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ABSTRACT
        This study formulates a conception of knowledge in
interactive practice disciplines such as education and health care
and clarifies different types of knowledge in these disciplines.
Focus is on the relationship between practical and theoretical
knowledge. Four theses are discussed: (1) the role of knowledge in an
interactive practice is to guide practice; (2) different types of
knowledge in an interactive practice consist of value-knowledge,
factual knowledge and procedural knowledge, parts of which are
unarticulated, parts articulated; (3) science is a way of
articulating and creating knowledge that can be used as internal
action determinants in the practice concerned; and (4) theories in an
interactive practice can have both a theoretical and a practical
purpose but the theoretical purpose is also indirectly linked to the
practical. (Author/JD)

**Department of
Education**

**University of
Helsinki**

RESEARCH BULLETIN 68

Anneli Sarvimäki

KNOWLEDGE IN INTERACTIVE
PRACTICE DISCIPLINES

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KNOWLEDGE IN INTERACTIVE PRACTICE DISCIPLINES. An analysis
of knowledge in education and health care. Dissertation. 276pp.

ABSTRACT

The aim of the study is to formulate a conception of know-
ledge in interactive practice disciplines like education
and health care and to elucidate different types of know-
ledge in these disciplines. Special attention is paid to
the relationship between practical and theoretical know-
ledge. The study is theoretical and philosophical. It is
based on a pragmatistically and constructivistically orien-
ted conception of knowledge, where living, acting and know-
ingare the main concepts. Four theses make up the point of
departure for the analysis: I. The role of knowledge in an
interactive practice is to guide practice. II. Different
types of knowledge in an interactive practice consist of
value-knowledge, factual knowledge and procedural know-
ledge, parts of which are unarticulated, parts articulated.
III. Science is a way of articulating and creating know-
ledge that can be used as internal action determinants in the
practice concerned. IV. Theories in an interactive practice
can have both a theoretical and a practical purpose but the
theoretical purpose is also indirectly linked to the practical.

The first two theses are argued for and explained through an
inquiry in the nature of practical knowledge in the inter-
active practices concerned. Practical knowledge is defined
as knowledge manifested in appropriate action. Moral know-
ledge is seen as part of practical knowledge. Practical know-
ledge is organized in action schemata and implicit theories,
which in turn organize the values, beliefs and abilities of
the actor. The three epistemic styles empiricism, rationalism
and metaphorism are used to describe how the beliefs are
organized. Practical knowledge can also be collective. Tradition
plays an important part in the mediation of practical know-
ledge. The last two theses are argued for and explained through
an analysis of theoretical knowledge and of scientific know-
ledge as a special form of theoretical knowledge. Theoretical
knowledge is characterized as a conception of the practice
concerned and of how it is to be conducted. This knowledge
too can be unarticulated or articulated. The aim of scien-
tific activity in interactive practice disciplines is to
formulate theories of and for practice, theories that can be
used as theories in practice. The relationship between prac-
tical and scientific activity in the disciplines concerned
is described as a common action system, the development of
which can be conceived as a common learning process.

Key words: educational knowledge, health car knowledge,
practical disciplines, moral practice, practical knowledge,
theoretical knowledge.

Anneli Sarvimäki
KUNSKAP I INTERAKTIVA PRAKTISKA DISCIPLINER. En analys av
kunskap inom edukation och hälsovård. Doktorsavhandling. 276ss.

SAMMANFATTNING

Avsikten med undersökningen är att formulera en syn på kun-
skapens roll inom interaktiva, praktiska discipliner som edu-
kation och hälsovård samt att klarlägga olika typer av kun-
skap som förekommer inom dylika discipliner. Speciellt av-
seende fästs vid relationen mellan praktisk och teoretisk kun-
skap. Undersökningen är teoretisk-filosofisk till sin natur.
Analysen baserar sig på en pragmatistiskt-konstruktivistiskt
influerad kunskapssyn, där grundbegreppen utgörs av liv, hand-
ling och kunskap. Fyra teser utgör utgångspunkt för analysen:
I. Kunskapens roll i en interaktive verksamhet är att vägleda
verksamheten. II. De olika typerna av kunskap i en interaktiv
verksamhet utgörs av värdekunskap, faktakunskap och procedur-
kunskap, av vilka delar är oartikulerade, andra artikulerade.
III. Vetenskapen är ett sätt att artikulera och skapa kunskap
som kan användas som inre handlingsdeterminant i den aktuella
verksamheten. IV. Teorier inom en interaktiv verksamhet kan ha
både ett teoretiskt och ett praktiskt syfte men också det teo-
retiska är indirekt relaterat till det praktiska.

De två första teserna underbyggs genom en undersökning av den
praktiska kunskapens natur inom de aktuella interaktiva verk-
samheterna. Praktisk kunskap definieras som kunskap manifes-
terad i lämpliga eller adekvata handlingar. Den moraliska kun-
skapen är en del av den praktiska. Den praktiska kunskapen är
organiserad i handlingsschemata och implicita teorier, vilka
i sin tur organiserar aktörens värden, föreställningar och
förmågor. De tre epistemiska stilarna empirism, rationalism
och metaforism används för att beskriva hur föreställningarna
organiseras. Den praktiska kunskapen kan också vara kollektiv.
Traditionen spelar en viktig roll vid förmedlingen av prak-
tisk kunskap. De två sista teserna underbyggs genom en analys
av den teoretiska kunskapen och av den vetenskapliga kunskapen
som en speciell form av teoretisk kunskap. Teoretisk kunskap
definieras som en uppfattning om den aktuella verksamheten
och om hur den bör bedrivas. Också denna kunskap kan vara oar-
tikulerad eller artikulerad. Målet för vetenskaplig verksamhet
inom praktiska interaktiva discipliner är att formulera teo-
rier om och för den praktiska verksamheten, vilka sedan kan
användas som teorier i verksamheten. Förhållandet mellan prak-
tisk och vetenskaplig verksamhet inom de aktuella discipli-
nerna beskrivs som ett gemensamt handlingssystem, där utveck-
ling kan uppfattas som en gemensam inlärningsprocess.

Nyckelord: edukationskunskap, hälsovårdskunskap, praktiska
           discipliner, moralisk verksamhet, praktisk kun-
           skap, teoretisk kunskap.

TO MY MOTHER

ACKNOWLEDGMENTS

For all the remaining weaknesses - linguistic as well as scientific - I am fully responsible myself.

Helsinki
October 1988

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1. INTRODUCTION

This study deals with knowledge in interactive practice disciplines like education and health care. The purpose is to clarify different types of knowledge that exist in these disciplines and to shed some light on the relationship between these types of knowledge. Special attention will be paid to the nature of practical knowledge and to the role of theories in the practices concerned.

1.1 Background

In her classical book Intention, G.E.M. Anscombe (1958, 57) says that in philosophy the main focus of interest has been on contemplative knowledge and that modern philosophy has misunderstood what ancient and medieval philosophers meant by practical krowledge. According to the contemplative view of knowledge, she says, knowledge is something that can be judged as being in accordance with facts. The facts constitute reality and determine what can be said, if we claim to have knowledge.

That Anscombe may be right can be seen by looking through different textbooks and studies of knowledge: they generally deal with scientific knowledge, propositional knowledge, perception, analytical knowledge and other kinds of knowledge that might be called speculative (see e.g. Ayer 1975 and 1976, Beardsley & Beardsley 19 2, Ekman 1979, 132-145, and O'Connor & Carr 1982). The conception of knowledge that we often meet is the one that Niiniluoto (1980, 138) calls the classical concept of knowledge: "knowledge is a well justified true belief".

This preoccupation with contemplative, scientific and propositional knowledge can be viewed as one manifestation of

the theoretical and rational mode of thinking that has in-
fluenced our Western culture for such a long time. Since
this mode of thinking can be said to have culminated in
science and scientific thinking, and science has to do
with knowledge, science has been equated with knowledge:
since science produces knowledge expressed in propositio-
nal systems, knowledge is always expressed in propositio-
nal systems produced by science. This implication is, of
course, false.

In many practice disciplines in recent years there has been
a growing uneasiness with the contemplative conception of
knowledge and, correspondingly, a growing interest in prac-
tical knowledge and other forms of knowledge like ethical
knowledge, know-how and aesthetic knowledge (see e.g. Car-
per 1978, Brownhill 1983, Eisner 1985, Elbaz 1983, Johans-
son 1983, and Nyiri & Smith 1988). Also, the role of scien-
tific knowledge in practice disciplines has been questioned.
The view of science has largely been adopted from natural
science and some writers thus feel that it is irrelevant
to the practice disciplines they themselves represent (e.g.
Hunt 1977, Munhall 1982, and Tom 1985).

In the discussion about the relationship between a practice
and its related theory and research we can point out at
least two themes. On the one hand, we can see that some writers
pay attention to the discrepancy between the practice le-
vel and the theory and research levels. According to Schröck
(1981a), for instance, nursing is in a state of crisis be-
cause of this discrepancy: the theoreticians and researchers
answer questions that the practitioners have not asked, they
answer other questions than those asked by the practitio-
ners, the researchers and the practitioners ask the same
questions but give different answers, or the researchers
do answer the questions asked by the practitioners - after
which the practitioners may go out and apply the answers
at once, which is not necessarily what the researchers had

in mind. Munhall (1982) and Greenwood (1984) ascribe this
discrepancy to the way in which nursing research has been
developed: while nursing care is considered a humanistic
endeavour, a practical activity in a social context and a
series of unique events, nursing research has dealt with
generalizations, statistical analysis and predictions.
In the area of education Marton (1986) has pointed out
that educational research also seems to have little rele-
vance for educational practice.

In contrast to these somewhat sceptical attitudes towards
the practical value and relevance of current research in
these disciplines the discussion also reveals lines of
thought according to which practice in these areas is de-
veloping towards a more scientific stage. Gage (1978, 15-
20, 41) emphasizes that teaching, for example, is a prac-
tical art, but in order to develop, the practical art of
teaching needs a scientific basis. Engeström (1983,
179-185) describes teaching in a historical
perspective and claims that teaching has developed from
the artisan's or trade stage through the technical and
humanistic stage and is now entering the theoretical stage.
In the theoretical stage the teacher teaches the students
to think and to master practice by means of theory. The
teacher is also theoretically conscious of his own teach-
ing and the practice of teaching is based on holistic co-
operation and on a combination of teaching practice, re-
search and developmental work, says Engeström.

Those who criticize the current state of research and theo-
ry in education and nursing, for example, usually mean
that the discrepancy between theory and practice need not
be permanent and inevitable. Thus, Munhall (1982) and
Greenwood (1984) propose a more phenomenological, herme-
neutic, idiosyncratic and situational approach in nursing
research as a : ution to the practice-research problem.
They are evidently not alone in this opinion: the interest
in hermenautic, phenomenological and ethnographic - so-

called qualitative - methods has grown continually in nursing research during the eighties and can almost be considered the "normal paradigm" for the moment (see e.g. Chenitz & Swanson 1984, Dunlop 1986, Leininger ed. & auth. 1984, Leininger ed. 1985, Oiler 1982, Parse 1981 and Watson 1985). In educational research qualitative methods do not seem to be stressed so strongly as in nursing research for the moment. Rather, there seems to be a tendency towards diversification and differentiation of methods (see e.g. Cohen & Manion 1980, Hellgren 1982, Hirsjärvi & Hurme 1979, Huttunen 1984, Wilenius 1976 and 1979).

In Finland the discussion about the relevance of scientific, theoretical and other types of knowledge in education and health care also has to do with recent educational reforms. About 15 years ago teacher education acquired academic status. During the last 10 years many health care disciplines have developed in the same direction. This shift from a mainly practical orientation to a more academic and research based orientation is probably one of the reasons why there seems to be a need for re-evaluation of types of knowledge and of the role of theory and research in these areas: the whole question of how to integrate theory and research into a practical activity is problematic, and so is the question of how to combine theoretical knowledge with e.g. practical, experiential and personal knowledge. There may also have been fear of losing valuable types of knowledge, embedded in traditions and habits, with the new academic status. The academization of old trades and practices is a process that is still going on - newcomers in the academic world in Finland are e.g. the restaurant and provision services. It is still too early to say how these new disciplines will develop and what problems they will encounter.

This process of academization of trades and occupations has probably not been unique to our country. It is a change

that many occupations have gone through in different
countries and at different stages of history. However, as
was noted previously, it may be one factor contributing
to the large interest in knowledge in practice disciplines.
Lindholm (1985, 124-125) says that we need to take care of
those types of knowledge that are threatened. If we consi-
der e.g. intuition, personal experience, empathy and prac-
tical excellence as "threatened" types of knowledge, there
actually seems to be a large interest in taking care of
them for the moment (see e.g. Agan 1987, Benner 1984, Boud
et al. 1985, Burnard 1987, Hult & Sarvimäki 1983, 1984a,
and 1984b, Rew & Barrow 1987, Schön 1983, and Usher 1985).

These changes and developmental trends, and this re-orien-
tation with respect to the conceptions of knowledge have
lead us up to a point where new roads are opening up. The
types of knowledge inherent in practical disciplines are
utterly diverse and variant, and apparently can not be re-
duced to one form.

The growing interest in knowledge in practice disciplines
indicates a need for a new conception of knowledge in these
areas, as well as a need for a view of the nature and
role of knowledge in these areas as a whole. There seems to
be a need especially for a deeper understanding of the
relationship between theoretical and practical knowledge,
between theory and practice. A deeper understanding in this
respect might help us see why it seems so difficult to
unite theory and practice.

1.2   The aims and problems of the study

The general aim of this study is to formulate a view of
knowledge in interactive practice disciplines. The aims can
be specified in the following way:

1. to formulate a view of the role of knowledge in an interactive practice,
2. to investigate and clarify different types of knowledge in an interactive practice,
3. to investigate and formulate a conception of science in an interactive practice discipline,
4. to clarify the concept of theory in an interactive practice discipline and to investigate different types of theories.

In order to achieve these aims I will try to answer questions like:

- Which are the types of knowledge embedded in an interactive practice discipline?
- What is meant by practical knowledge and theoretical knowledge?
- How are the different types of knowledge in an interactive practice discipline related to each other?
- How is scientific knowledge to be understood in an interactive practice discipline?

In order to answer these questions, however, I will first have to try to answer questions like:

- How shall we understand knowledge in general?
- What is the relationship between knowledge and action?
- How is an interactive practice and an interactive practice discipline to be understood?

Since the last three problems can be considered primary to the previous ones, they will be dealt with first. After that the other problems will be investigated.

As was noted previously, the area of study consists of interactive practices and interactive practice disciplines.

Later in the study I will go deeper into what is meant
by this. Some introductory remarks and restrictions may,
however, be needed before that. By interactive practices
I mean different kinds of practices where interaction
with individuals and groups constitute a central element
and where this interaction aims at doing something for the
individuals or the groups concerned. Interactive practices
are for instance education, social work, different types
of health care, and service practices like waiting on cus-
tomers in a restaurant, taxi driving, and guiding and in-
forming tourists.

I will restrict the study to the practices of education
and health care. One reason for this is that these consti-
tute systematic and organized practices with both social
and historical contexts. Another reason is that they have
developed a considerable amount of knowledge through both
tradition and research, which make them suitable for the
purpose of this study. They have also developed systems
for the education of practitioners, researchers and admi-
nistrators of the practice. Still another reason is that
both education and health care aim at doing something good
for other people: to help someone learn something, to help
someone recover from illness, to help someone to die peace-
fully etc. This gives the practices under study a certain
degree of coherence, although the immediate goals of the
practices may differ from each other.

There are other kinds of practices that involve human in-
teraction, which I do not consider interactive practices
in the same sense as the practices described above. Far-
ming and fishing, for instance, may involve both inter-
action and cooperation, but since these practices aim at
influencing processes and states in the environment rather
than at developing personalities, interpersonal relations
and human affairs, I do not include these in the category
of interactive practices.

1.3 On the nature of the problems and the study

The problems of this study can be conceived as philosophi-
cal problems. This means that they cannot be solved by
means of general empirical methods. Rather, the method
used can also be classified as philosophical.

However, philosophy is not only one method but includes a
variety of methods. Schröck (1981b) mentions e.g. systema-
tic doubt, phenomenological description, formal logic and
dialectic, while Gaut (1985) concentrates on concept analy-
sis, and Ray (1985) focuses on the phenomenological method.

All these methods have a common feature: they deal with
what Schröck (1981a) calls second-order questions. While
first-order questions are empirical and can be answered by
referring to observations gathered and organized by the
scientific method, second-order questions cannot be answered
in this way. Second-order questions are, according to
Schröck, philosophical; they help us understand the know-
ledge we have gained through empirical research and they
help us see the "inner logic" of our knowledge and action.

The idea of. arranging different types of questions and re-
search on different levels has previously been put forth
by Hirsjärvi and Lindholm. Hirsjärvi (1977, 86) has deve-
loped a conception of educational research according to
which we can distinguish between an action level, a research
level and a conceptualizing (hahmottava) level. The action
level refers to educational reality, while the research
level refers to empirical research in education and the
conceptualizing level refers to theoretical inquiry in
education. Hirsjärvi emphasizes that in serious scientific
work theoretical and empirical aspects are usually com-
bined.

Lindholm (1980, 70-71) presents a hierarchy that includes
science, metascience and philosophy. For him science con-

sists of different empirical sciences like physics,
psychology and anthropology. Metascience is empirical
inquiry in the sciences, which gives us history of sci-
ence, sociology of science and psychology of science.
Philosophy constitutes a level of its own, including on-
tology, axiology and epistemology.

Lines of thought that resemble these have also been put
forth by Brante (1980) and by Hirsjärvi in two later ar-
ticles (Hirsjärvi 1981b and 1982).

I shall here adopt Schröck's (1981a) idea of questions of
different orders and integrate it with Hirsj.rvi's (1977,
86) and Lindholm's (1980, 71) hierarchies (fig. 1.1).

D. PHILOSOPHY   Philosophical questions
  -of the sciences of   Third-order questions about
    interactive practices   interactive practices and
  -of interactive   their sciences
    practices

C. METASCIENCE   Metascientific questions
  -sciences of the sci-   Second-order questions
    ences of interactive   (empirical and theoretical)
    practices   about the sciences of in-
                        teractive practices

B. SCIENCES   Scientific questions
  -of interactive   Second-order questions
    practices   (empirical and theoretical)
                        about interactive practices

A. INTERACTIVE PRACTICES   Practical questions
  -education   First-order questions
  -health care, etc.   about interactive practices

Figure 1.1 Questions of different order with respect
           to interactive practices

Level A thus covers the actual interactive practices and
their practical questions. These are questions about e.g.
how to act and interact in specific situations and about
how to organize the intera tive systems in society in
the best possible way. Level B, the scientific level, co-
vers both theoretical and empirical questions about the
interactive practices. These are questions about how to
describe and explain the practices concerned and the
answers presuppose both theoretical inquiries and empirical
research. The metascientific level again, level C, includes
scientific questions about the scientific activity
on level B. Since the questions on level B and C are of
the same kind - they only have different objects - I con-
sider them questions of the same order. L vel D, finally,
is the philosophical level. On this level both the inter-
active practices, their sciences and metasceinces can be
studied by asking questions that cannot be answered by re-
ferring to a course of action (level A) or to empirical
facts in combination with theoretical concepts (level B
and C).

This hierarchy gives us questions of three orders instead
of two. The practical questions can be considered first-
order questions, the scientific and metascientific ques-
tions second-order and the philosophical question third-
order questions.

This study deals with third-order questions, which means
that the methods used can generally be classified as phi-
losophical. When the philosophical questions concern the
actual interactive practices we talk, for instance, about
philosophy of education, nursing philosophy and philosophy
of medical practice. When the questions concern the scien-
ces of these practices we talk about the philosophy of
educational science, the philosophy of health care sciences
and so on. The philosophy of the interactive practices has
strong connections with other domains of practical philo-

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sophy, while the philosophy of the sciences of interactive practices is connected to other areas of philosophy of science (see also Hirsjärvi 1985, 15-28; Niiniluoto 1984, 210; Sarvimäki 1976, 3-5 and 1984, 4-5).

The problems of this study belong to both the philosophy of the practices concerned and the sciences of these practices. Actually, the line between these two areas of philosophy is often vague and many problems can be seen as belonging to both areas.

