrasound encounters.

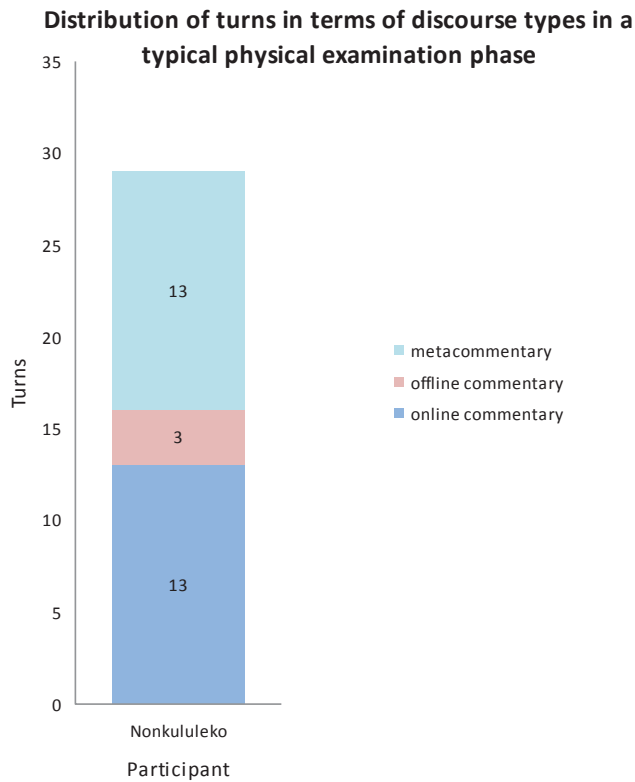


Figure 15 Distribution of turns in terms of discourse types in a typical physical examination phase with Nonkululeko

The Figure above illustrates that most of Nonkululeko's turns consist of online commentaries (13) and metacommentaries (13) followed by 3 offline commentaries. Compared with Nobuntu, Nonkululeko uses approximately half the number of online commentaries and metacommentaries, but approximately the same number of offline commentaries. The figure above indicates that there is an equal distribution between

online commentaries and metacommentaries in Nonkululeko’s talk. However, in order for the comparison of distribution of turns to make sense, we need to do a mapping of the volume of talk. Figure 16 below, we see how the discourse types are distributed after a word count.

The volume of discourse types in a physical examination phase

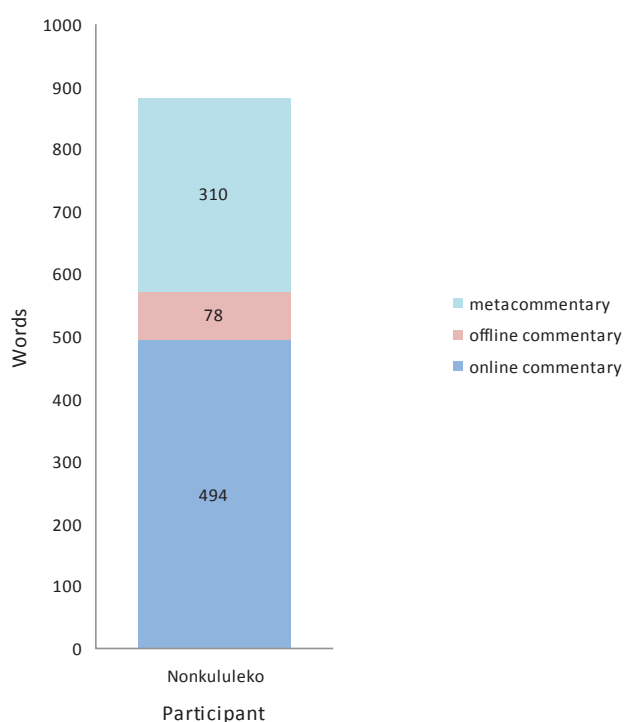


Figure 16 The volume (word count) of discourse types in the physical examination phase with Nonkululeko

When we conduct a word count, we see that the volume of the online commentaries dramatically exceeds the metacommentaries. This indicates that Nonkululeko orients herself mostly to what is happening on the screen, and she is commenting and assessing in the “here and now”. However, she also steps aside and provides metacommentaries on her actions.

Nonkululeko

Now, let us have a look at whom Nonkululeko is addressing through her talk.

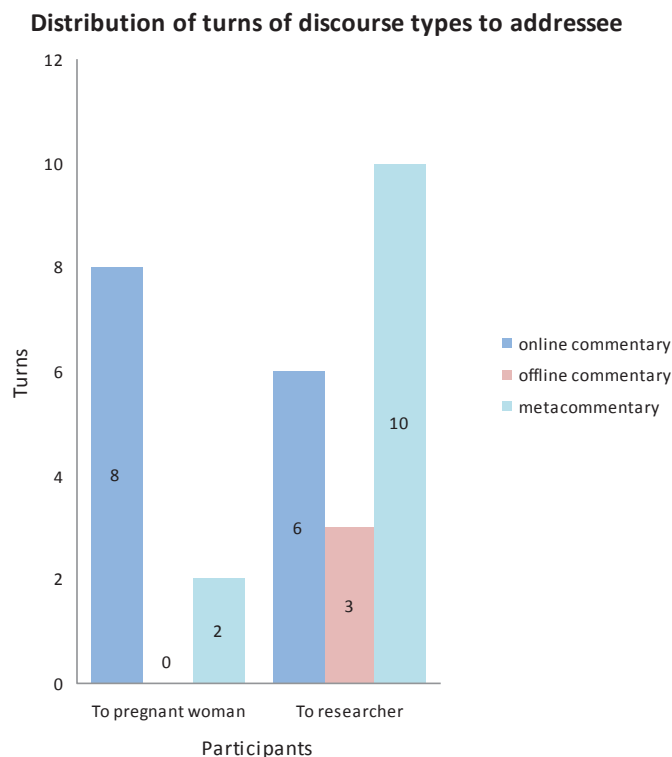


Figure 17 Distribution of turns of discourse types uttered by Nonkululeko to addressee

Figure 17 above shows that Nonkululeko addresses the researcher more than she addresses the pregnant woman. As we saw in chapter 6, also Nobuntu talked most to the researcher, both in terms of frequency (Figure 13) and volume (Figure 14). The orientation of Nonkululeko to the addressee is triggered by linguistic markers such as use of pronouns, but also through body positioning and gaze. In the figure below, we see that the distribution in volume indicates that while she talks quite a lot to the pregnant woman via online commentaries, even more of her talk spanning all discourse types is addressed to the researcher.

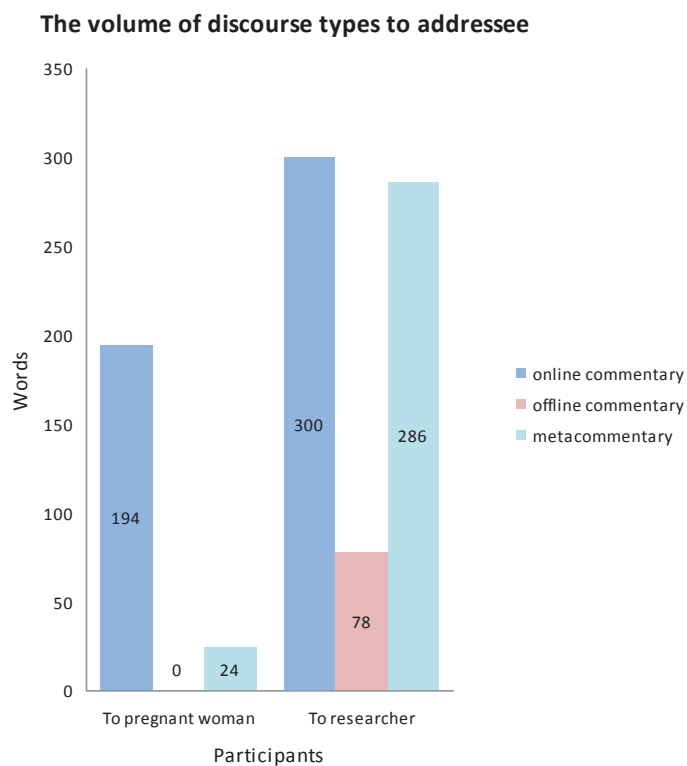


Figure 18 The volume (word count) of discourse types uttered by Nonkululeko to addressee

Nonkululeko directly addresses the pregnant woman several times, and she talks for quite a long time. Moreover, she literally takes a step away from the screen, and offers several metacommentaries. It is worth noting that she provided one turn of online commentary to the researcher, which was a long monologue of 300 words concerning her observations on the screen.

Now let us see how the thematic focus is distributed in Nonkululeko's talk.

Nonkululeko

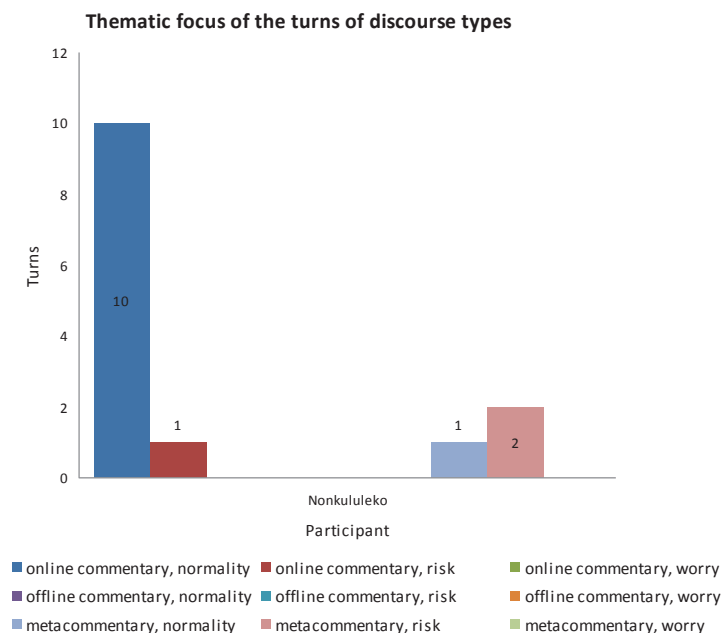


Figure 19 Thematic focus of the turns vis-a-vis discourse types in a typical physical examination with Nonkululeko

When examining the thematic focus vis-à-vis the discourse types used by Nonkululeko, we see that normality is the dominant theme with regard to online commentaries and one turn on normality as metacommentary. Moreover, Nonkululeko refers to risk in an online commentary as well as in a metacommentary. As mentioned earlier, we shall see that reassurance is an underlying theme in most of the talk, so there is not much purpose in trying to quantify it. Reassurance will be pointed out and discussed in relation to the examples given in the next section, in which I analyse the communicative activity of Nonkululeko while she is doing the ultrasound examination.

7.4 The physical examination phase

In this section, I closely examine Nonkululeko's expert interaction in the physical examination phase. I distinguish between the preparatory phase, the examination of the maternal anatomy and the uterus and the examination of the fetal anatomy and measurements.

7.4.1 The preparatory sub-phase

The seemingly trivial activities of the pregnant woman having to lie down on the couch and having gel applied over her abdomen have an important communicative function. In this socio-cultural setting, in which ultrasound technology is not commonly used in antenatal care, and where the midwives usually use their hands, tape measure and stethoscope to measure the size and condition of the fetus, the technology may be perceived as detached and even alienating. To cope with the pregnant women's estrangement, the advanced midwife can compensate communicatively, for example by preparing the pregnant women for every stage of the examination, starting with the application of gel.

Example 31 (Nonkululeko and Mbali) Amafutha

((Nonkululeko puts paper below the pregnant woman's abdomen in order not to spill gel on the clothes))

1. Nonkululeko: So, we are going to ...((Inaudible Zulu)) ..amafutha (gel)
2. Mbali: OK
((Nonkululeko starts to put gel on the abdomen))
3. Nonkululeko: They are cold. So, I am going to have a look at your baby. To see if everything is normal. Any congenital abnormalities. Any...
4. Mbali: OK.
5. Nonkululeko: is it OK?
6. Mbali: yes

The phase of applying the gel is, in this example, the moment when Nonkululeko prepares Mbali for what she may expect from the examination. First she informs her, using a prospective metacommentary, that she is going to apply gel (turn 1). Then she explicitly introduces the thematic focus of normality using a prospective metacommentary: "So, I am going to have a look at your baby. To see if everything is

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normal. Any congenital abnormalities.” A prospective metacommentary is talk that refers to activity that is going to happen. She presupposes that Mbali understands what she means about congenital abnormalities. “Congenital abnormalities” is a medical term, and refers to something acquired during development in the uterus and not through heredity, and as such it is part of the propositional knowledge (de Cossart and Fish, 2005) accessible to Nonkululeko. Normality and abnormality comprise a dichotomy to which Nonkululeko frequently returns in her talk. Mbali seems to have an understanding of what Nonkululeko is telling her, because she confirms with the minimal response: “OK”. However, we do not know whether Mbali understands the implications of the physical examination, or whether she is simply agreeing that Nonkululeko will carry on with the examination.

7.4.2 Examination of the maternal anatomy and the uterus

During each of the examinations, Nonkululeko is clear about what she has to examine and in what order. She starts with an overview of the maternal anatomy, and continues with an overview of the uterus. The marker for the start of this sub-phase is the moment when the transducer has been placed on the abdomen of the pregnant woman, and the monitor starts to project images focusing on the maternal anatomy, such as the bladder, cyst and cervix; and secondly, what is presenting inside the uterus, for example a singleton or twin pregnancy. Nonkululeko is explicit, with the use of metacommentary, in the following example about the fact that she is screening in order to distinguish normality from abnormality in the fetal condition; this example is quite typical for Nonkululeko in this phase,

Example 32 (Nonkululeko and Sibahle) Normality

1. Nonkululeko: _____((Looking at the screen))_____So, initially, I look at the lower pole where I look at the presentation. I look whether the fetus is inside the uterus or not. I look whether ...I look at the bladder. The bladder is intact. There is the urine...you can see -----((Turns the monitor towards the Sibahle, and points at the screen))----- _____((Sibahle holds her head up to look at the screen))_____
2. Nonkululeko: -----((Pointing at the screen))-----((Zulu: khamula?)) which is the bladder

3. Sibahle: mm
4. Nonkululeko: _____((Looking at Sibahle))_____ So, this is the fetus -----((Pointing at the screen while explaining in a word in Zulu))----- So, it is moving, you can see that it is alive. So, I don't hesitate to show you, because I see it is moving. The fetus is alive.
5. Sibahle: mm
6. Nonkululeko: So it is in the uterus. -----((Pointing at the screen))----- I can see that there is a layer in the uterus. The ..you see a line there. So, it is inside the uterus. So, there is no cyst. The bladder is intact. It is a cephalic presentation. So, the fetus is moving. It shows that the fetus is alive. So, from there I do the overview. .. of the uterus. Starting from the lower pole. You can see the head. The chest. The fetal heart. _____((Inaudible Zulu, pointing at the screen))_____
7. Sibahle: mm _____((Raising her head to see))_____
8. Nonkululeko: _____((Looking at the screen))_____ -----((Pointing at the screen))-----The spine. The spine is intact. The spine is intact. -----((Pointing at the screen))-----You can see the t-part of the spine. There is the t-part of the spine, which means it is not () You can also see the kidney -----((Pointing at the screen))-----there is the kidney

The point of this example is to illustrate Nonkululeko's focus on normality in her expert interaction during the examination of a normal, singleton pregnancy.

Nonkululeko accompanies her work with the transducer with online commentaries about what she identifies about the maternal anatomy (the location of the fetus, the condition of the bladder), and she invites Sibahle to jointly look at the screen (turn 1) by turning the monitor towards Sibahle and pointing at the screen. In turn 4, while pointing at the images on the screen, she twice gives evidence in online commentaries that the fetus is alive. She takes the role of a pedagogic clinician, by including the pregnant woman in the examination. This is an expertise that reflects her ability to share basic procedural and propositional knowledge (de Cossart and Fish, 2005) with the pregnant woman, and, implicitly, also with the researcher. Moreover, the invitation to see, accompanied online commentaries with assessments similar to the categories of Heritage and Stivers (1999), is evidence that everything appears to be normal, and this may contribute toward reassuring Sibahle about the health of her fetus (turns 1 and 4). The communication, which is intended to be reassuring, can be considered propositional adaptation knowledge, which de Cossart and Fish (2005) describe as: "knowing how to reorganize

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factual knowledge/skills to respond to the given case”. This means that conducting a physical examination based on propositional knowledge has to be adapted to the context, and conveyed to the other participants as relevant and understandable.

Providing reassurance about normality is a recurring theme. As we see in the online commentaries, Nonkululeko successively confirms normality when speaking about what she sees. Although she does not explicitly confirm the normality of all the organs, the other participants can assume that what they have seen is normal since they are not diagnosed as abnormal, and also because Nonkululeko moves on to the next organ without any mention of alarming abnormality. The professional eye and expertise of Nonkululeko are not questioned, and the pregnant woman takes it for granted that Nonkululeko iteratively reaches the correct conclusions.

In the discussion of structural mapping in Chapter 5, we concluded that the typical structural organization of the physical examination phase could be divided mainly into the following sub-phases: the preparatory sub-phase, the overview of the maternal anatomy, the overview of the fetal anatomy and the measurements. Nonkululeko follows a similar procedure in all the consultations studied, and she systematically goes through the sub-phases. This method of distinguishing the examination into four distinct phases was introduced by one of the lecturers during the practical training in 2004. The phase structure seems to serve as a mental map or a memory tool for Nonkululeko, which helps her to remember what she needs to examine.

Example 33 (Nonkululeko and Themba) Phase structure

1. Nonkululeko: _____ ((Looking at the screen)) _____ It is cephalic in position. -----((Pointing at the screen))-----There is the bladder. And there you can see that it is...there is the cervix...there is no cyst. There are no fibroids. There is the cord. It is an intrauterine pregnancy. You can see the endometrial line there is showing. () So, we move on.to do the overview of the uterus. As to what the ...what is inside the uterus.
2. Themba: ((Inaudible comment in Zulu))
3. Nonkululeko: _____ ((Looking at the screen)) _____ aha. The spine is on the right side of the mother. And the limbs are on the right side of the mother. So it is a singleton pregnancy. There are no abnormalities. The liquor is normal. The placenta is anterior. And it also covers part of the fundus. So you

do, then you do the overview of the fetus now. The head is intact. -----
 ((Turning the monitor towards the woman))-----_ _ _ _ _ ((Pointing at the
 screen))_ _ _ _ ((Inaudible comment in Zulu))

This example is typical of the way in which Nonkululeko organizes her examinations of the maternal anatomy and the uterus. First, in turn 1, she explains matters concerning the maternal anatomy, before she informs in a metacommentary that she is moving to the next organ: “So, we move on to do the overview of the uterus.” Then, in turn 3, she follows up with another metacommentary: “So you do, then you do the overview of the fetus now.” Nonkululeko is here displaying metacognitive knowledge (de Cossart and Fish, 2005).

Although Nonkululeko is following a typical pattern of what to examine when, for instance in identifying the position of the placenta or the number of fetuses, there is still scope for identifying extra details in the terrain within the abdomen. She is able to decide whether to follow the phases strictly, or to improvise, and to identify what she observes when moving from one organ to the next. The courage and ability to improvise can signal a level of expertise, as in the typology described by Dreyfus and Dreyfus (1986), in which the novices typically adhere rigidly to rules, whereas more advanced practitioners see what is relevant in the situation, as part of the whole picture.

Normality is the focal theme in this example, and is confirmed as absence of abnormality. Turn 1 consists of an online commentary: “what we see here is the head”, an assessment of the position of the fetus, an invitation for seeing, another online commentary: “There is the bladder”, another invitation for seeing: “and there you can see” and an online commentary that describes the absence of signs (Heritage and Stivers 1999): “There is no cyst, no fibroids”. The online commentary here is more complex than what Heritage and Stivers (1999) describe, since the application of the technology in the physical examination of the pregnancy affords the opportunity for offering an invitation for seeing and an instant demonstration of evidentials (Peräkylä, 1998) of the condition of the pregnancy.

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In addition to the medical term *fibroids*, she uses medical terminology in her remark: “It is an intrauterine pregnancy. You can see the endometrial line there is showing”.

‘Intrauterine’ and ‘endometrial line’ are terms associated with her propositional knowledge (de Cossart and Fish, 2005), through which she is most probably orienting to the presence of the researcher.

Nonkululeko offers metacommentary: “So, we move on...to do the overview of the uterus” about how she proceeds to the next sub-phase, the overview of the uterus, and is thus including the other participants in the process of the examination. This is a metacommunicative expertise that helps the pregnant woman to understand what is going on, and may function as a reassurance.

In her online commentaries in the example above, Nonkululeko eliminates the possibility of cysts on the cervix; she confirms that there are no fibroids and that the endometrial line is visible. These are all comments illustrating her propositional knowledge (de Cossart and Fish, 2005). The level of expertise reflected in her level of analysis, efficiency, certainty and terminology is more sophisticated than the mere basic level of ultrasound expertise. Let us look more closely at the systematic mental map retained by Nonkululeko, as displayed in her examination of the anatomy of the fetus.

7.4.3 Examination of the anatomy of the fetus

In the previous section, we pointed out that Nonkululeko appears to have a clear mental map of the points to cover, and that this map structures the examination. By navigating with this mental map, she can assure the pregnant women iteratively about the condition of the organs as she examines them. In this section, I continue to examine the expert interaction by Nonkululeko, focusing particularly on how she deals with the examination of the anatomy of the fetus. The marker for this sub-phase is the first detailed talk about the fetal anatomy.

Example 34 is quite complex since it illustrates the procedural and the propositional knowledge about the procedure. Both the procedural and the propositional knowledge

are manifest when Nonkululeko explicitly describes how she organizes the physical examination into four distinct phases.