The task of philosophy with respect to the interactive practices and their sciences can be stated as follows:

> -to problematize and question values, beliefs, concepts and theories that we often consider self-evident,
> -to reveal, explicate, analyze and clarify values, beliefs and concepts that are prevalent but often unconscious,
> -to critisize illogical, unreasonable and corrupted forms of thought and to argue for alternatives, and
> -to formulate overall views and syntheses, so-called "philosophies" of interactive practices and their sciences; these syntheses are often normative, that is, they tell us how we should describe and conceive these practices and their sciences and they also implicate principles for practical activity and inquiry in these areas.

This view of the tasks of philosophy is a synthesis of viewpoints presented by, among others, Beardsley & Beardsley (1972, 9-11), Hirsjärvi (1985, 24-28), McClellan (1976, 2), and Niiniluoto (1980, 21-22) (see also Sarvimäki 1987a and 1988).

This study includes elements of different tasks. The general

idea is to problematize and analyze as well as to criti-
size, argue and formulate syntheses in order to fulfill the
aims of the study. The possible sy heses, however, can-
not be conceived as forming a total "philosophy" in the
normative sense of the word.

The value of adopting a philosophical approach to the
practices and sciences of education and health care can
also be expressed in Russell's (1980, 93-94) words:

> "Philosophy is to be studied, not for the sake
> of any definite answers to its questions, since
> no definite answers can, as a rule, be known to
> be true, but rather for the sake of the questions
> themselves; because these questions enlarge our
> conception of what is possible, enrich our intel-
> lectual imagination, and diminish the dogmatic
> assurance which closes the mind against specu-
> lation;..."

1.4 Concluding comments

This study, then, can be considered as a journey into the
landscape of knowledge. The point of departure consists of
the problems listed on page 6. The possible answers are
not to be understood as definite solutions to the problems.
Rather, the function of the problems is to open up new
views, roads and landscapes, and the answers are to be con-
sidered as temporary halting-places.

Since knowledge is the main theme of this inquiry, I will
start out by studying some central lines of thought in
the theory of knowledge. On the basis of this review I
will formulate some theses that will constitute the basis
for my argumentation. The literature on education and health
care will not comprise a special review of literature.
Rather it will be included when it is relevant for the
topic discussed.

2. EPISTEMOLOGICAL BACKGROUND

Epistemology, or theory of knowledge, is one of the main
areas within the discipline of philosophy. Accordingly,
the literature on the subject is abundant. In educational
literature too, a lot has been written on knowledge; this
is probably because education has to do with learning and
learning has to do with knowledge. Since the relationship
between knowledge and health care is not so apparent and
many-sided as the relationship between knowledge and edu-
cation, literature on the subject is not so versatile and
not so extensive.

2.1 Epistemological traditions in philosophy

Because of the amount of literature on knowledge in philo-
sophy it is not an easy task to summarize the theories
into a few, distinct traditions. One basic distinction that
is usually made is the one between empiricism and rationa-
lism (Beardsley & Beardsley 1972. 73, 77; Ekman 1979, 136;
Hirsjärvi 1985, 60-63; O'Connor & Carr 1982, 8-10; Randall
& Buchler 1971, 74-89; Scheffler 1965, 2-4). In addition
to these two main traditions, pragmatism is often mentioned
as an important theory of knowledge (e.g. O'Connor & Carr
1982, 24-25; Randall & Buchler 1971, 126-139; Scheffler
1965, 4-5). Types of knowledge that are less frequently
mentioned and that are not always related to these previous
distinctions are practical knowledge or knowing how and
knowledge by acquaintance (O'Connor & Carr 1982, 61-62;
Russell 1980, 25-32; Ryle 1976, 28-32). Metaphorism is some-
times mentioned (e.g. Bronowski 1979, 43-63) but does not
usually appear in established textbooks on theory of know-
ledge.

As will be apparent in the treatment of the epistemilogical
tradition., there is not only one problem of knowledge but

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many. One problem has to do with the concept of knowledge:
what is knowledge? Another one concerns the sources of
knowledge and a third the justification of knowledge.
Still another problem deals with what is called modes of
knowing. These problems are of different relevance within
the different epistemological theories and traditio.s, and
I will deal with them accordingly, although maybe not in a
very systematic manner.

In the following overview I will follow two themes: one is
that of rationalism and empiricism, the other one concerns
theoretical and practical knowledge.

2.1.1 Rationalism

As the word 'rationalism' indicates, the rationalistic tra-
dition in epistemology emphasizes the role of ratio, or rea-
son, in acquiring and justifying knowledge. Outstanding
rationalists in the history of philosophy are for instance
Plato (427-347 B.C.), Descartes (1596-1650) and Spinoza
(1632-1677).

Plato distinguishes between 'episteme , which means know-
ledge, and 'doxa', which means opinion or belief. While
knowledge always concerns something stable and unchanging,
opinion and belief concern something that is uncertain and
subject to change. Therefore, the object of knowledge is the
world of ideas which can not be grasped by the senses.
The empirical world around us, which we get in contact with
through our sense organs, is only an object of opinion.
(Furberg 1969, 63-64; Niiniluoto 1980, 39)

Therefore, Plato's theory of knowledge is closely connencted
with his view of reality as divided into an empirical world
and a world of ideas. It is also closely connected with his
view on the human soul as possessing innate knowledge. Dia-

logues that are relevant for an understanding of Plato's
conception of knowledge are especially "Phaedo" (Platon
1984a), "Meno" (Platon 1984b), "The Republic"(Platon 1984c), and
"Theaetetos" (Platon 1985). In "Phaedo" Plato argues for the
immortality of the soul and the world of ideas; it is on
these two ideas that the conception of innate knowledge is
founded. In "Meno" Socrates shows how an uneducated slave
comes to understand a geometrical idea; this is again seen
as support for the idea of innate knowledge - since the
slave has never been taught geometry, his knowledge must
be innate. In "The Republic" Plato further develops the con-
ception of the ideal world and elaborates the difference bet-
ween knowledge as access to the world of ideas and opinion
as sense impressions of the empirical world. Finally, in
"Theaetetos" Plato discusses knowledge as perception, as true
belief, and as a well justified true belief, without arri-
ving at any clear solution (see also Furberg 1969, 77-80).

Descartes, too,concluded that our sense impressions are
uncertain and often deceitful. The only truths that we can
be sure of are those that our reason immediately compre-
hends; intuition, then, is the criterion of knowledge.
(Ekman 1979, 135-137; Hartnack 1958, 87-91; Hirsjärvi 1985,
. 61; Ketonen 1981, 11-13)

Spinoza's Ethics (Spinoza 1983) can also be conceived as a
rationalistic endeavour. Mathematics and geometry were,
according to Plato, the ideal sciences (Niiniluoto 1980,
39) and Spinoza develops his ethical theory using geo-
metry as a model. He formulates axioms, definitions, pos-
tulates and proofs.

The main characteristics of rationalism can accordingly be
summarized as follows:

> - There are a prioric truths, i.e. truths that do
>   not need empiric support.
> - The a prioric truths are certain whilst sense
>   impressions are not.

- Intuition and discursive thinking, i.e. argumen-
  tation and logic, are the main methods for jus-
  tifying knowledge.
- Rationalistic knowledge often has a systematic
  character (e.g. Spinoza).
  (Ekman 1979, 136-137; Hirsjärvi 1985, 61; O'Connor
  & Carr 1982, 8-10)

2.1.2 Empiricism

As opposed to rationalism, empiricism claims that all know-
ledge comes from the senses and that sense impressions and
observations are the criteria of knowledge: in justifying
knowledge we must appeal to experience. Important empiri-
cists in the history of philosophy are for instance Locke
(1632-1704), Hume (1711-1776), and Mill (1805-1873).

Niiniluoto (1980, 39, 42) points out that empiricist traits
can be traced back to Aristotle (384-322 B.C.). Aristotle
emphasized the role of experience more than his teacher
Plato. However, it would be misleading, says Niiniluoto, to
call him an empiricist, because he never really succeeded
in analyzing the role of experience in science. It was not
until the New Age that empiricism developed into a philo-
sophical programme and that the conflict between rationalism
and empiricism became apparent.

In An Essay concerning Human Understanding, published in 1690
Locke criticizes the view that knowledge may be innate. He
claims that there can be no knowledge without experience.
There are two kinds of ideas, according to Locke: ideas of
sense impressions and ideas of reflexion. The ideas of
sense impressions arise when the external world affect our
sense organs and these ideas are then the object of refle-
xion. Hence, without sense impressions reflexion has nothing
to work with and we can have no knowledge. (Ekman 1979,
138-139; Hartnack 1958, 104-106)

Several authors have discussed whether Locke's critique is
to be considered as philosophical or psychological. Aspe-
lin (1977), for instance, shows that Locke has a tendency
to combine psychological and epistemological arguments.
Wall (1977) claims that Locke treats the conception of in-
nate knowledge as an empirical, psycho-genetic hypothesis
about how we come to possess knowledge rather than as an
epistemological thesis.

The psycho-genetic nature of Locke's argument renders his
theory especially applicable to education. Locke developed
his educational theory in Some Thoughts concerning Educa-
tion. In this work Locke sees the child as a Tabula Rasa
on which early experiences leave their mark:

> "The little, or almost insensible, impressions on
> our tender infancies, have very important and las-
> ting consequences; and there it is, as in the
> fountains of some rivers, where a gentle applica-
> tion of the hand turns the flexible waters into
> channels, that make them take quite contrary cour-
> ses; and by this little direction, given them at
> first, in the source, they receive different ten-
> dencies, and arrive at last at very remote and
> distant places." (Locke 1970, 135)

> "But having had here only some general views, in
> reference to the main end and aims in education,
> and those designed for a gentleman's son, whom,
> being then very little, I consider only as white
> paper, or wax, to be moulded and fashioned as one
> pleases;..." (Locke 1970, 152)

Hume's conception of knowledge can be found in A Treatise
of Human Nature, from 1739, and in Enquiries concerning
the Human Understanding, which was first published in 1748.
Hume makes a distinction between propositions that express
relations of ideas and propositions that express matters
of fac^s. The propositions of mathematics and logic belong
to the first class while propositions about the reality
belong to the second class. In order to justify knowledge
organized in the second type of propositions we must appeal
to experience. This means, however, that it is very diffi-

cult to justify any empirical knowledge that goes beyond
our immediate sense impressions. We cannot, for instance,
know anything about the relationship between cause and
effect, upon which our knowledge of reality should be foun-
ded. Neither can we have any perceptions of our Self or
Soul. Hume's argument leads up to a sceptical attitude, but
at the same time he points to the solution of the problem,
a solution that was further developed by Kant. (Ekman 1979,
140-141; Hartnack 1958, 111-115; O'Connor & Carr 1982, 10-
14)

Mill, appearing on the scene about one hundred years after
Hume, can be seen as one of the philosophers that opened
up the road for the positivistic tradition in science (Nii-
niluoto 1980, 45). In System of Logic Mill (1872) outlines
a view of The Scientific Method that rests strongly on ex-
perimentation and experience and takes physics as its point
of departure. In The Logic of the Moral Sciences, which is
a reprint of one Book in System of Logic, Mill applies
this argument to social sciences an psychology as follows:

> "All phenomena of society are phenomena of human
> nature, generated by the action of outward circum-
> stances upon masses of human beings: and if, there-
> fore, the phenomena of human thought, feeling, and
> action, are subject to fixed laws, the phenomena
> of society cannot but conform to fixed laws, the
> consequence of the preceding. There is, indeed, no
> hope that these laws, though our knowledge of them
> were as certain and as complete as it is in astro-
> nomy, would enable us to predict the history of
> society, like that of the celestial appearances,
> for thousands of years to come. But the difference
> of certainty is not in the laws themselves, it is
> in the data to which these laws are to be applied."
> (Mill 1987, 63)

The empiricist position can be summarized as follows:

- All knowledge of reality is a posterioric, i.e.
  it needs empirical support.
- Sense impressions are the sources of knowledge
  about reality.

- The method for justifying knowledge must rest
  on observations.
  (Ekman 1979, 136; Hirsjärvi 1985, 60-61; O'Connor
  & Carr 1982, 8-10, 146)

A solution to the conflict between rationalism and empiricism was introduced by Kant (1724-1804). Since Kant also put forth interesting ideas on the relationship between the theoretical and the practical, I shall pick up this theme before we go to Kant's syntheses.

2.1.3 Theoretical and practical knowledge

It is not only the rationalism-empiricism theme that can be traced back to the early Greeks but also the theoretical-practical theme. As Hintikka has shown in a series of studies (Hintikka 1965, 1969 and 1974) the theoretical-practical theme was important in both Plato's and Aristotle's writings. In the 18th century Vico presented an interesting view of practical and social knowledge.

In his studies Hintikka (1965; 1969, 21-27, 59-74; 1974, 1-47, 80-81) points out the close relationship between theoretical and practical knowledge in Plato's and Aristotle's writings. According to him, this has to do with the teleological world view of the early Greeks and with their admiration of the knowledge that the craftsmen possessed. In their work the craftsmen produce or make something, i.e. they realize a goal. The knowledge they possess has been referred to as maker's knowledge, or, to use the Greek word, techne. This maker's knowledge was highly estimated by both Socrates and Plato. However, in order to make something, the craftsman needs to know what he is to make, he needs to define the product he is going to make. Here we can see, says Hintikka, the close relationship between theoretical and practical knowledge in Plato's epistemology: in the process of making a product,

the craftsman copies or reproduces an idea,
which means that he must know the idea. The idea is at
the same time the goal of the process. Plato's theory of
ideas is then directly linked to his theory of practical
knowledge as techne.

The Greek word for knowledge, episteme , refers to two
types of knowledge, according to Hintikka (1965; 1974, 28-
31): knowing that, or propositional knowledge, and knowing
how, or skill. Techne presupposes both.

There also seems to be different kinds of practical know-
ledge. Firstly, there is a difference in the craftsman's
and the artist's knowledge, as Hintikka (1969, 24-25) no-
tices. The shoemaker, he says, has not invented the shoe,
he only makes the shoe, following a model. The artist, on
the other hand, does not reproduce a preconceived goal or
model, he also invents the goals. This distinction has la-
ter been used by, among others, Collingwood (1960, 15-16,
128, 151) to explain the difference between technical and
artistic activity: technical activity is making something
according to a preconceived goal or model, artistic acti-
vity means creating something without any preconceived,
fixed result.

Another distinction that Hintikka (1974, 47) notices is
that between maker's knowledge and user's knowledge. While
the   shoemaker only makes the shoe, the person who has
ordered the shoe must have knowledge about how the shoe
is going to be used. Of these two types of practical
knowledge   Plato considers user's knowledge more valuable
than maker's knowledge, says Hintikka.

User's, creator's and maker's knowledge, then, seem to be
three different types of practical knowledge that form a
hierarchy. Creator's knowledge and user's knowledge are
higher in the hierarchy, since they invent and formulate

goals. Technical knowledge is lower, since technical acti-
vity only realizes the goals that have been invented and
formulated by the previous types of knowledge. This idea
has also been applied by Harrison (1978, 13, 136-143); he
uses the terms designing, making and designing while ma-
king, where designing stands for designing the models and
designing while making for creative activity.

Finally, Hintikka (1969, 59-74) also shows that Socrates
and Plato conceived of virtue, or morality, _arete_ , as
knowledge, i.e. _episteme_ . As Hintikka notices, Socrates'
remark that "virtue is knowledge" has puzzled philosophers
at different ages. It is however understandable, says Hin-
tikka, in the same way as _episteme_ in general. Virtue
includes on one hand knowledge of what goals to pursue,
i.e. knowledge of the good. On the other hand it includes
knowing how, i.e. a set of skills or capacities. Hence,
virtue as moral knowledge includes both theoretical and
practical knowledge.

As a student of Plato's Aristotle (384-322 B.C.) inherited
his fundamental concept of knowledge from Plato and Socra-
tes. He further developed the idea of different kinds of know-
ledge and divided knowledge or science into three large
groups: theoretical, practical, and productive. (Barnes
1982, 23-27; Joachim 1955, 1; Taylor 1971, 20-25)

Joachim (1955, 1) remarks that according to our modern view
of science, only Aristotle's theoretical sciences would be
called sciences. In viewing practice and arts as sciences
Aristotle reveals his close kinship to Socrates and Plato.

The theoretical sciences are contemplative and guided by
theoretical reason alone. In doing theoretical science
man is only a spectator of what _is_, independent of his own
will, goals etc. The theoretical sciences are divided into
theology, physical sciences and mathematics. Within these
areas man tries to understand the nature of things. He

tries to acquire knowledge of substances, attributes,
causes and properties simply for the sake of understan-
ding. (Joachim 1955, 2-12)

The division in practical and productive sciences grounded
in action as doing, praxis , and action as making, poie-
sis . In The Nikomachean Ethics Aristotle (1967, 20; Joachim 1955,
19) makes a distinction between activity that has an aim
outside itself and activity where the end lies in the ac-
tivity itself; poiesis represents the first type, praxis
the second. The practical sciences deal with praxis , the
productive sciences with poiesis .

Both doing and making realize an ideal. In praxis the
ideal lies in a certain kind of life and conduct, in the
will and motives of the actor: living well, having a good
will. Practical sciences are e.g. ethics and politics that
pursue knowledge of the good - the good life, the good
society, etc. (Joachim 1955, 12-18)

In poiesis the ideal lies in the result that is produ-
ced through the process. Only the result is important, not
the craftsman or the way in which it is produced. Produc-
tive sciences are the different kinds of art and craft, as
well as rhetoric. (Joachim 1955, 12-13)

The sciences can be pictured as a hierarchical classifica-
tion system (fig. 2.1).


```
                              SCIENCES
                                 |
         _____
        |                        |                           |
   THEORETICAL              PRACTICAL                    PRODUCTIVE
        |                        |                           |
   _____      _____        _____
  |      |          |     |          |       |        |                 |
Theo-  Mathe-     Natu-  Ethics   Poli-     Art    Crafts          Rheto-
logy   matics     ral             tics etc.                        ric      etc.
                  scien-
                  ces
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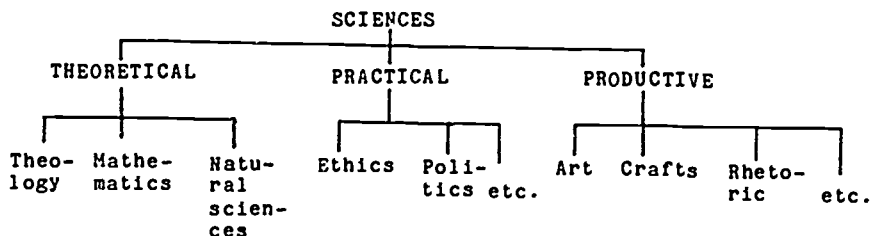
Figure 2.1   Aristotle's classification of sciences
             (modification of Barnes 1982, 27)

Aristotle makes the same distinction between maker's
knowledge and user's knowledge as did Plato. The arts
and practices are organized in a hierarchical structure
so that some arts use the products that are results of
other arts. Politics is according to him the highest art
and education is the most important of those arts that
serve politics: the statesman requires certain moral pro-
perties and character traits from the citizens and it is
the educator's task to produce them. The knowledge inhe-
rent in the arts and crafts is the same episteme that
Socrates and Plato defined as techne , a combination of
knowing that and knowing how. So, for example, the art
of healing is more or less identical with knowledge of
what health is. An art or craft can also be put into ru-
les and principles and in that way it can also be taught
and learned. (Aristotle 1928, Book A, pass.1; Aristoteles
1967, 162-163; Hintikka 1965; Hintikka 1974, 37-38; Tay-
lor 1971, 85)

Therefore, for the early Greeks practical and theoretical
knowledge are closely interrelated. In many cases they
seem to be one and the same thing. Aristotle, however,
separates a special theoretical area, which, according
to him, is entirely contemplative. This made possible the
distinction between the conception of a life in action
and a contemplative life - vita activa and vita contempla-
tiva - that influenced many medieval theologians and phi-
losophers (Taylor 1971, 92-93, see also Arendt 1958, 7-21).

The conception of real knowledge as maker's knowledge was
also transmitted from the early Greeks to medieval phi-
losophers, and from them further on to the natural scien-
tists of the New Age. This line of influence is pointed
out by Hintikka (1969, 19-34; 1974, 80-83). The conception
of maker's knowledge is according to him an expression of
the same idea as Bacon's "knowledge is power".

Hintikka (1969, 27) says however that there are certain differences between the medieval conception of maker's knowledge as true knowledge and Bacon's conception of knowledge: while the medieval philosophers saw maker's knowledge as a presupposition for theoretical knowledge, Bacon's view was more or less the opposite.

A somewhat later advocate of the conception of true know- ledge as maker's knowledge is Giambattista Vico (1668- 1744) who, according to Hintikka (1974, 81-83), claims that since man has made society but not nature, man can possess true knowledge only of society. Hintikka himself does not agree with this: according to modern judgment man seem to have much more maker's knowledge about nature and controls it more successfully than society and culture.

Vico's main work is The New Science, a science which, in accordance with his conception of knowledge, is a social science. Vico (1961) uses the term 'poetic wisdom' for ma- ker's knowledge as it expresses itself in the making, or creating, of social institutions. The term 'poetic' origi- nates from the Greek word 'poiesis', i.e. making, which points to the kinship with the early Greeks (Bergin & Fisch 1961, xlvi-xlvii). This poetic wisdom, consisting of both intellect and will, is inherent in mythology, language, metaphors and traditions; it is, in other words collective, belonging to whole groups of peoples (Vico 1961, 64-70). In the process of making the social institutions man has also created his own humanity. According to Vico (1961, Book Four) the making of society has progressed through diffe- rent stages, from stages of religion and divinity to hu- manity and duty.

As we can see, the concept of practical knowledge, as well as the problem of the relationship between theoretical and practical knowledge, has a long history. And, as Hintikka (1974, 80) points out, a striking feature of this history

is that theoretical and practical knowledge are so inextri-
cably intertwined.

We can now sum up the history so far as follows:

- There seems to be two separate types
  of knowledge, theoretical knowledge and practical
  knowledge.
- Theoretical knowledge has ususally been defined
  as 'knowing that', propositional knowledge, know-
  ledge of definitions, or ·contemplative knowledge.
- Practical knowledge has usually been conceived as
  maker's knowledge, i.e. technical knowledge, and
  doer's knowledge (see e.g. Hintikka 1974, 80) or
  user's knowledge.
- Theoretical and practical knowledge seem to be
  in some way interrelated; the opinions differ,
  however, as to how they are interrelated.

An interesting contribution to the theory-practice theme
was offered by Immanuel Kant. He also suggested a solution
to the rationalism-empiricism problem.

2.1.4   Kant's syntheses

Kant (1724-1804) introduces the distinction between analy-
tical and synthetical judgments in combination with a prio-
ric and a posterioric knowledge as a solution to the epis-
temological problems of rationalism and empiricism. Kant
presents his epistemological theory in Kritik der reinen
Vernunft, published 1781. He begins by stating that all
our knowledge begins with experience and goes on:

> "But, though all our knowledge begins with experi-
> ence, it by no means follows, that all arises out
> of experience. For, on the contrary, it is quite
> possible that our empirical knowledge is a com-
> pound of that which we receive through impressions,
> and that which the faculty of cognition supplies
> from itself (sensuous impressions giving merely

the occasion), an addition which we cannot dis-
tinguish from the original element given by sense,
till long practice has made us attentive to, and
skilful in separating it. It is, therefore, a
question which requires close investigation, and
is not to be answered at first sight - whether
there exists a knowledge altogether independent of
experience, and even of all sensuous impressions.
Knowledge of this kind is called a priori, in contra-
distinction to empirical knowledge, which has its
sources a posteriori, that is, in experience "
(Kant 1984, 25)

"By the term 'knowledge a priori,' therefore, we
shall in the sequel understand, not such as is in-
dependent of this or that kind of experience, but
such as is absolutely so of all experience. Opposed
to this is empirical knowledge, or that which is
possible only a posteriori, that is, through expe-
rience. Knowledge a priori is either pure or impure.
Pure knowledge a priori is that with which no em-
pirical element is mixed up. For example, the pro-
position, 'Every change has a cause,' is a proposi-
tion a priori, but impure, because change is a con-
ception which can only be derived from experience."
(Kant 1984, 26)

Kant (1984, 30-34) then combines his view of a prioric and
a posterioric knowledge with analytical and synthetical
judgments. An analytical judgment is one where the predi-
cate belongs to the subject. In a synthetical judgment the
predicate does not belong to the subject but adds something
to it. The distinction between a prioric and a posterioric
judgments is not synonymous with the distinction between
analytical and synthetical judgments. All analytical judg-
ments are a prioric but the synthetical judgments can,
according to Kant, be either a prioric or a posterioric.
The basic principles of science, like the category of cause
and effect, are synthetical and a prioric, Kant claims.

Kant's argument has been called a transcendental argument.
This means that in his attempt to achieve a compromise
between rationalism and empiricism, he studies the presup-
positions of knowledge. Synthetical a prioric knowledge is

then introduced as the presupposition of our empirical know-
ledge of the world. It determines how the human mind works
when it is confronted with the empirical world. The analy-
tical judgments, on the other hand, have nothing to do
with the empirical world, they are purely "rational".
(See also Ekman 1979, 143-145; Hartnack 1958, 117-123; Nii-
niluoto 1980, 144-146; O'Connor & Carr 1982, 145-149,159-
161)

Kant's theory of knowledge is related to his view of rea-
lity. The synthetical, a prioric categories determine our
knowledge of the empirical world, the world of phenomena.
There is, however, another world, the world of noumena or
things in themselves, of which we can have no experiential
knowledge. This leads Kant   to an idealistic view of rea-
lity. (Ekman 1979, 141-142; Kant 1984, 180-191)

The previously related theories of knowledge are also rela-
ted to different kinds of theories of truth and views of
reality (see e.g. Ekman 1979, 138-42; Niiniluoto 1980, 139-
144; O'Connor & Carr 1982, 164-165). I will not go through
these in the present chapter but touch on them later when
I formulate the points of departure for this inquiry.

Kant's influence on later philosophy has been enormous.
In addition to his influence on German idealism and her-
meneutics, which is understandable, he has influenced
pragmatic epistemologists as well as scientific realists.

One line of influence stems from Kant's recognition of the
human mind as an active part in acquiring and creating
knowledge. In close association with this idea is the con-
ception that the active mind works according to some spe-
cific categories or presuppositions that influence the
knowledge acquiring process. Later philosophers and scien-
tists, however, hardly consider these categories a prioric
and synthetic in the same way as Kant. Lorenz (1974), for

instance, considers them genetically inherited and speci-
fic for the human race; he calls them "the back of the
mirror". Tuomela (1983, 35) again sees them as social and
linguistic, and hence also as changing.

Another important source of influence stems from Kant's
way of linking knowledge and morality. While Kant's theory
of knowledge is found in his Kritik der reinen Vernunft,
his theory of morality can be found in Grundlegung zur Meta-
fysik der Sitten, published 1785, and Kritik der praktischen
Vernunft, published 1788. According to Kant, man belongs
to two worlds:

> "Therefore a rational being must regard himself
> qua intelligence (and hence not from the side of
> his lower powers) as belonging not to the world
> of senses but to the world of understanding.
> Therefore he has two standpoints from which he
> can regard himself and know laws of the use of
> his powers and hence of all his actions: first,
> insofar as he belongs to the world of sense sub-
> ject to laws of nature (heteronomy); secondly,
> insofar as he belongs to the intelligible world
> subject to laws which, independent of nature,
> are not empirical but are founded only on rea-
> son.
>
> As a rational being and hence as belonging to the
> intelligible world, can man never think of the
> causality of his own will except under the idea
> of freedom; for independence from the determining
> causes of the world of sense (an independence
> which reason must always attribute to itself) is
> freedom. Now the idea of freedom is inseperably
> connected with the concept of autonomy, and this
> in turn with the universal principle of morality,
> which ideally is the ground of all actions of ra-
> tional beings, just as natural law is the ground
> of all appearances." (Kant 1981, 53-54)

Then, while the pure reason deals with knowledge, practi-
cal reason deals with morality. Moral ideas are according
to Kant for instance freedom, self, world, God, immorta-
lity. Of these we can have no experiential knowledge.
Rather, they are to be conceived as regulative ideas,

which means that they influence our thinking. This again
means that they influence our interpretations of reality.
Thus man's knowledge of the world is influenced by both
the categories of pure reason and the regulative ideas.
(Hartnack 1958, 125-129; Kant 1981, 44-62; Thayer 1968,
37-42)

The laws of morality, expressed in the categorical impera-
tive, are not the only principles guiding action, according
to Kant (1981, 24-30). There are, he says, rules of skill,
counsels of prudence and laws of morality. The first kind
of imperatives are technical, i.e. belonging to art, the
second kind is pragmatic, i.e. belonging to welfare, and
the third is moral, i.e. belonging to free conduct as such.
While the first two kinds of imperatives are hypothetical,
the moral imperative is, says Kant, categorical; moral action
is not justified by anything outside morality.

Kant's argumentation is very extensive and by no means al-
ways free from contradiction. It is difficult to do him -
as well as the other philosophers - justice in a relatively
brief account like this and my main idea has simply been
to point out some central features that have influenced
many philosophers and that will also have some bearing on
my own points of departure. These features can be summari-
zed as follows:

- The traditional conflict between rationalism and
  empiricism can be conceived as a question of
  different types of knowledge. In later philosophy
  these types have often been called formal know-
  ledge or truth and empirical or material know-
  ledge or truth (Kaila 1939; Niiniluoto 1980, 108-
  115).
- The human mind is active in the pursuit of know-
  ledge.
- The activity of the mind in the knowledge acqui-
  ring process is influenced by some kind of "a pri-

oric" categories, regulative ideas c. other
presuppositions.
- The moral principles are of a higher order than
  the principles of skill and prudence; here we
  can see a parallel to Plato's and Aristotle's
  view of the relationship between maker's know-
  ledge and user's knowledge.
- Moral reason is primary to theoretical reason,
  since as Hartnack (1958, 129) puts it, to Kant
  existence is fundamentally moral.

Some of the Kantian ideas have been picked up by pragmatism,
which, in its own way, has carried them on.

2.1.5 Pragmatism

In his extensive account of pragmatism Thayer (1968, 3-8, 44-45,
64-65) points out the Kantian influence, although he also
indicates that it is not very easy to trace the philoso-
phical roots of the first pragmatists.

The first pragmatist that Thayer (1968, 68-71, 79-83, 120-
132) recogniz‹‹ is Peirce (1839-1914), who was influenced
by both Aristotle and Kant. Peirce's pragmatism was initi-
ally a theory of meaning (see also Niiniluotr 1980, 49-50,
112), according to which meaning and truth are established
by the scientific community, through experimentation, i.e.
action, and consensus. Another important pragmatist dis-
cussed by Thayer (1968, 53, 71-73, 136-148) is James (1843-
1916). James was more influenced by the empiristic tradi-
tion than Peirce. He viewed experience as a means for adap-
tation, ideas and beliefs as plans of action, and thoughts,
concepts and theories as instruments for action. Truth,
according to James, has a moral basis.

Dewey (1859-1952), Mead (1863-1931) and Lewis (1883-1964)
are other American pragmatists that Thayer (1968) discus-
ses, and among European philosophers he finds pragmatistic
lines of thought in e.g. Schiller's, Wittgenstein's and
Sorel's theories.

Pragmatists that have influenced my own way of thinking are
Dewey, Lewis and Rescher. I will return to them later in
my analysis of living, knowing and acting. However, I will
also point out some of their central ideas in this chapter
in order to give them an appropriate place in tradition.

Dewey's production is very extensive and diverse. He has
written on epistemology, ethics, society, education and
art, for example. Central concepts in his writings are
experience, value, action and knowledge. On experience
he says for instance:

> "The nature of experience is determined by essen-
> tial conditions of life.
> /.../
> "The first great consideration is that life goes
> on in an environment; not merely in it but because
> of it, through interaction with it."
> (Dewey 1934, 13)

Thus, Dewey primarily sees man as a living being, inter-
acting with the world. In his interaction with the world
man confronts things, obstacles etc. which become meaning-
ful and give rise to emotions and interests. Just as life
is a continuous process, so is experiencing. Man proceeds
from one interactive situation to another and his expe-
riences in previous situations influence subsequent expe-
riences. Interaction and continuity are the principles of
experience. Growth, as an aim of education, is conceived
as a continuous development of experience. In this process
of living and interacting, knowledge is created and tested
by its consequences. Knowledge is instrumental. (Dewey
1934, 35-45, 59, 104, 264; Dewey 1963, Ch.2 and 3)

Lewis (1971) explicitly links knowledge to action and eva-
luation:

> "Knowledge, action, and evaluation are essentially
> connected. The primary and pervasive significance
> of knowledge lies in its guidance of action: know-
> ing is for the sake of doing. And action, obvious-
> ly, is rooted in evaluation. For a being which did
> not assign comparative values, deliberate action
> would be pointless; and for one which did not know,
> it would be impossible. Conversely, only an active
> being could have knowledge, and only such a being
> could assign values to anything beyond his own
> feelings." (Lewis 1971, 3)

Lewis (1971) then goes on to analyze the relationship
between knowledge, action and evaluation in terms of ex-
perience, meaning, beliefs and values.

In The Primacy of Practice, Rescher (1973, xii-xiv, 1-8,
22, 151-152) overtly declares his Kantian point of de-
parture. This does not mean that he would accept all
Kant's theories but rather that his own way of arguing
has a "Kantian orientation" and a "Kantian flavor".
Rescher means that our empirical knowledge rests on jus-
tified postulates of regulative import and that these are
practical. He advocates a pragmatic validation of the cri-
terion of truth but distinguishes between propositional
pragmatism and criterial pragmatism. According to proposi-
tional pragmatism, a proposition is to be accepted, if
its adoption leads to maximal success. Criterial pragma-
tism, on the other hand, asserts that a proposition is to
be accepted, if it conforms to a criterion, the adoption
of which as a principle of propositional acceptance is
maximally success-promoting. Rescher sees himself as a
criterial pragmatist, which means that the criteria for
validating truth are such that the truths accepted will
promote practical success. We could say that although
science, for instance, does not always pursue what is
applicable but rather "knowledge as such", Rescher (1973, Ch.

44

VII) talks about an extra-pragmatic dimension of human pur-
pose - this knowledge, if applied in action, will lead
to success, because the whole endeavour of science is de-
termined by practical, regulative postulates. Rescher
considers practical reason primary to theoretical. He
says:

> "These considerations indicate that the ultimate
> metacriterial standard for weighing a criterion
> of truth-acceptance (in the factual area) is not
> cognitive at all, but rather affective, and the
> justificatory reasoning for the test-procedure
> of truth-determination represents in the final
> analysis an appeal not to knowledge, but to feel-
> ing. The affective dimension of pain, frustra-
> tion of hope, disappointment of expectation -
> and their opposites - becomes the court appeal
> that stands in ultimate judgment of our proce-
> dures for deciding upon questions of factual truth
> and falsity. In the final analysis cognition is
> ancillary to practice and feeling becomes the
> arbiter of empirical knowledge." /Rescher 1973,
> 21)

Pragmatism exhibits features of both empiricism and Kantia-
nism. The empiricist influence can be seen in the strong
emphasis on experience and experimentation. The Kantian
influence can be seen in the practical postulates that
pragmatists often conceive of as presuppositions for exper-
ience. The main idea of pragmatism, says Thayer (1968, 6,
65), is not the emphasis on utility as a criterion of
truth, but the total relationship between action, expe-
rience, meaning, and knowledge. This large approach to
knowledge often also includes art as a way of expressing mea-
ning, experience and knowledge. Dewey (1934, 83-84), for
instance, says that a piece of art can be true or false,
and he continues:"Science states meanings; art expresses
them." He also conceives of art as criticism of life, and
says that art is "more moral than moralities" (Dewey 1934,
346, 348). A similar conception of art is presented by
Collingwood, when he says:

> "Art is knowledge; knowledge of the individual"
> (Collingwood 1960, 289)

> "Art is the community's medicine for the worst
> disease of mind, the corruption of conscious-
> ness." (Collingwood 1960, 336)

The pragmatic position can be summarized as follows:

- Knowledge is formed by experience judged on
  the basis of practice.
- The a prioric presuppositions for our know-
  ledge of the world are practical.
- A conception of man as an acting, interacting,
  feeling and valuing being is primary to a
  conception of human knowledge.
- Knowledge is a concern not only for science but
  also for art, morals and society.

The review of central themes in the area of knowledge has
now led us   to a point where knowledge is related in a
fundamental way to man as a social actor. This relation-
ship has been further investigated on the one hand by Haber-
mas, on the other hand by social reconstructionists like
Bernstein.

2.1.6 Habermas and social knowledge

One of the points of departure in Jürgen Habermas' theory
of knowledge is his critique of the relationship between
current social theory and practice.

In order to clarify his argument Habermas (1974, 1-40) goes
back to Aristotle's distinction between theoretical and
practical sciences, and between techne and praxis. Habermas
claims that there is a gap between theory and praxis. Bern-
stein (1979, 175-178) means that according to Aristotle the
contemplative life, bios theoreticos, had actually a prac-
tical aim: through contemplation the philosophers would de-
velop their intellectual capacity and finally acquire wis-
dom; this wisdom would then guide them in their practical

affairs. This faith in speculative theory is accord g to
Habermas a mistake - a mistake that has been made   ~ough-
out Western philosophical and social thought.

Habermas (1966; 1974, 1-40) then develops his theory of
knowledge interests. These knowledge interests have, accor-
ding to him, an a prioric status: they "determine the as-
pect under which reality is objectified (Habermas 1974, 9)".
The knowledge interests are the technical, the practical
and the emancipatory interest. The technical interest is
the i terest that guides goal-directed, instrumental action.
In this type of action, objects are experienced as capable
of being manipulated. In addition to this type of objects
man, in his dealings with the world, also confronts acting
subjects who can be understood symbolically. In his inter-