Example 34 (Nonkululeko and Sibahle) Four stages

1. Nonkululeko: _____((Looking at the screen)) _____ -
 You can also see the kidney -----((Pointing at the screen))-----there is the kidney. It is intact! And you move on...-----((Pointing at the screen))-----
 You can see the limbs and you can see the placenta. ((Inaudible word in Zulu))
 This is the placenta ((Inaudible word in Zulu)). This layer -----((Stops pointing at the screen))----- . It is situated on the fundal region. Then you move on. -----((Moving the transducer))-----...up to the end. So, there are no abnormalities. The head is intact. The heart is OK. You can see that there are four chambers. ----- ((Pointing at the screen))-----You can see the liver. You can see everything. You can see the limbs. There are the limbs. That is the femur. There are no abnormalities. -----((Organizing the paper that is covering the clothes of Sibahle))----- _____((Looking at the screen))_____ So, there are four stages to look into: stage 1: to look at the lower pole to see what is presenting. And then you also see any abnormality. And you also see that it is an intrauterine pregnancy. Or there is an extra uterine pregnancy. And then you are able to (diagnose) if they are in and then you will be able to diagnose the liqua...will be able to see the liqua, if the ..and also to see whether the bladder is intact. There is the bladder. So, in stage 2, you look ..you do the overview of the whole uterus, now. You will be able to see the fetus, you see whether it is a live fetus. ((A phone is ringing)) You will be able to locate the placenta. And then you will be able to see whether it is a single or twin pregnancy. Or a multiple pregnancy. So that is what you see while you...are moving. You are able to see the limbs of the fetus. Up to the limbs. And then stage 2, stage 3 now.
2. Researcher: mm
3. Nonkululeko: you look at the fetus as a whole. You can see the head. The head is OK. There is no abnormality. There is no hydrocephalus. You see the spine. The spine is OK. No abnormalities. The fetus is moving. You can see that it is moving. And at times you are losing the contact. And from there you look at...at..you look at the kidneys -----((Pointing at the screen))-----
 There is the kidney. And from there you look at the limbs. There are the limbs. ----- ((Pointing at the screen))-----The femur. And here is the lower limbs. The lower part. The foot is there. As well as tibia and fibula -----((Pointing at the screen))----- And you can see that there is the placenta lying on the fundus((Turning towards the researcher and back to the screen)).....

Here we see that the procedural as well as the propositional knowledge manifest themselves in the metacommentaries accompanying Nonkululeko's actions. In turn 1,

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starting with the prospective metacommentary: “So, there are four stages to look into...”, Nonkululeko systematically informs the co-present participants, especially the researcher, about each of the identified stages as she reaches it: “stage 1: to look at the lower pole to see what is presenting”, “So, in stage 2, you look ..you do the overview of the whole uterus”, “3 now (...) you look at the fetus as a whole”. These are all prospective metacommentaries, which display the way in which she organizes her knowledge about the process of the ultrasound examination. The use of generic impersonal ‘you’ attests this.

Now let us look at the thematic focus in the above example. During the examination of the fetal anatomy, Nonkululeko regularly distinguishes between what is normal or abnormal. In turn 1, there is an excess of online commentaries about the fetal anatomy, followed up by the confirmation that it is normal, for example: “There is the kidney. It is intact!” and “so, there are no abnormalities. The head is intact.” Each of the organs she is examining is presumably normal, although she is not explicitly commenting on all of them. She confirms twice that “there are no abnormalities” and is thus providing interim reassurance to Sibahle that everything is fine. In turn 3, she continues with the examination while providing online commentaries about what she is looking at. These are followed up with comments confirming the normal and eliminating the possibility of abnormality. Turn 3 is initiated with a metacommentary: “you look at the fetus as a whole”, which is followed up by the online commentary: “you can see the head” and an online commentary of an assessing character: “the head is OK” and the online commentary that describes the absence of signs (Heritage and Stivers, 1999) with a more reassuring function: “there is no abnormality”. The subsequent utterance, “there is no hydrocephalus”, is an online commentary, but in an educational context it may also be interpreted as offline commentary, because of the use of the medical terminology, hydrocephalus. As we noted in relation to examples 32 and 33, these commentaries have an assessing character, and are constantly reassuring the pregnant woman about the health of the fetus. This example adopts the interactional form of a lecture or a teaching session, all explained in the online commentary, and is what I would characterize as an ongoing display of propositional and procedural expertise (de Cossart and Fish, 2005), as if Nonkululeko is being assessed for her expertise.

Nonkululeko's marked air of efficiency does not appear to reduce the quality of the examination. Rather, it is advantageous that Nonkululeko has a good technique in using the transducer appropriately and can thus achieve good images on the screen. Good procedural knowledge (de Cossart and Fish, 2005) is a necessary condition for being a good ultrasound operator. However, the propositional knowledge is important in order to make the procedural knowledge relevant in the context in which it is being used.

Now, let us look at another ancillary benefit of the ultrasound examination, which is not exclusively medical. As noted previously, the ultrasound examination is primarily a clinical examination. However, it also provides an opportunity for the prospective parents to make acquaintance with their future baby, for the first time. Studies report that parents enjoy the possibility that they might be able to identify recognizable human features on the baby, such as the face, the nose, the eyes, the fingers. In the example below, Nonkululeko shows the baby's profile and its nose to the pregnant woman:

Example 35 (Nonkululeko and Themba) Human features

1. Nonkululeko: _ _ _ _ _ ((Looking at the screen))_ _ _ _ _ Then you move on...to chase the spine. Spine is OK. So ...spine is OK. No abnormalities. And then the heart is also OK. ----- ((Pointing at the screen))-----You can see the ventricles and the atria. ----- ((Pointing at the screen)) -----There is the kidney it is also right. ----- ((Pointing at the screen)) -----You see? The limbs. On this side are the limbs ((Turning the monitor to the mother)) ----- ((Pointing at the screen))-----The profile. The nose. You can see the nose.
2. Themba: mm

The focal theme here is normality, with a focus on the heart. In addition to the confirmation of the normal heart, the human features of the fetus are displayed. There is a switch from the online commentary with assessment: "And then the heart is also OK" and the invitation to see: "You can see the ventricles and the atria."----- Pointing at the screen on the beating heart---- to the online commentary that is a direct assertion about the profile and face. The use of technical terms may signal an orientation to the researcher, and hence the educational frame, rather than addressing the pregnant woman

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within the clinical frame. However, Nonkululeko is addressing something the mother can relate to, and this may contribute to strengthening the bonding between the mother and the unborn child.

In the next example, which is fairly complex and which concerns a twin pregnancy, Nonkululeko makes explicit assessments of normality and lack of abnormalities in the online commentaries. As we saw in the interactional mapping, the types of commentaries that Nonkululeko used most were online commentaries about normality. Here we shall see what she actually says. We also see the worry experienced by the pregnant woman when she is informed that she is carrying twins.

Example 36 (Nonkululeko and Mbali) Twins?

1. Nonkululeko: _____((Looking at the screen)) _____Start to look at the lower pole. That is the bladder, which is intact. There is the cervix. There is the cervix. There is the liqua. There is the placenta. It is a bit low lying. But it is not covering a lot. But it is situated anteriorly. That is the overview. Then what is presenting is the head. And there is likewise an intrauterine pregnancy. I can see the uterine wall. There is the uterine wall. And () you are able to see it here. And when there is a cyst, we are also able to diagnose it here. And then there are no abnormalities. So, and then we get to look at what is... what is it inside the uterus...You get the overview of the uterus. There is the fetus. It is moving. _____((Looking at the screen)) _____When you are scanning, you are able to see if it is a singleton pregnancy. Or multiple pregnancy. And then you are also to see any abnormality. You are able to see whether the liqua is increased or not. So, this one is a normal liqua volume. ()So, you move to see the gestation are two-three.() Then you look at the fetus. You look at the head. -----((Turning the monitor towards Mbali))----- -----((Pointing at the screen))-----((Inaudible word in Zulu)) Right? No problem.
2. Mbali: Yeah
3. Nonkululeko: We look at the fetus. Gestation. How is the fetus? The head is intact. No abnormalities. It is intact. No hydrocephalus. No congenital abnormalities. We move on...OH! This is a twin pregnancy! Twins.
4. Mbali: _____((Looking at the screen))_____((Looking at Nonkululeko))_____twins?
5. Nonkululeko: _____((Looking at the screen)) _____Yes twins You see the separating membrane _____((Looking towards the researcher))_____
6. Mbali: No, no, no, no

7. Nonkululeko: _____((Looking at Mbali))____((Turning head towards the researcher, then back to Mbali))_____ Yes, you can see there is a twin pregnancy, sis. There are twins...
8. Mbali: -----((Closing her eyes))-----oh, God!
9. Nonkululeko: -----((Small laughter, claps carefully on the side of the abdomen of the woman))----- Twins. You can see the separating membrane, did you see it _____((Looking at the researcher))_____
10. Researcher: mm
11. Nonkululeko: Separating membrane. The other twin is moving on the other side. And then you can see...((Looking at Mbali)) Can you see, my friend?
12. Mbali: Yeah.
13. Nonkululeko: -----((Pointing at the screen))----- There is head number one. Then you move on and you see another body. There is another body. And there is the head. There is the head ((Inaudible Zulu))
14. Mbali: Yeah. Nothing wrong?
15. Nonkululeko: -----((Organizing the paper in order not to spill gel on the clothes))----- Hæ? No, there is nothing wrong, sister. I haven't seen anything wrong. _____ ((Looking at the screen)) _____ Now, let us look at the first twin. The first twin is a cephalic presentation, which means that it is presenting with a head. _____((Looking at Mbali))_____ ((Inaudible word in Zulu))
16. Mbali: OK.
17. Nonkululeko: _____ ((Looking at the screen)) _____ and, then there is a placenta anteriorly. Now, there is the head. The spine of this fetus. Oh, there it is, good. There is the fetal heart -----((Turning the monitor towards the woman))----- there -----((Pointing at the screen))----- ((Inaudible Zulu))
18. Mbali: ((Inaudible word in Zulu))
19. Nonkululeko: -----((Pointing at the screen))-----Yeah. There is the fetal heart. There is the spine. The position is not right. There. But you can see the spine. Showing. As if his face is seen upwards. Can you see?
20. Mbali: yeah
21. Nonkululeko: oh, another one
22. Mbali: _____((Looking at Nonkululeko))_____
23. Nonkululeko: There is another one shouting ((Referring to the labour ward, and a delivery)) () The fetus is all right. There is the spine. There is another twin. So, there is no abnormality.

The main purpose of this example is to illustrate how the thematic focus of normality and worry are manifest on the communicative level in Nonkululeko's expert interaction during the physical examination phase as she identifies a twin pregnancy. The online commentaries about what is displayed on the screen are mixed with offline

Nonkululeko

commentaries. In turn 1, there is a clustering of straightforward online commentaries, for example: “There is the cervix. There is the liqua. There is the placenta”. A typical example of an offline commentary is: “It is a bit low lying. But it is not covering a lot. But it is situated anteriorly”. This commentary confirms the position of the placenta. The preferable position of the placenta would be on top of the fundus, but as Nonkululeko confirms, although it is situated low, it is not covering the birth channel and it appears not to cause any risk. The offline commentary has an explanatory dimension.

The classification of discourse type can be challenging. An example of an ambiguous commentary of an educative character occurs in turn 1: “When you are scanning, you are able to see if it is a singleton pregnancy. Or multiple pregnancy. And then you are also to see any abnormality. You are able to see whether the liqua is increased or not”. This comment can be interpreted both as an offline commentary and as a metacommentary. On the one hand, this comment is an indicator of the educational frame within which Nonkululeko is operating, informing the researcher about what can be achieved through the use of ultrasound, and what the pregnant woman can expect. The comment is not confirming what is taking place on the screen, but is inspired by the activity on the screen. Nonkululeko follows up the commentary with an online commentary with an assessing character about what actually might be the status of this pregnancy: “So, this one is a normal liqua volume”. This switch between the offline commentaries and the online commentaries demonstrates that the offline commentary is not always necessarily a consequence of the online commentaries, but that offline commentaries are informing the listener, and building up to the interim diagnostic conclusion. On the other hand, this commentary can be interpreted as a metacommentary. Nonkululeko is orienting about what she is doing metacommunicatively, and implicitly refers what she usually does, and intends to do here.

Again, we see that the thematic focus is on normality as opposed to abnormality. In Nonkululeko’s online commentaries, she mentions normality and abnormality explicitly, as in example 36, turn 3: “How is the fetus? The head is intact. No abnormalities. It is intact. No hydrocephalus. No congenital abnormalities”. The constant awareness of the search for normality and the absence of abnormality is characteristic of the talk by

Nonkululeko, which was also confirmed in the thematic mapping. In fact, thematic mapping revealed that all three midwives were mostly concerned with normality. In example 36, normality and the absence of abnormality is a thematic focus for Nonkululeko, for example in turn 23: “So, there is no abnormality, even in this more complex case of twins”.

Mbali expresses worry about having twins, and she expresses worry about whether there may be something wrong with the babies. In a subsequent sequence (turn 7), Nonkululeko shows evidence to Mbali about the fetuses: the position of the placenta and of the head, spine and heart of each fetus. Nonkululeko attempts to reassure Mbali by confirming that there are no abnormalities.

Mbali expresses worry immediately after she is informed that she is carrying twins in utterance 6: “No, no, no, no” and in turn 8: “Oh God!”. Her body movements underline the sense of worry: she moves from looking at the screen and at Nonkululeko to closing her eyes, exclaiming: “Oh God!”. Nonkululeko responds to Mbali’s worry, and pats her carefully on the abdomen. Then she invites Mbali to engage in joint seeing, in the online commentary in turn 11. Mbali’s worry is again manifest in turn 14, in which she asks if anything is wrong. Nonkululeko reassures Mbali about the normal condition in turn 15, and continues with a prospective metacommentary: “Now, let us look at the first twin”. In addition to examining and giving online commentaries about the twin pregnancy, Nonkululeko invites Mbali to engage in joint seeing (turn 15), by pointing at the screen. The invitation to see may be an attempt to show evidence to the pregnant woman which will help to reassure her that the first fetus is normal and healthy. Finally, in turn 23, after having examined both fetuses, Nonkululeko confirms that there are no abnormalities. In this encounter, she thoroughly engages in communicative work to reassure Mbali that there is no risk or need to worry, because the twin pregnancy is normal.

When Nonkululeko actually identifies that the pregnancy in example 6 diverges from the “normal” singleton pregnancy, she expresses enthusiastic surprise: “oh!”, and repeats “twins” several times. She follows up the confirming online commentaries with

Nonkululeko

evidence, now with the researcher as the primary addressee: “There is a small membrane, did you see it. Separating membrane. The other twin is moving on the other side”. Although Mbali may not be aware of the implications of the finding cited, the invitation to look at the screen may in itself be reassuring to her.

Nonkululeko’s enthusiasm at having identified twins may be understood in various ways, depending on the frame we use for interpretation. The enthusiasm may be because she is content that she was able to demonstrate to the researcher, in the frame of the Educational Programme, that she is able to identify a twin pregnancy. The enthusiasm may also be due to a feeling of happiness that two babies will bring double the joy of a singleton to the expectant mother, Mbali.

7.4.4 Measurements

In this section, the focus is on the expert interaction by Nonkululeko when she is dealing with the process of estimating of the date of delivery, whether it is based on last menstrual period or measurements by ultrasound. The marker for the start of this sub-phase is when the advanced midwife starts to measure one of the following features: the head, the abdomen or the femur. Normality is the typical focal theme in the measurement phase, as we see in the example below. The expert interaction by Nonkululeko is manifest in the straightforward activity of measurements where there are no obstacles, such as the fetus moving. The first two examples below are typical of the way in which Nonkululeko measures and talks. The final example is somewhat unusual, as it displays that Nonkululeko is put under pressure while doing the measurements, because she is called away, to the Labour Ward.

Example 37 (Nonkululeko and Duduzile) Measurements

1. Nonkululeko: __ __ (Looking at the screen))_ __ __ __ ----((Turning the monitor towards Duduzile))-----((Pointing at the screen))-----Can you see that? It is a live fetus. -----((Turning the monitor back))-----So there are no abnormalities on the head. There are no abnormalities affecting the spine, and also the head. No spina bifida. Or other congenital abnormalities. Then I am going to do the measurements. Since it is a breech I will start with the femur. Start here. -----((Pushing buttons))-----

- It is really easy for me to get the femur. -----((Finds landmarks on the screen, pushes buttons on the keyboard)) -----((Measuring the femur))-----
 () 28 weeks. Repeat again the measurements of the femur.
 So...something else -----((Pushing buttons))----- Something else-----
 ((Pushing buttons))----- () ___ ((Looking at the screen))_ _ _ _ _
 Measure now the abdominal circumference. () ----- ((Pushing buttons))-
 -----((Putting on more gel))----- Measure now the abdominal
 circumference ((Concentrating in silence)) 27 weeks. Then I must erase
 the...is gonna give us..._____((Talking to herself while doing
 measurements))_____ () So, she is 27 weeks, BPD, head
 circumference 27 weeks, AC 27 weeks 5 days, ? 27. So the EDD is the 20 of
 February 2007. There are no abnormalities.

In this example, we notice that Nonkululeko's mental map is systematic, and it is fairly easy to see the connection between thought and action. In the form of a summary, she gives metacommentary about what she will do, and consequently she does it, as in example 37 above (all in turn 1): measuring the femur, repeating the measurements of the femur, measuring the abdominal circumference and repeating the measurements, and so on. Because the fetus is in a breech position, the femur is easily accessible to measure, and this is where Nonkululeko starts. In other encounters she started by measuring the head. The chronology of which organ to measure first is dependent on the position of the fetus. The advanced midwife needs to have a pragmatic approach to deciding what comes first and last, depending on the position of the fetus during the physical examination. Finally, she reaches a conclusion, and informs those present about the estimated date of delivery, adding that the condition of the fetus is normal.

In example 38, we see that Nonkululeko specifies that she will start with the landmarks of the head, but when she finds it challenging to measure, she decides on another strategy:

Example 38 (Nonkululeko and Themba) Measurements

1. Nonkululeko: _ _ _ _ _ ((Looking at the screen)) _ _ _ _ _ and, then lastly, you do the measurements. _ _ _ _ _ ((Pointing the transducer on the lower part of the abdomen)) _ _ _ _ _ -----((Moving the monitor towards Themba))----
 ---I am going to use the zoom to expand the head. -----((Pushing buttons, and measuring the BPD)) -----() Oh, it is a late ultrasound. It is giving me

Nonkululeko

- 34 weeks. () Again let me measure for the second time. The parameters for the falx cerebri and the box and the head. We can see it. -----((Pushing buttons. Scrolling to find the HC function)) ((Scrolling to find the BPD)) ()
2. Themba: mm
 3. Nonkululeko: _____((Talking to Themba))_____How many?
 4. Themba: (Inaudible Zulu)
 5. Nonkululeko: ____((Turning to the researcher, and immediately back to the screen))_____It is giving wrong meters. It is never reliable. It is never reliable. It is better to measure the femur. Small (...) measurements.
 6. Researcher: OK. Mm

In turn 1, Nonkululeko begins with a metacommentary: “and, then lastly, you do the measurements. I am going to use the zoom to expand the head”. This metacommentary prepares Themba for what is going to happen next. During the measurements of Themba’s baby, Nonkululeko articulates in an online commentary that it is late in pregnancy: “Oh, it is a late ultrasound. It is giving me 34 weeks”. This online commentary is what Heritage and Stivers (1999) referred to as online commentary with assessment of what is observed. Then in a metacommentary she notes that she has to measure again. She finds it difficult to measure the head of the fetus since it is late in the pregnancy, and she expresses, with the researcher as the primary addressee, that she prefers the method of measuring the femur for a fetus of this age (turn 5).

Nonkululeko displays her knowledge of the landmarks of measurements (turn 1) but she is facing difficulties in conducting the measurements. She has the propositional knowledge (de Cossart and Fish, 2005), but experiences problems in conducting the procedural work. This example demonstrates that the ultrasound expertise is a combination of procedural knowledge and propositional knowledge. The situated contextual premises, such as the age of the fetus, the extent of the fat tissue of the woman and the movements of the baby, together determine the extent to which the advanced midwife is able to conduct the examination successfully and, consequently, to display her expertise to the researcher.

Example 39 is slightly more complex than the previous one, since it demonstrates that institutional challenges have an impact on the the professional conduct of Nonkululeko, manifesting in her work with measurements.

Example 39 (Nonkululeko and Sibahle) Labour ward

1. Nonkululeko: So, the last one. You do the measurements. And to do the measurements, you need to know the parameters. -----((Pointing at the screen))-----You must be able to identify this falx cerebri. And you must identify the pox -----((Pointing at the screen))-----There is the pox. It must be in a (uplock) fashion. Keeps so moving ((Laughing)) It is difficult! _____((Looking at Sibahle))_____So, there is the head -----((Pointing at the screen))-----_. _____((Looking at the screen))_____ So, now I am going to do the measurements... as to how old is the baby () -----((Pushing buttons on the machine))----- () Getting the front right. Then I am doing the measurements now of the baby. When you measure the head, you measure from the outer to the inner. And then you press SEND. And then you move on to measure the head circumference again. In case (.) You measure the BPD. Then I measure the .head circumference...to move outer to outer. Outer to outer part of the head. - -----((Pushing buttons))----- Then move on...to the abdomen now. And then when measuring the abdomen, there are also parameters that you look into. They must be used...they must be umbilical cord (?) They must be...there should be a landmark shown.() () It is a moving fetus. And then the spine -----((Pointing at the screen))-----You see? _____((to Sibahle))_____ Very active your baby ((Zulu word)) ((Sibahle is smiling))
2. Nonkululeko: Can you see that? Can you see ((Sibahle is nodding)) It shows that it is a live baby. Then when you come across the heart...you move away from the heart. Cause you estimate the...There are the ribs -----((Pointing at the screen))----- There are the...there are the ribs there. And here is the stomach. And here is the umbilical cord. Then I measure from outer to outer -----((Pushing buttons))-----((Concentrating in silence)) Then we move over to-----((Pushing buttons))----- So, I am repeating the measurements. You have to repeat three times. Until you are satisfied ...you correct the ... ((A person enters the room, talks to Nonkululeko)) As I say...I don't know what role to play. They are asking for my help in the labour ward.
3. Researcher: OK.
4. Nonkululeko: But then you measure. You do all the measurements three times
5. Researcher: mm.
6. Nonkululeko: Until you are satisfied that you have the correct measurements and the parameter as you can see... -----((Pushing buttons))-----((Scream audible from the labour ward))((Mobile phone calls)) -----((Pushing buttons))-----
7. Researcher: What would you do normally when they want your help in the labour ward?
8. Nonkululeko: They say they need my help with delivery. Perhaps there is someone having a problem when she is giving birth to her baby.
9. Researcher: Yes.

Nonkululeko

10. Nonkululeko: When she is giving birth...
11. Researcher: So, please...you must do what you usually do then....
12. Nonkululeko: _____((Looking at the screen))_____OK. Perhaps I should finish her...Measure the abdomen also. Or to get other parameters. The spine... The ribs. The landmarks. The cords. Perhaps they need my help... I am sorry...((A loud scream of a woman is audible from the labour ward that is about 10 metres away)) The estimate date is ...she is 20 weeks and six days. Here is another (...) is 21 plus. Femur length is 21 plus. And the estimated weight is 3.23. grams. And the expected date of delivery is 28. Of February 2007.((Turning her head towards the researcher)).....Now, I must rush to the labour ward.