action with other subjects, man is guided by a practical
interest: mutual understanding, coordination of goals and
action. There is, however, a third interest that transcends
the technical and the practical interest. This is the eman-
cipatory interest that guides man to revealing distorted
forms of communication and to self understanding. According
to Habermas different sciences are - or should be- guided
by different interests. Thus, the natural sciences are de-
termined by the technical interest while the humanistic
sciences are determined by the practical interest. The so-
cial sciences, says Habermas, should be guided by the eman-
cipatory interest. The problem is, however, that they are
determined by a technical interest. This has distorted the
relationship between theory and practice in the social area;
instead of serving an emancipatory dialogue, social theo-
ries are applied in goal-directed, technical and startegi-
cal action.

Later Habermas extended his theory into a general theory of
action, distinguishing mainly between action oriented to
success and action oriented to reaching understanding (Ha-

bermas 1981, 384-387).

Habermas has had a vast influe.ice on social philosophers
as well as researchers in various areas of social and be-
havioural studies. Bernstein (1979, 219-225) recognizes
Habermas' importance but he also points to some difficul-
ties in his theories. For instance, he says, Habermas has
not succeeded in clarifying exactly the epistemological
role of the knowledge-constitutive interests - which must
be considered a weakness as they play such an important
role in his theory. Bernstein suggests that Habermas' dif-
ficulties may be due to the far c that his ambitions are
too high.

The study of theoretical and practical knowledge in the
thinking of some philosophical trends has now led us up
to a conception of practical krowledge s, on the one hand,
technical, i.e. instrumental and strategic, knowledge, and
on the other hand, communicative and emancipatory action.
Which, in a way, leads us back to Aristotle again. What can
be considered as new, however, is of course the view of
nature inherent in the modern natural sciences. Another new
aspect is the view of society. On the whole, Habermas' ana-
lyses of knowledge has brought a strong social dimension to
the conception of practical knowledge. There are in the so-
cial sciences recent theories that also strongly emphasize
the social dimension. One of these is the so called theory
of reconstructive knowledge, advocated for instance by
Raskin and Bernstein (1937). The reconstructionists view the
acquiring and creating of knowledge as a social process,
based on moral conceptions (e.g. Raskin 1987, 19-36). In
Finland Koskiaho (1986, 11-21, 205, 220-240) has adopted
the concept of everyday or daily life knowledge to refer to
a type of knowledge that grows out of the shared history,
experiences and trials of a social community; she advoca-
tes a "citizens' society", where knowledge streams from
"the bottom to the top", instead of the expert's society,

where the citizens are ruled by the knowledge of the ex-
perts. Still another recent theory that has developed the
pragmatists' and Habermas' ideas further, is the theory of
action science, developed by Argyris, Schön, Putnam and
Smith (Argyris & Schön 1974; Argyris & Putnam & Smith
1985). The aim of action science,   according to Argyris,
Putnam and Smith (1985, 2, 6, 36, 45-54, 69-79), is to create
knowledge that can inform action. This knowledge, they say,
should not consist only of knowledge of which means lead to
which ends. It should be critical knowledge that also in-
cludes moral aspects, knowledge that "engage human agents
in public self-reflection in order to transform the world
(Argyris & Putnam & Smith 1985, 6)". Another interesting
theory of practical and theoretical knowledge is presented
by Bourdieu. He analyzes social and cultural practices,
which, according to him, tend to reproduce themselves through
durable generative principles called habitus; habitus is
a lasting disposition that integrates past experiences and
at every moment functions as a matrix of perceptions, ap-
preciations and actions (Bourdieu 1985, 78-87). The social
practices pursue objective interests, and according to
Bourdieu we can have three types of theoretical knowledge
of the social world: familiarity (primary knowledge that is
tacit, practical and not reflective), phenomenological
knowledge (makes explicit the primary experiences of the
social world), and objective knowledge (construction of
objective relations which structure pr.ctice and repre-
sentations of practice) (Bourdieu 1985, 3). Bourdieu's
theory has some resemblance with Polanyi's theory. Polanyi
(1958, 49-54, Part Two) describes knowledge in terms of
skills, traditions and tacit components; he also stresses
the personal, active dimensions in the process of acquiring
knowledge.

2.1.7 Concluding comments

With this review I have tried to bring out a certain line of

thought. According to this line of thought all human know-
ledge rests on some kind of <u>a prioric</u> elements. These ele-
ments need not be transcendental - rather, they have to
do with man as a living, valuing and sensing actor in a
bio-physical and socio-cultural context. The relationship
between theory and practice then becomes twofold. On the
one hand, practice constitutes the <u>a priori</u> of knowledge.
On the other hand practice is - directly or indirectly -
the aim of knowledge.

Another point that I have wanted to make is that there are
different types of knowledge - knowledge is not one thing
but many. Firstly, knowledge is organized and transmitted
in many ways, in science, in art, in practice. Different
types of knowledge are, for instance, theoretical knowledge
or 'knowing that', practical knowledge or 'knowing how',
which may include technical as well as praxis-knowledge and
emancipatory knowledge. Also, we can talk of knowledge by
familiarity or acquaintance, tacit knowledge that is not
formulated into words, articulated knowledge that may be
phenomenological or objective, formal and empirical know-
ledge.

The philosophers that were hosen for the review, were cho-
sen in order to illuminate these points. This means that
many theories have been omitted; my ambition has not been
to give a complete view of the history of epistemology. There
are also differences between many of the theories cho-
sen that have not been treated very much here.

2.2   The epistemological point of departure in this study

In the following I will outline the view of knowledge that
will serve as the point of departure for the analysis of
knowledge in an interactive practice discipline. This view
can be considered as a continuation of the line of thought
presented in the previous section, but now I will go into

some of the concepts and ideas in more detail. The prob-
lems I will deal with are two of those that were
previously (p. 6)   presented as primary to the main
problems of the study, namely:

- How shall we understand knowledge in general?
- Which is the relationship between knowledge and
  action?

In the view outlined here knowledge will be conceptualized in
the context of living, valuing, and acting.

2.2.1 Living

In his analysis of practical arts Mill (1872, 547-553) sees
the art of life as the fundamental art, which includes all
other arts. Although the conception of knowledge and action
adopted in this work is not in all respects the same as
Mill's, his view of the relationship between the art of life
and   other arts can be useful for illuminating some points
concerning education and health care. According to this
view the art of healing and caring, as well as the art of
teaching and educating are subordinate to the art of li-
ving. As I see it, subordination does not mean that the
arts of healing, caring and education are technical with
respect to living. At least, this is not the only possible
interpretation. Subordination also includes the idea that
healing, caring and educating are parts of life, leavened
with the same principles as life. Health care and education
can be viewed as forms of life. I will   explain   this idea
later.

In this work I will conceptualize life in the following
way: Life is participating in a continuous creating pro-
cess. Martin Heidegger, Ludwig Binswanger, Henri Bergson,
Lewis Mumford and Jean-Paul Sartre have put forth thoughts
along the same lines as I will here.

Heidegger (1981, 78-107) calls man's existence 'Being-in-the-World'. Constituent for 'Being-in-the-World' is care or concern (Sorge), which means being concerned, caring about and taking care of things. Concern has a positive and a negative modus, the positive meaning to act for or on the behalf of something and the negative meaning to act against something or being indifferent.

I shall interpret Heidegger's view in the following way: Man and the world are inextricably intertwined with one another. Man lives in the world, he is always related to it in one way or another. Even the attitude of indifference is a way of relating to the world. Thus, the value aspect is fundamental to man's existence. This interpretation means that I also see the attitude of indifference as valuational: the concept of indifference logically presupposes value concepts. Kant's view that man's existence is primarily moral (see p. 30) is also close to this view, although the valuational aspect as such does not necessarily mean that the values must be moral.

Living as participating then means that man is an integral part of the rest of the world. There is a continuous interaction between man and the world, a, interaction that could be described as co-action: man and the world live a common life and act together. The value aspect describes the way in which man relates to the world, in which value modus he exists. The action terms describe in which way man and the world influence each other, how man participates in his common life with the world. In his action, interaction and co-action with the world man also gains experiences of the world and of himself. He gets to know the world and this knowledge guides his further action, as also Dewey expressed the matter (see p. 31). Dewey says:

> "But the process of living is continuous; it pos-
> sesses continuity because it is an everlasting re-
> newed process of acting upon the environment and

being acted upon by it, together with institu-
tion of relations between what is done and what
is undergone. Hence experience is necessarily
cumulative and its subject matter gains expres-
siveness because of cumulative continuity. The
world we have experienced becomes an integral
part of the self that acts and is acted upon in
further experience. In their physical occurence,
things and events experienced pass and are gon℀.
But something of their meaning and value is re-
tained as an integral part of the self. Through
habits formed in intercourse with the world, we
also in-habit the world. It becomes a home and a
home is part of our every experience."(Dewey 1934,
104)

There is, then, a continuous interplay between action, va-
lues and knowledge in man's intercourse with the world:
on the one hand knowledge and values are formed in and
through this process, on the other hand they influence the
process.

This also brings out the creative dimension in living: in
the process of living man continuously creates himself as
well as the world, knowledge as well as values. This can
be described by using Popper's idea of man living in three
worlds.

World 1 according to Popper is the organic and material
world. It is the world of physical objects and living or-
ganisms. World 2 is the world of subjective experiences.
It is made up of sentience (e.g. animal consciousness) and
consciousness (especially human consciousness of self and
death). World 3, finally, consists of products of the hu-
man mind: art, science, technology, human language, theo-
ries of self and death. There is a continuous interaction
between the three world, an interaction that also forms
an interrelated control system. World 3, for instance,
which is a product of or an objectivation of the human
mind, has become a new system that controls human life.
(Popper 1977, 16, 38-50; Popper 1982, 180-193)

An idea resembling Popper's has been presented by Binswang-

er (1958a, 270-292; 1958b; 1962, 65-67, 440-445). He uses
the terms 'Umwelt', 'Mitwelt' and 'Eigenwelt'. Umwelt is
the world of nature, biology, and natural laws; man's bo-
dy, for example, is part of Umwelt. Mitwelt is the social
and cultural world, where man lives with other men. Eigen-
welt, finally, is man's "own" world, a subjective world
where he experiences himself as a conscious, free, and re-
sponsible being.

Roughly, then, Binswanger's 'Umwelt' corresponds to Pop-
per's 'World 1', 'Mitwelt' to 'World 3', and 'Eigenwelt'
to 'World 2'.

Creativity can be seen as a characteristic of man's life
in all three worlds. Biological life, for example, has been
described as a creative process by, among others, Bateson
(1973;1980), Dubos (1972), Eccles & Robinson (1984), Mum-
ford (1970, 27-28) and Sinnott (1982). Biological crea-
tivity manifests itself in, for example, new species and
new individuals. Creativity in World 2 or Eigenwelt means
that every person is continuously engaged in the process
of creating himself. This idea has previously been expres-
sed by, for instance Bergson (1911, 11-13, 30-31; 1946,
91-95) and Sartre (1957, Ch.1). Creativity in World 3 or
·Mitwelt means that man is also continuosly creating a
socio-cultural world, with art, science, values, social
institutions etc.

Hence living means participating in a continuous, creative
process.   This process, since it is creative, has no
fixed end. It is a manifestation of creative rationality,
which means that it can be seen as a process of choices,
where every choice influences the next but where the goal
is open, although the process has a direction (see e.g.
Collingwood 1960, 118, 128; Harrison 1978, 35, 66, 122-
123; Pye 1968, 21-22; Sarvimäki 1936b, 114-119). Since man
is participating in the creation of the world and of him-
self, he also becomes responsible for both the world and

himself - this has especially been stressed by Sartre
(1957, 16-18; 1986, 35-40). In this respect we may agree
with Kant: since living means participating in a common
world and a common life process, and since participating
implies responsibility, existence is essentially moral.

2.2.2 Acting

It is through action that man actually participates in the
creation of the world.

Much of contemporary action theory goes back to Aristotle
and his so called practical syllogisms (e.g. Aristoteles
1967, 187-192). G.H. v.Wright, for instance, has analyzed
Aristotle's practical syllogisms and used them as a means for
action explanations in many books and articles. According
to v.Wright (1963, 35-41; 1971, 86-90), an act is something
that an agent does and that is related to changes in the
world. Through his action man interferes with the world;
he choses to do something or not to do something and by
that he prevents and produces changes in the world. More-
over, an act has an inner as well as an outer aspect. The
inner spect, according to v.Wright, is the intention of the
act which is the way we describe the act. The outer aspect
are the processes and activities (e.g. muscular activities)
by which the act is carried out. An act can also be des-
cribed in terms of results and consequences. The result, says
v.Wright, is that which is achieved by the act; it is lo-
 tcally connected to the act. According to the practical
syllogism that v.Wright (1971, 96-106; 1977) uses to ana-
lyze action an act or a decision to act is based on (at
least) two premises: an ond-premise and a means-premise.
In some cases the syllogism consists of a rule- or norm-
premise and specific act-premise (see also Thornton 1982).
However, in most of v.Wright's own examples the means-
end syllogism is used.

V.Wright's description of action in terms of means and
ends, results and consequences, makes his theory appli-
cable to the type of action that has been called techni-
cal, instrumental or success-oriented (see p. 22-23, 35-
36). This is also indicated by the examples he uses:
opening a window, making a house habitable etc. (v.Wright
1971, 88; 1977; 1978). Examples of social inter-
action are scarce. Since this study is dealing with in-
teractive practices, a technical, means-ends view cannot
suffice. The norm- or rule-following syllogism is also in-
sufficient: it does not allow for the creation of new
norms and rules through what Aristotle calls 'praxis' and
Habermas 'communicative action'.

Raimo Tuomela (1983, 72-91) has elaborated the terminolo-
gy to fit social action. According to this view a result
can be produced in three ways in social action: causally,
conceptually and through representation. When a group of
people are carrying a table upstairs, they are producing
a result causally; when two people greet each other by
saying "Hello" they produce a result conceptually. In the
latter case the act is a social act of greeting and the
result is the two "Hellos". Social action is also in Tuo-
mela's theory characterized by a We-intention: the actors
pursue a common result.

Tuomela's theory suits the purpose of this study better.
However, although it is a theory of social action, it does
not actually account fc social interaction; it is more
concerned with co-action.

Theories of interaction have been presented by, among others,
Lennart Nordenfelt and Ingmar Pörn. Nordenfelt (1977a,68-90;
1977b) analyzes what he calls interactive episodes and stu-
dies how the influence of one agent over another can be
described. He describes both agents in terms of practical
syllogisms and describes the influence as an influence over

another agent's action premises. Pörn (1977) too sees so-
cial interaction as two or more agents influencing each
other in different ways.

Since the object of this study is knowledge in interactive
practices, Nordenfelt's, Pörn's, and Tuomela's theories
seem more appropriate than v.Wright's. These theories do
not necessarily exclude v.Wright's analyses. Rather, they
extend them to the sphere of social interaction and co-
action.

In the preceding section man was described as living in
various worlds. Since man lives in these various worlds
at the same time, his acti   i can also be described in va-
rious terms at the same time. In most practices man com-
bines the bio-physical, the socio-cultural and the sub-
jective world. Practices like fishing and farming, for
instance, are in a way directed towards the bio-physical
world. They are instrumental in Habermas' sense of the
word. However, as food producing practices they are also
part of a social system and usually they also include so-
cial interaction and co-action. And the individual actors
participate in the action from the standpoint of their sub-
jective consciousness. Health care again which is primari-
ly social interaction belonging to Mitwelt, also includes
acts directed towards biological processes, i.e. to Umwelt, and
is thus also instrumental. The nature of action in the in-
teractive practices concerned in this study are hence quite
complicated and I will return to this problem later. In
this chapter I will only outline some general frames of re-
ference concerning action.

In this study I will use as a general frame of reference an
action model presented by Pörn. Since this model can be
considered as rather general, it can be applied to differ-
ent kinds of action and practices.

According to Pörn's (1981; 1984a) model, action can be de-

scribed as a system specified by four variables. If the
action system is described in a time sequence, these
four variables can be distinguished as phases of the ac-
tivity: inquiry, decision, implementation, and change
(fig. 2.2).
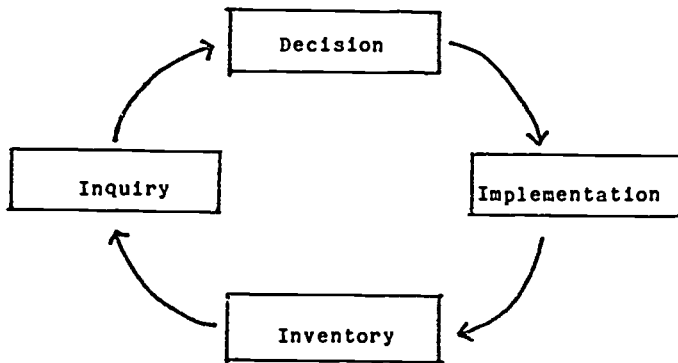
Figure 2.2   Pörn's action model

Pörn (1981) clarifies the model with the following example:
A man maintains a wine cellar, which at a certain time con-
sists of a certain number of wine bottles (inventory). By
counting the bottles (inquiry) the man gets information
(right or wrong) about the inventory. If the information
he gets shows a discrepancy between the actual and the
ideal inventory, the man will make a decision to order mo-
re wine. He then implements his decision, calls the wine
merchant, and as a consequence, there is a change in the
number of bottles so that the actual inventory amounts to
the ideal.

In addition to these four state-variables or phases the
system includes three factors that, according to Pörn
(1984a) do not belong to the control loop but influence it
from outside. Pörn calls these determinants. The first de-
terminant is the ideal state of the inventory, which is

called want or volition. The second determinant is the
action repertoire, that is, the agent's intrapersonal
abilities to act. The third determinant is the episte-
mic frame. While volition influences decision and the
repertoire influences implementation, the epistemic fra-
me, according to Pörn, influences the inquiry phase. It
consists, he says, of a class of possible models of the
inventory, of which the agent accepts one.

This action model does not presuppose action always being
successful. As was noted above, the agent may have a dis-
torted picture of the actual inventory. He may also lack
the abilities needed for the act, or he may suffer from
"weakness of the will". Or, finally, the environment may
not provide the agent with the opportunity to act. The
model also allows for the case of an agent deciding not
to act. (Pörn 1981 and 1984)

I will use Pörn's model with some modifications. Firstly,
I will distinguish between internal and external action
determinants. Internal action determinants are the ones
that Pörn calls intrapersonal, while the external ones
belong to the environment and the situation. By environ-
ment I mean relatively constant bio-physical and socio-
cultural factors outside the action system. By action si-
tuation I mean continually changing action conditions.
The concept of action situation roughly corresponds to
v.Wright's (1963, 37) concept of occasion; an occasion may
or may not provide an opportunity to act.

The internal action determinants I will call axiological
orientation, epistemic orientation and ability. By axio-
logical orientation I mean all aspects of an actor's va-
lue system: ideals, values, etc. By epistemic orientation
I refer to an actor's system of beliefs. I have chosen the
term ability instead of Pörn's repertoire, and I use the
term in the same sense as v.Wright (1963, 48-51). An actor
who has the ability to do a certain act can do it, or knows

how to do it. This again means that on most occasions,
when he tries to do the act, he will succeed. An ability
presupposes mastership of one or several techniques, i.e.
skills. An actor may also have what v.Wright calls 'second
order abilities'; these are abilities that he does not
actually possess but that he is able to acquire. An actor's
second order abilities constitute his capacity. Since
v.Wright's definitions of ability, skill and capacity ma-
kes 'ability' a key concept to the other two, I chose to
use this concept as the main concept.

As I see it, all action determinants influence all the pha-
ses of the action sequence. We can then add the internal
and external action determinants to the action model as an
internal and external "steering mechanism" (fig. 2.3).
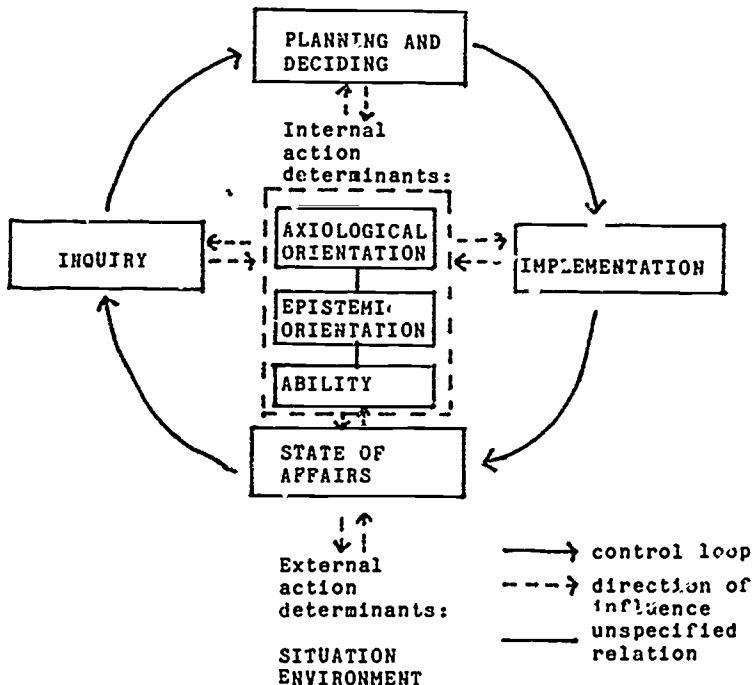
Figure 2.3 The action sequence and action determinants

A few changes have been made in this figure compared to