The example above illustrates the methods Nonkululeko uses for measurements, and it illustrates how she arrives at the results of the measurements. Moreover, the example illustrates that institutional division of labour influences the situated activity. Let us have a look at her expert interaction regarding these issues.

The method for measuring the head circumference is explained by Nonkululeko in the form an offline commentary in turn 1: “When you measure the head, you measure from the outer to the inner.” This is distinguished from the method of measuring the biparietal diameter of the head, which is explained in an offline commentary in turn 1: “You measure the BPD. Then I measure the ..to move outer to outer”. She demonstrates that she has both propositional knowledge and procedural knowledge (de Cossart and Fish, 2005) concerning measurement of the fetus.

The method for measuring the abdomen of the fetus is more vaguely explained, while Nonkululeko has problems in finding the landmarks because the fetus is moving. However, after some struggle, she finds the landmarks and explains in a turn with a switch between metacommentaries: “Cause you estimate the...Where are the ribs?”, online commentaries: “There are the...there are the ribs there. And here is the stomach. And here is the umbilical cord” and finally the utterance: “Then I measure from outer to outer” which may be interpreted as a metacommentary because of its preparatory, self-directed nature. Nonkululeko subsequently measures the femur. Each of the measurements is repeated three times, as quality assurance that the measurements have been done correctly (turns 1 and 3). Consequently, Nonkululeko is able to provide

information about the estimated date of delivery. She has demonstrated certainty about her expertise when going through the measurements, and conducts the measurements in the way in which she was taught during the Educational Programme. This certainty is likely to be reassuring to the pregnant woman, since it may convey to her that she is dealing with a health professional who knows what she is doing.

The example also illustrates how Nonkululeko deals with the dilemma of being wanted in the labour ward. While Nonkululeko measures, she learns that the colleagues working in the labour ward need her help: “They are asking for my help in the labour ward”. This is a reference that draws the attention to the institutional context. The colleagues are demanding Nonkululeko’s expertise. She communicates her dilemma to the researcher: “As I say...I don’t know what role to play. They are asking for my help in the labour ward”. She is both informing the researcher and attempting to get the researcher’s approval to interrupt the physical examination. However, the researcher does not respond, and Nonkululeko carries on with the measurements. After a short while there is a loud scream from the labour ward, audible even though it is approximately 10 meters away, on the other side of the waiting room, and behind two closed doors. Subsequently, Nonkululeko is summoned by a call to her mobile phone. The researcher tries not to influence Nonkululeko’s actions (“what would you do normally when they want your help in the labour ward?”), with the consequence that Nonkululeko becomes insecure about which task to attend to. The researcher then turns to Nonkululeko, suggesting that she should not be influenced by the presence of the researcher: “So, please...you must do what you usually do then...”. Nonkululeko hurries to finish the task she is doing before she rushes off to the labour ward. She does not even take the time to write down the fetal measurements, so the consultation is left incomplete and the pregnant woman has to come back later the same afternoon.

The institutional role of Nonkululeko in the hospital is one which includes considerable responsibility. Nonkululeko is an advanced midwife who has much experience in managing complicated cases. In the example above, she is torn between the frame of the Educational Programme, the frame of the clinical encounter, and the institutional frame of the delivery in the labour ward.

7.5 Summary

The purpose of this chapter was to identify how the professional expertise of Nonkululeko manifested itself during the physical examination of the pregnant woman. I explored how the discourse types of online commentary (ONC), offline commentary (OFC) and metacommentary (MC) are manifest in the expert interaction by Nonkululeko, and how they connect with the thematic focus on normality, risk, worry, and reassurance. The chapter was organized with two main sections: first the interactional mapping of one typical encounter, where I illustrated the frequency and volume of the discourse types, primary addressee and focal theme. Secondly, I discussed the expert talk of Nonkululeko in the physical examination and the sub-phases: the preparatory phase, the overview of the maternal anatomy and the uterus and finally the overview of the fetal anatomy and the measurements.

As shown in the interactional mapping of the typical encounter, Nonkululeko offered most online commentaries, and the primary addressee was mainly the researcher in the educational research frame. The pregnant woman was also addressed several times through online commentaries, then mainly to invite the pregnant woman to look at the screen and to confirm normality. For Nonkululeko, the primary focal themes of the physical examination were normality, and this was emphasised as opposed to abnormality. Nonkululeko was very explicitly concentrating on the dichotomy between normal and abnormal. We have seen from the analysis of her talk that Nonkululeko was very systematically going through one organ at a time, confirming its normality. This iterative confirmation of normality was occasionally accompanied by invitations for joint seeing.

The analysis shows that the online commentaries as well as the offline commentaries and the metacommentaries can be classified in sub-commentaries, as we saw in Table 7, Chapter 5. Some of the online commentaries by Nonkululeko may be interpreted as having an assessing character. Some are invitations to see. The deictic references, such as the pointing on the screen, accompanied by comments and invitations to see are, on the one hand, a way of showing evidence about the normality of the fetuses, and may contribute in a reassurance process of the pregnant women. On the other hand, the

visualization on the screen and invitations to see were also a way of contributing to the bonding by the pregnant woman with the fetus. Enabling the pregnant woman to see what was happening on the screen helped to involve her in the medical assessment process. Nonkululeko was mostly orienting to the researcher, and was thus privileging the educational frame over the clinical frame.

The offline commentaries had an educational character, and seemed to be directly addressed to the researcher, as a display of expertise. Another characteristic of offline commentaries was that they included medical nomenclature, and irrespective of whether the addressee was the researcher or the pregnant woman, they functioned as a display of Nonkululeko's propositional knowledge.

Nonkululeko had a mental map for navigating within the abdomen. She organized the physical examination in four clear stages, and conducted the examinations strictly according to this mental map. This mental map indicated that she had an awareness (de Cossart and Fish, 2005) about the organization of the obstetric ultrasound examination.

Nonkululeko had a good technique for using the transducer, for example when doing the overview and when taking the measurements. There was an association between her level of procedural knowledge (demonstrated by the talk accompanying the layers made with the transducer) and her level of propositional knowledge (demonstrated by the offline commentaries) (de Cossart and Fish, 2005).

On one occasion, while she was engaged in systematically conducting the measurements, Nonkululeko was called to assist in the Labour Ward. This created a dilemma for her about which task to attend to, the ultrasound examination or the delivery. The dilemma was presumably due to the presence of the researcher, as one would expect that the senior advanced midwife in the department would give priority to the urgent delivery case over the routine ultrasound.

Nonkululeko

8 Case study 3: Nivedita

8.1 Introduction

In this chapter, Nivedita is the focus of analysis. As in the previous two chapters, the intention of this chapter is to investigate how the professional expertise is manifest on a communicative level during the physical examination of the pregnant woman.

Normality, risk and worry are a recurring thematic focus, and reassurance is an implicit response to these themes. The research questions guiding this chapter are: What aspects of Nivedita's expertise manifest themselves through the following discourse types: online commentary, offline commentary and metacommentary? How is this linked to the focal themes of normality, risk, worry and reassurance?

The chapter is organized in two main sections, starting with the structural mapping of all the encounters of Nivedita in Section 8.2, followed by an interactional mapping by a typical encounter with illustrations of the frequency and volume of occurrence of discourse types vis-à-vis addressees and focal themes in Section 8.3. This is followed by a close analysis of what is happening in the communication, with examples from the physical examination phase of the encounters. As in the previous two chapters, the discussion of the physical examination phase is organized around the following sub-phases: the preparatory phase, the examination of the maternal anatomy and the uterus, and the examination of the fetal anatomy and measurement.

At the outset it is worth noting that Nivedita is dealing with an ultrasound machine that is not working properly, as it is not calibrated for measurement. This has a significant effect on Nivedita's professional performance, and it may appear that she is compensating communicatively for the limitations to her power to provide adequate service. This and other issues concerning the ability to display expertise are discussed further throughout the chapter.

Nivedita

8.2 Structural mapping of all the encounters

The structural mapping of the encounters of Nivedita below demonstrates how she organised her encounters in terms of phases and sub-phases.

Phases/participants	Nivedita- Salome	Nivedita- Nelisiwe	Nivedita- Dumisani	Nivedita-Amaka
Pre-examination phase				
Sub-phase: initial greeting				
Sub-phase: informed consent	X	X	X	X
Sub-phase: presentations		X (also researcher)	X (not researcher)	X (not researcher)
Physical examination phase				
Sub-phase: Preparatory routine	X	X	X (Identifies a scar)	X
Sub-phase: The examination of the maternal anatomy and the uterus	X	X	X	
Sub-phase: The examination of the anatomy of the fetus	X	X	X	X
Sub-phase: Measurements				
Post-examination phase				
Sub-phase: talk about delivery	X		X	
Sub-phase: summary of findings, and farewells	X	X		

Table 10 Structural mapping of all the encounters with Nivedita

As we can see in Table 10, Nivedita introduced herself to the pregnant women, and in one occasion she also introduced the researcher. As we shall see in the interactional mapping, Nivedita did not talk explicitly to the researcher during the encounters. The presentation of the researcher signals that she nevertheless had a consciousness about the

researchers presence, and she positioned the participant in relation to the pregnant woman.

Nivedita commented on the examination of the maternal anatomy and the uterus in three of four encounters, and she commented on the anatomy of the fetus in all four encounters.

Nivedita used an ultrasound machine that was not calibrated for doing measurements, and this had an impact on how she organized the encounters structurally. She could not conduct the measurements, and was not able to inform about the estimated date of delivery. Consequently she did not talk systematically about the delivery. In the encounter with Dumisani, where Nivedita identified that she had a scar due to a previous caesarian section, delivery was brought up in the course of the the physical examination phase.

Nivedita

8.3 Interactional mapping of a typical encounter

The interactional mapping in Chapter 5 showed that out of the three midwives, Nivedita was the one who offered most offline commentaries. Let us return to the frequency and the volume of the discourse types:

Distribution of turns of discourse types in a typical physical examination phase

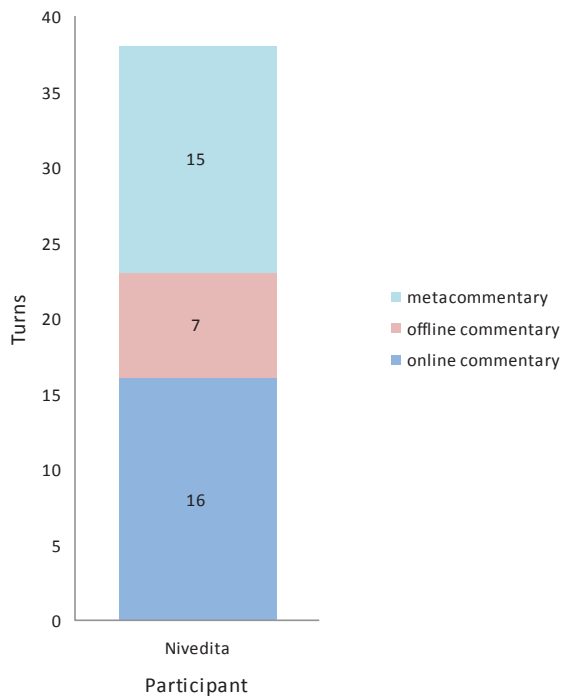


Figure 20 Distribution of turns of discourse types in a typical physical examination phase with Nivedita

Figure 20 illustrates the frequency of discourse types used by Nivedita. Online commentaries and metacommentaries are almost equally distributed, and she offers 7 offline commentaries, which is more than what Nobuntu and Nonkululeko did, with respectively 5 and 3 offline commentaries. Let us see how this manifests itself volume-wise when we do a word count, as in the next Figure.

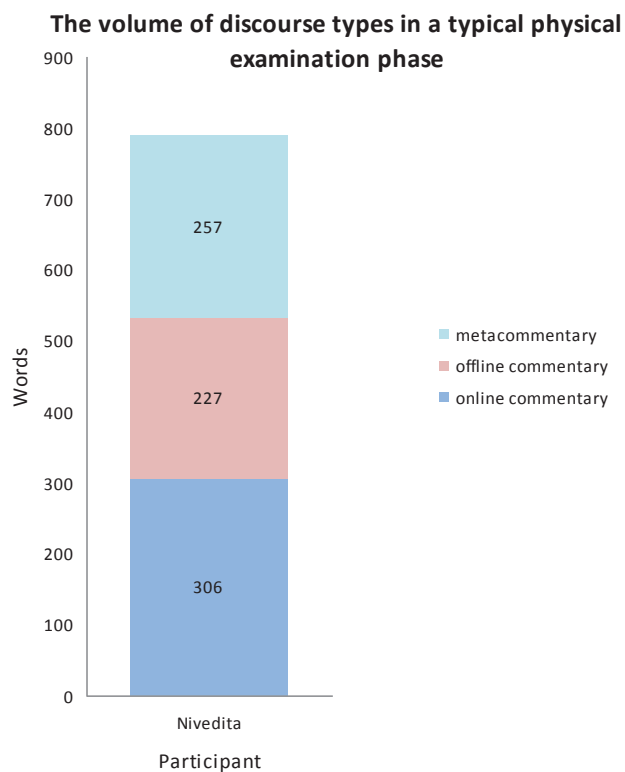


Figure 21 The volume (word count) of discourse types in the physical examination phase with Nivedita

A word count shows that the volume of Nivedita's online commentaries in fact exceeds that of her metacommentaries. The frequency and volume of offline commentaries offered by Nivedita are interesting in that she uses considerably more offline commentaries than Nobuntu and Nonkululeko. We see in the Figure 21 of volume based on the word count, that the offline commentaries by Nivedita include in total 227 words. Nivedita is the advanced midwife who has to use an ultrasound machine that is not calibrated for measurements, and as we shall see in the subsequent analysis of her expert interaction, she actively compensates communicatively for this deficit. This may be why she has relatively many offline commentaries and metacommentaries.

Nivedita

Now let us have a look at how the discourse types are distributed in frequency with regard to the different addressees.

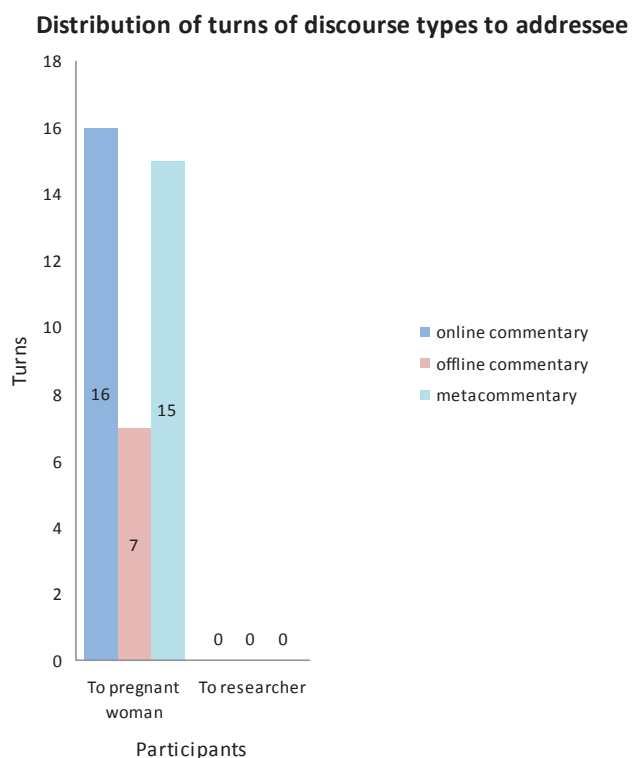


Figure 22 Distribution of turns of discourse types uttered by Nivedita to addressee

In Figure 22, we see that Nivedita exclusively addresses the pregnant woman during the physical examination. In fact, her bodily orientation and gaze is always directed toward the pregnant woman or to the ultrasound technology. In each of her recorded encounters, she did address the researcher a few times, once with a comment concerning the informed consent, and the other with a comment because she had to interrupt one encounter to answer an urgent phone call. She also addressed the researcher briefly while she was explaining to one pregnant woman why she could not reveal the sex of the fetus.

Nivedita expresses online commentaries, offline commentaries and metacommentaries to the pregnant woman in this typical encounter. Let us see how the discourse types are distributed in terms of volume.

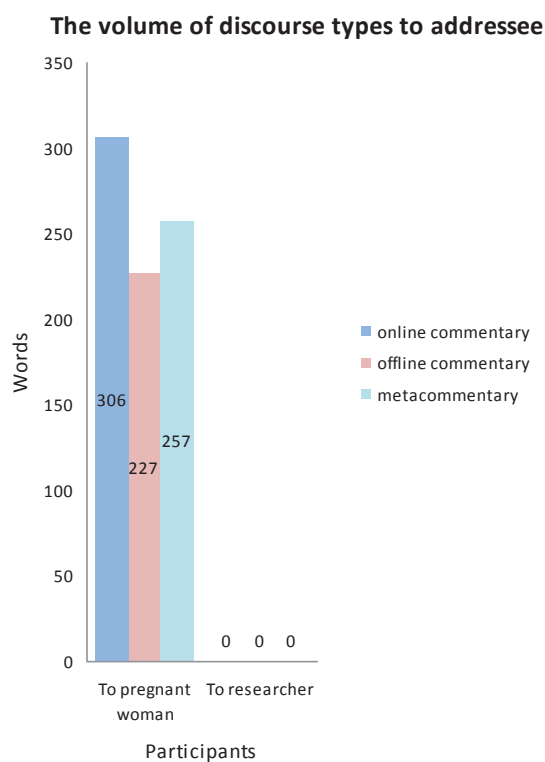


Figure 23 The volume (word count) of discourse types uttered by Nivedita to addressee

The most dominating discourse type is the online commentary, comprising 306 words. As we saw in Figure 22, she occupies almost the same amount of turns concerning online commentaries and metacommentaries, but in Figure 23 we see that she used fewer words while giving metacommentaries.

Nivedita

Now let us have a look at how the thematic focus is distributed vis-à-vis the three discourse types:

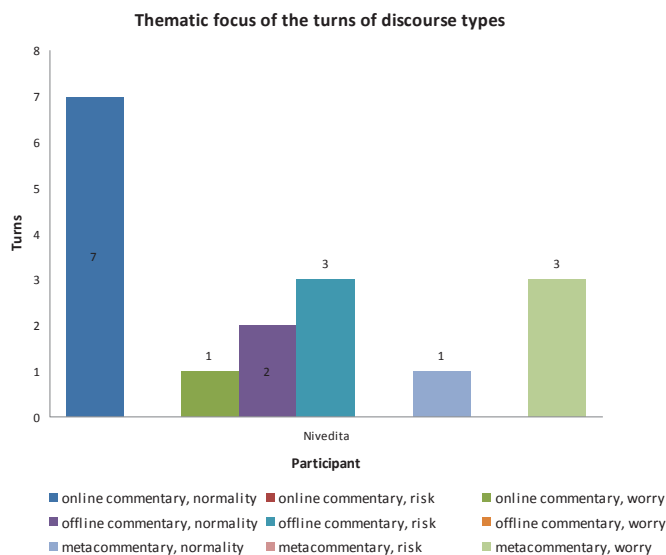


Figure 24 Thematic focus of the turns vis-a-vis discourse types in a typical physical examination with Nivedita

As already mentioned, in the thematic mapping, reassurance is not an explicit thematic category, but it is implicit in the communication about normality, risk and worry. Reassurance is a response to these categories.

Figure 24 shows a tendency toward normality as the most distinctive thematic focus, consisting mainly of online commentaries, but also two offline commentaries and one meta commentary is about normality. Secondly, the thematic focus of worry is expressed through metacommentaries, and once as metacommentary. Risk is mentioned via offline commentaries. The thematic focus of normality includes both explicit talk about normality and absence of abnormality.

8.4 The physical examination phase

The physical examination phase is the core activity during the ultrasound encounters.

We shall examine Nivedita's expert interaction, by looking at examples from each of the sub-phases of the physical examination phase: the preparation, the maternal examination and the fetal examination.

8.4.1 The preparatory sub-phase

For the ultrasound operator to be able to conduct the ultrasound examination of the fetus, the pregnant woman must lie in a position that enables the ultrasound operator to obtain good images on the screen by moving the transducer over the woman's abdomen. The application of gel onto the abdomen of the pregnant woman is necessary to make it possible to move the transducer freely and to obtain images of the fetus. The task of applying the gel is the activity during which the advanced midwife is first in direct physical contact with the pregnant woman. It is also a moment when there is an opportunity to mention issues which may provide information about the status of pregnancy.

Example 40 (Nivedita and Dumisani) Operations?

1. Nivedita: I will explain to you what I am doing. ((Starting to apply gel)) No operations? This is an operation?
2. Dumisani: Yes.
3. Nivedita: Why did you have an operation?
4. Dumisani: I was giving birth to my first baby.
5. Nivedita: Why were you given operation?
6. Dumisani: He was breech also. He was breech.
7. Nivedita: Oh!

After the initial metacommentary, "I will explain to you what I am doing", Nivedita, through her procedural knowledge (de Cossart and Fish, 2005) and midwifery experience, identifies a scar on Dumisani's abdomen (turn 1). The professional eye of the midwife spots the form and size of scars that might have implications for the pregnancy and the delivery. The whole example is a question-answer sequence. Nivedita displays awareness about the potential that the expectant mother might have had

Nivedita

previous operations. When talking about the scar, important information about the previous pregnancy comes up. The previous baby was in breech position, and a caesarean section was necessary. This information is relevant for planning the delivery of the present pregnancy. The seemingly trivial act of preparing the abdomen for an ultrasound may thus be a critical discursive moment of information seeking that is relevant to the delivery.

8.4.2 Examination of the maternal anatomy and the uterus

The marker for the beginning of this sub-phase is the moment when the transducer is in place on the abdomen and it starts to project images on the monitor. During a typical ultrasound examination in the encounters studied, scanning begins with an overview of the maternal anatomy and an overview of the uterus, in any order.

We shall look at a simple, typical example followed by a more complex one. In the typical example below, the most prominent focal theme is normality, and Nivedita is reassuring Nelisiwe.

Example 41 (Nivedita and Nelisiwe) Normality

1. Nivedita: _____ ((Looking at the screen)) _____ OK. What we see is ----
-----((Pointing at the screen))----- And the baby's head is there at the
bottom. You see? And there is some fluid around the baby's head, which is all
normal. ___ _ ((Gaze switching between the abdomen, transducer and the
screen)) _____ () OK. As I said to you, I am just gonna see (?) And I am
gonna show you the baby once I have finished. ((A phone is ringing))
((Nivedita answers the phone)) Sorry! See if we are getting a nice picture now.
-----((Pointing at the screen))----- Placenta anterior. Frontal wall -----
((Pointing at the screen))----- spine is here -----((Turning the button))-
----- () -----((Pointing at the screen))----- Liqua... _____((Looking at
Nelisiwe))_____ OK. OK, we saw the overview of the baby. We see the
head is on the bottom. The uterus. And that it was enough fluid around the
baby. And there is only one
baby. _____((Nelisiwe is looking at Nivedita, she is nodding and
smiling))_____
2. Nivedita: _____((Looking at Nelisiwe))_____ and the heartbeat was
fine. And we saw the placenta also on fundus... Fundus meaning on ...it is
normal placenta. Placenta is afterbirth.