the previous one (fig. 2.2, p. 46). To the decision-phase
I have added planning, since most decisions are preceded
by some kind of mental activity, conscious or unconscious,
more or less profound. I have substituted 'state of affairs'
for 'inventory', since it is a more general term. I assume
that some kind of relationship exists between the
internal determinants, but I have not specified the na-
ture of this relationship. Furthermore, the influence between
the internal action determinants and the action sequence is
mutual, meaning that in and through action the actor's va-
lues and ideals, beliefs, skills and abilities are modified.
This is another way of expressing wha. Dewey said when he
described man as proceeding from one interaction situation
to another, gaining experience that influences his action
in the next situation (p. 31).

The action model presented here bears some resemblance to
Royce's & Powell's (1983, 13) model of integrated persona-
lity that will be treated later in this study.

The process of living then proceeds in action sequences of
the kind described above, or as Pörn (1981, 199) puts it:
"In such circles we spend our lives."

2.2.3 Knowing

The view of knowledge advoca 'd in this work could be
called an interactionist -constructivist view, implying that
knowledge is something that man creates or constructs in
his interaction with the worlds in which he lives.

The interactionist aspect has strongly been emphasized by
Dewey, and also Kant, which has been pointed out previous-
ly in this study (p. 27, 29, 31). Constructivism is a large
conception that does not include only a view of knowledge
but also a view of values and reality. The constructivist
view of reality says that what we call reality is actu-

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ally something we have constructed. One advocate of this
view is the sociologist Peter L. Berger, who says: "Rea-
lity is socially constructed (Berger 1963, 118)."
A constructivist value theory has been put forth by, among
others, Niiniluoto. He sees values as relatively indepen-
dent human constructs that belong to what Popper calls
World 3 (Niiniluoto 1984, 318-319, 323-327). Constructi-
vism in ethics can be seen as part of the more general
constructivist value theory, since moral values are one
type of values. Moral constructivism is represented by
J.L. Mackie. He says for instance: "Morality is not to be
discovered but to be made (Mackie 1983, 106)." He adds that
in a way morality has to be remade in part, which does not
exclude that there are general moral principles that do not
have to be remade; the function of morality is to control
conduct in such a way as to protect the interests of others
rather than of the agent himself, to check on his spontaneous ten-
dencies to act, and, if necessary, make him act contrary
to them (Mackie 1983, 106, 123).

The view opposite to constructivism is usually called rea-
lism. In the philosophy of science realism means that we
assume that there is a reality independent of the human
mind and that science is the best way of getting access to
this reality (Niiniluoto 1980, 230). As Tuomela (1983, 34-
71) points out, there are different kinds of scientific
realism. In ethics and value theory realism means that val-
ues have an objective existence independent of the human
mind (see e.g. Vine 1983, 25-27). It is possible to have a
constructivist view of values and a realistic view of
knowledge.

What I advocate here is a so called modified constructi-
vist view of both values and knowledge. By constructivism
I mean in both cases that they are objects in World 3,
and that neither of them is independent of the human mind.
That this constructivism is modified means that as ob-
jects in World 3 they are not pure products of the mind,

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they are products of the interaction between the human
mind and the external world. The modification of con-
structivism is thus brought in by interactionism (see Vi-
ne 1983, 21-23).

This view, in addition to the pragmatistic position de-
clared previously (e.g. p. 41), has implications for the
way of conceiving the relationship between action and
knowledge, which was one of the problems of this chapter.
The relationsnip between action and knowledge works, as I
see it, in three ways:

>   1. Action constitutes the a priori of knowledge.
>   2. Knowledge is constructed through action.
>   3. The function of knowledge is to serve as an in-
>   ternal action determinant.

The first point, that action constitutes the a priori of
knowledge, means the same here as for the pragmatists and
Tuomela: the mind does work with some kind of a prioric ca-
tegories in constructing knowledge; the categories however
are not transcendental but tied to man as an agent and so-
cial actor. Categories like time and place, causality, te-
leology, all make it possible for man to create knowledge
that help him act in his different worlds. Here we might
add that some of the a prioric element can also be part of
man's biological make up - a view emphasized strongly by
e.g. Piaget (1971 and 1985) and Lorenz (1974).

The second point, that knowledge is constructed through
action, also has to do with the view of man as an agent
and social actor. In outlining the view of action under-
lying this study I referred to Pörn and noted that it is
through action sequences that man lives his life (p.49).
This also means that it is through action sequences of
this kind that man creates knowledge.

That the function of knowledge is to serve as an internal

action determinant can be understood as an extension of
point 1. Namely, since action is the a priori of know-
ledge, the way in which human actors construct knowledge
is such that the knowledge constructed, if it is done in
accordance with the "knowledge making rules" e.g. of sci-
ence, can in principle be used as action orientation.
This is the same type of argument that was presented by
Lewis and Rescher (pp. 32-33).

Whether knowledge actually does serve as an internal action
determinant depends on whether an actor's internal action
determinants are made up of knowledge or not. As I will put
forth in the following, knowledge is not only a question of
epistemic orientation but also of ability and values. When
an actor possesses knowledge, knowledge is not only an ob-
ject in World 3 but also in World 2, the actor's subjective
consciousness. Some elements of knowledge can also belong
to World 1, as will be pointed out in the following.

Axiological orientation, epistemic orientation, and abili-
ty, can all be made up of knowledge or of "ignorance".

Within the axiological system knowledge consists of value-
knowledge. Moral knowledge and esthetic knowledge are types
of value-knowledge.   If we use the term moral knowledge,
this means that we can say that an actor knows, for instan-
ca, what is good and right, unfair and unjust, while some
other actor may not possess this knowledge. We then talk of
moral knowledge with respect to World 2. But we must also
be able to say that the values in World 3 represent value-
knowledge or not. This means that we need some kind of cri-
teria in order to judge what values are based on knowledge
and what values are not. Mackie (1983, 83-102) argues for
the view that it is possible to establish criteria for
morality and according to him this is done by a process of
universalization going through three stages. I will not,
this work, analyze possible criteria for moral knowledge. I

only want to claim that values can have knowledge status
and that the way of judging this is in principle no dif-
ferent from judging knowledge in general. This view of
value-knowledge is also consistent with the idea that
knowledge in this area can be developed and that the cri-
teria may need revision. But, again, this also concerns
other types of knowledge. Having value-knowledge can then
be conceived as having good values according to some jus-
tifiable criterion.

Within the epistemic system knowledge consists of _factual_
knowledge.   This type of knowledge corresponds to what
previously has been called 'knowing that'. This is also
the type of knowledg that best corresponds to what was
called the classical concept of knowledge: a well-justified
true belief (p. 1). The requirement that it be well-justi-
fied might not be necessary; it depends on whether the be-
lief is articulated or not. Factual knowledge can include
knowledge of a great variety of things. I may, for instance,
know that the world is round, that my name is so and so,
that if I do X, Y will happen etc. Factual knowledge can
thus consist of knowledge of the world in general, know-
ledge of myself, and of my acts and their results and con-
sequences, just to mention some examples.

Within the ability system knowledge consists of what has
sometimes been called _procedural knowledge_. Cicourel (1986)
makes a distinction between declarative knowledge and pro-
cedural knowledge meaning that declarative knowledge is
knowledge of data, while procedural knowledge is knowledge
of process. Knowledge of process means, according to him,
both knowledge of how to do something and how to understand
something. This knowledge is contextual and tied to expe-
riences. It is often tacit, he says, while declarative
knowledge relies on explicitly known inference rules and
is less contextual. I will use the term 'procedural know-
ledge' to refer to knowing how, i.e. knowing how to carry
out a process; I will not include the actor's understanding

of this process in this type of knowledge. A person who
has procedural knowledge of, for instance, the process of
riding a bicycle knows how to ride a bicycle. This again
means, in v.Wright's terms (pp. 47-48), that on most occa-
sions when the person tries to ride a bicycle, he will
succeed. His success is dependent on the mastership of a
set of techniques that he can coordinate and apply appro-
priately in a given context. It is not necessary, however,
that he can declare or describe how he is carrying out the
process. In this respect I tend to agree with Polanyi
(1958, 49-50) in his analysis of skillful practice.

Value-krowledge, factual knowledge and procedural knowledge
can be said to be different types of knowledge. These types
of knowledge can be tacit or articulated (see e.g. Polnayi
1958, Part Two), and if they are ariculated, they can be
articulated in different ways. Unarticula ed knowledge has
been touched upon previously in this study: familiarity,
kr.owledge by acquaintance, tacit knowledge, implicit know-
ledge. Unarticulated knowledge is gained through inter-
action with the environment, when an actor makes the world
his home, as Dewey might put it. An actor who has unarticu-
lated knowledge of the world knows his way about and can
act appropriately in various situations. His knowledge is,
however, is unreflected and unart'culated; the actor cannot
expresss his knowledge in concepts or other kinds of symbols
and can therefore not reflect upon it.

When the actor's knowledge becomes articulated, he can ex-
press his knowledge in concepts and other kinds of symbols
and his knowledge also becomes reflected. Can all know-
ledge be articulated? I am inclined to think not. An ac-
tor's value-knowledge and factual knowledge can be arti-
culated while procedural knowledge, as I have defined it,
cannot. Procedural knowleuge is by definition expressed in
action, while value-knowledge and factual knowledge can be

expressed in action as well as articulated in concepts and other symbols.

The problem of reflected versus unreflected and articulated versus unarticulated knowledge has been discussed to some extent in educational literature, so I will return to this problem in my treatment of educational knowledge.

For the moment I will only comment on some general ways of articulating knowledge. Three general ways are everyday language, science and art.

Knowledge articulated in everyday language often has what ethnomethodologists call en "emic" character: it is the way people themselves understand and explain their world, from the perspective of their own socio-cultural background and experiences (see e.g. Leininger 1985). This kind of knowledge also comes close to Koskiaho's 'daily life know-ledge' (see p. 36-37). Engeström (1982, 102-105) contrasts everyday knowledge with theoretical knowledge, and says that everyday knowledge is based on immediate observation and experience, is unconscious and spontaneous and connec-ted to isolated situations. It does not, according to him, constitute systems; it is describing and classifying and concerns the external properties of phenomena. I am not convinced that Engeström's view is correct is all respects. People's everyday knowledge may well be larger as well as deeper than what he assumes, and it may well constitute systems; it is only expressed in another language than the language of science.

That science and art can be seen as two different ways of articulating experience has been suggested by, among others, Dewey (p.33). The same .dea is put forth by Goodman (1984, 1-5), who sees science and art as two ways of knowing.

The function of science is generally considered to be the creating of new knowledge about the world and formulation

of theories that state something about the world in terms
of descriptions, explanations, interpretations (see e.g.
Rosing 1978, 101-105 and Ödman 1979, 22-24, 50-52). One
problem that has been discussed since Aristotle's classifi-
cation of sciences into theoretical, practical and pro-
ductive, is whether the role of science is primarily theo-
retical or whether the role of science is also to guide
action. Niiniluoto (1980, 64-67) makes a distinction between
the cognitivistic and behaviouralistic view of science.
According to the cognitivistic view the role of science is
to create a scientific world view, while, according to the
behaviouralistic view the task of science is to formulate
action principles. A special group of sciences are those
that Niiniluoto (1984, 208-214) calls 'planning sciences'.
According to him, planning sciences are, for instance, the
science of education, nurs₊g sc' ₊ce and the science of
economic⁻. The task of these sciences is to formulate tech-
nical norms for the corresponding practices, he claims. I
will return to this conception in the discussion of the na-
ture of educational and health care sciences.

According to the pragmatistically influenced conception of
knowledge that has been outlined in this study the role of
science is directly or indirectly practical. We can, of
course, make a distinction between a theoretical purpose
that is more concerned with only describing, explaining
and interpreting, and a practical purpose that is concerned
with formulating guidelines for action. But, as e.g.
R⸱ . (p.32-33) pointed out, since practice in general
constitutes the a priori of science the whole endeavour of
science is practical, even when the purpose is extra-
pragmatic. Although descriptive, explaining and interpre-
ting theories do not provide direct action guidelines,
they may well help an actor to find his way about in the
world; it can be part of his epistemic orientation, of his
system of beliefs about the world and thus function as an
internal action determinant.

As Goodman (1984, 1-8) points out, art is usually concei-
ved as something apart from science; he sees them however
as two ways of understanding the world. Hence they both
belong to the realm of epistemology, which Goodman defines
as the philosophy of understanding. He also criticizes the
notion that science is only cognition, void of feeling,
while art is mostly feeling, void of cognition. According
to Goodman both art and science represent cognition, and
there is feeling in all cognition. Dewey, who also saw
art as a means of expressing knowledge, said that art wi-
dens and deepens our experiences, through art we can learn
to see life in a new way (Dewey 1934, 83-89, 103). In its
own way art makes life intelligible:

> "Tangled scenes of life are made more intelligible
> in esthetic experience: not, however, as reflection
> and science render things more intelligible by
> reduction to conceptual forms, but by presenting
> their meanings as the matter of a clarified, cohe-
> rent, and intensified or 'impassioned' experience
> (Dewey 1934, 290)."

Collingwood (1960, 109-122, 288-289), who also sees art as
a form of expression, says that art is in no way indiffe-
rent to truth. As expression art does not describe and ge-
neralize, it individualizes feelings and experience. Through
different forms of expression the artist explores his own
feelings, and by letting the audience take part in this, he
helps them explore their feelings. Ultimately, says Col-
lingwood, art strives for truth.

Art as well as science can thus be conceived as means of
articulating knowledge about life and the world. In addi-
tion to science striving for generality while art strives
for individuality, there is probably a difference in the
"logic" of science and art. While science uses a combina-
tion of rational and empirical means in the process of
articulating knowledge, art is more inclined to use meta-
phors. This point is stressed by Royce & Powell (1983, 4-5,

191-196). They have developed a theory according to which
there is a connection between personality, modes of know-
ing and disciplines. I will return to this theory later.
For the time being it may be sufficient to point out that
they propose three modes of knowing - rationalism, empiri-
cism and metaphor'sm. Rationalism and empiricism can be
traced back to the epistemological traditions that have al-
so been described in this study. According to Royce and
Powell these modes of knowing have dominated during the
past 500 years, and they are strongly connected to modern
science and the philosophy of science. Metaphorism domi-
nated during the Middle Ages and has, according to Royce
and Powell, lived on in the arts and the humanities. They
remark, however, that all three modes of knowing are in-
volved in different disciplines, although, for instance
science, art and religion, each gives greater credence to
one of the modes.

Science and art can thus be conceived as two ways of arti-
culating knowledge. Science - especially the natural sci-
ences - formulates theories that are made up of statements
about the world; these statements include formal (i.e.
analytical, rational) as well as empirical aspects (i.e.
synthetical, material). Art creates works that often in a
metaphorical way express knowledge.

2.2.4 Conclusions

The epistemological point of departure in this study can be
summarized in a few points.

> 1. Man is primarily an actor, living and acting in
> a bio-physical, a socio-cultural and a subjective
> world.
> 2. Living and acting in the three worlds constitu-
> tes the a priori of human knowledge.

3. Since living and acting constitutes the a pri-
ori of knowledge, knowledge is constructed in such
a ways that an application of well constructed know-
ledge will directly or indirectly serve living and
acting.

4. When knowledge becomes part of an action system,
it functions as an internal action determinant.

5. There is a continuous interaction between know-
ledge and action so that knowledge is created in
and through action and so that experiences that the
actor acquires through action influences subsequent
action.

6. Value-knowledge, factual knowledge, and procedu-
ral knowledge are three types of knowledge connec-
ted to the three types of internal action determi-
nants. Having value-knowledge means knowing what
values fulfill the criteria of good values. Having
factual knowledge means having true beliefs about
the three worlds in which one is living. Having pro-
cedural knowledge means knowing how to carry out a
specific act or act sequence.

7. Knowledge can be unarticulated or articulated.
Unarticulated knowledge is, for instance, tacit
knowledge, familiarity, knowledge by acquaintance.
Knowledge can be articulated in everyday language,
science, and art.

Knowledge, then, is not only one thing but many. Two con-
cepts that have not appeared in the point of departure are
'theoretical knowledge' and 'practical knowledge'. One way
of defining these concepts - that would be consistent with
many availing definitions in the literature - would be
to define theoretical knowledge as factual knowledge and
practical knowledge as procedural knowledge. However, the-
se concepts - crucial as they are to this study - will be
defined later in order to let the inquiry into education
and health care influence the definitions.

3. THE THESES, MODE OF ARGUMENTATION AND FRAME OF REFERENCE OF THE INQUIRY

The epistemological background makes it possible to formu-
late the theses and to outline the frame of reference for
inquiry into knowledge in interactive practice disciplines.

3.1 Theses

The theses formulated here correspond to the aims of the
study (p.6) and are derived from the epistemological point
of departure. They can be stated as follows.

> I. The role of knowledge in an interactive prac-
> tice is to guide practice.
> This thesis is derived from the pragmatically
> influenced view of knowledge, according to which
> the function of knowledge in general is to g·ide
> action.
> II. The different types of knowledge in an interac-
> tive practice consist of value-knowledge, fac-
> tual knowledge and procedural knowledge; some
> knowledge is unarticulated, some articulated.
> This thesis is derived from the conception of
> knowledge types connected to the different in-
> ternal action determinants of an action system.
> III. Science is a way of articulating and creating
> new knowledge that can be v ·d as an internal
> action determinant in the p·actice concerned.
> This thesis is derived from the view of science
> as a practice that - together with everyday
> language and art - articulates knowledge. It is
> also a consequence of Thesis I.
> IV. The theories of an interactive practice can have
> both   a theoretical ard a directly practical
> purpose but the theoretical purpose is also in-
> directly linked to the practical.
> This thesis is derived from the view of science

as having both theoretical and practical pur-
poses. However, according to the pragmatical-
ly influenced view of knowledge, also expressed
in Theses I and III, the function of all know-
ledge is directly or indirectly related to ac-
tion.

3.2 Argumentation and material

The purpose of the argumentation to follow is to defend the
theses and to explicate them so that new views and concep-
tions crn be a result of the argumentation.

In the argumentation and explication two types of material
will be used: literature and examples.

In the epistemological background mainly philosophical li-
terature was used. Literature on knowledge in education and
health care was hence not used to back up the original for-
mulation of theses. This area of literature will now be
used to defend and explicate the theses.

Literature on problems and aspects of knowledge and
education is legion, because, as also Hirsjärvi (1985, 58)
remarks, one of the central tasks of education has to do
with knowledge: the task of the teacher is to transmit
knowledge, the curriculum should reflect what knowledge is
considered valuable and how this knowledge can be attained.
Much of the literature on knowledge and education thus con-
cerns teaching-learning problems and curriculum problems
(see e.g. Brubacher 1962, Ch.4; Harris 1979; Hirst 1974;
Peters 1973; Pring 1976). Although learning and curriculum
problems are not irrelevant to this study they do rot con-