3. Nelisiwe: ((Nodding)) OK.
4. Nivedita: It is normal for afterbirth to be on top of the uterus. _____
 ((Looking at the screen))_____ So, now, just gonna look at more
 detail...more detailed what we saw...But unfortunately, we are unable to do
 the measurements. Oh, it is probably things that you see. () _____
 ((Pointing at the screen))----- All the ? things that you see, that is ()
 _____ ((Looking at the screen))_____ I am just following the
 placenta now. Placenta. And the anterior wall. It is normal.

The main purpose of this example is to demonstrate Nivedita's strategy of reassuring about normality iteratively with online commentaries including assessments. Nivedita does a systematic overview of the position, fluid and placenta. She explicitly utters "normal" four times in this brief example (turns 1, 2, and 4). Moreover, she points to the screen and invites Nelisiwe to see the evidence herself that everything is normal.

In the offline commentaries in turn 2 ("And we saw the placenta also on fundus...Fundus meaning on ...it is normal placenta. Placenta is afterbirth") and turn 4 ("It is normal for afterbirth to be on top of the uterus") she explains the meaning of the terms placenta and fundus, and she explains the functions of the placenta. With these offline commentaries, she demonstrates her competence and at the same time she educates the pregnant woman. Unlike Nobuntu and Nonkululeko, Nivedita seems to orient to the pregnant woman rather than the researcher when offering offline commentaries, as evidenced by her attempt to make medical concepts intelligible, thus extending the circumference of the consultation frame. Indirectly, of course, her explanations are also directed at the researcher.

In the next example, which is more complex than the previous one that dealt only with normality, the thematic focus is normality, reassurance, and risk. In the consultation with Salome, Nivedita starts by doing the overview of the uterus.

Example 42 (Nivedita and Salome) Normality, reassurance and risk

1. Nivedita: ____((Looking at Salome))____ Looking down on...the uterus. The top of the uterus. That is what we are looking for, isn't it. Where the head is. _____ ((Looking back at the screen)) _____ Yes. I am looking at the

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- bottom now. -----((Pointing at the screen))-----And I can see the head. And the bladder. That is what we were looking at. -----((Pointing at the screen))-----
---- But I will show you. _ _ _ _ ((Looking at the screen)) _ _ _ _ _-----
((Working with the transducer on the abdomen))---
2. Nivedita: _____((Looking at Salome))_____ ----((Holding the transducer in her hand away from the abdomen))----- OK. What I was trying to do was to get an overview of the whole fetus. And what we saw was that the head was at the bottom. And that there was water around the baby's head. And we saw the placenta was there. -----((Indicating with her left hand on the abdomen of Salome))-----Anterior...on the frontal wall. Anterior means frontal on the top of the uterus. And normal placenta...placenta is afterbirth...it is normal for it to be at the top () Now we found that the placenta was there and there was enough fluid and there was a live baby. And just general....How the baby is situated in the presentation...presentation means where the head is. In any pregnancy you () exactly where the head is, but as the pregnancy is progressing, you want to see that the head is at the lower part of the uterus. So that when you deliver if the baby comes out...if you have a normal delivery, the head comes out first.
 3. Salome: Yeah.
 4. Nivedita: Cause any other position...can be difficult to deliver. We might have to ask you to have a caesarean section. But we saw now that the head is OK. So now we have to look at ...the reason we look at the () is to make sure that the state of your pregnancy was ...you need the assurance to be told that it is fine. The baby's head is at the bottom. OK. Fine. -----((Starting to move the transducer on the abdomen again))----- _ _ _ _ ((Looking at the screen))_ _ _ _ So I am just gonna look at the ...

The thematic focus in this example is normality and reassurance, as well as risk. The main point of this example is the need for reassuring the pregnant woman that everything appears to be well. In turn 1, Nivedita explains, through several online commentaries, what she is looking at. She has not yet included the pregnant woman by inviting her to engage in joint seeing. She reassures Salome that the position of the fetus is nothing to worry about, since she can confirm that the head was down. She announces that she will show evidence of what she says, through the metacommentary: "But I will show you" (turn 1).

In turn 2 there are retrospective metacommentaries about what Nivedita has been doing, for example: "What I was trying to do..." followed by online commentaries having both a summarizing and assessing character, such as: "And what we saw was that the head was at the bottom". This is what Heritage and Stivers (1999) would refer to as

reports of observations or as *assessments of what is observed*. Subsequently, she offers offline commentaries: “Anterior...on the frontal wall. Anterior means frontal on the top of the uterus”. She summarizes, but she does not depend on referring to the screen while doing so.

Nivedita gives a series of confirmations of normality of the position of the baby, the amount of fluid, the amount of water, the position of the placenta and the viability of the fetus. Let us break up turn 2, and define the different types of commentaries: “And what we saw was that the head was at the bottom. And that there was water around the baby’s head. And we saw the placenta was there. Anterior...on the frontal wall” are online commentaries. Confirmation of normality through online commentaries are further supported by offline commentaries: “Anterior means frontal on the top of the uterus”, “placenta is afterbirth... it is normal for it to be at the top ()”, “and just general...How the baby is situated in the presentation... presentation means where the head is...”, and “So that when you deliver if the baby comes out...if you have a normal delivery, the head comes out first”. These offline commentaries offer elaborations of the facts and support the process of reassuring the pregnant woman. The offline commentaries here are mainly explications of medical terminology, which is a display of Nivedita’s propositional knowledge (de Cossart and Fish, 2005).

In the offline commentaries, Nivedita explains terminology and issues about the pregnancy that may not be familiar to the pregnant woman. She educates the pregnant woman about absolutely basic pregnancy-related issues, e.g. in a normal delivery the head would come out first. However, she also educates the pregnant woman about the position of the placenta. Moreover, she explains that it is normal that the placenta is high in the uterus, implicitly reassuring the woman that in this pregnancy there is no obvious risk. She supports her explanations of technical words by explaining them further, in order to be absolutely sure that the pregnant woman will understand the implications of what she is saying.

In turn 4, the focal theme includes risk. There is a risk dimension to Nivedita’s offline commentary when she explains that at delivery, positions other than cephalic may be

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difficult to deliver. She introduces the likely consequence of a non-cephalic position, which may be a caesarean section.

Reassurance is also prominent here. Going back to the example, in turn 4, Nivedita explicitly states: “You need the assurance to be told that it is fine”. Nivedita is conscious about her role when reassuring the pregnant woman about normality. She looks directly at Salome when explaining what she identifies during the procedure, and she does not let herself be distracted by the activity on the screen.

8.4.3 Examination of the anatomy of the fetus

In the next phase of the interaction, the focus is on the expert interaction by Nivedita when she is examining the anatomy of the fetus. A marker of this sub-phase is the point when Nivedita starts to go into detail about one of the traits of the fetal anatomy.

First, in the examination of the fetus, Nivedita typically talks about the viability of the fetus. The focal theme in the example below is worry.

Example 43 (Nivedita and Salome) Worry

1. Nivedita: -----((Switching between looking at the screen and the abdomen, and moving the transducer))----- Before you get too worried I just gonna show you -----((Starting to move the monitor))----- I just want to show you the heart beat -----((Turning the whole portable US machine))-----I don't want you to get too worried. Can you see that? That's..._ _ _ _ _ ((Pointing at the screen)) _ _ _ _ _ that is the heart beat. OK? ((Pointing at the screen)) and these lines coming to meet...you don't have to worry, because it is reflection from the () Then it is usually.... ----- ((Stops pointing at the screen))-----((Turning the button))----- _ _ _ _ _ ((Pointing at the screen)) _ _ _ _ _ Can you see the head?

Here Nivedita uses the ultrasound to show evidence of normality and to reassure the woman that there is nothing to worry about, as for example in: “before you get too worried...”, “I don't want you to get worried...” and “You don't have to worry”. All of the utterances thematizing worry are followed up by online commentaries, including an invitation to see, and pointing at the screen, for example: “I don't want you to get too worried. Can you see that? That's..._ _ _ _ _ ((Pointing at the screen)) _ _ _ _ _ that is the heart beat. OK?”. Nivedita requests confirmation after her observations: “Can you

see that?” and “OK?” and “Can you see the head”. She does not signal that she needs an answer, but carries on with the examinations. This activity is a way of showing evidence of normality and of the fetal activity as a reassurance for Salome.

Use of online commentaries with invitations for seeing is also a strategy that may enhance bonding by the prospective mother with the fetus. In the following example, we see how Nivedita focuses on the parts of the anatomy that are easy for the pregnant woman to identify with.

Example 44 (Nivedita and Salome) Human features

1. Nivedita: It is the () I will try to get you a better vision of the baby. You see there_____ ((Pointing at the screen)) _____ that is the face. You see that. The profile of your baby. I am sorry that we don't have the pictures...it is a portable machine...OK _____ ((Pointing at the screen)) _____ You see the baby's hand is close to the mouth. It is moving it. _____ ((Looking at the screen))_____
2. Salome: mm ((Looking at screen)) ()
3. Nivedita: -----((Pointing at the screen))-----look there. The spine. The white dots there. It is the baby's spine. -----((Pointing at the screen))----- You can see it? That is the head. You saw the head there. -----((Pointing at the screen))-----That is the () The white upper part...you can see the skin. () -----((Pointing at the screen))----- The placenta. The space that you see..it is the fluid that is around the baby. -----((Pointing at the screen))----- Also fluid. -----((Pointing at the screen))-----You can see a bit of the placenta is there. Can you see?
4. Salome: ((Nodding))
5. Nivedita: -----((Moving the transducer))----- ()

The main purpose of the example above is to illustrate how the advanced midwife may emphasize features that demonstrate the fetus as a human being-to-be, for instance by showing the mother the baby's profile (turn 1), and the hand moving towards the mouth (turn 1). Being able to see the presentation of the little human being may contribute to bonding.

Moreover, the normality of the spine, the head and the placenta is pointed out (turn 3). Nivedita continuously points at the screen and invites the pregnant woman to engage in

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joint seeing, accompanied by online commentaries: “ -----((Pointing at the screen))-----
-----You see there...that is the face. You see that. The profile of your baby. I am sorry
that we don't have the pictures.” Nivedita's remark about taking pictures of the fetus
emphasizes the references to the fetus as a human-being-to-be, and thus to the process of
bonding by the pregnant woman.

Another point about the example above is that the division between the examination of
the maternal anatomy and the fetal anatomy is not clear-cut. Some themes that, in a strict
sequence, would be found in one phase may appear in a different phase. An example of
this is the talk about the fluid and the placenta. This would, under a strictly
chronological examination, fall into the content of sub-phase 2 [examination of the
maternal anatomy and the uterus], but in this encounter it blended appropriately in phase
sub-phase 3, [examination of the fetal anatomy]. Nivedita does not follow a strict mental
map of the structure of the examination, but has a more pragmatic approach, jumping
from one theme to another. This is indicative of her intention to orient to the pregnant
woman as her primary addressee. This also demonstrates the difficulty of adhering
rigidly to a structure in communication. Themes evolve and appear during the course of
communication.

In the subsequent example, the transition between the phases goes from talking about
issues that fall into sub-phase 3, placenta, to talk about details of the fetal anatomy. It is
interesting to observe the extensive work that Nivedita is doing to involve Nelisiwe as a
participant in the examination.

Example 45 (Nivedita and Nelisiwe) Transitions between phases

1. Nivedita: _ _ _ _ _ ((Looking at the screen)) _ _ _ _ _ -----((Working
with the transducer))-----I am just following the placenta now. Placenta.
And the anterior wall. It is normal. ()
2. Nivedita: _ _ _ _ _ ((Looking at the screen)) _ _ _ _ _ Now I am just
gonna look at the baby's spine. -----((Pointing at the screen))----- You can
see that the skin is intact there. Baby's. Skin intact... () OK we had a look at
the spine. And we saw that it was fine. Now. What I am gonna do, I gonna
allow you to see -----((Turning the US-machine entirely towards the
pregnant woman))-----

3. Nivedita: At least the profile of the baby. So, you won't get too worried. What I show to you is the spine. -----((Pointing at the screen))-----
This is the baby's spine. When you are looking at top, you can see the ... That is the baby's head. -----((Pointing at the screen))-----
The white line there.
4. Nelisiwe: ((Nodding))
5. Nivedita: And then we are going up a bit, looking at the lip. OK? If there was any opening...anything, they wouldn't get a line on top. It means that everything is fine. _____((Looking at Nelisiwe))_____ Do you know what that is?
6. Nelisiwe: Heart?
7. Nivedita: Heart beat. () Up there...the spine goes up there. See if we could see () ((Moving the transducer towards the bottom of abdomen)). You can see the whole (.) of the baby. -----((Pointing at the screen))-----
-----The hands, the other side, that is the head. You can see the clear view. () Sometimes we get a clear view. OK. That was what I wanted to show you. That is the baby's abdomen. -----((Pointing on the screen))-----
And you can see the black areas around here. That is liqua.

Nivedita involves Nelisiwe through explicit invitations to see, but also by pointing at the screen. Moreover, she is including Nelisiwe both when posing her questions and when she is informing her about what is happening through metacommentaries, such as: “now I am just gonna look at the baby's spine--((Pointing at the screen))--You can see that the skin is intact there.”

Nivedita follows up the introductory metacommentary, “Now, I am just gonna look at the baby's spine”, with an online commentary, “You see that the skin is intact”, and she continues with a metacommentary which is a confirmation of the finding and a preliminary assessment: “OK we had a look at the spine. And we saw that it was fine”. Interestingly, Nivedita uses the pronouns “we” and “you”, while commenting online, and she follows up by saying she will turn the computer to allow the pregnant woman to see. This is a strategy for involving the pregnant women in the examination. She also asks Nelisiwe questions: “Do you know what that is?”, and we see in turn 6 that Nelisiwe understands what she is looking at. It is not difficult for Nelisiwe to recognize the beating heart.

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When Nivedita wants to reassure the pregnant woman, she turns the monitor, and starts to address her directly, verbally emphasizing that she should not be worried.

8.4.4 Measurements

As we have noted, in the South African setting many pregnant women tend to be uncertain about the date of their last menstrual period; this was commonly due to factors such as malnutrition, illnesses and teenage pregnancies. The measurement of the fetus by ultrasound is therefore a more reliable way of establishing the due date, which is one of the most common reasons why pregnant women are referred for an ultrasound examination. Yet there is no official programme for the delivery of ultrasound scanning in the state maternity services in South Africa.

Because fetal measurement is such a common reason for needing to use ultrasound, it is especially important that the ultrasound equipment is calibrated for taking measurements. Unfortunately, in Nivedita's hospital, the ultrasound machine, a portable one, is partly out of order, so it is not possible to use it for taking fetal measurements. Nivedita has to compensate through her communication with the pregnant woman because of this deficit. Instead of entering the sub-phase by pointing out the landmarks on the anatomy that are relevant for the measurements, she explains what she would have done if the technology had been working. The two following examples are quite complex, showing how Nivedita deals with the broken machine and is thus not managing to provide the quality of service which she would prefer to offer.

Example 46 (Nivedita and Salome) Broken technology

1. Nivedita: _____((Looking at the screen)) _____ The shape of the head seems fine. _____((Pointing at the screen))_____We also look at the ventricles, and it looks fine. Everything seems proportional. I don't see any significant.. But if the machine had been working, I would have measured it. Then I could...I would have measured...this is the abdomen. () You can see the heart is..._____((Pointing at the screen))_____That is what I would have measured. _____((Looking at Salome))_____The abdomen and the head would have given me the indication of how old the baby is. _____((Pointing at the screen))_____This around here. I

- would have measured----- ((Pointing at the screen))----- And we also see the black points ...the fluid...OK, Salome.
2. Salome: Can you see what the baby is?
 3. Nivedita: -----((Starts cleaning the transducer))-----((Looking at Salome))_____as I explained to you in the beginning..._____((Looking at the researcher))_____everybody asks us...they want to know the sex of the baby_____((Looking at Salome))_____ First of all, I am not qualified to see it properly. And in the public sector...-----((Cleaning the abdomen for gel))-----we don't look for that. Cause maybe we look like overall...how is the baby doing. How is the ...If there is anything wrong with the baby.
 4. Salome: _____((Looking at Nivedita))_____So when am I supposed to expect the baby to come? Before or.. after or..
 5. Nivedita: _____((Looking at Salome))_____Well, as I explained, we don't have the facilities to...measure...because the machine is out of work...
 6. Salome: because the doctor...
 7. Nivedita: _____((Looking at Salome))_____Mm. Next month? Yeah...the baby seems to be growing well. And you won't have a problem. And...the sister has brought you here because she was worried if the baby has turned...and whether it is facing. The lower segment of the abdomen... The lower part of the uterus. But as we saw, the baby is (). But when we ...once you come into 8th or 9th month, it is more important that the baby's head is down Because if the head is up, on top here, it is. ----((Pointing at the top of the abdomen))-----((Looking at Salome))_____You know what? What is it called? Then it is a breech presentation. That is why we worry about a breech presentation. But now, what we saw, is ...you have still got time, because the head can always turn. When you come to about...let's say 36 weeks...How many weeks are you now? Do you know?
 8. Salome: _____((Looking at Nivedita))_____34.
 9. Nivedita: _____((Looking at Salome))_____-----((Cleaning the transducer and placing it on the ultrasound machine) 34 weeks. Yeah. Right till 36 weeks, the baby can still turn. But once you pass 36 weeks, you want to make sure. Because here at the clinic, we don't do breech deliveries. And if it is in a breech position, you have to make sure that you are screened and sent to a hospital in time so the doctors see you. Prepares so that you can have a ...because if you have a breech delivery...But that is not a problem now. Because we have shown you that it is not a breech delivery. The baby's head is down. Are you comfortable?
 10. Salome: yes.

What we see here is that Nivedita talks as a way of compensating for the weaknesses in the system, as the hospital has not provided ultrasound equipment that works well enough for Nivedita to conduct good quality ultrasound examinations. She compensates

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in turn 1: “But if the machine had been working, I would have measured it”. In turn 1 Nivedita offers, in a metacommentary, what she would have done if the technology had been working. She includes Salome with an online commentary and invitation for seeing, while pointing at the screen: “you can see ...the heart is”. She continues to talk in metacommentaries about what she would have done. She returns to the problem of the broken equipment in turn 5 after Salome’s question about the estimated date of delivery: “Well, as I explained, we don’t have the facilities to...measure...because the machine is out of work”. After an explication about the technology, she suggests that the fetus seems to be growing well. Then she switches subject, and refers to the reason why Salome has been referred for an ultrasound. Nivedita reiterates that she has reassured the pregnant woman about the cause of concern, namely the position of the fetus. She continues with this theme until the end of the example, when she states that there is no need to worry: “Because we have shown you that it is not a breech delivery. The baby’s head is down.”

The second shortcoming to which she refers, in turn 3, is that she has no professional or institutional mandate to tell expectant mothers about the sex of the fetus. Again, she compensates for the deficits of the technology in turn 5. She claims that there is a limitation due to her own qualifications. Additionally, she refers to the regulations at the institution with the following: “...and in the public sector we don’t look for that”. She acknowledges that she is limited by these factors in not being able to provide the information requested by Salome. This is a demonstration of what de Cossart and Fish (2005) refer to as professional knowledge and conduct and describes it as knowledge of the traditions and the parameters surrounding professional practice within a given legal framework.

This example also illustrates how the worry of the pregnant woman is being dealt with in the encounter. In turn 7, the issue of the pregnant woman knowing the date of her own LMP is actualized, when Nivedita asks Salome how many weeks old the fetus is. Salome needed the ultrasound scan because of worry about the position of the baby, and not, as many of the other women did, because of worry about the estimated date of delivery based on the LMP. Turn 9 is intended to reassure Salome that she would have

been appropriately cared for if she had been carrying a fetus in a breech position. However, she does not need to worry now that they have confirmed that the head is down.

During turn 1, Nivedita includes Salome, by calling her by name. The excess of talk by Nivedita may be due to her status as a novice as well as being ill-equipped technologically, or it may be because she is uncomfortable with the situation of being assessed.

This series of metacommentaries about what she would have done is a demonstration of the hybrid activity type. Nivedita is perhaps describing the omitted tasks thoroughly because she wants to show the researcher that she is knowledgeable about how to measure, although she cannot do it 'here and now' with the equipment which she has available. She displays her propositional knowledge (de Cossart and Fish, 2005) about it in spite of the fact that she cannot demonstrate procedural knowledge due to the technological and institutional deficits.

As we saw in the previous example, the deficiency of the technology prompts Nivedita to talk hypothetically about what she would have measured if she had access to properly functioning equipment. She does the same in the encounter with Nelisiwe. Let us have a closer look at what is going on in the measurement sub-phase in the encounter with Nelisiwe, where the thematic focus is normality.

Example 47 (Nivedita and Nelisiwe) What we usually measure.

1. Nivedita: Just look at the shape of the head. And see that the shape of the head is fine. And when we look at the ventricles inside the head. It is not too wide. There is nothing unusual there. Want to see...And usually it is easier to look at these features (?) between 18 to 22 weeks. So, when you get your first ultrasound, the follow-ups will be easier. As far as you detect any abnormalities, you detect... The earlier the better. The reason to () is to book very soon. So we can do ultrasound. So we measure that...we usually measure the... round thing there...it is the abdomen...We measure around there. We measure that. And we measure the leg. The femur. The bone of the baby. To get a...that's the baby. And even measurements are easier if we start at 18-22

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weeks. We will do that when you have difficulties, because the view gets OK. Are you fine?

Initially in this elaborate turn, Nivedita specifies, in an online commentary, that the focus is on the head, “Just look at the shape of the head”, and confirms that: “the shape of the head is fine”. This act of reassurance is further supported by online commentaries that specify the condition of the brain on a more detailed level: “And when we look at the ventricles inside the head. It is not too wide”. This level of precision is a demonstration of the level of expertise of the advanced midwife. She is knowledgeable about the anatomy of the brain and is able to decide whether the organs have an abnormal shape or not, and is thus displaying propositional knowledge (de Cossart and Fish, 2005).

Nivedita’s talk is directed at both the pregnant woman and the researcher, but seemingly with different functions in the communication with the different hearers. The pregnant woman is informed, for example in turn 1: “And see that the shape of the head is fine. And when we look at the ventricles inside the head, it is not too wide. There is nothing unusual there”. The researcher is informed about the competence of the advanced midwife when it concerns this part of the brain anatomy.