stitute the main problem. Thus I have omitted much of the
literature on these problems. Instead I have chosen litera-
ture that deals with knowledge in and about education, i.e.
knowing how to educate, being able to interact in educatio-
nal contexts, having theories to understand and explain

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education etc. These areas naturally become relevant to
teaching-learning problems and curriculum problems in
teacher education.

The same kind of literature has been chosen in the health
care area: literature on knowing how to care, how to inter-
act in health care contexts, having theories to understand
and explain health care etc. Most of the literature used
from this area concerns nursing care. One reason for this
is that there seems to be a lively interest in questions
concerning nursing knowledge and nursing theories for the
time being. Medical care is also represented in the litera-
ture, since this is an old discipline with much research
done. What makes medical care interesting is that there
seems to be a growing interest in philosophical and episte-
mological problems (see e.g. Jensen 1983; Jääskeläinen
1983; Louhiala 1984; Pellegrino & Thomasma 1981;
Rimpelä 1976; Söderfeldt ed. 1985; Törnebohm 19l Occu-
pational therapy and physiotherapy again are less rep.esen-
ted in the literature. The choice of literature in the
field of health care raises the question of whether tne
line of argument is applicable to the whole field or whether
it should be restricted to nursing care and medical care.
However, there are strong arguments for a view according to
which all the sub-practices in health care are strongly rela-
ted and actually just sub-practices of one main practice -
care (see e.g. Downie & Telfer 1980, ix; Sarvimäki & Sten-
bock-Hult 1988). Then there is also a high degree of trans-
fer between the sub-practices. Since the problems and the-
ses in this study are common to all the sub-practices of
hoalth care, it seems possible to generalize the line of
argumentation.

In addition to literature from the fields of education and
health care, some of the philosophical works used in the
epistemological background will be referred to anew, and
some additional material will be used.

The literature is not gathered into an inclusive review
but the different works and thoughts will be treated as
they fit into the argumentation.

In addition to analys s of literature,systematic exempli-
fication from the practices concerned will be used to cla-
rify and support the line of argumentation.

The order of the treatment of problems and theses will fol-
low the structure of an interactive practice d scipline.

3.3 Frame of reference: the structure of an interactive practice discipline

One of the problems of this study, preceding the main prob-
lems, is to clarify what is meant by an interactive
practice discipline. Such a conception presupposes a defi-
nition of the concept of a discipline in general as well
as a view of the classification of disciplines.

3.3.1 The concept of a discipline

According to Donaldson and Crowley (1978) disciplines are
ways of organizing human knowledge: disciplines ve bo-
dies of knowledge that also constitute realms of learning.
Similar views have been presented by e.g. Fagermoen (1981),
and Karollussen and Smebye (1985, 227-228); the latter ones
add that a discipline also includes an area of research.

While these characterizations concentrate on discipline as
a <u>body</u> of knowledge and <u>realms or areas</u> of educati- d
research, Phenix (1964, 317) and Pring (1976, 25-28) also
emphasize that a discipline is characterized by a <u>way of</u>
learning, a <u>mode of</u> inquiry, i.e. studies in a specific
discipline do not consist of memorizing facts but of
learning how to solve problems and create something of val-
ue in that discipline.

A discipline is thus characterized by:
- a body of knowledge
- an area of research
- an area of teaching and learning
- a mode of inquiry and learning.

3.3.2 Classification of disciplines

Various attempts have b   ide to classify disciplines.
Many of the attempts make some kind of basic distinction
between academic or scientific disciplines on the one hand
and professional or function oriented disciplines on the
other. The academic or scientific disciplines are usually
considered as consisting of the "traditional" sciences,
i.e. natural sciences and humanities and as searching for
knowledge. "as such   r knc ledge organized in descriptive
theories. The professional or function oriented disci-
plines are considered as related to a specific practice and
as pursuing practical aims; knowledge in these disciplines
is organized in Jescriptive as well as prescriptive theo-
ries. (Donaldson & Crowley 1978; Fagermoen 1981; Thomsen
1973)

According to these classifications education as well as the
different areas of health care would be conceived of as
professional or function oriented disciplines.

A classification system that resembles the ones related
above but that also has its own original aspect has been
developed by Phenix. He too makes a distinction between
what he calls fundamental disciplines and applied or deri-
vative studies. The fundamental disciplines consist of
six types that corrspond to six patterns of meaning or
modes of understanding. (Phenix 1964, 6-7, 273)

Behind the classification of fundamental disciplines into
realms of meaning is a view of man as a being searching
for and creating meaning (Phenix 1964, 21). Phenix says:

"A human being is in essence a creature who cre-
ates, discovers, enjoys, perceives, and acts on
meanings. These meanings are of six general kinds:
symbolic, empirical, esthetic, synnoetic, ethical,
and synoptic, corresponding respectively to the
distinctive human functions of expressing and
communicating, describing, making and perceiving
significant objects, entering into relations deci-
ding between right and wrong, and comprehending
integrally. Each of these realms is defined by a
certain general logic of meaning. Within each
realm there are special fields of study, each de-
fined by its own subject matter, typical concepts,
and methods of inquiry. Yet all these exhibit the
general logic of the realm to which they belong."
(Phenix 1964, 48)

The six realms are made up of different disciplines in the
following way:

Realms of meaning	Disciplines
Symbolics	Ordinary language, mathe-matics
Empirics	Physical sciences, life sciences, psychology, so-cial sciences
Esthetics	Music, visual arts, arts of movement, literature
Synnoetics (Personal knowledge)	Philosophy, psychology, literature, religion, in their existential aspects
Ethics	The varied special areas of moral and ethical con-cern
Synoptics	History, religion, philo-sophy

Table 3.1 Realms of meaning and their corresponding
disciplines according to Phenix (modifi-
cation of Phenix 1964, 28)

derivative or applied fields of study are built up
around practical concerns and they derive and apply mea-
nings from the fundamental disciplines. Examples of deri-
vative fields are the skilled crafts, engineering, law, and

education. Thinking in the applied fields and in cross-
disciplinary studies are according to Phenix very deman-
ding and tend to be nondisciplined because of the mixture
of methods and concepts. Thus they presuppose greater skill,
care, and maste , of material than studies within the fun-
damental disciplines. To learn to cross the discipline lines
is however an important educational goal. (Phenix 1964,
318-320)

If Phenix's classification system is adopted to education
and health care, the conclusion must be drawn that these
fields of study belong to the derivative or applied fields;
Phenix himself places education among these fields. He al-
so remarks that education draws on all the fundamental
disciplines (Phenix 1964, 319). An analysis of the differ-
ent sub-practices of health care would probably lead to
the same conclusion.

3.3.3 The structure of an interactive practice discipline

Interactive practice disciplines, according to the charac-
terizations and classifications so far,can be described as
bodies of knowledge, areas of research, teaching and lear-
ning, and modes of inquiry and learning that evolve around
distinct practices where interaction plays a central part.
The knowledge created and transmitted in these disciplines,
to a high degree,can be viewed as a derivation and appli-
cation of knowledge from fundamental disciplines, i.e.
disciplines that are not related to any specific practices
but only to the growth of human understanding in all its
areas.

Thus the term 'applied discipline' could be substituted for
'interactive practice discipline'. However, the term 'in-
teractive practice discipline' brings forth at least two
important points that are relevant for this study:

1. the disciplines concerned here are not any ap-
   plied fields but expressly knowledge fields that
   evolve around human interaction,
2. the point of departure for the study of know-
   ledge in these disciplines is the nature of the
   interactive practice, not the fundamental disci-
   plines.

Reijo Wilenius (1975, 11, 39-40) has developed a view of
education and its auxiliary practices that exp. ssly takes
its point of departure in education as the primary practice.
The task of educational acts is according to Wilenius to
support and stimulate the intentional growth of the chi'd
or student. In the same way   the educational acts are
auxiliary with respect to intentional .growth educational
practice has its ov auxiliary practices. The auxiliary
practices are called secondary practices and they are: rc-
search, education of the educators (especially teachers),
and the administration, planning and development of educa-
tion. Wilenius also indicates that the whole area of so-
cial policy might he seen as a tertiary practice with the
supporting of primary and secondary practices of education
as an important task.

Since education as well as its support systems are charac-
terized as practices, they can be described in terms of
action systems. That is, they go through action sequences
consisting of inquiry, planning and dec' __g, implementa-
tion, and they are influenced by inter il as well as exter-
nal action determinants. If the intere .ive element on the
primary level is stressed, this practice can in turn be
described as two or more action systems interacting with
each other.

If this same idea is adopted to health care, both education
and health care can be seen as hierarchies of practices,
where the interactive practice constitutes the primary le-
vel, research, education of practitioners, and administra-

tion the secondary level, and social policy in general the
tertiary level (fig. 3.1).
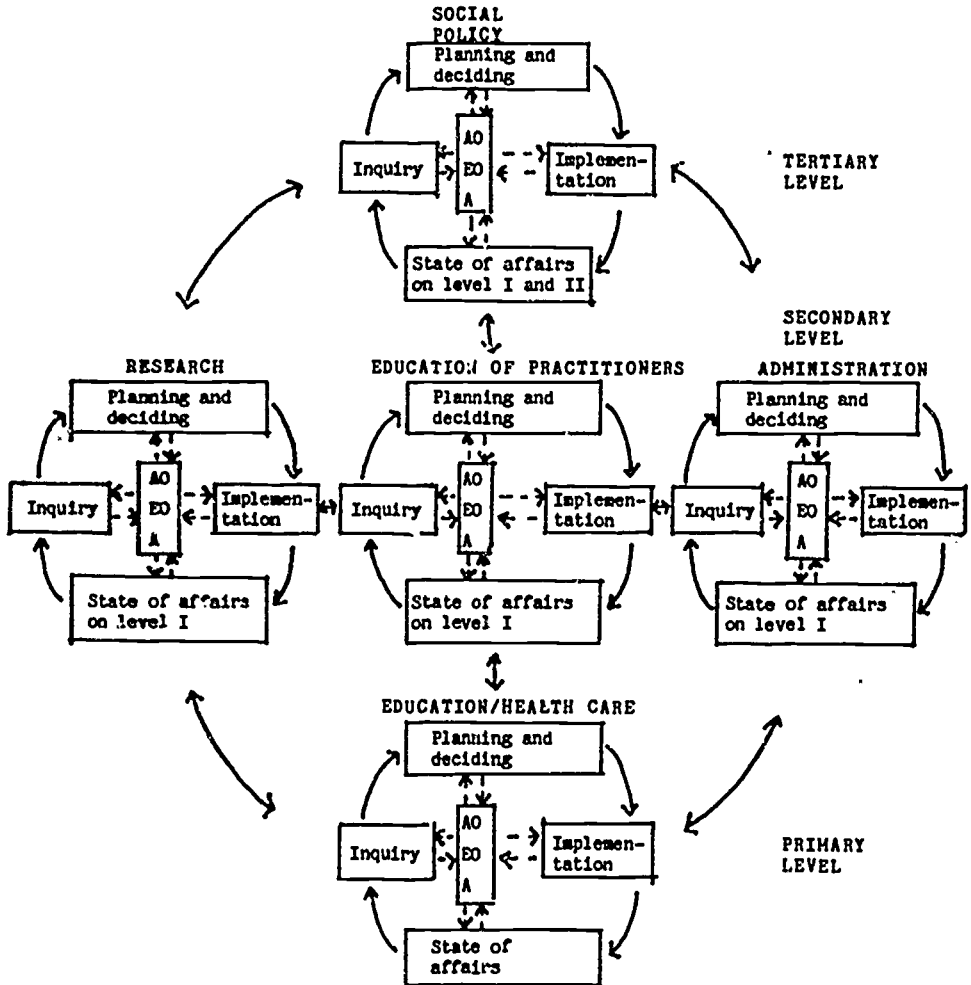
Figure 3.1 The disciplines of education and health care
as hierarchies of practices

In figure 3.1 the primary practice - for the sake of simpli-
city - has   been depicted as one action system instead of
as an interaction between several systems. For the same
reason the external action detern'nants have been omitted.
Furthermore, the control loops between the systems are on-
ly indicative: they indicate the existence of feedback be-
tween the systems without specifying different kinds of
connections between the systems.

The disciplines of education and health care can now be spe-
cified as:

- bodies of knowledge related to education and
  health care
- areas of research, te 'hing and learning, admi-
  nistration and planning, and social policy
- a mode of inquiry, learning and administration.

This specification of the concerned disciplines includes
the systems of administration and social policy in the disci-
plines and adds a mode of administrating to the modes of
inquiry and learning.

3.4   Continuation of the study

In this study the main focus is on knowledge in the primary
practices of education and health care and on research as
a support system for practice. Some consequences for educa-
tion will be discussed but the education of practitioners
as well as modes of teaching and learning will not be stu-
died in depth. Administration and social policy will hard-
ly be dealt with at all.

The inquiry will start with knowledge in the primary prac-
tices and then continue with the research system.

4.   KNOWLEDGE IN INTERACTIVE PRACTICES: PRACTICAL KNOWLEDGE

This chapter deals with theses I and II of the study, i.e.
with knowledge as a guide of the interactive practices and
as consisting of different types.

The totality of knowledge as it manifest.   in the in-
teractive practice will be conceived of as practical know-
ledge. Practical knowledge is thus a very comprehensive type
of knowledge, including other types of knowledge and ma-
nifesting itself as proper courses of action in different
situations.

This view does not in all respects correspond with the view
of practical knowledge that is prevalent in educational and
health care literature.

4.1 Some accounts of practical knowledge in educational and
    health care literature

Much of the literature on practical knowledge in education
and health care use this term in the sense that the terms
'procedural knowledge' and 'skill' have been used previous-
ly in this study. This use of the erm 'practical knowledge'
usually goes back to Gilbert Ryle's and Michael Polanyi's
analyses of skills and 'knowing how'.

4.1.1 'Knowing that' and 'Knowing how'

Ryle (1976, 26-60) distinguishes between two types of know-
ledge: knowing that and knowing how. These two types have
been touched on previously in this study - Hintikka used
them to refer to the conceptions of theoretical and prac-
tical knowledge in the thoughts of the Ancient Greeks. Accor-
ding to Ryle 'knowing that' and 'knowing how' are two lo-
gically separate types of knowledge that are irreducible to

one another. 'Knowing that' means having knowledge organi-
zed in propositions and prescriptions; it is knowledge of
what is the case. 'Knowing how', on the other hand, means
having practical knowledge, knowing how to do things, how
to perform certain tasks. It is possible, according
Ryle, to 'know that' without 'knowing how' as well as it is
possible to 'know how' without 'knowing that'. The exer-
cise of a skill does not presuppose any propositional know-
ledge of the skill and its performance.

Polanyi (1958, 49-57) expresses a similar view in his ana-
lysis of skills. For instance, in order to ride a bicycle
you do not have to be able to account for how you use the
centrifugal forces. However, according to Polanyi, skills
are only one aspect of a larger type of knowledge, personal
knowledge, which refers to the whole way in which a subject
participates in 'the Art of Knowing'.

Ryle's and Polanyi's ideas have been adopted to edu .ional
and nursing contexts by several authors.

Hartnett and Naish (1976, 107-121) discuss the difference
between knowing in theory and knowing in practice. By 'know-
ing in theory' they refer to Ryle's 'knowing that' and by
'knowing in practice' to 'knowing how'. They also refer to
Polanyi and firmly stress the point that practical know-
'edge - the intelligent and critical exercise of skills -
cannot be put into propositions. Practical knowledge always
has an unspecifiable and ineffiable element, it can be
acquired only through practice and it can also be dependent
on .haracterological factors.

Pring (1976, 16-24) also uses the terms 'belief-type' and
'procedural-type' when referring to theoretical knowledge
as 'knowing that' and to 'practical knowledge' as 'knowing
how'. He points out the importance of practical knowledge
in education, since propost'onal knowledge does not cover
everything that is important to learn.

Burna·d (1987) distinguishes between propositional, prac-
tical, and experiential knowledge. By propositional know-
ledge he means the same as Ryle's and Pring's 'knowing
that', while experiential knowledge covers knowledge gained
through direct encounter with persons and things.
Experiential knowledge is synonymous with Polanyi's perso-
nal knowledge. Finally, practical knowledge consists of
skills like giving an injection, driving a car, and coun-
selling. It then corresponds to Ryle's and Pring's 'know-
ing how' or procedural knowledge. Burnard says:

> "It is important to note, however, that a person
> may develop considerable practical knowledge without
> necessarily developing the appropriate propositio-
> nal knowledge. Thus, I may become skilled in giving
> an injection without necessarily knowing why I am
> giving it and without knowing the possible conse-
> quences of my actions."

Burnard's view of practical knowledge corresponds to the
type of knowledge that in this work is called procedural
knowledge, but not necessarily to practical knowledge as
it has been envisaged.

Ryle's distinctions have also been criticized for being too
restricted. Martin (1970), for instance, analyzes 'knowing
how' and comes to the conclusion that there are three differ-
ent types of 'knowing how'. Type A consists of skills and
capacities that are learned through practice, like cooking,
doing logic, and playing tennis. Type B does not require
practice but consists of knowing how to answer questions
correctly. Knowing how the accident happened, for example,
means that one can answer questions about the accident. How-
ever, this does not require practice but propositional know-
ledge. Type C, finally, includes knowing moral judgments or
rules of conduct. According to Martin the 'knowing how' of Type
C consists of an .tion tendency rather than of a capacity
and thus does not either require practice. Martin concludes
that Ryle's 'knowing how' actually covers only Type A and
that Type C needs another term than knowing how' in this
sense.

Ryle's account of 'knowing how' has also been criticized
by Entwistle (1976). Accou-ding to Entwistle Ryle does not
take into account that many skills are very complex and
presuppose both practical and theoretical knowledge. In a
ball game, for instance, it is not enough to be skilled in
hitting and running, you must also be able to judge the
total situation and decide when to do what. Entwistle agrees
with Ryle that to learn skills requires practice and that
theoretical knowledge is not enough for the exercise of
skills. Practice is needed primarily to develop the tac-
tile dimension that according to Entwistle is included in
almost all skills. However, what Entwistle opposes, is the
view that the exercise of skills be independent of theore-
tical knowledge:

> "On the other hand, reasons have been advanced for
> believing that theorizing may helpfully precede
> and accompany practical learning and for the view
> that knowing how to do something intelligently
> often depends upon reference to theoretical know-
> ledge about the contexts in which a skill is prac-
> ticed. Similarly, a proper understanding of the
> contingent experiences of daily life depends upon
> the acquisition of a considerable cognitive reper-
> toire." (Entwistle 1976, 50)

Operating skill, for instance, is dependent on making the
right diagnosis and teaching skill is dependent on exper-
ienc` of the class and the individual pupils; this makes
it possible to adapt ones own action and to intervene at
the right moment (Entwistle 1976).

The contextual nature of practical problems has also been
pointed out by Gauthier (1976), who moreover emphasizes
that the context has a dynamic aspect. Practical problems
also have a personal aspect: they always confront a certain
person. Finally, they are met by action, they are solved by
doing the right thing.

Practical knowledge interpreted as 'knowing how' in Ryle's
sense thus seems to be restricted to fairly limited skills
and procedures. There are, however, larger conceptions of

practical knowledge in educational and health care con-
texts.

4.1.2   Practical knowledge as situational and contextual,
        personal and experiential

Sternberg and Caruso (1985) define practical knowledge as
"procedural information that is useful in one's everyday
life". On the one hand they distinguish between procedural
knowledge and declarative knowledge, on the other hand
between knowledge   relevant and irrelevant to everyday
life. According to their classification practical knowledge
has to fulfill two criteria: it has to be procedural and it
has to be relevant to everyday life. The other combinations
they call academic knowledge, which is then either declara-
tive or procedural knowledge irrelevant to everyday life.
Practical knowledge, according to Sternberg and Caruso, is
mostly stored in the form of production systems embedded in
general scripts. Nonprocedural knowledge, on the other hand,
is stored in systems of interrelated concepts.

Sternberg's and Caruso's concept of procedural knowledge
does not differ in principle from Ryle's, Pring's and Bur-
nard's corresponding concepts. What Sternberg and Caruso
add to the concept of practical knowledge, however, is the
criterion of relevance for everyday life. Thus, they empha-
size the context where this knowledge is used. But since
they do not specify what is meant by "everyday life" this
criterion becomes very vague. An academic context, for in-
stance, belongs to the everyday life of many professionals.
And what about other work contexts, like schools and hospi-
tals? Do they represent everyday life?

Wilenius (1975, 21-38) uses the practical syllogism as a
model in defining practical educational knowledge. Practi-
cal knowledge is according to him knowledge that is ex-
pressed   or manifested in action. Hence, the logic of

action provides the clue to practical knowledge. According
to Wilenius the practical syllogism indicates three large
areas that together constitute educational knowledge: know-
ledge of goals, knowledge of the situation and knowledge
of means. These areas of knowledge are in their turn con-
nected to knowledge of the development of human beings,
knowledge of the present and future society, of the con-
crete educational situation, and of the curriculum. Thus,
Wilenius' view of practical knowledge is larger than the
concept of procedural knowledge, also including knowledge
of the society in which education takes place.

Freema Elbaz has used case study as a method to develop a
view of practical teaching knowledge. Practical knowledge
is according to her oriented to situation, personal, social,
and experiential, and it also has a theoretical orientation.
It is structured into rules of practice, practical princi-
ples and images. The rules of practice are specific pre-
scriptions about what to do in concrete situations. The
practical principles are more inclusive and less explicit,
and include, for instance, the teacher's general purposes
and beliefs. The images are least explicit and most inclu-
sive. They hold the teacher's general ideas about what
teaching should be like and are made up of the teacher's
feelings, values, needs, and beliefs, as well as of theo-
retical knowledge and folklore. The teacher's own experi-
ence is crucial for all practical knowledge. (Elbaz 1983,
13-22, 101-145)

One of Elbaz's (1983, 3-6) main ideas is that teachers,
during their work, create a considerable amount of know-
ledge that they use in their work but that is not necessa-
rily conceptualized. Their practical knowledge is, so to
speak, immanent in their practice. It is this immanent
knowledge that she wants to uncover.

The idea of practical knowledge as embedded in practice and

as situational, personal and experiential can also be
found in Donald Schön's The Reflective Practitioner (1983),
Patricia Benner's From Novice to Expert (1984), and David
Hunt's Beginning with Ourselves in Practice, Theory, and
Human Affairs (1987).

Schön criticizes what he calls the technical rationality
in practical professions, i.e. the idea that these practi-
ces consist in t e application of standardized, speciali-
zed and scientific knowledge to instrumental problem sol-
ving. Rather, the practicians find themselves involved in
personal relations, concrete action situations, and value
conflicts. In his practice, the professional develops know-
ledge that is often tacit and spontaneous, embedded in rou-
tines; he is knowing-in-action. In order to break the rou-
tines he also needs reflecting-in-practice. In the reflec-
tive practice the practitioner surfices and criticizes his
own action - ends as well as means - and he becomes a re-
searcer in the practice context, his practice becomes a
"reflective conversation with a unique and uncertain situa-
tion". The relation between the practitioner and the situa-
tion is transactional: on the one hand his understanding
is shaped by the situation, on the other hand he shapes the
situation. (Schön 1983, 21-30, 49-69, 130, 150-151)

The purpose of Benner's study was to uncover knowledge em-
bedded in clinical nursing practice. She refers to prac-
tical knowledge as 'know-how' in the sense of Polnayi's
personal knowledge and skills, which means that she sees
this knowledge as founded in personal experience. In order
to describe the development of skills in clinical nursing
practice Benner uses a model developed by Stuart and Hu-
bert Dreyfus. According to this model skilfull practice
develops through five stages: 1. Novice, 2. Advanced Be-
ginner, 3. Competent, 4. Proficient, and 5. Expert. The
stages describe how the practitioner becomes less dependent

on abstract models and rules in her practice, at the same
time freeing her attention to the total situation. Her
functioning becomes more flexible, intuitive, relying on
experience and observation. Benner's own study involved
dialogue with nurses, identifying   the five levels of
competency. She also identified six areas in which practi-
cal knowledge can be organized: 1. graded qualitative dis-
tinctions, e.g. the ability to recognize subtle physiolo-
gical changes, 2. common meanings that form a tradition and
that can be made explicit through narrative accounts, 3.
assumptions, expectations and sets, e.g. predispositions
to act in certain ways in certain situations, 4. paradigm
cases and personal knowledge, e.g. important experiences
that have influenced the nurse's foreknowledge, 5. maxims,
i.e. "cryptic instructions that make sense only if the
person already has a deep understanding of the situation",
and 6. un   ned practices, including the development of
new know-   n areas that actually do not belong to the
nurses. (£ -ner 1984, xvii, 1-38)

Hunt uses the term 'implicit theory' to refer to the fund
of experience practitioners use in their practice. The
practice of teaching he describes as a process of "reading"
the situation and "flexing" one's intentions and actions
depending on the changing circumstances. The implicit theo-
ry a teacher (or counselor, supervisor, theorist) uses in
the reading-flexing process can be made explicit through
concepts, matching models and metaphors. (Hunt 1987, xi,
1-2, 53-83, 145-149)

The works related here represent a coherent line of thought,
although there are differences between them. They can be
said to be part of a tradition in educational and caring
literature that strongly emphasize the importance of ex-
perience, experimentation, confrontation and personal as-
pects of practice and learning. Dewey is, of course, one of

the main figures in this tradition. Others are, for examp-
le, David Boud, Rosemary Keogh, and David Walker (1985),
Peter Jarvis (1987), David Kolb (1984), and R.S. Usher
(1985;1986a;1986b).

Thus,in educational - and also in caring - literature
practical knowledge is quite generally described as knowing
how or procedural knowledge that is personal, experiential,
contextual and embedded in practice. Some of it is tacit
and ineffiable, but it is also organized in shared meanings,
images, and metaphors, and it can be reflected upon. What is
less visible is the ethical side of practical knowledge. Martin
(1970) touched upon knowing how as moral judgment and rules
of conduct but concluded that another term is needed for
this type of knowledge. Schön (1983, 49, 68) touched upon
it, when he included value conflicts in practitioner's si-
tuation and when he united ends and means as objects of
reflection-in-practice. The reason why ethics does not seem
to be part of practical knowledge can be seen as symptoma-
tic of the current view of education and health care - they
are rather conceived of as <u>techne</u> or <u>poiesis</u> than
as <u>praxis</u> and they tend to emphasize maker's knowledge
more than user's knowledge , to use the terms of the An-
cient Greek. Carper (1978) recognizes ethics as the moral
component of nursing knowledge, in addition to empirics,
esthetics, and personal knowledge, but she does not relate
it to the concept of practical knowledge; however, her art-
icle indicates   that she sees these four patterns of know-
ing - as she calls them - as relevant for nursing practice.
Another aspect missing in much of the literature on edu-
cational and health care knowledge is the collective side
of practical knowledge. Benner (1984, 6) touches upon the
subject when she describes the common meanings as something
that is shared among nurses and as forming a tradition.

4.2 Knowing how to educate and care

The conception of practical knowledge in education and
health care that is to be outlined here is founded on a
view of these practices as fundamentally moral forms
of life. This gives moral knowledge a crucial part 'n
educational and health care knowledge. Practical knowledge
is however not only moral but can be seen as the most comp-
rehending form of knowledge in a practice discipline, draw-
ing also on theoretical and procedural knowledge.

4.2.1 Education and caring as moral forms of life

In chapter 2.2 knowledge was related to living and acting
in the sense that living and acting are seen as the a pri-
ori of knowledge as well as the context or process in which
knowledge is created and used. In the same way educational
and caring knowledge can be understood in relation to euu-
cation and health care as forms of living and acting.

The concept of 'forms of life' has been coined by Ludwig Witt-
genstein and it is related to another central concept of his -
the language game'. Words and expressions get their mea-
ning from the way we use them, from the language game,
which is a practice governed by rules. The language game
again is related to forms of life in that some words and
expressions are applicable only to certain forms of life.
For instance, concepts referring to a character of human
handwriting has no application to beings that do not write.
(Wittgenstein 1981, 8-23, 174-180, 226)

This idea has been used by e.g. Richard Wollheim (1984) to
describe art as a form of life, meaning that the a so-cal-
led artistic intention or impulse as well as concepts re-
ferring to art should be understood not prior to the insti-
tution of art - or life form of art - but as a part of it.
Carola Sandbacka (1987, 18-21, 62-74, 92-93) again uses the

idea to show how an understanding of other cultures is possible. She sees cultures as different life-forms, characterized by shared practices that constitutes the foundation for the understanding of language.

Now, how can this help us understand education and health care? Firstly, the socio-cultural context in which education and health care take place can be conceived of as a form of life, a "game" with distinct rules, practices, shared meanings; education and health care are part of this form of life, determined by the same rules and meanings. Secondly, education and health care can be understood as separate life-forms within this larger form, being characterized by their own shared practices and rules that give a common meaning to what takes place within these forms of life.

As parts of a larger form of life education and health care are not only themselves influenced by this form. They also influence the life-forms of which they are parts. As conservative forces the work as means of social control: they maintain and transm.. common practices, meanings, values, and traditions. As reformative forces they can contribute to a renewal of the surrounding life-form: new meanings, values and practices can be generated. That education can be seen as a social force with both conservative and reformative impacts is a generally accepted notion. That caring practices have the same function is perhaps not equally generally recognized but doubtlessly health care has a great influence on our life and society through different health care practices and through ideas about what is good and bad for you, what is healthy and unhealthy. The role of medicine as a form of social control or "ideological practice" has been pointed out by, among others, Illich (1975), Robinson (1978, 106-108), Szasz (1974), and Söderfeldt (1985, 115-125).

As specific life-forms within a larger socio-cultural life-

form, education and health care are not neutral.
Their task is to preserve a life-form that is considered
valuable or to improve it, if it is not considered satis-
fying. Either way they are committed to the maintenance
and creation of valuable life-forms.

This socio-cultural aspect of education and health care
brings out what in Aristotelian terms could be called the
"praxis"-side of these practices: they are forces in the
continuous development and creation of human life-forms.
This also points to an important area of educational and
health care knowledge - knowledge of valuable life-forms
and of the current state of the surrounding life-form.
Thus, this is what also has been called "user's know-
ledge", knowledge of what role education and health care
play in a larger context of human life-forms. Wilenius'
(975, 30-33) conception of educational knowledge includes
elements that touch upon these aspects, because he views
futurological knowledge and knowledge of society as ele-
ments of educational knowledge. An emphasis on educational
knowledge as socio-cultural and political-ethical know-
ledge can also be found in Edgar Dale's (1973, 1975 and
1981) and Paulo Freire's (1972 and 1976) conception of
education as social praxis. Lars-Olof Edström (1969, 11)
also says that teaching, in its widest sense, is a poli-
tical act.

The view of what is to be considered as a valuable form of
life is refelcted in the view of the goal of the practices
concerned: the well and educated person is one who can
take part in and contribute to a valuable life-form. This
connection between on the one hand ethics, view of life,
man and society, and on the other hand the goal of educa-
tion has been explicated by, among others, William Fran-
kena (1965, 7-9), whose point of departure is J.S. Mill's
(1872, 547-553) view of the logic of practical arts. Accor-
ding to Frankena every decision in the practice of educa-
tion has both a knowledge base and a value base, in other

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words, both a value- or goal premise and a premise about
means. ᴀe goal premises of the practice is derived from
more overreaching premises abcut goals and values. Thus,
behind this model is again the practical syllogism.
The model has been further adjusted to educational con-
texts by Hirsjärvi (1975) and to caring practice by Sarvi
mäki (1984, 9-13) and Kalkas (1984 and 1985, 31-43).

A look at some definitions of the concept of health may re-
veal this connection between goals of a practice and a
view of a valuable form of life. In most health care prac-
tices health is conceived if not as the goal, so at
least as one important goal. Health is conceived by Mas-
low (1976, 24-56), for instance, as ccmplete humanity, self-
realization, creativity and personal development, and by
Ma, (1978, 36) as creativity and self-realization. Johns-
son and Ohlsson (1977, 132-131) see health as the ability
to take responsibility and be in charge of one's own life,
and Illich (1975, 154) conceive of health as a virtue: the
individual's capacity for autonomuous adaptation with res-
pect to the social and cultural reality, the capacity to
tai.e responsibilty for oneself and for others - a task that
requires self-awareness and self-discipline. These defini-
tions show that the concept of health includes values. It
is, as Downie and Telfer (1980, ix) say, an expression of
a value judgment, a judgment about what kind of life is
worth living and how people ought to live. The definitions
related here tell us, for instance, that a life worth li-
ving is one in which people can be creative, develop and rea-
lize themselves, and take responsibility; this is also, mu-
tatis mutandis, how people should live. In the same way,
we may conclude, views about the goal of education can be
seen as value judgments about what kind of life is worth
living, about what can be considered as a valuable form of
life.

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This can be seen, for instance, in documents laying the
foundation for an ongoing _eform of vocational education
in Finland. According to the initial idea (Komiteamietin-
tö 1973: 52, 12-23),vocational education - including edu-
cation in many health care areas - should promote a so-
ciety characterized by spiritual and material welfare,
freedom, security, comfort, many-sided development of the
individuals, and the development of equality, democracy,
cultural life, and international understanding. These fea-
tures can thus be seen as a conception of a good society,
providing the foundations for a valuable life-form, and
the role of education is, according to the plans, to pro-
mote this society and this life-form.

The relationship between the practices of education and
health care on the one hand and the conception of a valu-
able life-form on the other hand is complex. Firstly, the
goals of the practices reflect a conception of a valuable
life-form. This relationship is essentially conceptual,
which means that an analysis of the goals reveals th con-
ception of a life-form. This can be seen in the definitions
of the concept of health on the previous page. Secondly,
there is an empirical-causal relationship between them,
which means that the practices concerned are supposed o
promote a valuable life-form by pursuing certain goals.
This relationship can be seen in the ideas behind the edu-
cational reform mentioned, where educational policy is
seen as a means for social policy. A third relationship
that can be conceived of between life-form and the practi-
ces in question includes not only the goals but the whole
practices. This relationship involves education and health
care as manifestations of a valuable life-form, which means
that not only the goals but everything that goes on in the
practices - the main principles, the relationships between
the participants, the methods, etc. - should be seen an
example of what is meant by a valuable life-form.

Questions about what kind of life is worth living and about

how we should live are moral questions. Since these are
the questions education and health care ultimately deal
with, they can be conceived of as moral forms of life.
Naturally, they could also be called moral practices. The
reason why they primari_y are seen as life-forms and secon-
darily as practices is that I want to emphasize the shared
meanings, rules and traditions that are immanent and
determine them as practices. The view of education and ca-
ring as life-forms also shifts the focus from mere acting
to a way of being and living. Being an educator, a nurse
or a doctor, for instance, does not involve only <u>doing</u>
things, it also involves being in a certain way, sharing
certain meanings and values, relating and living in a cer-
tain way, when operating within the life forms of education
and health care. It involves taking a position on the ques-
tion of valuable life-forms. These decisions are not neces-
sarily always conscious but a teacher's way of teaching
and a health care provider's way of providing care is al-
ways a manifestation of his or her position to the ques-
tions of a life worthwhile. Living within a certain form of
life means participating in it, and in participating one
always becomes morally responsible - whether one refrains
from doing anything or tries to change the form of life.

While the term 'form of life' or 'life-form' refers to a
whole way of being, living and relating, of sharing mea-
nings, values and traditions, the term 'practice' refers
to doing, acting and making. In this work 'practice' re-
fers to acting as described in the action sequence, i.e.
a practice is conducted through acquiring information, plan-
ning and deciding and implementing action. A practice is
related to a life-form in the sense that the way it is con-
ducted is determined by the shared meanings, values and
traditions of the life-form of which it is part.

Thus, since the practices of education and health care are
part of a moral form of life, they can also be conceived
of as moral practices. The moral nature of the concepts of

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education and health care as well as of these practices
has been pointed out by several authors (see also Sarvi-
mäki 1987a, 1987b, 1987c, 126-127, and 1988).

Daveney (1973), for instance, explicitly argues for the
view that the concept of education is a moral concept. He
says:

> "My main thesis can be stated quite simply: when
> we speak of education, there is presupposed either
> an ideal of a person to which the e'ucation is
> leading; or alternatively an ideal of a society
> for which the education fits the individual mem-
> ber. But in any case - and this is the important
> part - lying behind the concept of education is
> the notion of a norm or a set of norms which gi-
> ves the education its purpose." (Daveney 1973, 79)

Daveney (1973) argues that always when we use the concept
'education' we refer to a process or an activity that aims
at something good. He also makes a distinction between
technical problems and moral problems in education. The
technical problems have to do exclusively with the methods
while, according to him, the moral aspects come in when we
discuss the aims of education. And since education always
has an aim or a leading idea of some sort, we cannot ex-
clude the moral aspect when we discuss education. Daveney
concludes that an educational debate is always a debate
about society:

> "If we are going to be clear about the sort of edu-
> cational system we want, then we must be clear
> about our notion of the good society. Education
> inevitably is a moral concept, and educational dis-
> cussions of a non-technical kind are, logically,
> moral discussions." (Daveney 1973, 95)

That the socio-cultural aspect of education, which is re-
flected in the aims of education, has a moral dimension
is emphasized by Daveney, and this point has also been
made in this work. What is not necessarily the case, how-
ever, is that questions about methods be purely technical,
void o. moral aspects. Here Daveney seems to make a clear
distinction between praxis and techne, means and ends, in
education: questions about the aims of education belong to

the realm of praxis, which includes ethics, while questions
about means and methods belong to the realm of techne,
which only considers how the end is going to
be achieved. This view also makes a clear distinction
between user's knowledge, belonging to praxis, and maker's
knowledge, belonging to techne and thus also being non-
ethical. If, on the other hand, education is seen as a mo-
ral life-form, everything that is part of this life-form
has a moral aspect - even the means and methods used. The
view of education as a form of life then makes it impossi-
ble and also unnecessary to distinguish sharply between
means and methods. This view is also defended by Richard
Peters (1967, 5-9; 1970), who says that if education means
learning a valuable form of life, we cannot make a clear
distinction between means and ends, since the values we pur-
sue must leaven the whole process; the end is not something
that is technically produced by ethically neutral means. This
also implies that if the practical syllogism in Frankena's
and Hill's interpretation is used as a model for understand-
ing practical arts, it is not only the aims that are deri-
ved from more overreaching principles about life, ethics,
man and the world, but also the means and methods. In short,
the whole practice of education or health care and every-
thing that goes on in it is tied up with a life-form.

Alan Tom (1984, 79-119; 1985) does not analyze the concept
of education but the practice itself and advocates that
teaching be conceived of as a moral craft. He contrasts two
conceptions of teaching: the applied science view and the
moral craft view. According to the first view teaching con-
sists in applying research results to the activity concer-
ned. Tom criticizes this view and says that research fin-
dings can never provide significant guidelines for teaching
practice. There are two reasons for this. Firstly, the con-
nection between theory and practice is always loose, and it
is not possible to derive clear-cut guidelines from a re-
search based theory to a practice. Secondly, normative con-

siderations are central to all curriculum decisions but
the focusing on research-based theory tends to obscure
these normative considerations. There are, according to
Tom, basically two factors that determine teaching as a
moral art: the normative considerations of the curriculum
and the unequal teacher-student relationship. He defines
the craft and the moral basis of teaching in the following
way:

> "Teaching is a craft - much like fishing and garden-
> ing are crafts - because teaching fits the defini-
> tion of craft, that is, the application of know-
> ledge and skill to attain some practical end. At
> the same time, teaching is more than a craft because
> education necessarily involves designing a curri-
> culum to 'improve' students.
> /.../
> Teaching is also more than a craft because teaching
> involves a human relationship between people of un-
> equal power. Since teachers do have considerable
> control over the lives of the students and are in-
> evitably involved in forming students in desirable
> ways, teaching can be said to have a moral as well
> as a craft basis. Teaching, therefore, can be con-
> ceived of as moral craft." (Tom 1985, 149)

Tom's way of defining teaching as a moral craft indicates
that he primarily views teaching as a craft, i.e. as tech-
ne. As techne, however, it differs from other crafts because
of the normative decisions and the nature of the teacher-
student relationship. His arguments for viewing teaching as
moral thus differs from the arguments presented in this
work, but the conclusion is the same.

That medical care as well as nursing care moral practices
is claimed by, among others, Curtin (1979), Kleinman (1986),
Robinson (1978, 106), and Silva (1983). Curtin describes
nursing in the following way:

> "The end or purpose of nursing is the welfare of
> other human beings. This end is not a scientific
> end, but rather a moral end. That is, it involves
> the seeking of good and it involves our relation-
> ship with other human beings. The science that we
> learn, the technological skills that we develop
> are both shaped and designed by that moral end -
> much as an artist uses a brush. Therefore, nursing