An important task during the ultrasound examination is to inform and educate the pregnant women about pregnancy related issues. Nivedita informs Nelisiwe about the stages in pregnancy when it is most useful to undertake an ultrasound examination for the purposes of fetal measurement.

This example can be seen as containing references to the Educational Programme. During the training programme, the lecturers had explained about the benefits of conducting the ultrasound scans routinely between 18 and 22 weeks of pregnancy, in order to be able to examine and measure the fetus with reference to the statistical definitions of normality at that stage. Between 18 and 22 weeks, the fetus is not especially big, so it is easier to examine and to measure the whole body. The lecturers providing the Educational Programme work in the Norwegian context, in which scans

are routinely performed at 18 weeks, and benefits of the routine ultrasound examinations are reported from the point of view both of the pregnant women and of the healthcare institutions.

Finally, we see in this example how Nivedita tries to compensate communicatively for the shortcomings of the technology. She explains what she usually measures when she has an ultrasound machine that works: “So we measure that...we usually measure the... round thing there...it is the abdomen...We measure around there. We measure that. And we measure the leg”. With these offline commentaries, when online commentaries are not possible in the absence of appropriate technology, she displays her expertise in doing measurements although she does not have the tools to do them here. She displays propositional knowledge (de Cossart and Fish, 2005) about what to measure.

8.5 Summary

The purpose of this chapter was to investigate how the professional expertise of Nivedita is manifest on a communicative level during the ultrasound examination of the pregnant women, by focusing on the discourse types: online commentary, offline commentary and metacommentary. The thematic focus on normality, risk, worry and reassurance was manifest in the communication, and I discussed how this was linked to the various discourse types.

The first section of the chapter illustrated the structural mapping of the encounters of Nivedita in terms of organization of phases and sub-phases (Section 8.2.). This was followed by the interactional mapping of the frequency and volume of the occurrence of the three discourse types in one typical ultrasound encounter with Nivedita (Section 8.3). Nivedita used most online commentaries, but she also had a high proportion of metacommentaries. It is worth noting that she never directly addressed the researcher in the typical example. Her main focal theme was normality, both in online commentaries and offline commentaries.

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Nivedita seemed to be orienting more to the pregnant woman than to the researcher. This was evident in her translations from medical terminology to lay terminology, for example when she explained that: “placenta means afterbirth”.

Section 8.4. offered a close analysis of Nivedita’s expert talk during the physical examination, organised in terms of the sub-phases: the preparatory phase, the examination of the maternal anatomy and the uterus, the examination of the fetal anatomy and the measurements. Nivedita actively included the pregnant women in the examination process, through online commentaries and offline commentaries as well as metacommentaries. While offering online commentaries she pointed at the screen, and invited the pregnant women explicitly to look at the screen, often posing questions in a way which required the pregnant women to respond. Additionally, Nivedita involved the pregnant women by elaborating about the findings of normality, for example by giving facts formulated as offline commentaries. The pregnant women were also included in the examination through the metacommentaries by Nivedita, in which she informed them about what she was about to do and what she had done.

Nivedita juggled between coping with the shortcomings of the technology and trying to reassure the pregnant women that, if she had identified a problem, they would be referred onwards to a unit with better facilities. She talked a great deal, presumably in order to compensate for the fact that the ultrasound equipment was not working properly. She repeated that she could not respond to the questions asked by the pregnant women because of the limitations of the equipment. In order to compensate for the lack of opportunity to display her expertise, she offered several offline commentaries during the examination, explaining words such as placenta, fundus, etc. Instead of focusing on the ultrasound technology, Nivedita’s talk intended to reassure the pregnant women. On several occasions, she referred to the worry of the pregnant women, and was explicit about her role in providing reassurance. Unlike in the study by Bredmar (1999), where the midwives avoided talking about risk, Nivedita often talked about potential problems, before she ended up saying that there was no reason to worry, because she had identified that everything was fine.

Nivedita was the informant who had had the least experience with ultrasound after the Educational Programme two years earlier. Nivedita indicated in her interview in 2004 that she did not want to be perceived primarily as a sonographer when she returned to her local clinic. She did not want her role to be limited exclusively to the sonographer's tasks; she is an advanced midwife, and wants to practice as such in her daily work. This may have influenced her professional conduct, especially the extent to which she engaged in the practice of obstetric ultrasound. Several times during the ultrasound encounters, she made excuses about her ultrasound competence to the pregnant women, and she was not able to meet some of the requests from the pregnant women, such as identifying the sex of the fetus.

9 Discussions and conclusions

9.1 Introduction

The purpose of this study was to gain insight into how the professional expertise of the advanced midwives manifested itself in their communication with pregnant women in ultrasound encounters. The professional expertise of the advanced midwife is not only reflected by their understanding of the factual results of the examination, such as the estimated date of delivery of the fetus or the degree of normality of the fetus. The process and outcome of an ultrasound encounter, in the context of the present study, is also related to the quality of communication between the advanced midwives, the pregnant women and the researcher.

Sarangi (2010) argues that healthcare interactions can be seen as expert communicative systems that embed complex differences with regard to the professional specialities and participant frameworks. The healthcare professional invariably draws upon his/her communicative expertise, often implicitly, when mediating information and advice within complex frameworks. Communicative expertise in professional practice can be defined as the ability of the healthcare professional to organize discursive resources strategically in the course of an encounter, in addition to propositional and procedural expertise as acknowledged throughout the thesis. In what follows, I discuss how the three advanced midwives contextualized and realized their communicative expertise with the pregnant women and the researcher in the obstetric ultrasound encounters in KwaZulu-Natal. I suggest that they did this through the deployment of discursive resources such as framing of the activity, including the structural and interactional organisation of the physical examination phase, supplemented a range of interlocking discourse types.

In Section 9.2, I discuss the complexity of the ultrasound encounter as an activity type in the present study, by focusing on frame hybridity. The dominant frames of the

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encounters are the clinical examination frame and the educational research frame. In Section 9.2.1, I relate the discussion to the researcher variable which can account for some of the analytical findings, especially with regard to the occurrence of the discourse types of online commentaries, offline commentaries and metacommentaries in different configurations.

In Section 9.3., I discuss some of the similarities and differences between the three advanced midwives, Nobuntu, Nonkululeko and Nivedita, in terms of how they displayed their expertise – especially procedural and propositional expertise – and their communicative expertise.

The manifestation of their expertise is discussed in relation to the categorisation of practice knowledge as espoused by de Cossart and Fish (2005) (see Section 2.6), and in Section 9.4, I challenge the taxonomic framework they offer by showing that different kinds of expertise are context dependent and complex practices-in-action.

In Section 9.5, I revisit the research questions and summarise the findings accordingly.

Finally, in Section 9.6, I discuss the relevance of the study, followed by, in Section 9.7, suggestions for further research.

9.2 The ultrasound encounters constituted a complex activity type

In this study, I have pointed out some of the aspects that have had an impact on the focused event, i.e. the ultrasound encounter, in order to illustrate the complex setting in which the advanced midwives displayed their expertise. The multiplicity of frames, both on a social and a cultural level, and the divergent background knowledge of the participants, created particular challenges concerning how the advanced midwives communicated with the pregnant women. This complexity of the communicative environment was further exacerbated by the presence/participation of the researcher during the ultrasound encounter.

In the ultrasound encounters observed in this project, the advanced midwives had to orient themselves simultaneously to several addressees, and they had to fulfil different functions in the course of the same activity type. The hybridity of frames – first, the medical examination undertaken within the clinical frame, and secondly, the educational assessment/research dimension which characterised the activity in general – emerged both as a resource and as a constraint, with implications for display of communicative expertise.

With the metaphorical layers of frames described by Goffman (Section 3.5.1) in mind, I suggest that some of the layers of frames directly or indirectly influenced the interactional trajectories of the obstetric ultrasound encounter as a focused, goal-oriented activity. The clinical examination frame was driven and influenced by, firstly, the frames of healthcare services within the South-African culture with recognisable values, traditions, laws, politics and priorities (cultural/social frame). The clinical examination frame also related to the institutional infrastructure of the hospital and its rules and regulations (institutional frame). Moreover, the clinical examination frame embodied the professional knowhow of medicine, and more specifically midwifery, with its norms and division of labour (the professional frame, which for Goffman was embedded in the institutional frame) as well as the interactional frames including the participant framework and the expert technology involved in the interaction.

The second frame that constituted the hybridity, the educational research frame, was influenced by the ethos of the international obstetric ultrasound community (institutional frame), the global practices of obstetric ultrasound use in pregnancy care as embedded in teaching and training paradigms including the one adopted by the parent educational programme which facilitated the present study (professional frames), as well as the participant framework which necessitated the presence/participation of the researcher during the ultrasound encounter, leading to specific trends in language choice and use of discourse types (interactional frames).

Communicative expertise comes to the fore in hybrid activity types such as the one studied here. Communicative expertise is a matter of attending to various context-

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dependent variables, including for example the literacy level of the pregnant women, the language situation, the experience with medical knowledge and technology, the availability of sophisticated ultrasound machines etc. As we saw in the analysis in Chapters 6, 7 and 8, the hybrid nature of the activity had an impact on the communicative trajectories of the advanced midwives who had to juggle between providing the pregnant women with information about the pregnancy, and simultaneously demonstrating their expertise to the researcher.

The hybridity of activity types is not limited to encounters like the obstetric ultrasound encounters in this project. For example, the ultrasound encounters in an educational setting, such as the practical training during the Educational Programme in 2004, were typical examples of hybrid activity types, since they were clinical examinations of authentic pregnant women, and at the same time they were educational activities. Teaching and training programmes in obstetric ultrasound should not only include a focus on the development of procedural and propositional knowledge. Communicative expertise should also become an integral part of the curriculum. The notion of frame and the awareness of the multiplicity of frames may work as an analytic and explanatory tool for teachers in obstetric ultrasound in helping them to distinguish the different aspects that have an impact on communicative expertise in the targeted social and cultural context. Developers of educational programmes need to deal with these different analytical layers of frames, and the different discourse types that constitute these frames, that have an impact on the teaching and training in order to ensure that their educational programme aligns with the situational demands in a given socioculturally mediated healthcare context.

9.2.1 The researcher variable

The effect of the researcher's presence and participation in the ultrasound encounters studied may partly be seen as similar to that associated with the presence of any other expert person in the clinic education setting, such as a tutor or an ultrasound specialist or fellow medical students.

As we saw through the interactional mapping of typical ultrasound encounters in the present study context, especially in the case of Nobuntu and Nonkululeko, the researcher became the primary addressee as evidenced in frequency and volume of talk. As a researcher, I was present during all the encounters described in this thesis. Although I intended to be a non-participant observer, I was drawn into the participation sphere. The effect on the interaction due to the presence of a researcher is what Labov (1972) refers to as the observer's paradox. The observer, as a co-present participant, directly and indirectly influences the communicative trajectories. In this study, this meant that the pregnant women at times became the third party in the encounter when the midwives explicitly or implicitly oriented to the researcher with their use of online commentaries, offline commentaries and metacommentaries. This orientation was particularly manifest in code-switching as suggested in the analytical chapters. The frame hybridity in fact afforded the advanced midwives the opportunity to display different aspects of their propositional and procedural expertise, linked to differential management of their communicative expertise.

The advanced midwives oriented to my presence as researcher differentially. For instance, Nobuntu signalled in her frame shifts the translations from Zulu to English. Sarangi (2010) draws attention to the notion of 'participant's paradox' – the phenomenon of when the participant observes the observer, resulting in different participant frameworks. The focus is thus not on the observer influencing the situated event as suggested by Labov, but on the participant being influenced by the presence of the observer. The code-switching behaviour of the advanced midwives, which foregrounds the participatory status of the researcher, is thus indicative of 'participant's paradox'.

Moreover, I became an active participant because of my interventions, for example when asking for translations and explanations. In addition, the advanced midwives were consciously aware of the association between the organizing team for the Educational Programme and myself. They may have felt that they were not only being observed, but that they were also indirectly being assessed for their professional competence

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(although the researcher, who is not a sonographer, did not have the propositional or procedural expertise to evaluate the actual quality of the expertise of the practitioner).

9.3 Professional expertise as manifest in the ultrasound encounter

In order to study the manifestation of expertise through discursive action, we need to systematically display the specific features in the interaction (Candlin and Candlin, 2002), what has already been referred to as communication as an expert system (Sarangi 2010). One prominent feature in the ultrasound encounter was the structural organisation in terms of the pre-examination phase, the physical examination phase and the post-examination phase. The focus in this study has been the physical examination phase, since this is the phase where the ultrasound technology is actively in use, and I wanted to study how the propositional and procedural expertise of the advanced midwives manifested in their communication (i.e., in their communicative expertise) involving the pregnant women. Each of these phases had their respective sub-phases. The sub-phases were organized slightly differently by the three advanced midwives (Sections 6.6, 7.6 and 8.6). The levels of detail and degree differed, especially in relation to the use of different kinds of commentaries (Sections 6.7, 7.7 and 8.7). The discourse types that recur in the physical examination phase are online commentary, offline commentary and metacommentary (see Section 5.3.1).

In this section, I discuss the most prominent discourse features during the respective phases that contribute to our understanding of professional expertise, especially communicative expertise, by focusing on the advanced midwives' strategic framing of events and on their strategic use of discourse types during the interaction.

The main aim of the communication during the pre-examination phase was to prepare the pregnant women for what was going to happen during the physical examination, and to make them feel comfortable. A striking activity in the pre-examination phase was also that the pregnant women were asked to give their informed consent to participate in the research study.

The advanced midwives routinely drew on their experience of managing and delivering pregnancy care, as evidenced in their consulting of relevant medical records and by requesting information from the pregnant women about their pregnancy history. Based on this information, the advanced midwife could construct a medical profile before initiating the physical examination.

Finally in the pre-examination phase the advanced midwives set the agenda by explaining what was going to happen in the encounter. All of the three midwives occasionally explained in metacommentaries what would happen during the encounters, but the level of detail in their explanations varied from encounter to encounter in context-specific ways.

The Educational Programme had prepared the midwives both in terms of procedural and propositional expertise concerning the ultrasound encounter. All three midwives organized the obstetric ultrasound encounters similarly with regard to phases and sub-phases. Moreover, they conducted the measurements with a focus on the same landmarks for measurements, and this was manifested in their metacommentaries. This uniformity in method of organisation and conduct can be directly linked back to what they had learned during the Educational Programme. Also through their online commentaries the link to the teaching and training and the curriculum of the Educational Programme was apparent. Their way of organization of the actual physical examination on the abdomen, the starting point with the transducer and the systematic anatomy and measurement in the examination was uniform across the three midwives, and this indicated, at the communicative level, the effect that the Educational Programme had on their procedural and propositional knowledge in obstetric ultrasound. As we shall see below, although there were similarities in how Nobuntu, Nonkululeko and Nivedita organised and conducted the obstetric ultrasound examinations, they also deployed different strategies that displayed their sensitivity to the contingently complex, hybrid activity.

The aim of the physical examination phase was to reveal obstetric ultrasound information in order to be able to monitor the pregnancy and to prepare for a safe delivery. The physical examination phase was in this study distinguished into the

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following sub-phases: the preparatory phase, the examination of the uterus and the maternal anatomy, the examination of the fetal anatomy and the measurements.

A prerequisite for being able to conduct an ultrasound examination is the application of gel on the abdomen. In all the encounters, the advanced midwives prepared the abdomen and applied gel. During this activity, the advanced midwives strategically framed present and previous pregnancy experiences. For example in the case of Nonkululeko, we saw that the seemingly trivial acts of preparing the pregnant woman for the ultrasound examination had an important communicative function. In a socio-cultural setting where expert systems are not commonly available in healthcare services, Nonkululeko could actively reduce the eventual feeling of estrangement of the pregnant woman toward the technology. Nonkululeko displayed this communicative expertise when she, with prospective metacommentaries, prepared the pregnant woman for what is going to happen during the physical examination. Also in the case of Nivedita, the preparatory sub-phase of the physical examination phase offered an opportunity for her to display her procedural expertise in midwifery, when identifying a scar on the abdomen of the pregnant woman. A previous caesarean section has consequences for delivery, and the identification of the scar triggered talk about delivery. The seemingly routine act of preparing the abdomen for an ultrasound was a critical discursive moment of information seeking that is relevant to the delivery, thus underlining professional expertise.

The communication during the phase of the examination of the uterus and the maternal anatomy proceeded slightly differently between the three midwives. Nobuntu, for example, did not explicitly make a clear distinction between whether she was examining the uterus and the maternal anatomy. Contrastingly, Nonkululeko made this distinction in most encounters. Unlike Nobuntu, Nonkululeko invited the pregnant women to look at the screen and supplemented such invitations to visualization with online and offline commentaries. The focus on this sub-phase by Nonkululeko may be indicative of her procedural and propositional expertise. She seemingly took into consideration more details than Nobuntu with regard to the gynaecology of the pregnant woman, although this could be interpreted as her alienating the pregnant woman from the sphere of

communication. Like Nobuntu, Nivedita did not explicitly focus on the maternal anatomy, but she commented on the uterus and the amount of liquid, and how the bladder, the uterus and the placenta were positioned in relation to each other. This is once again indicative of her communicative expertise in keeping the potentially hybrid activity frame to a minimum level.

The procedural expertise is a precondition for doing the examination, because the advanced midwives need at least basic procedural knowledge in order to project the correct layers on to the screen – which was one of the key objectives of the Educational Programme. During the analysis we have seen how the procedural knowledge is intertwined with the propositional knowledge in order to arrive at trustworthy assessments of the condition of the pregnancy. The procedural knowledge and propositional knowledge manifest themselves at different levels for the advanced midwives. For example, when Nobuntu identified twins, she struggled procedurally for quite a long time before she confirmed what she had seen on the screen. She was not sure, and her doubt about her own procedural knowledge had consequences for how she expressed her propositional knowledge. Unlike Nobuntu, Nonkululeko confirmed her identification of twins quite immediately and by referring to the separating membranes, she added propositional knowledge in offline commentaries. This difference in communicative expertise may be indicative of the difference in the level of the two midwives' procedural and propositional expertise. However, another difference was that Nobuntu revealed the finding of a possible twin pregnancy to the pregnant woman quite early, while she was still very uncertain, but she withheld this finding from the researcher. This withholding of information may be a signal of Nobuntu's awareness of hybrid frames, and that she felt a need to be certain before she disclosed information to the researcher who was perceived to be in an assessor role. In contrast, Nonkululeko proudly disclosed the information immediately to the researcher first, and secondly to the pregnant woman. The presence of the researcher influenced the disclosure of information in both cases, but strikingly differently. This illustrates how communicative expertise may index different levels of propositional and procedural expertise, while not discounting the context-specific variables, including differential orientations to different participants in the given ultrasound encounter.

9.4 Managing the complexity of expert communicative systems

In Section 2.2 and earlier in this chapter, I have referred to Sarangi's (2010) characterisation of healthcare interaction as an expert communicative system. An obstetric ultrasound encounter is an example of a complex expert communicative system that calls for comprehensive interactional expertise. The interactional expertise, or what I refer to as communicative expertise of the advanced midwives, is instrumental, on the one hand, for fulfilling the institutional and professional requirements in the expert system of obstetric ultrasound and, on the other hand, for maintaining relational and ethical propriety. Communicative expertise, such as the ability to include the pregnant woman in the examination process, is a kind of expertise that stands out as a crucial variable with regard to the involvement of the other participants. We may recall that communicative expertise is not mentioned by de Cossart and Fish (2005). I refer to selective instances of communicative expertise below, and argue why the taxonomy of expert knowledge in the map of practice knowledge of de Cossart and Fish (2005) is deficient.

The metacommentaries used by the advanced midwives indicated their strategic shift of frames in the activity in question. In the case of Nobuntu, who had to communicate in two languages during the ultrasound encounter, in Zulu with the pregnant women and in English with the researcher, a metacommentary, e.g. "I will just explain to the pregnant woman", was an indication of this frame shift, from the educational research frame to the medical examination frame, signalling this was a hybrid encounter. Nobuntu juggled between the two frames through all her encounters, and demonstrated an expertise that went beyond the types of practice knowledge, including procedural and propositional knowledge, described by de Cossart and Fish (2005). What Nobuntu displayed with the language switch and frame shift constitutes an essential part of communicative expertise as conceptualised here in terms of linguistic and contextual sensitivity in situ, such as her awareness of, for example, language, nomenclature, level of literacy etc. Also Nonkululeko dealt with Zulu-speaking pregnant women. However, her strategic use of metacommentaries to include the pregnant women in the communication is minimal. Nonkululeko spoke rather in English, and made only a few comments in Zulu. The

interactional orientation of Nonkululeko was manifestly toward the co-present researcher. This signals the awareness Nonkululeko had of the hybrid frames of the activity type, and the contextual sensitivity to the fact that she was being assessed by the researcher. Her communicative priority was the researcher in the frame of the educational research. Unlike Nonkululeko, Nivedita did not seem to have this focus on the educational research frame. Nivedita was orienting herself mostly toward the pregnant women. In fact, Nivedita was the advanced midwife with most communicative contributions from the pregnant women and fewest contributions from the researcher. It must be noted that Nivedita did not have the challenge of bilingualism since all her patients spoke English. This is different from Nobuntu and Nonkululeko, who both had several contributions from the researcher. In Nivedita's encounters there were no metacommentaries that signalled that she was orienting to a frame other than the clinical examination.

The framing of professional expertise concerning the procedure of conducting the physical examination phase differed between the three midwives. During the examination of the fetal anatomy, Nonkululeko displayed communicatively and procedurally that she was doing the ultrasound examinations in a very systematic manner. She displayed both procedural and propositional knowledge when listing the four stages of the examination, and she simultaneously conducted the examination. Although she followed her predefined mental scheme of what to do during the procedure, she could improvise within each stage. She was not the kind of novice described by Dreyfus and Dreyfus (1986) that relied strictly on the rules, but she saw the whole picture and improvised accordingly. Even though the predefined systematic map was not equally transparent in the case of Nobuntu in Chapter 6, she followed the same phases as Nonkululeko. The ongoing display of propositional and procedural expertise vis-à-vis the predefined mental map was a signal of the awareness that Nonkululeko had of the educational research frame, and of being assessed for her propositional and procedural expertise.

Another signal of the awareness of the educational frame was the tendency of Nonkululeko to use medical terminology during the encounter. References to the

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propositional knowledge, in terms of medical nomenclature, can be linked back to the Educational Programme and the textbooks and compendiums offered as part of the teaching and training activity. During the physical examination phase Nonkululeko introduced several medical terms to the other participants, such as fibroids, endometrial line and congenital abnormalities. The term congenital may not have been understood by the pregnant woman with Zulu as her mother tongue, but she was nevertheless consenting to going through the procedure that Nonkululeko had described.

Nonkululeko displayed procedural expertise in her ability to identify the details of the anatomy, and she displayed propositional expertise when explaining them using medical terminology. Nonkululeko made no attempts to explain what the medical terminology meant in lay English. Unlike Nonkululeko, Nivedita thoroughly explained medical terms, even those terms that were not particularly difficult. For example, Nivedita would explain that placenta means afterbirth. Given the fact that Nivedita did not foreground the hybrid frames underlying the ultrasound encounter, the explication of medical terms was more a matter of displaying communicative expertise as a way of including the pregnant women into the examination and providing them with enough information so that they could understand what was happening.

The procedure of estimating the gestational age of the fetus and of doing the measurements proceeded in different ways for the three midwives.

Nobuntu displayed her attention and respect towards the pregnant women when she tried to align the date of the last menstrual period with the ultrasound evidence of gestational age of the fetus. The measurement by the ultrasound machine was a task that not only required procedural expertise in how to do the layers in order to measure correctly, but also propositional expertise to assess the evidence in terms of the range of normality. At the same time as she did the ultrasound measurements, Nobuntu displayed sensitivity towards the information given by the pregnant woman about her last menstrual period. Nobuntu displayed communicative expertise in terms of maintaining the dignity and credibility of the pregnant woman in the context where technology had a strong authority. She also demonstrated propositional knowledge by re-evaluating the information assembled through her own skills, in response to the conflicting evidence

from the pregnant woman. Moreover, she displayed ethical awareness when relying on the information given by the pregnant woman and by including her in the process of measurements. The ethical awareness of Nobuntu displayed in the encounters is indicative for her communicative expertise.

Nobuntu was the advanced midwife who explicitly referred to schemes of measurement, independent of the technology that displayed evidence-based connection between the measurement and the gestational age of the normal fetus. The ultrasound machines usually incorporated predefined connections between the measurement and the estimated date of delivery. Nobuntu's reliance on schemes outside the ultrasound machine may be a signal that she did not only rely on the trustworthiness of the technology but she had to use her propositional knowledge as a midwife in order to get to the most accurate result. The midwives had also been evaluated on their measurements during the Educational Programme.

Unlike Nobuntu, Nonkululeko exclusively relied on the calculations done by the software of the ultrasound machine, which displayed the estimated date of delivery (EDD) when Nonkululeko fed it with the measurements. Nonkululeko was generally efficient in her search for the landmarks for measurements, and she was efficient in providing these results. In fact, one of her ultrasound encounters lasted for approximately 12 minutes. In this encounter, she did a quick observation of the maternal and the fetal anatomy, and concentrated mainly on conducting the measurements. This efficiency displayed her priority during the examination, and signals her professional expertise in terms of her propositional and procedural knowledge. However, her communicative expertise is not revealed here. In her work during her other encounters, Nonkululeko displayed that she has the propositional knowledge of doing measurements as well as communicative expertise through her use of offline commentaries with explanations of the landmarks for measurements.

Let us return to the map developed by de Cossart and Fish (2005) (see Section 2.6), and consider it critically in light of the findings in the present study. Although their map is informative in the classification of the types of knowledge that may constitute

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professional practice, in my opinion it suffers from a major weakness: they have not incorporated any communicative aspects in their model. Also, de Cossart and Fish (2005) have not taken into account how these different levels interact at the communicative level. As we have seen in this study, communication is not just a premise for knowledge; rather, it helps to constitute and to transform knowledge. In our discussion of different types of commentaries above, the expertise displayed involves both procedural knowledge and propositional knowledge (de Cossart and Fish, 2005), though in any one encounter they tended to be unequally balanced. Evidently, procedural knowledge is a necessary precondition for being able to say anything at all about the propositional issues. The technical skill necessary for obtaining a view of the correct layers, for a view of each of the organs, is crucial. The level of detail provided both in procedural knowledge and in propositional reasoning reflects the level of expertise of the advanced midwife. However, the communicative expertise that we have pointed out above, whether expressed in online commentaries, metacommentaries or offline commentaries, underscores the fact that the professional expertise of the advanced midwives includes communicative expertise. The different kinds of expertise displayed in the ultrasound encounters by the advanced midwives are intermeshed, context-dependent and complex practices-in-action.

9.5 Summary of the study

This section offers a summary of the study with a particular focus on the research questions. The research questions for this study were:

- **What characterises an ultrasound encounter?**
- **What discursive features characterise the talk of the advanced midwife during the physical examination phase?**
- **What are the focal themes that emerge during the ultrasound encounters?**

I briefly summarize the main findings in relation to the research questions.

A striking characteristic of the ultrasound encounters here is the frame hybridity. In the context of the present study, the ultrasound encounter is both a clinical examination activity and an educational research activity. Moreover, the frame of the lifeworld of the pregnant women and the institutional/professional ethos of the midwives, in the cultural context of rural KwaZulu-Natal, South Africa, has an impact on the situated interaction. The hybridity of frames creates a contextual complexity that shapes the communication trajectories of the advanced midwives. An important aspect of their communicative expertise is their ability to be context sensitive in the situated encounter characterized by this frame complexity. The participants relate to these frames, and draw on them occasionally to achieve specific communicative goals. In the analysis we saw that the advanced midwives strategically managed the shifting between frames through metacommentaries, through language switch and through switching between professional and lay terminology. Moreover, they referred to other frames through metacommentaries and offline commentaries.

The ultrasound encounter as an activity type is also characterised by the structural organization in terms of pre-examination phase, examination phase and post-examination phase. Each of these had their respective sub-phases. The uniformity of the organisation of the phases can be directly linked back to what the advanced midwives had learnt during the Educational Programme and through the Curriculum (2003).

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Now let us turn to the research question of what discursive features characterise the talk of the advanced midwife during the physical examination phase. A key conclusion that can be derived from this study is that the professional expertise of the advanced midwives is not limited to the procedural and propositional knowledge of conducting the obstetric ultrasound examination instrumentally. An important part of their professional expertise is the communicative expertise. The communicative expertise includes their ability to be context sensitive as mentioned above in relation to frames, but also their ability to strategically deploy the different discourse types in order to manage their professional conduct informatively and ethically, for example by including the pregnant women in the medical examination and by informing them iteratively throughout the whole encounter. Through our engagement with the case studies involving the three advanced midwives, we have seen how they strategically deployed different types of commentaries. Below I summarize the functions of the three types of commentaries which have been the focus in this study: the online commentaries, the offline commentaries and the metacommentaries.

The online commentaries that the advanced midwives used while conducting the ultrasound examinations concerned issues related to the condition of the pregnancy and the condition of the fetus. Through these online commentaries, the midwives confirmed the immediate normality or abnormality of the particular organs they were studying. The credibility of their online commentary depended on the sophistication and detail of the commentary that was associated with their level of expertise in analysing the specific organ, partly mediated by the frame hybridity of the ultrasound encounter under study. The ongoing talk was in itself reassuring, but when the online commentaries were accompanied by invitations for seeing and assessments, they were likely to be even more reassuring and credible as display of evidence-based explanations. However, we have also seen that the very simple act of seeing her baby's heartbeat was reassuring for the pregnant woman.

Offline commentaries were informative and educative for the primary addressees. Offline commentaries make references to propositional knowledge that supports the

finding on the screen, for example the use of medical terminology, statements of medical facts as described in the textbook or the explication of how the medical observation is linked to the statistically estimated assessment of normality. An example of a relatively simple offline commentary is “The heart occupies a third of the thoracic area.” This offline commentary is educative for the pregnant woman, who can subsequently look at the screen and herself estimate if the heart is approximately that size. It is, however, worth noting that the above offline commentary may have been directed at the researcher in order to display propositional knowledge which can be favourably assessed. In that sense, the offer of an offline commentary can be indicative of a frame shift as far as participant framework is concerned. In terms of content, the offline commentary routinely includes commonly agreed facts in modern medicine, such as how the human body is built, and at times alludes to more controversial issues, such as the probability of risk for genetic disorders.

The metacommentaries functioned as cues or self-preparations for what would happen, what was happening, and what had happened during the encounters. Additionally, the metacommentaries informed both the primary addressee, the pregnant woman, and the secondary addressee, the researcher, about what was at stake. Metacommentaries were helpful for including the designated addressees, for helping them to become involved in the clinical examination and consequently for them to feel that they had ownership of what was happening and about the findings that were being revealed. Through the metacommentaries, the pregnant women were treated as stakeholders in the ultrasound examination. Strategic use of prospective metacommentaries, metacommentaries and retrospective metacommentaries contributed to maintaining the communicative ethos of the ultrasound encounters.

The thematic mapping of the encounters indicated that the primary focal themes in the communication with the pregnant women were: normality, risk, worry and reassurance. The most prevalent thematic focus observed in the ultrasound communication was normality. In the course of the examinations, the advanced midwives explicitly and implicitly confirmed normality and excluded abnormality of each organ they reviewed. Nobuntu, Nonkululeko and Nivedita talked about normality primarily through online

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commentaries, and Nobuntu also brought up this theme several times through metacommentaries. Unlike Nonkululeko, Nobuntu and Nivedita referred to normality also in offline commentaries. Another focal theme that the advanced midwives touched upon was risk. The advanced midwives did not talk explicitly about risk in prognosis at the physical examination phase, but they dealt with it in relation to the potential problems that the pregnant women could encounter in relation to pregnancy condition and in relation to delivery. In the ultrasound encounters in this project, risk was mainly related to the previous pregnancy experiences of the pregnant women (miscarriages), to the findings (twins), to the methods of delivery (caesarean section), to health condition (hypertension), and more crucially, to exclude abnormality. While Nobuntu and Nonkululeko talked about risk and potential risk through online commentaries and metacommentaries, Nivedita talked about risk through offline commentaries.

The pregnant women who took part in this study presented for ultrasound because they or the healthcare professionals providing antenatal care for them were worried that something might be amiss with the fetus or with the progress of the pregnancy. Their worry was made explicit either by the women themselves or by the midwives. Nobuntu and Nonkululeko dealt with the worry of the pregnant women that were identified to have twin pregnancies. Nobuntu and Nivedita dealt with the worry the pregnant women had for delivery. Interestingly, Nonkululeko did not refer explicitly to delivery, except from providing estimated date of delivery. Only in relation to the twin pregnancy, method of delivery was thematized.

A range of different strategies were deployed, firstly to make the pregnant woman comfortable in the ultrasound situation, and secondly to reassure her about the health of the fetus. During the ultrasound examination, the advanced midwives had various strategies for reassuring the pregnant women. These included:

- Preparations for what was going to happen during the encounter through metacommentaries (overall preparation);
- Preparation about what was going to happen next through metacommentaries (recurring preparations);

- Regular confirmations of normality through online commentaries during assessment;
- Regular exclusions of abnormality through online commentaries;
- Inclusion of the patient in the diagnostic process by, for example, inviting her to participate in seeing the fetus on the screen;
- Display of evidence of normality of the organs on the screen, for example heart beat, body movements, intact head and brain.

The deployment of discursive strategies of reassurance indicated that the overall communicative aim of the advanced midwives is to reassure the pregnant women, be that about feeling comfortable in the situation, about the wellbeing of the fetus or about the fact that they would be taken good care of if there were problems.

9.6 Relevance of the study

The Educational Programme had the following objectives (Curriculum, 2003: 8, see also Section 2.7):

- to enable participants to understand and practice basic level transabdominal obstetric diagnostic ultrasound and transabdominal gynaecological use of ultrasound in the first, second and third trimester of pregnancy
- to enable participants to present high-quality ultrasound images
- to make the participants acknowledge and act on their responsibility to promote the provision of good quality care, both physical and psychological, for the pregnant woman examined
- to stimulate the interest of the participants in quality assessment in diagnostic ultrasound.

These objectives are somewhat different in nature. The first two points call for a development of the instrumental skills of the advanced midwives on an operational level. The third point calls for developing the communicative and ethical dimensions of advanced midwifery practice, since these involve their responsibility for both

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physiological and psychological care for the pregnant women. The final point calls for developing the metaknowledge about obstetric ultrasound knowledge of the advanced midwives in order to be able to assess their own as well as other healthcare professionals' expertise in obstetric ultrasound. This implies that a future task for the advanced midwives is to share their obstetric ultrasound knowledge with colleagues.

The present study, in focusing on the crucially salient physical examination phase, has provided insights about how the advanced midwives actually have understood, and how they actually practise obstetric ultrasound in basic level transabdominal obstetric diagnostic ultrasound and transabdominal gynaecological ultrasound. The focus has been the manifestation of professional expertise of the advanced midwives in their work with pregnant women at their local hospitals. Through the analysis, we have seen that the professional expertise of the advanced midwives can be distinguished into two main dimensions:

One dimension of professional expertise in obstetric ultrasound of the advanced midwives is the combination of procedural and propositional knowledge that enables the midwife to conduct the obstetric ultrasound consultations. The procedural knowledge has to do with how to move the transducer to make the correct layers in order to provide high-quality ultrasound images, and the propositional knowledge is the factual knowledge derived from textbooks, lectures etc, that enable the advanced midwives to communicate what can be seen on the screen. Both these kinds of knowledge can be described and assessed at different levels, from novice via proficient to expert. This is knowledge that relates to the two first objectives of the Educational Programme listed above.

The other dimension of professional expertise in obstetric ultrasound of the advanced midwives is the communicative expertise. The communicative expertise is not usually acknowledged in educational curricula as the previous dimensions. However, in the situated ultrasound encounter with the pregnant woman, the communicative expertise of the advanced midwife has consequences for the process and outcome of the ultrasound encounter. In order to maintain the overall ethos of the obstetric ultrasound

examination, the pregnant women need to be informed and be included during the examination. In this study, I have pointed out that the advanced midwives, through their context sensitivity and through their strategic use of discourse types such as online commentaries with invitations for seeing and assessments, offline commentaries with educative and explanatory functions, and metacommentaries that indicate what will happen, what is happening and what has happened, contribute to maintaining the purpose of the obstetric ultrasound examination. Communicative expertise, as conceptualised here, relates to the third objective of the Educational Programme as listed above.

In order to develop the advanced midwives' metaknowledge about their own professional expertise, and in order for them to be able to transform this knowledge in the teaching and training of other healthcare professionals, we need to provide them with tools for analysing their own expertise. In this study, we have identified specific communicative strategies characterising the so-called communicative expertise of the advanced midwives that can be applied also in an educational setting. One such strategy is the awareness of contextual frames, and the communicative ability to switch between these frames. Another strategy is to use discourse types selectively in the training setting, for example online commentaries with invitations for seeing and accompanying assessments, offline commentaries with explanations and references to relevant propositional knowledge and evidence-based research, and meta commentaries that explain what the teacher as well as the "student" is doing. The deployment of these communicative strategies in the educational setting ensures that the quality assessment of communicative expertise in obstetric ultrasound education is maintained.

A curriculum in obstetric ultrasound should therefore take into consideration the importance of training students and practising professionals in the domain of communicative expertise, while remaining sensitive to sociocultural setting.

9.7 Further research

This study included a narrow analysis of the ultrasound interactions, focusing on the physical examination phase, of only three advanced midwives in the specific setting of KwaZulu-Natal in South Africa. As well as gaining some insight into ultrasound expertise, we have also tested the usefulness of an analytic approach – Activity Analysis. The next phase of such a study might be to make it much more extensive by including a larger group of advanced midwives, and following their activities over a longer period of time, preferably before and after educational training interventions. Another dimension might be to compare displays of professional expertise in clinic vs. education settings, thus minimising the hybrid framing of the activity as has been the case for the present study. Other trajectories of comparison might include informants from different cultures, to see if there are significant differences in the ways in which professional expertise is communicatively realised.

It might also be useful to study how other allied health professionals learn to use ultrasound technology in antenatal care, such as doctors at different levels of obstetric expertise, and radiographers and sonographers. This might provide valuable information regarding how different professional practitioners display communicative expertise with their patients when performing an ultrasound examination. How do novice doctors communicate while performing an ultrasound examination, and how different is that to the way in which a specialist obstetrician communicates? How are the different discourse types configured and what thematic foci do they have?

The obstetric ultrasound examination might also be studied from the point of view of the pregnant women in the cultural setting, in order to gain insight into their experience and their potential communicative needs during such an encounter. How do the pregnant women perceive the ultrasound examination, and what do they understand from the information provided by the health professionals?

The material collected in this study could be used further to study demographic and cultural issues associated with antenatal care in South Africa. In particular, the interviews from the pilot study and the interviews at the university campus in 2004

might provide insight into such issues through the application of a social anthropological approach.

It might also be interesting to study the organization of the theoretical lectures during the course in 2004, by studying the video-recorded lectures. This would help to provide feedback to the lecturers about how they teach and what can be improved further, using the analytical framework developed in this thesis, especially concerning the different discourse types and the focal themes that quintessentially define the obstetric ultrasound encounter.

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Appendix

I 4 Appendix

Appendix A: Letter of approval for conduct of research project



University of KwaZulu-Natal

**Nelson R Mandela School of Medicine
Department of Obstetrics and Gynaecology**

✉ Private Bag 7, Congella 4013 South Africa
Telephone + 27 (0) 260 4250 / 2604220
Facsimile + 27 (0) 31 2604427
e-mail mhlanga@ukzn.ac.za

16 July 2007

Ms Heidi Gilstad

Prosjektleder IKT/Project leader ICT

Nasjonalt Senter for Fostermedisin/National Center for Fetal Medicine
(NSFM)

St.Olavs Hospital, Universitetssykehuset/St.Olav University Hospital
Trondheim, Norway

Tel: +47 73 86 90 72 Mob:+47 90 12 26 53

Dear Heidi

Re: Approval for conduct of interviews and audiovisual materials for study purposes

1. This is in reference to the audiovisual material you produced following your visit to the XXXX Hospital and XXXX Hospital.

Appendix

2. The affected hospitals have employed the advanced midwives whom the project trained in ultrasonography.
3. The Hospital Managers of these hospitals gave their consent. The midwives also gave their signed informed consent.
4. I consulted the chairperson of the Bioomedical Research Ethics Committee. It is the opinion of the Chairperson that no bioethics committee approval is needed, because the project was set to improve service delivery. The documentation is part of the process for information sharing, and not a research undertaking. Further, the appropriate consent was obtained from the relevant and involved persons.
5. I however recommend that the faces of the patients who were examined should be made unrecognizable.
6. As a Department of Obstetrics and Gynaecology I endorse the view of the Chairperson of the Biomedical Ethics Committee.

Thank you

Sincerely

A handwritten signature in black ink, appearing to read 'Roland Edgar Mhlanga', with a long horizontal stroke extending to the right.

ROLAND EDGAR MHLANGA

Head of Department

Chief Specialist

Appendix B: Consent form for the advanced midwives

Consent Form

Cooperation in the development of an educational program

in ultrasound technology and fetal diagnosis for health personnel in S-A.

You are invited to be in a research study concerning the consequences of an educational program in ultrasound technology in pregnancy care. You were selected as informant because you participated in the educational program in Durban 2004. We ask that you read this form and ask any questions you may have before agreeing to be in the study. This study is being conducted by:

Principle investigator Professor SH Eik-Nes, Responsible university/institution, National Center for Fetal Medicine, St. Olavs Hospital, Trondheim University Hospital, Norway

and

principle investigator Professor ER Mhlanga, Responsible university/institution, Nelson Mandela School of Medicine, University of KwaZulu-Natal, Durban, South Africa

and

communication researcher Heidi Gilstad National Center for Fetal Medicine, St. Olavs Hospital, Trondheim University Hospital, Norway.

Background Information

The primary aim of this project is to improve the care of pregnant women in South Africa in general, and specifically in KwaZulu-Natal, with regard to ultrasound and fetal diagnosis. The first objective of the project is to strengthen the competence among health personnel regarding the use of ultrasound technology.

Procedures:

If you agree to be in this study, we would ask you to approve of the following:

- that the researcher observe and video record the communication between you and the pregnant women while you conduct regular ultrasound based pregnancy care consultations
- that short cuts of the video recordings, where the pregnant woman is kept anonymous may be used as illustrations when the project is being presented at conferences and seminars
- that you participate in an interview about aspects concerning the educational program and the potential effects of it for your daily work
- that you allow the researchers to use the questionnaires and the student logs that you completed in Durban 2004 as secondary material in the research project.

Risks and Benefits of being in the Study

The study has the following risks: None The benefits to participation are: You have a possibility to influence the future development of the educational program by expressing your experiences and preferences.

Appendix

Confidentiality:

The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be stored securely and only researchers will have access to the records.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the Nelson Mandela School of Medicine, University of KwaZulu-Natal or with the National Center for Fetal Medicine, St.Olav's University Hospital, Trondheim, Norway. If you decide to participate, you are free to not answer any question or withdraw at any time with out affecting those relationships.

Contacts and Questions: The researcher conducting this study is: Heidi Gilstad

You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at the National Center for Fetal Medicine, St.Olavs University Hospital, Trondheim, Norway, cell phone +47 90 12 26 53, email: heigil@hf.ntnu.no.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), **you are encouraged** to contact Professor Sturla Eik-Nes at the National Center for Fetal Medicine, St.Olavs University Hospital, Trondheim, Norway

You will be given a copy of this information to keep for your records.

Statement of Consent: I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Signature: _____ Date: _____

Signature of Investigator: _____ Date: _____

Appendix C: Consent form for the pregnant women



..... HOSPITAL
Tel:
Fax: 000 100 0020
Email:
www.kznhealth.gov.za/.....


Enquiries : Ms
Telephone : (000) 100 0000

13 September 2006

PATIENT CONSENT FORM

I (Names) Patient number)
grant permission to the to capture a video of
me and appear on national or international television / to use my name
and my photos for publication in your newspaper

My rights have been explained to me and I fully understand the
implications of the consent granted.

Translated by:


Signature (Patient): Date: 17/10/06

Signature (Ward in Charge): Date: 17/10/06

Witness: Date: 17/10/06
(full names & signature)

Witness: Date: 17/10/06
(full names & signature)

uMnyango Wezempilo . Departement van Gesondheid

Fighting Disease, Fighting Poverty, Giving Hope

Appendix

Appendix D: Coded transcript of a typical encounter with Nobuntu

Case study 1: Nobuntu, pregnant woman 1: Lindiwe

Distribution of turns in the whole encounter:

Nobuntu 91 turns/ volume 1441 words

Lindiwe 48 turns/ volume 164 words

Researcher 43 turns/ volume 159 words

(Only the uttered words are counted, not the translations)

ONC 24/ 454words, OFC 5/ 137 words, MC 33/524 words in the physical examination phase

ONC 8/ 71 words, OFC 1/ 6 words, MC 11/86 to pregnant woman

ONC 16/383 words , OFC 4/ 131 words, MC 22/438 to researcher

Normality ONC 14, OFC 2, MC 6

Worry MC 6

Risk/potential risk ONC 2, MC 5

From /to time	Interactional mapping (Turns, volume and discourse types)	Thematic mapping	Structural mapping (Phases and sub-phases)
	((The researcher is whispering to the video recorder that the patient has agreed to participate, and that she is signing the informed consent form for the hospital.)) ((Lindiwe, and Nobuntu are standing beside the bed, and Nobuntu is indicating for Lindiwe where she should sign.		Pre-examination phase
1,34-4,01	1. Nobuntu: photo ((indicates on the form. The woman responds in Zulu and the Nobuntu starts spelling))((a newborn baby is crying in the background)) P-H-O-T-O (02.00) ((Lindiwe writes photo. Nobuntu explains something else, takes the pen out of the hand of Lindiwe, makes some notes on the form and gives the pen back to the patient. The patient writes her name on the form. They exchange some words in Zulu)) ((Nobuntu indicates on the form with her finger)) Seventeenth. ((Lindiwe writes)) and the tenth ((Lindiwe writes)) ((Nobuntu says something .		

Appendix

	Lindiwe fills in 2006 on the form and gives it to Nobuntu)) Thank you very much.		
4,04	<p>((Nobuntu says a word to Lindiwe in Zulu, and indicates that she can go around the bed, and lay on the bed from the other side)) ((Nobuntu opens the patient record and reads.))((Lindiwe takes off her shoes))((Nobuntu gathers the journal and the documents. She says something in Zulu. Then she closes the curtain that separates the room from the labour ward))((The newborn baby is crying from the labour ward)) ((Nobuntu goes around the bed towards the pregnant woman. She helps her to find the step beneath the bed that she may step on to get on the bed.)) ((Lindiwe is lying on the bed with the abdomen naked. She has pulled up her t-shirt. A sheet is covering her feet. Nobuntu walks around the bed, picks up some paper towels from behind the curtain, goes back to Lindiwe and covers the underwear with the paper towel, in order to not spill ultrasound gel on it. Nobuntu puts on a pair of rubber gloves, and walks around the bed to pick up the ultrasound gel-bottle. She returns to the ultrasound machine. The woman is lying on the couch with her left hand under the head. We hear the baby crying in the labour ward. We also hear a CTG machine giving regular wave sounds.)) ((Nobuntu moves the ultrasound machine, takes out the transducer and lifts the ultrasound gel))</p> <p>Ok. ((Nobuntu says a word in Zulu)) ((Nobuntu moves her hand up and down the above the abdomen)) ((Lindiwe smiles)) ((Nobuntu distributes the gel on the abdomen and sits down on a chair next to Lindiwe, in front of the monitor on the ultrasound machine.)) So, we are going to start now. ((Her head towards the video camera))</p>		Physical examination phase starts
3,37	<p>((Nobuntu waves the pregnant woman to come closer to the edge of the bed. The woman moves.)) ((Nobuntu distributes the gel on the abdomen with the transducer)) ((Lindiwe looks towards the screen, says something inaudible and smiles.))</p>		
	<p>2. Nobuntu: mm ((Nobuntu points the transducer to the lower part of the abdomen, and an image appears on the monitor))</p> <p><u>Amafutha lawa abandayo. Ngizokuthela kancane. (I will put this gel on your stomach, it is slightly cold) (MC)</u></p>		
3,43	<p>3. Lindiwe: Ngiyawazi. (I know it)</p>		
3,44	<p>4. Nobuntu: Uyawazi? (You know it?)</p>		
3,45	<p>5. Lindiwe: Ehhe, kodwa sengikhohliwe. (Yes, but I have forgotten how cold it is.)</p>		
3,46	<p>6. Nobuntu: Awugcine lesisandla sakho eqolo. (Please bring this hand to your waist)</p>		

Appendix

	sisi...uyayibona? (This is the heart, can you see the baby's heart, can you see the baby's heart beat, can you see it?) (ONC)		
	13. Lindiwe: Ehhe, ngiyayibona. (Yes, I can see it.)		
9,09	14. Nobuntu: <u>Okay. Ikhanda lakhe leli sesike salibona. Nakhu uma sibuka ngapha, asibone ukuthi sizokwazi yini ukumubona ebusweni...</u> <i>(Okay, this is the baby's head we have already seen it. Let's see whether we can look at the baby's face when we move this direction.)</i> (MC) <u>Let me see whether we'll be able to see the face.</u> (MC)	Normality	
	15. Nobuntu: <u>Yini esingayibonanga manje, sesimkale wonke umntwana...(?). Yini esingabonanga manje? Kukhona esingakubonanga?</u> <i>(Is there something we have not seen yet? Do you think there's something we have not seen?)</i> (MC)		
	16. Lindiwe: Mina ngibona engathi uphila kahle. Kodwa ngiyakuzwa ukuthi kunalesi...(?) <i>(In my opinion the baby seems healthy, but I do acknowledge your ...(?).)</i>		
10,09	17. Nobuntu: small baby (hm) (09.28) ((Says something to Lindiwe, and turns the monitor slightly towards her.)) <u>I am just showing her the profile.</u> (MC) ((looking at the video camera)) ((Pregnant woman smiles, Nobuntu points to the monitor))		
	18. Lindiwe: Ooh (smiles)		
10,14	19. Nobuntu: <u>Hey, it is running away. (Nobuntu says something to the pregnant woman, tries to move the monitor but hesitates and moves on with the transducer)</u> <u>So you can see the back. You can see the four chambers. The () the thoracic cavity. The ribs. The neck</u> (ONC) . ((Lindiwe smiles)) Hey, this baby is moving. ((the pregnant woman seems to understand a bit of English, she smiles more after this last comment of Nobuntu)) ((Nobuntu says something inaudible in Zulu))	Normality	
	20. Lindiwe: ok		
10,21	21. Nobuntu: <u>the spine is intact.</u> (ONC) <u>And then we take the anterior. Ok. Let me go back here and see.</u> (MC)	Normality	
10,39	22. Researcher: what did the pregnant woman ... what did the pregnant woman ask?		
	23. Nobuntu: I beg you pardon?		
10,44	24. Researcher: what did the pregnant woman ask? She said something, so I just wondered what		
	25. Nobuntu: Ok. She said, she doesn't see what it is. (MC)		
	26. Researcher: No.		
	27. Nobuntu: And I have to show her that this is the	Normality	

Appendix

	fetal head (MC)		
	28. Researcher: yes		
11,08	29. Nobuntu: <u>This is the heart, this is the whole body. And then she understands. When she sees the whole body she sees that this is the baby. (MC)</u>	Normality	
	30. Researcher: Yes.		
11,12	31. Nobuntu: <u>Ok. It is difficult to get the measurements for the fetal head. (OFC)</u>		
	32. Researcher: mm		
11,18	33. Nobuntu: There, sister, look at the head (ONC)((towards the pregnant woman)) ((Lindiwe looks at the screen, smiles, responds briefly in Zulu)) <u>The limbs, yeah the limbs. You can see both limbs, the lower limbs and the upper limbs. Small baby.. (ONC)</u> (Turns the monitor more towards Lindiwe. Points at the screen.) ((The pregnant woman moves. Nobuntu asks something. The pregnant woman points at her head)) ((Nobuntu turns back to the screen)) ((Nobuntu starts to push buttons on the machine. Transducer is not on the abdomen, thus, no image on the screen. Prints out some paper. Turns back to the pregnant woman and says something in Zulu, inaudible to the transcriber))	Normality	
13,02	34. Lindiwe: ok		
13,59	35. Nobuntu: <u>Small. It is moving all around. Ok. Can't get hold of the fetal head. It is moving. It is moving away from me. (ONC)</u>		
	36. Researcher: Hm		
14,37	37. Nobuntu: <u>that's the cord. With to arteries and one vein (ONC).</u> ((Lindiwe is moving a little bit)) jay?	Normality	
14,54	38. Lindiwe: kono?		
	39. Nobuntu: hm		
	40. Lindiwe: kono?		
	((Nobuntu concentrates))		
15,22	41. Nobuntu: <u>that's the femur (ONC)</u> ((towards the camera))((pushes the buttons to do the measurements)) Se go no? Zingaki izinyanga? (How far are you in your pregnancy?)	Normality	
16,00	42. Lindiwe: Six. (Six months)		
	43. Nobuntu: Ziwu six? (Six months?)		
	44. Lindiwe: (Inaudible Zulu)		
	45. Nobuntu: Wagcina nini ukuya esikhathini? (When was your last normal menstrual period?)		
	46. Lindiwe: Ngo-May. (It was in May)		
	47. Nobuntu: Waya ngo-May? (Did you bleed normally in May?)		
	48. Lindiwe: Ngaya usuku olulodwa, ngingathini, ngaya ngokuqoqwa ngosuku, kwangaphela ngisho usuku.		

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	<i>(I did for a day, in fact it was not even a full day.)</i>		
	49. Nobuntu: Kwangaphela ngisho...? <i>(You said it was not...?)</i>		
	50. Lindiwe: Usuku, kwathi nje co co mhlampe amahour ambalwa kwangaphela ngisho usuku. <i>(It was not a full day, the bleed was just a few drops which lasted few hours and it stopped before the end of the day.)</i>		
	51. Nobuntu: Ngaye u-May? <i>(That was in May, is that right?)</i>		
	52. Lindiwe: Yebo. <i>(Yes)</i>		
16,50	53. Nobuntu: <u>Buka-la, uyabo?</u> <i>(Look! Can you see this?) (ONC)</i>		
	54. Lindiwe: Hmm...Angiboni nokuthi yini le <i>(Yes, but I don't even recognise what I'm looking at.)</i>		
	55. Nobuntu: (?)		
17,06	56. Lindiwe: Iyangizelisa enathi ngingabuka ngala. <i>(The screen makes me sleepy, it's better when I look away.)</i>		
17,22	57. Nobuntu: Uthe ziwu-six... <i>(You said it's been six months since your last normal menstrual period?)</i> <i>((Nobuntu turns the attention towards the screen again by pointing at it and does some measurements))</i>		
17,28	58. Researcher: could you translate, please?		
	59. Nobuntu: I beg you pardon?		
	60. Researcher: could you translate, please?		
	61. Nobuntu: oh. For you?		
	62. Researcher: yes, please.		
17,35	63. Nobuntu: I was just asking her when her last normal menstrual period was. I'm just checking if it correlates with what I'm saying now. She's not sure but she thinks according to her to her that it's six months. So I have to measure the () the first one was 9,39, that is () weeks (MC)		
17,58	64. Researcher: yeah. So she knew her last menstrual period?		
18,08	65. Nobuntu: She is not sure, but she thinks ...according to her she thinks she is six months.		
	66. Researcher: mm.		
19,58	67. Nobuntu: (mumbling) let me see. ((working with the measurements)) (humming) Why is this thing not going? hm ((Has frozen an image on the screen, takes away the transducer from the abdomen, starts to push the buttons.)) ((Nobuntu starts to move the transducer again)) ((says something to the pregnant woman while pointing on the screen.)) (ONC)		
	68. Lindiwe: Cha. <i>(No)</i>		

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21,54	69. Nobuntu: Those are the four chambers you can see <u>it, the diaphragm, the four chambers of the heart, the stomach, the ribs...</u> Uyabo? (<i>Can you see ?</i>) (ONC)	Normality	
22,19	70. Lindiwe: Hmm, ngiyabona. (<i>Yes I can.</i>)		
22,31	71. Nobuntu: Nabu ubuso, it's in the profile (?) (<i>This is the baby's face, it's its profile</i>) Nabu ubuso, nawu umlomo, nanka amehlo, nali ikhala nali ikhanda. (<i>Here is the face, that's the mouth, the eyes are here, this is the nose and here is the head.</i>) Uyambona? (<i>Can you see your baby?</i>)(ONC)	Normality	
	72. Lindiwe: Hmm. Ngiyakhululeka. (?). (<i>Yes, now I feel better because I can see the baby.</i>)		
23,04	73. Nobuntu: You couldn't see a thing. You couldn't see a thing. Awukakhathali (<i>Are you feeling tired yet?</i>)		
23,31	74. Lindiwe: Cha. (<i>No</i>) Ngisazombona udokotela? (<i>Do I still have to see the doctor?</i>)		
23,35	75. Nobuntu: Ehhe usazombona. (<i>Yes you will see the doctor after this.</i>) the position that she is adopting, I don't think it will allow me to do the BPD (MC)		
	76. Researcher: mm		
23,48-24,34	77. Nobuntu: Try to see. Kukhona okunye ofuna ukukwazi njengoba usumbonile? (<i>Is there anything else you'd like to know now that you have seen the baby?</i>) (MC)	worry	
24,54	78. Lindiwe: Bengifuna ukwazi ukuthi inhliziyo yakhe ayishayi yini ngoba bengiphathwa isiyazi. (<i>I wanted to know if the baby's heartbeat was normal because I had dizzy spells.</i>)		
25,02	79. Nobuntu: She said she was worried because of eh... she did not feel the baby moving for... Nini, kusukela nini, izolo? (<i>You said you didn't feel the baby kicking since when.... yesterday?</i>) (MC)	worry	
25,15	80. Lindiwe: Cha, ngeSonto. (<i>No, since Sunday</i>)		
	81. Nobuntu: For about a day. It was on Sunday.		
25,38	82. Researcher: so, was that why she contacted the hospital?		
	83. Nobuntu: Yes, that's why. She thought the baby was not alive (MC)	worry	
	84. Researcher: ok.		
25,44	85. Nobuntu: She said that the last kick, she felt was on Sunday. So yesterday there was nothing and even today. Now she's happy that the baby is alive	normality	

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	because she can see the baby moving. With the ultrasound it shows that she's quite active. (MC)		
26,03	86. Researcher: mm.		
	87. Nobuntu: So, she was afraid today. But now she knows that the baby is alive because she can see the baby is moving. She sees that is quite active. (MC)	Worry(normality)	
	88. Researcher: mm		
26,14	89. Nobuntu: Now, I think she didn't know that with an ultrasound you are able to see the baby's hand, everything... Quite different ((putting on more gel on the abdomen)) (MC)		
27,27	90. Researcher: mm. ((Video camera zoom in zoom out)) When did she find out that she was pregnant? ((Nobuntu asks in Zulu a question to Lindiwe))		
	91. Lindiwe: August		
27,36	92. Nobuntu: August.		
27,50	93. Lindiwe: I do..I am not sure		
30,19	94. Nobuntu: (inaudible Zulu) ((Doing new measurements)) Uphi umkhwenyana? <i>(Where is your husband?)</i>		
30,21	95. Lindiwe: Akekho use-Maritzburg. <i>(He is not here, he's in Pietermaritzburg.)</i>		
30,29	96. Nobuntu: Akafuni yini ukubona umntwana yena khona ezobona ukuthi umntwana wakhe uhamba kanjani? <i>(Wouldn't he like to see the baby, to see that she/he is doing well?)</i>		
	97. Lindiwe: Hawu, ngeke ngimazi ukuthi uyathanda noma nje ubhizi. <i>(Well, I don't know whether he wouldn't like it or he's just busy.)</i>		
30,33	98. Nobuntu: Owesingaki umntwana? <i>(Is this your first child?)</i>		
	99. Lindiwe: Owesithathu. <i>(No, this is my third child.)</i>		
30,45	100. Nobuntu: Awu, indoda ngeke isafika nje, umuntu azobona, uma ungathiwa akazobona ingane yakhe, uthande nje ukuzoyibona? <i>(You mean he wouldn't like to come just for a day to see the baby?)</i>		
	101. Lindiwe: Uyabhala njengamanje. <i>(He has exams at the moment.)</i>		
	102. Nobuntu: Uyabhala? <i>(Exams?)</i>		
	103. Lindiwe: Hhmm... <i>(Yes.)</i>		
	104. Nobuntu: Ubhala ini? <i>(What exams?)</i>		
	105. Lindiwe: Ubefunda, ngingathini... <i>(He's been studying...)</i>		
31,02	106. Nobuntu: Ubefunda ini? <i>(What was he studying?)</i>		

	107.Lindiwe: Ufundela ini, ufunda i-computer (He was studying something to do with computers)		
	108.Nobuntu: Oh, ufunda i-computer. (Oh, in computers?)		
31,22	109.Lindiwe: Eyi, sengikhathele-ke manje. (Ooh, now I'm tired...)		
31,34	110.Nobuntu: Bheka ngapha-ke. (Turn towards me then...) (woman moving, changes position and lies with the abdomen towards the Nobuntu) Ok She is tired now. She needs taking a pause.		
	111.Researcher: mm.		
	112.Nobuntu: ((Nobuntu is indicating a curve on the screen)) <u>So, at the moment the baby is lying like this (forming a curve with the transducer on the abdomen). Lying facing upwards. (ONC)</u>	(potential risk)	
	113.Researcher: mm		
31,57	114.Nobuntu: <u>Yeah. It is transverse. Because the limbs are somewhere here, and then the head is here. Look here ((pointing at the screen)) (ONC)</u> She is turning. <u>But what I have seen: I have seen the placenta. The baby. That the baby's heart () is there. Then I have seen the placenta. In () position. the spine that is intact as well as the anterior abdomen. Which is very much important. And then I have seen the cord. That had () the heart I have seen the four chamber, and I have seen the diafragm. That is separating the cavity from the thoracic cavity. And the () that seems to be normal at this age. Of this gestational age. (ONC)</u>	(potential risk) Normality	
33,04	115.Researcher: mm		
	116.Nobuntu: <u>And the cord is having tree openings, which is (...) (ONC)</u> So the only thing that is difficult to get is the HC and the femur length. That is () weeks (MC)	Normality Potential worry	
	117.Researcher: twenty?		
33,34	118.Nobuntu: <u>twenty weeks. ((pointing on the wall above her, where there are some tables)) A normal (.) I refer to my ((pointing)) because we use one to say 17 weeks we have to measure the BPD. And then if we loose it, say for instance like she. She is 18 weeks, and then the BPD is 46 millimeters. ((video camera zooming in to table on the wall with all the measurements: week, BPD, femur, MAD, AC, HC)) Which is close to 20 weeks. (OFC)</u>	Normality	

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34,01	119.Researcher: so, it is quite in accordance with her data then		
	120.Nobuntu: I beg you pardon?		
34,10	121.Researcher: the gestation is quite in accordance with her own		
	122.Nobuntu: yeah.		
	123.Researcher: she thought 6 months and you say...		
	124.Nobuntu: more or less (.) 5		
	125.Researcher: five months?		
34,22	126.Nobuntu: yes, five months. (Inaudible Zulu)		
	127.Lindiwe: (Inaudible Zulu)		
	128.Nobuntu: she thought five months		
	129.Researcher: mm		
34,38	130.Nobuntu: so, the BPD lies (.) Because when you <u>measure BPD you have to get all the reference points, you cannot ...maxeri, cerebri, septum and diafram. Which are the points for BPD. And when we measure them (.)from outside-inside. And then we make it (.) (OFC)</u>		
	131.Researcher: mm		
	132.Nobuntu: (Inaudible Zulu)		
	((Lindiwe turning to her back))		
35,12	133.Nobuntu: Can I just the last time see if I can get the <u>BPD (MC)</u> Oh, there we are. We nearly got it, but we can see the (.)		
	134.Researcher: mm.		
35,54	135.Nobuntu: <u>So, whenever you are measuring the BPD, the head must roll over and we must be able to see the cranium all over (OFC)</u> ((a woman in the labour ward is singing)) ((Nobuntu puts on more us gel on the abdomen.)) ((Nobuntu speaks Zulu to the singing woman and she stops to sing))		
	136.Lindiwe: (inaudible Zulu)		
36,55	137.Researcher: it is her first pregnancy?		
37,19	138.Nobuntu: this is her third pregnancy. She is previously the times two (.) . Therefore this is going to be an elective Cesar. And then she will do elective Cesar (MC) Angithi uyazi ukuthi uzohlinzwa? <i>(You do know that you will have to have a Caesarean section) (MC)</i>	(potential risk) (potential risk)	(temporary Post-exam)
	139.Lindiwe: Futhi? <i>(Again!?)</i>		
	140.Nobuntu: Ehhe, Angithi wena usuhlinzwe kabili. <i>(Yes, you have already had two surgical incisions...)</i> (MC)	(potential risk)	

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	141.Lindiwe: Kodwa ngani? <i>(But, why?)</i>		
	142.Nobuntu: Eh? <i>(Eh?)</i>		
	143.Lindiwe: Uyangiduduza nje kancane, kodwa angisabuzwa...(?). <i>(It is somewhat better than having to go through the pain of labour...(?).)</i>		
	144.Nobuntu: Ngeke, ngeke sisi, wena nje sesizokunikeza i-date yokuthi uzobuya nini. <i>(There is now way you're going to give birth through labour. It's impossible my sister. After I'm done we'll give you another appointment.) (MC)</i>	(potential risk)	
	145.Lindiwe: Ngizokwenzani? <i>(Why do I need to come another day?)</i>		
37,44	146.Nobuntu: Sizokuhlinza. <i>(The next appointment is your day at the theatre for your Caesarean section)</i> I was just explaining to her that since she's previous Caesar times two there will be no chance that will be given to her for trial of labour, she is just going to be done an elective Caesar because of two scars. (MC)	(potential risk)	
37,54	147.Researcher: ok.		
38,09	148.Nobuntu: Ok, this baby is moving. <u>I forgot to mention the limbs and that the baby is opening fingers.</u> (ONC)	Normality	Returns to physical examination phase
38,19	149.Researcher: mm		
	150.Nobuntu: <u>To show that the baby is quite active. And that is a good sign for life.</u> (ONC) (Lindiwe notices that the researcher is waving her arm because of tired arm after holding the camera. Trying to get the blood circulation back to the hand.)	Normality	
	151.Lindiwe:(Zulu)		
	152.Nobuntu: aah! Maybe it is best that you get a chair? (to the researcher)		
	153.Researcher: I can maybe do it afterwards, yes, and maybe leave the camera.		
38,55	154.Nobuntu: <u>The only thing that is giving me a problem is this () it is the landmark, but you can see the cavum septum. Have to get all the landmarks. But it is moving. Move your head, little one. She showed me the face, that I don't want.</u> (ONC) (translating to Zulu)		
	((Lindiwe is smiling.))		
	155.Nobuntu: ((inaudible Zulu))((pointing on the		

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40,25	screen, and indicating the head for the pregnant woman.) Maybe we will be able to see the other one. This one will not be able to take..... <u>Can I try another one to get the head? (MC)</u>		
40,47	156. Researcher: mm.		
	157. Nobuntu: This one is moving. Moving.		
	158. Researcher: mm		Returns to post-examination phase
	159. ((Nobuntu is inaudible Zulu seemingly explaining the position of the baby, indicating on the abdomen))		
	160. ((Lindiwe responds in an inaudible word in Zulu))		
40,54	161. Nobuntu: <u>It is still too early for her. Maybe the baby is going to turn down.</u>		
	162. Researcher: Mm		
41,36	163. Nobuntu: <u>As she lies. As it is a bridge position. It is a transverse. Because the limbs are here. The head is here. And the back is here. Down there. So, there is still chance for the baby to turn. ((Pregnant woman is getting up from the bed.))</u>	(potential risk)	
	164. Researcher: Yeah.		
	165. Nobuntu: So, we'll ask her to come back after 36 weeks. And then, to see whether the baby has turned or not.		
	166. Researcher: mm.		
41,54	167. Nobuntu: <u>Even if the baby hasn't turned, or the baby has turned, she will end up doing caesarean section.</u>		
42,04	168. Researcher: mm. Does she live close to here, so it is ok for her to come around 36 weeks?		
	169. Nobuntu: yeah. She says that she has come today. We are going to ask her to come to the health care clinic. So that we can be able to book her earlier. That she comes back earlier before she starts labouring.		
	170. Researcher: mm.		
	((Lindiwe is sitting on the bed. Nobuntu is cleaning her abdomen of gel with a piece of paper)) ((Zulu. Gives Lindiwe a touch on the shoulder))		
42,29	171. Nobuntu: Thank you very much. ((Translation from Zulu))		
	172. Researcher: Ok. ((Nobuntu takes of the plastic gloves.))		

Appendix E: Coded transcript of a typical encounter with Nonkululeko

Case study 2: Nonkululeko, pregnant woman 1: Sibahle

Distribution of turns in the whole encounter:

Nonkululeko 25 turns/ volume 1323 words

Sibahle 6 turns/ volume 11 words

Researcher 16 turns/ volume 50 words

ONC 13/494 words, OFC 3/ 78 words, MC13/310 words in the physical examination phase

ONC 8/194 words, OFC 0, MC 2/ 24 to pregnant woman

ONC 6/300, OFC 3/ 78 words, MC 10/ 286 to researcher

Normality ONC 10, MC 1

Worry

Risk ONC1, MC 2

From /to time	Interactional mapping (Turns, volume and discourse types)	Thematic mapping	Structural mapping (Phases and sub-phases)
0,8	1. Nonkululeko: signing the form...that she agrees.		Pre-examination phase
	2. The researcher: ok. Thank you very much.		
	3. Nonkululeko: H here...write H((to Sibahle))		
	4. Sibahle: hospital number?		
0,20	5. Nonkululeko: it is 9. Write 9. And you sign. Sign here. Today is eight.....		
0,40	((Sibahle mumbling)) 6. Nonkululeko: it is eighteenth of October 2006		
0,55-1,41	7. Nonkululeko: ok. ((putting the form on the table to the left.)) Ok. Lie! ((sitting down on the chair in front of the ultrasound machine. Sibahle lies down on the coach)) So, I am sister (anonymous). I am working here at (anonymous). Maternity. So I () with this here ((pointing at the USmachine)). They call it amafutha. <u>So, I am going to scan you to see how is the fetus. How does it lie. What is presenting. So everything that I can... whether it is outsideinside(?) the uterus, I will try to see.</u>		

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	So, she is (anonymous), she is 19 ((to Sibahle)) you are 19, you said so?		
1,47	8. Sibahle: yeah, 19.		
1,50	9. Nonkululeko: she is 19 years old. She is a primigravida. Which means that she is pregnant for the first time.		
	10. The researcher: mm		
2,00-2,20	11. Nonkululeko: So, at the clinic where she booked, she was unsure of her dates. But on palpation, she was 23 weeks. And when they measured the fundus, they found that it is 23 cm. be sure() That it corresponds with the palpation. So I am going to estimate the date of delivery.		
	12. The researcher: ok.		
2,30	13. Nonkululeko : so, before I start, I am going to protect your linen, so that you are not ((takes off some paper from a roll of toilet)) ((Sturla enters the room: kan jeg gå forbi der, eller går det nå? Prøve å få deg i aksjon ((taking photos))))		
2,52	14. The researcher: Yes, I am recording now.		
	Sturla: yes		
3,01-3,25	15. Nonkululeko: I am sorry; I don't have a proper paper. I am using the toilet paper instead of.... I left my gloves...? They are not here. So I want to () ((goes out of the room))		
	Sturla: that is all right. ((Sturla is leaning on the table. Eva comes in: har du WHO-boka der?)) ((Sturla: ja.)) ((Nonkululeko re-enters the room, and puts on the rubber gloves)) ((Sturla: kan du gå litt nærmere, slik at jeg får deg med?)) ((Video recording moves towards the pregnant Sibahle lying on the coach. The researcher is standing behind the advanced midwife, at the feet end of the couch.))		
4,25	16. Nonkululeko: <u>so, I am going to use this ((taking up the bottle of gel)). It is cold, so....(MC)</u>		Physical examination phase
4,31	17. Sibahle: what do you call it?		
4,41	18. Nonkululeko: it is gel. It is cold gel. ((puts the gel down on the machine. The toilet paper falls down behind the machine.)) <u>I am going to spread it, so that it is enough all over. So, initially, I look at the lower pole where I look at the presentation. I look whether the fetus is inside the uterus or not. I look whether ...I look at the bladder. (MC)</u> <u>The bladder is intact. There is the urine...you can see ((turns the monitor towards the pregnant Sibahle. She holds her head up to look at the screen. The camera is on the left hand side of the advanced midwife.)) ((Zulu: khamula?)) which is the bladder (ONC)</u>	Normality	
5,18 5,40	19. Sibahle: mm		
5,45	20. Nonkululeko: <u>so, this is the fetus. ((pointing and explaining in Zulu)) So, it is moving, you can see that it is alive. So, I</u>	Normality	

	don't hesitate to show you, because I see it is moving. The fetus is alive. (ONC)		
6,00	21. Sibahle: mm		
6,01	22. Nonkululeko: so it is in the uterus. I can see that there is a layer in the uterus. The ..you see a line there. So, it is inside the uterus. So, there is no cyst. The bladder is intact. It is a cephalic presentation. So, the fetus is moving. It shows that the fetus is alive. (ONC)	Normality	
6,33	So, from there I do the overview... of the uterus. Starting from the lower pole. (MC) You can see the head. The chest. The fetal heart (ONC) . ((in Zulu, pointing at the screen))	Normality	
6,55	23. Sibahle: mm ((raising her head to see))		
7,00	24. Nonkululeko: the spine...((pointing at the screen)) this is fine. The spine is intact () . There is the spine. You can see the T-part of the spine. There is the T-part of the spine. Which means that it is not ... You can also see the kidney. There is the kidney. ((Sibahle raising head to see)) It is intact! And you move on... You can see the limbs and you can see the placenta. ((word in Zulu)) This is the placenta ((Zulu)). It is situated on the fundal region. (ONC) Then you move on... ((moving the transducer)) ...up to the end. So, there are no abnormalities. The head is intact. The heart is ok. You can see that there are four chambers. You can see the liver. You can see everything. You can see the limbs. There are the limbs. That is the femur. There are no abnormalities. (ONC)	Normality	
7,52			
8,29-10,46	So, there are four stages to look into: stage 1: to look at the lower pole to see what is presenting. And then you also see any abnormality. And you also see that it is an intrauterine pregnancy. Or there is an extra uterine pregnancy. (MC) And then you are able to diagnose () if they are in and then you will be able to diagnose the () liqua...will be able to see the liqua, if the ..and also to see whether the bladder is intact. There is the bladder. (ONC) So, in stage 2, you look ..you do the overview of the whole uterus, now. You will be able to see the fetus, you see whether it is a live fetus. You will be able to locate the placenta. And then you will be able to see whether it is a single or twin pregnancy. Or a multiple pregnancy. So that is what you see while you...are moving. You are able to see the limbs of the fetus. Up to the limbs. And then stage 2, (MC)	Normality Awareness of risk Normality Awareness of risk	

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	<u>..stage 3 now.</u>		
10,46	25. The researcher: mm		
10,50	26. Nonkululeko: you look at the fetus as a whole. (MC) you can see the head. The head is ok. There is no abnormality. There is no hydrocephalus. You see the spine. The spine is ok. No abnormalities. The fetus is moving. You can see that it is moving. In (ONC)	Normality	
11,50	And from there you look at...at..you look at the kidneys. (MC) There is the kidney. And from there you look at the limbs. There are the limbs. The femur. The lower limbs. The lower part. The () is there. As wee as tibia and fibula And you can see that there is the placenta. ((turns to see if the camera is still there)) ONC	Awareness of risk	
12,30	So, the last one...you do the measurements. (MC) And to do the measurements, you need to know the parameters. You must know the...you must be able to identify the false cerebri, and then you go to identify the pox. There is the pox. I need to ...it must be in and	Normality	
13,29	Keeps on moving. ((laughing, communicating with the pregnant Sibahle.)) So, the head. So, now I am going to do the measurements. (MC)		
13,48-14,53	Concentrating in silence		
14,53	<u>Then I am doing the measurements now. (MC)</u>		
14,49	<u>When you measure the head, you measure from the outer to the inner. And then you press sent?</u> <u>And then you move one to measure the head circumference again. In case (.) You measure the BPD. (OFC)</u> <u>Then I measure the .</u> <u>to move outer to outer. Outer to outer part of the head.</u> ((pushing buttons)) <u>Then move on..to the abdomen now. (MC)</u> <u>And then when measuring the abdomen, there are also parameters that you look into. They must be used...they must be under the cord() They must be...there should be a landmark shown? (OFC)</u>		
16,00-16,55	Concentrating in silence		
16,56	<u>It is a moving fetus. And then the spine. You see? (ONC)</u> ((to Sibahle)) Very active your baby ((Zulu-word)) ((Sibahle is smiling))	Normality	
	<u>Can you see that? Can you see (ONC forts)</u> ((Sibahle is nodding))		
17,16	27. Nonkululeko: it shows that it is a live baby. Then when you measure the heart. Cause you estimate the...Where are the		

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17,36	<p>ribs? (MC) <u>There are the...there are the ribs there. And here is the stomach. And here is the umbilical cord. (ONC)</u></p> <p>Then I measure from outer to outer. (MC) ((pushing buttons))</p>	Normality	
17,57-18,35	((Concentrating in silence))		
18,53	<p>Then we move over to... ((pushing buttons)) <u>So, I am repeating the measurements. You don't have to until you are satisfied ...you correct the ... (MC)</u> ((a person enters the room))</p> <p>As a say...I don't know what role to play. They are asking for my help in the labour ward.</p>		
	28. The researcher: ok.		
20,00	29. Nonkululeko: <u>but then you measure. You do all the measurements three times (OFC)</u>		
	30. The researcher: mm.		
20,30	31. Nonkululeko: <u>until you are satisfied that you have the correct measurements and the parameter as you can see...</u>		
20,40-21,25	<p>((pushing buttons)) ((Scream from the labour ward)) ((Mobile phone))</p>		
21,25	32. The researcher: what would you do normally when they want your help in the labour ward?		
21,38	33. Nonkululeko: the say they need my help with delivery. Someone is having problems.		
	34. The researcher: yes.		
	35. Nonkululeko: when she is giving birth...		
21,48	36. The researcher: so, please...you must do what you usually do then....		
21,50	37. Nonkululeko: ok. Perhaps I should finish her... <u>Measure the abdomen also. Or to get other parameters. The spine... The ribs. The landmarks The cords. Perhaps then... (ONC)</u>		
22,30	I am sorry...((we hear a load scream of a woman from the labour ward that is approx 10 meters away))		
23,12	<u>The estimate date is ...she is 20 weeks and six days. Here is another (...) is 21 pluss. Femur length is 21 pluss. And the estimated length () is 3.23. cra() And the expected date of delivery is 28. Of February 2007 (ONC)</u>	Normality	
	No, I must rush to the labour ward.		
	38. The researcher: mm ((Nonkululeko turns and looks at the camera. Takes up the transducer and starts to clean Sibahles abdomen.))		Post-examination phase
23,28	39. Nonkululeko: <u>You are able to notice that there are no abnormalities...but when we notice abnormalities, we notice the doctor as soon as possible. So that she is actually taken as soon as possible.</u>		
	40. The researcher: mm		

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	41. Nonkululeko: and, when you find an abnormal fetus you notice as soon as possible, so that...if it is a very severe abnormality, it is ...the doctor perhaps should terminate the pregnancy.		
	42. The researcher: mm		
24,06	43. Nonkululeko: so, all the abnormalities are reported to the doctors.		
	44. The researcher: mm		
24,15	45. Nonkululeko: in worst cases, I report to xxxx that is our regional hospital.		
	46. The researcher: mm		
24,27	47. Nonkululeko: where we refer cases which have problems. ((cleans the transducer with the paper)) ((Zulu: sebolakses)) ((Sibahle gets up)) ((Nonkululeko gets up from the chair.))		
24,40	Maybe we should record later, because they need me in the labour ward.		
24,50	48. The researcher: yes. ((Nonkululeko runs out of the door)) ((Sibahle puts on her shoes and smiles)) Thank you very much!		

Appendix F: Coded transcript of a typical encounter with Nivedita

Case study 3: Nivedita, pregnant woman 1: Salome

Distribution of turns in the whole encounter:

Nivedita 23 turns/ volume 1593 words

Salome 20 turns/ volume 43 words

Researcher 2 turns/ volume 17 words

ONC 16/306 words, OFC 7/227, MC 15/257 in the physical examination phase

ONC 16/ 306 words, OFC 7/227, MC 15/257 to pregnant woman

ONC 0, OFC 0, MC 0 to researcher

Normality ONC 7, OFC 2, MC 1

Worry ONC 1, MC 3

Risk OFC 3

From /to time		Thematic mapping	Structural mapping (Phases and sub-phases)
0,12	1. Nivedita: ((while talking to Salome, she puts on the plastic gloves, after opening the sterile packet they are wrapped in.)) Sign there to say you accept... it is not... it is for official purposes.		Pre-examination phase
	2. Nivedita: so, how is the pregnancy going so far?		
	3. Salome: ()		
	4. Nivedita: hm? Tiring? Are you working?		
	5. Salome: no		
0,51-1,20	6. Nivedita: at home. You need to get enough rest! just gonna...		
1,21-1,52	((turns on the US machine. Cleans the display with regular paper.))		
1,59	<u>what I want to do...I will explain to you...</u>		
2,03	<u>I just have basic training.</u> <u>I just gonna show you the baby and basic things. We don't show sickness of the baby. We will just have an overall look at the baby and see that the baby is ok.</u> But it is not professional, going to a sonographer. I am not a sonographer, I am a midwife.		

10,40			
10,40	<u>But we saw now that the head is ok.</u>		
	<u>So now we have to look at ...</u>		
	<u>the reason we look at the () Is to make sure that the state of your pregnancy was ...you need the insurance to be told that it is fine. (MC)</u>	Awareness of worry	
12,19	<u>The baby's head is at the bottom. Ok. Fine....(ONC)</u>		
	<u>((Starts to move the transducer again.)) So I am just gonna look at the</u>		
	<u>((Silence))</u>		
	<u>Before you get too worried I just gonna show you ((starts to move the monitor)) I just want to show you the heart beat ((turns the whole portable US machine))(MC)</u>	Awareness of worry	
	<u>Can you see that? That's...that is the heart beat. Ok? ((Pointing at the screen)) and these lines coming to meet....you don't have to worry, because it is reflection from the () Then it is usually....(turning the button))</u>	Awareness of worry	
	<u>Can you see the head. It is the ()(ONC)</u>		
	<u>I will try to get you a better vision of the baby. (MC)</u>		
	<u>You see there...that is the face. You see that. The profile of your baby</u>	Normality	
	<u>I am sorry that we don't have the pictures...it is a portable machine...ok.</u>		
	<u>You see the baby's hand is close to the mouth. It is moving it. (ONC)</u>	Normality	
12,41	13. Salome: mmm ((looking at screen))		
12,41-13,19	<u>((Concentrating in silence))</u>	Normality	
	14. Nivedita: <u>look there. The spine. The white dots there. It is the baby's spine.</u>		
	<u>You can see it? That is the head. (ONC)</u>		
	<u>You saw the head there.</u>		
	<u>That is the () The white upper part...you can see the skin.</u>		
13,19-13,50	<u>The placenta. (ONC)</u>	Normality	
	<u>((Concentrating in silence))</u>		
	<u>The space that you see..it is the fluid that is around the baby. Also fluid. You can see a bit of the placenta is there. Can you see? (ONC)</u>	Normality	
15,00-15,39			
16,10			
	15. Salome: ((nods))		
16,10-18,50	<u>((Concentrating in silence))((moves the transducer))</u>		
18,50	16. Nivedita: <u>the abdomen of the baby.</u>		
19,25-20,26	<u>Whenever you see the black...you see the black...()That is the stomach. (ONC)</u>	Awareness of risk	
	<u>Means that it is normal. There is fluid inside. If we didn't see those black...it would mean that it is not ok. (OFC)</u>		

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	<p><u>And what we try ... what I try to do here is to get an overview of the ... to see if there is anything that I have seen.... (MC)</u></p> <p>if I have seen something... I would send you to a doctor that is qualified in looking at that. I want to show you.... are you ok? Are you comfortable?</p>		
	17. Salome: mm		
20,40	<p>18. Nivedita: <u>you see the baby's () that's the toe. If you look at it you see the () And then the ... (ONC)</u></p> <p><u>If it ((the machine)) was working, we would measure it, and then it would tell us exactly...no, not exactly, but more or less, what would be the age of your baby. And if () show us between 18 and 22 weeks, then it would give us more information. (OFC)</u></p> <p><u>And I have got a guide as to how to measure that. That was the leg you saw. And then you saw the hands () The baby's bladder there. (MC)</u></p> <p><u>So, when we are trying to measure... to get the age of your baby... we usually measure the size of the head. The abdomen and the bone of the leg... the bone that I've shown you. (OFC)</u></p>		
22,40-23,30	<p><u>Because this machine is a bit... it is an older machine, and we try to just... do some learning... And maybe to show you it is all right. (MC)</u></p>		
23,30-23,58	<p><u>That's the... That's the leg. And the white covering, that is the skin. There is no opening. (ONC)</u></p>		
23,58	<p>We measure the head. ((focusing on the head)) ((Concentrating in silence)) are you ok? Tired? (MC)</p>		
	19. Salome: ok.		
24,00-24,33	((Concentrating in silence))		
24,33	20. Nivedita: <u>The shape of the head seems fine.</u>	normality	
25,00-25,15	<u>We also look at the ventricles and it looks fine.</u>		
25,15	<p><u>Everything seems proportional. I don't see any... significant.. (ONC)</u></p> <p><u>But if the machine had been working, I would have measured it. Then I could... I would have measured... (MC)</u></p> <p>this is the abdomen. ((Concentrating in silence)) You can see the heart is... (ONC)</p> <p>That is what I would have measured. The abdomen and the head would have given me the indication of how old the baby is. Around here. I would have measured... (MC)</p> <p>And we also see the black points ... the fluid... Ok, Salome? (ONC)</p>		
	21. Salome: can you see what the baby is?		Post-examination phase

26,00	22. Nivedita: as I explained to you in the beginning...everybody asks us...they want to know the sex of the baby... First of all, I am not qualified to see it properly. And in the () sector... we don't look for that. Cause maybe we look like overall...how is the baby doing. How is the ...If there is anything wrong with the baby.		
26,50	23. Salome: so when am I supposed to expect the baby to come? Before or.. after or..		
27,05	24. Nivedita: well, as I explained, we don't have the facilities to...measure...because the machine is out of work...		
27,11	25. Salome: because the doctor...(.)		
27,15	26. Nivedita: mm. Next month? Yeah...the baby seems to be growing well. And you won't have a problem. And...the sister has brought you here because she was worried if the baby has turned...and whether it is facing... the lower segment of the abdomen... The lower part of the uterus. But as we saw, the baby is fine. But when we ...once you come into 8 th or 9 th month, it is more important that the baby's head is down. Because if the head is up, on top here, it is... Then it is a bridge presentation. That is why we worry about a bridge presentation. (But now, what we saw, is ...you have still got time, because the head can always turn. When you come to about...let's say 36 weeks...How many weeks are you now? Do you know?		
28,15	27. Salome: 34.		
	28. Nivedita: 34 weeks. Yeah. Right till 36 weeks, the baby can still turn. But once you pass 36 weeks, you want to make sure. Because here at the clinic, we don't do bridge deliveries. And if it is in a bridge position, you have to make sure that you are screened and sent to a hospital in time so the doctors see you. Prepares so that you can have a ...because if you have a bridge delivery...But that is not a problem now. Because we have shown you that it is not a bridge delivery. The baby's head is down. Are you comfortable?		
29,03	29. Salome: yes.		
	((Informed consent)) 30. The researcher: sign this?		
29,35	31. Nivedita: you're gonna sign the form for us, he? Just lie down,() I'll explain to you. Just... ((gives the woman a hand in getting up from the bed)) This is a patient consent form. But it is to say, ...the name and the number....that you are giving us the permission ...to		

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	videotape the session.		
30,02	32. Salome: right...		
30,05	33. The researcher: only I will look at it. It won't be published or made available to anybody.		
30,14	34. Salome: Ok.		
30,19	35. Nivedita: ok. She is in.		
	36. Salome: a pen?		
	37. Nivedita: yes. Come down. Put your shoes on...		
	38. Salome: () ((Noise in the background))		
	39. Nivedita: yes. She says she will....		
30,11	((small break))		
	(On the way out after the examination has finished) 40. Nivedita: when you () the baby move...Give yourself an hour when you are relaxing. Anytime. Doesn't have to be specifically time...Any time...But watch how many times the baby kicks.		
0,15	41. Salome: if it's less than four...?		
0,17	42. Nivedita: and if it is less than four kicks, then you try another hour. And if you still see that it is less than four kicks, you come to us, and we put you under the machine called the CTG to monitor the baby's heart beat. And then we will send you to a doctor, But this is just a way to measure that your baby is moving...ok, and everything is going fine. And if there is anything...because the baby should be moving...well, ...		
0,52	43. Salome: ok.		
0,55	44. Nivedita: so, if you ...don't get to worried about it. Just...when you have got time, you sit down, and you notice how much the baby is moving. Any mother, for example...if your () doesn't move...you use to gain that kick all the time...and all of a sudden you see...no, it is not kicking that often...and you wanna know why, why is now my baby not kicking, as often as it should be. So don't get to worried, heh!?! Just when you have got time. Just to make sure that the baby is fine.		
2,16	45. Nivedita: put your name under the patient number. There. ((Woman signing the informed consent form))		