> is a moral art. The wise and human application of
> our knowledge and skills is the moral art of nur-
> sing. Nursing science serves this art, and this
> art would not be possible without nursing science.
> This art is a moral art because it involves other
> human beings, our relationship with those human
> beings and the promotion of what we see mutually
> as 'good' - health." (Curtin 1979, 2)

Curtin then offers primarily two arguments for conceiving
nursing as a moral art: it has a moral end and it involves
relationships with human beings. She does not clarify in
what respect welfare and health are moral ends or repre-
sent the moral good. However, recalling Downie's and Tel-
fer's (1980, ix) view that the concept of health is to be
conceived of as a judgment about what kind of life is worth
living and how people ought to live, the same can certainly
be said about the concept of welfare; thus, welfare and
health can be seen as moral ends. In terms of life-forms
we can also say that concepts like health, welfare and the
educated person all refer to a valuable life-form, to a
life worth living, and are thus moral concepts.

The conception of education and health care as moral forms
of life can be summarized in the following way.

- Education and health care involve shared meanings,
  traditions, values, being, relating and acting,
  and can thus be conceived of as forms of life.
- As forms of life education and health care are
  part of a larger socio-cultural life-form with
  which they interact.
- The idea of education and health care is to help
  individuals to find a life worth living, a
  valuable life-form.
- Thus, education and health care can be conceived
  of as moral life-forms.
- As practices, education and health care are part
  of a moral life form.
- Thus, education and health care can also be co-
  ceived of as moral practices.

4.2.2   Categories of practical knowledge in interactive
        practices

As interactive practices, education and health care have
thus been characterized as moral life-forms and moral prac-
tices, meaning, that the role of these practices is to
pursue valuable life-forms and to help individuals, groups
and communities to find a life worth living. And, as far as
health care is concerned, it must be added that one task
is also to help individuals die when this life comes to an
end; or, a better way of conceiving this might be, that the
conception of a life worth living includes the conception
of dying when the time comes.

Living and acting in these moral life-forms can be descri-
bed in the same way as living and acting generally: it
means participating and creating, it means existing in the
three worlds - World 1 or Umwelt, World 2 or Eigenwelt,
and World 3 or Mitwelt. It also means acting in terms of
inquiring, planning and deciding, and implementing action.
Finally it means that knowledge in the interactive practi-·
ces concerned has the same conditions as knowledge in gene-
ral: practice constitutes the a priori of knowledge in in-
teractive practices, knowledge is constructed through ac-
tion, the function of knowledge is to serve as an internal
action determinant. This knowledge can be divided intc val-
ue-knowledge, factual knowledge, and procedural knowledge,
which, in turn has articulated as well as unarticulated.
elements.

Before these types of knowledge in education and health care
are studied,   a general characterization of practical
educational and caring knowledge must be made.

In the literature reviewed practical knowledge was commonly
defined as knowing how, meaning some kind of ability and
skill manifested in action but not necessarily formulated,

or even possible to formulate, in concepts and propositions. As was noted in the analysis of knowing how and of the general view of practical knowledge in education and health care, this view tends to be focusing on the "technical", situational and skill-aspect of knowing how. If, however, the concept of knowing how is enlargened so as also to include moral and socio-cultural aspects, it can be used to characterize the concept of practical knowledge as it is conceived in this work.

As an implication of the analysis so far practical knowledge in education and health care can be characterized in the following way.

- Practical knowledge in education and health care means knowing how to educate and knowing how to provide health care.
- Practical knowledge in education and health care is manifested in action on the primary level.
- Practical knowledge in education and health care involves knowing how to use skills and other types of knowledge in interpersonal situations but also moral knowledge about valuable life-forms.
- In its largest sense, then, practical knowledge in these areas means knowing how to participate in a moral life-form.

To these initial characterizations that are derived from the previous analysis a few more - which will also serve as a basis for the forthcoming inquiry - may be added.

- Practical knowledge is always manifested in an action system; this action system may be the acts of individual actors or of a collective.
- As a form of knowledge, knowing how to educate and care must be distinguished from ignorance, i.e. not knowing how to educate and care. While having practical knowledge means acting appropriately or adequately with respect to valuable life-forms, the situation at hand, and the context, practical ignorance means acting improperly or inadequately in these respects.

Thus, practical knowledge in interactive practices can be
divided into different categories. On the one hand practi-
cal knowledge can be possessed by individuals or by collec-
tives. On the other hand, practical knowledge involves a
socio-cultural level and an interpersonal level. (Fig. 4.1)

ACTOR

	Individual	Collective
Interpersonal	a	c
Socio-cultural	b	d

L E V E L   O F   K N O W L E D G E

Figure 4.1   Categories of practical knowledge in
interactive practices

The four categories of practical knowledge can be charac-
terized as follows.

a) Individual interpersonal knowledge involves an
   individual's knowing how with respect to inter-
   personal relations and situations: it means
   knowing how to interact with and relate to other
   individuals.
b) Individual socio-cultural knowledge involves an
   individual's knowing how with respect to the sur-
   rounding life-form: it means knowing how to in-
   teract so as to promote and manifest a valuable
   form of life.
c) Collective interpersonal knowledge involves a
   collective's knowing how with respect to inter-
   personal relations and situations.
d) Collective socio-cultural knowledge involves a
   collective's knowing how with respect to the
   surrounding life-form.

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On the basis of what has been said previously about current literature on practical knowledge in education and health care, we may conclude, that much of the current theories and view can be placed in Category a, individual interpersonal knowledge. This concerns at least Pring (197(, 16-24), Hartnett and Naish (1976, 107-121), Burnard (1987), and Benner (1984), while e.g. Wilenius (1976, 21-38) has a wider conception of practical knowledge.

It should be noted that the distinction between the interpersonal and the socio-cultural level of practical knowledge does not mean that, for instance, a teacher or a health care provider sometimes acts on the interpersonal level and sometimes on the socio-cultural level. The two levels are intertwined with one another in every interactional situation and in every phase of the action sequence, and it is only analytically that we can separate them from one another. The same concerns the two levels of collective practical knowledge.

Collective and individual practical knowledge also tend to be connected to each other, since the individual is always a member of a collective - a professional group, a society, etc. - and utilizes common knowledge and traditions of the collective in developing his own fund of practical knowledge.

Since it may be easier, however, to study practical knowledge with respect to an individual actor, I will divide the study of practical knowledge in interactive practices into individual knowledge and collective knowledge, and start with individual knowledge.

4.3 Individual practical knowledge

Since practical knowledge manifests itself in action, it
may be fruitful to continue the investigation into prac-
tical knowledge in education and health care by relating
it to the action model as it was presented in chapter
2.2.2.

4.3.1 The individual practitioner as an action system

In educating and caring the individual practitioner spends
his time in the same circles as we generally spend our
lives (fig.4.2), at least according to Pörn (see p.49).

The action model used can be seen as a quite general action
and decision model and similar models can be found at least
in nursing and in education.

Helen Yura and Mary Walsh, for instance, presented their
Nursing Process in 1967. This process describes nursing as
a system involving assessing, planning, implementing and
evaluating. The four phases are carried through as an in-
teraction between nurse and patient. (Yura & Walsh 1988,
ix, 105-183)

Faep Koort (1974, 80-88, 114-118) has presented a model of
the educational process   that includes planning, teach-
ing, studying, production, product information and evalu-
ating, in which planning also involves acquiring of informa-
tion, and where the four phases in the middle can be seen
as implementation of plans. This model also involves inter-
action between educator and student.

Katie Eriksson (1979 and 1981) has developed a process of
care that in many respects is a synthesis of Yura's & Walsh's
and Koort's models.

These models describe the practice as such while the intention here is to describe it as it is manifested in an individual practitioner's action (fig. 4.2).
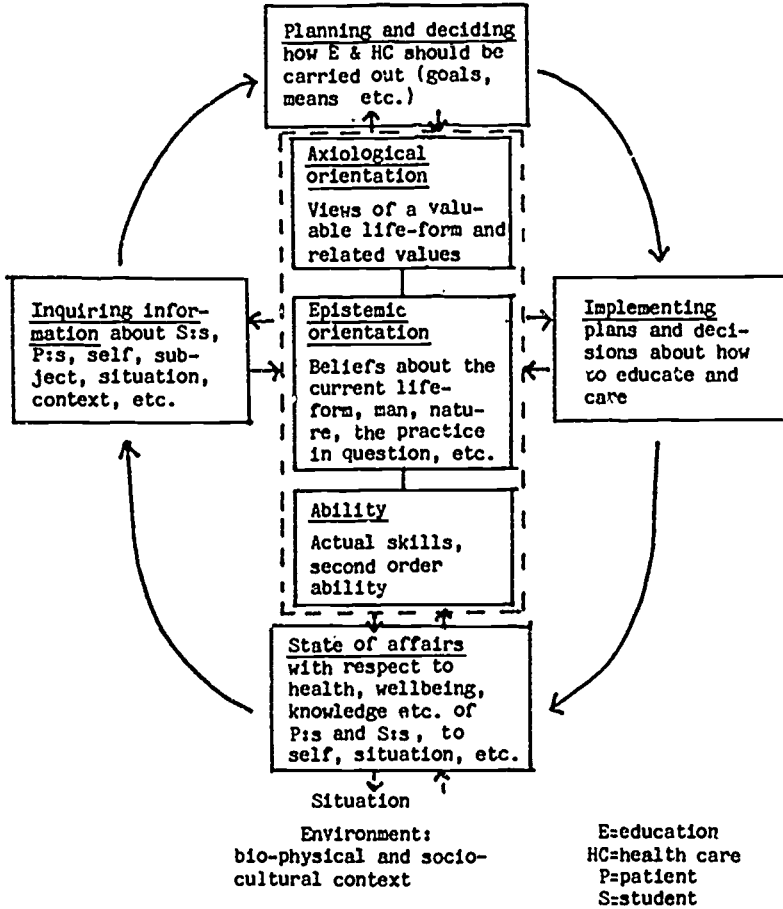
Figure 4.2   The practice of education or health care
            described as an individual's action system

As distinct from the education and nursing or care models mentioned on the previous page this model includes no spe-

cial phase for evaluation. This phase, however, is in-
cluded in Inquiring information, because after implemen-
tation new information is acquired of the state of af-
fairs which means evaluating.

Moreover, although the phases are presented in a certain
order in the model, they can also occur at the same time,
or there may be rotations back and forth in the sequence.
For instance, during the planning phase a pract'tioner may
become aware of not having enough information, so sh goes back
and acquires more information before going on with the
planning. Or, during implementation a practitioner may no-
tice that the situation has rapidly changed and made the
initial plans inappropriate; she must rapidly adjust to the
new sicuation and make new plans - or just improvise. Since
each   phase represents a distinct sub-actîvity in the
action process, it is also possible to describe each one
of them as a sequence of its own.

In any case the connection of practical knowledge to the action
system points out some features of practical knowledge:

            - Practical knowledge in education and health care
              is manifested in the whole action sequence: it
              means acquiring correct information, making the
              appropriate plans and decisions, implementing the
              appropriate courses of action, and, after that,
              acquiring correct information.
            - Practical knowledge is a function not only of
              ability, but also of a system of beliefs and a
              system of values.

It must be pointed out once again, however, that the actor
is not necessarily conceptually and propositionally con-
scious of all moments, processes and determinants of his
own acts.

An example may clarify how the sequence proceeds and how it

is influenced by action determinants.

Example 1

A nurse has a young woman as a patient, who is very
depressed after a broken relationship. The nurse has
so far met the patient only a few times.

Acquiring information. The nurse has acquired the fol-
lowing information about the patient: she is at the be-
ginning of her professional career, the relationship
has been going on for a couple of years but they were
neither married nor engaged, the relationship ended
because her boyfriend felt he did not want to make any
commitments. The patient's parents and two brothers
live in a city not far from where she lives herself,
she has some good friends among her professional col-
leagues. In the contacts with the patient the nurse
has got the impression of a quite intelligent and am-
bitious but emotionally unconscious young woman. In
addition to information about the patient the nurse al-
so has knowledge of the surrounding life-form: accor-
ding to the general opinion about a valueble life-form
it is valuable to have a permanent relationship and to
establish a family, a professional career is also con-
sidered valuable provided it does not - if you are a
woman - interfere too much with your permanent relation-
ship or your family. Finally, the nurse also has infor-
mation about herself, her own resources and skills: she
has recalled her own experiences and analyzed her know-
ledge in this area, she has also discerned her abili-
ties and weaknesses when it comes to helping the pa-
tient.

Planning and deciding. In planning the next meeting with
the patient the nurse tries generally to think of what
kind of goal could be pursued in the process. Should the
patient accept the situation and concentrate on her pro-
fessional career? Should she try to mend the relation-
ship by giving the boyfriend more freedom? Should she
go out looking for a new friend, be more active social-
ly? And what means and methods should she herself use in
order to help the patient? Should she help the patient
analyze the reasons for her depression and, maybe, re-
veal some unresoved conflicts in the past? Or should she
just help the patient cope with the present situation
and find a way out of it? In thinking about these alter-
natives the nurse comes to the conclusion that she does
not know the patient well enough to make any kind of de-
cisions. She does not know what kind of life the patient
considers worth living, and she does not know what the
patient wants out of her meetings with the nurse. So she
decides to try to talk about these things the next time
and to come to some kind of agreement with the patient.

Implementation. When the patient and the nurse meet the
next time, the nurse tries to lead the discussion into
the areas she has planned. However, she realizes quite
quickly that the patient is not yet ready to think about
what kind of life she wants to live and what she wants
to get out of her meetings with the nurse - other than
"feeling better". The patient is still entirely obsessed
by the broken relationship. The nurse must in-
stantly abolish her plans and decisions and adjust her-
self to the present needs of the patient. She gives the
patient more time to live out her feelings about the re-
lationship.
Acquiring information (Evaluation). After the meeting
the nurse acknowledges that she did not achieve what she
had planned during the meeting. However, the patient
seemed to feel better after the meeting.

The nurse's internal action determinants can be descri-
bed as follows.

Axiological orientation. The nurse certainly has a view
of what she herself considers as a life worth living
for herself, this view is manifested in her way of li-
ving and working. When it comes to the patient, she does
not want to prescribe how the patient should live and
what goals she should pursue; she wants the patient her-
self to make these decisions. However, this reveals
that according to the nurse, one important feature of
a valuable life-form is that individuals themselves
should be allowed to decide about their goals and lives.
Furthermore, when she realizes in the stage of
implementation that she cannot implement her plan, she
does not force it upon the patient but adjusts herself
to the patient. In this, too, she manifests respect for
the patient's needs and feelings for the moment. The
form of life, then, that the nurse manifests as valu-
able is one characterized by respect for persons as
one important feature.

Epistemic orientation. In acquiring information the
nurse is not a tabula rasa.. She already has a system of
beliefs about the life-form of which she is part and
about the rest of the world, about herself, her weak-
nesses, strengths and abilities. These belief she has
acquired through previous action sequences in ordina-
ry life-situations, in work-situations and through edu-
cation. Some of these are ariculated, some not.

Ability. At least, the nurse seems to have the ability to
acquire information, and to make plans and decisions.
In this she is dependent on cognitive skills like skill
in analyzing, thinking and understanding. To the im-
plementation stage she also exhibits ability change her
plans and adjust to new situations. This again requires

skill in observing changes in the situation and in perceiving the needs and feelings of another person.

About the external action determinants the following can be said.

Situation. The interactional situation in which the nurse found herself in the implementation stage was not what she had expected and so she changed her course of action, which seemed the appropriate thing to do. However, the fact that she could change her course of action was due to two factors: she was able to perceive the situation, and she was able to adjust her intentions to it. Thus, it was not the situation as such that changed her course of action but her perception of it and her ability to adjust.

Environment. The environment consists of the bio-physical and the socio-cultural context in which both nurse and patient live. The socio-cultural context is the form of life in which they participate. It is in this form of life they both have developed their internal action determinants. The environment also constitutes the frame of reference for their future actions. It is more permanent that the changing action situations.

The question now arises: Did the nurse have practical knowledge? How did her knowledge manifest itself in action? In order to answer these questions we ought to know how the meetings continued. At least in some respects we may say that she exhibited practical knowledge: she was able to acquire a good deal of relevant information and to use this information in the planning phase, she was also able to see gaps in her information and to take these into account when she made her decisions, and, she was able to act appropriately in the implementation phase in spite of the unexpected situation. As a result of this the patient felt better. We might of course say that the nurse ought to have known that it was too soon to start talking about the future, which shows more gaps in her information than she was herself aware of: she ought to have known the patient better. But then again, it is never possible to foresee interaction situations completely: changes in the environment may change the situation,

or the other participants do not react as one has expec-
ted. Or, a person may find himself reacting quite unex-
pectedly in a situation. The ability to deal with changing
and unexpected situations can thus be seen as one expres-
sion of practical knowledge.

This analysis brings out one feature of practical inter-
action knowledge, namely that it must always take into
account that this knowledge occurs in situations with more
than one participant: it involves not only one action sys-
tem but two or more.

4.3.2 Action systems in interaction and co-action

In the previous example the caring situation was seen only
from the viewpoint of the practitioner,and the acquiring
of information as well as planning and deciding was seen
as stages that preceded the actual interaction concerned.
Since educational and caring relationships often stretch over
a relatively long period of time, there are periods of di-
rect contact and interaction and periods when the partici-
pants are separate. Although the whole process involves in-
teraction between two or several participants, the acquir-
ing of information and the planning and deciding can take
place during the periods when the participants are not di-
rectly interacting with each other. The direct interaction
would then take place in the implementing phase.

In the direct interaction two or several action systems
meet. In the interaction they all then go through the
phases of acquiring information, planning and deciding,
implementing and evaluating.

In addition to being described as an interactional process,
i.e. as a process where several participants act in rela-
tion to each othe the practices concerned can also be
described as co-. _ion, meaning that in education and health
care the participants also act together. Viewed as a system
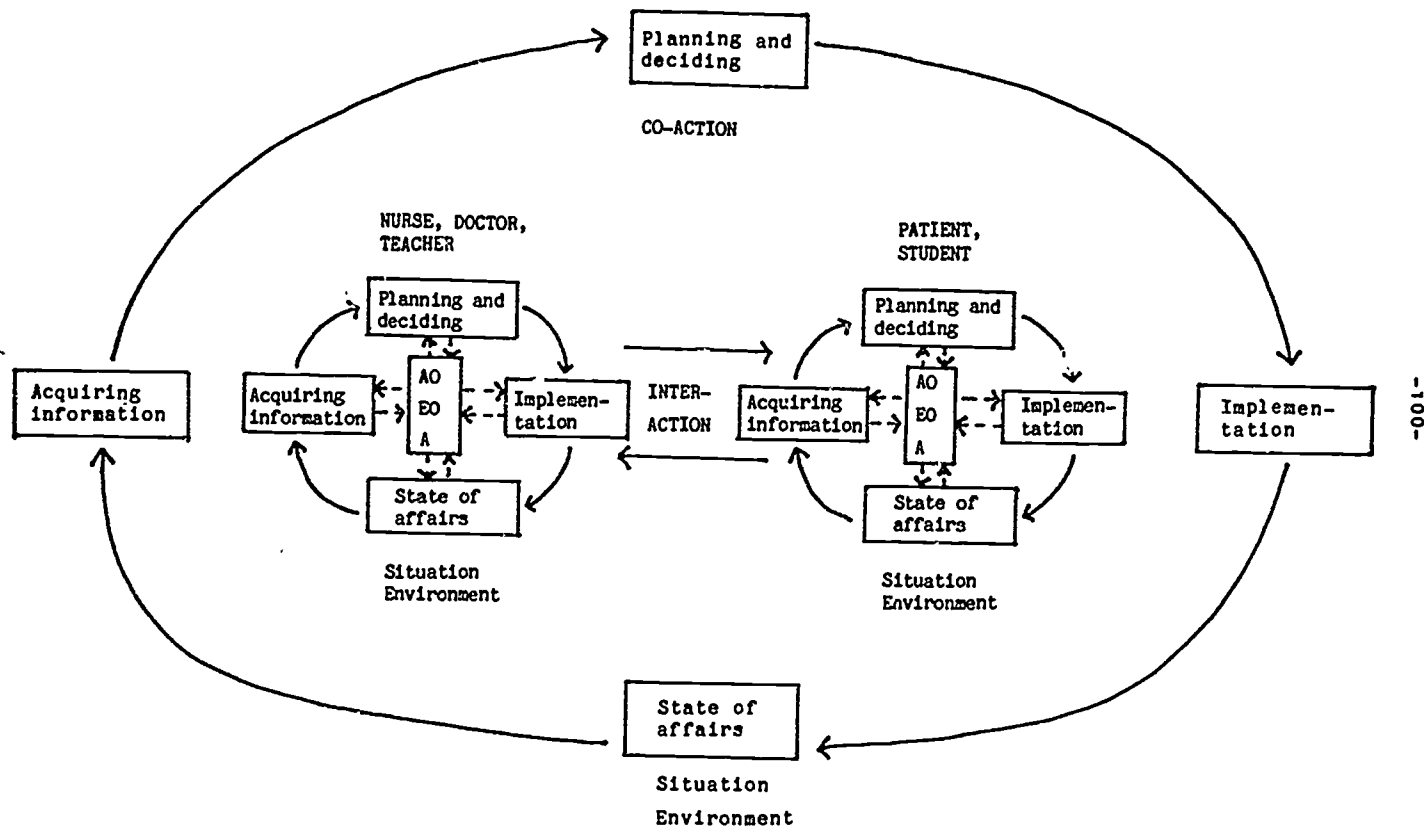
Figure 4.3.   Education and health care as interaction and co-action

of co-action, the participants constitute a common action system, going through the action sequence together (fig. 4.3).

Figure 4.3 can be conceived of as a representation of a concrete interaction situation or of a longer sequence of interaction and separation. For the sake of simplicity on-ly one care provider or teacher and one patient or student is included. The figure is only indicative in that it does not specify how the two action systems are related or in which way they make up the united action system. This is not considered necessary for the argument.

The view of education and health care as interaction and co-action calls for a comment on the concepts of self-education and self-care. Self-education has been defined by Koort (1974, 12, 15) as education where the educator and the student are one person. Self-care again has by Orem (1985, 31) been defined as "the production of actions direc-ted to self or to the environment in order to regulate one's functioning in the interest of one's life, integrated func-tioning, and well-being". In both cases an actor acts in relation to himself - directly or indirectly through the environment. If the care provider/teacher and the patient/ student in Figure 4.3. are seen not as two separate indivi-duals but as two positions, we can say that in the case of self-education and self-care, one individual occupies both positions. One actor is then represented by two action sys-tems that are related to each other in a special way. An actor can thus be conceived of as a hierarchy of action sys-tems that act in relation to each other (Pörn 1981 and 1984a; Sarvimäki 1986a; 1986b, 27, 65, 167). That one actor may occupy two positions and act in relation to himself does not exclude the possibility that, in doing this, he also interacts with other actors.

In educational and caring interaction, which involves two
or more agents acting in relation to each other (see e.g.
Pörn 1977, 78), the agents are united by a special kind
of relationship and the whole process can be described as
a process of "reading-and-flexing" or "matching in the mo-
ment" (Hunt 1977;1983b;1987, 147-148)

The inequality between teacher and student was seen by Tom
(p.86)as one of the features of teaching that made it a mor-
al art. Although the line of argument in this work is not
consistent with Tom's, reasons can be advanced for a con-
ception of the educational and caring relationship as moral.
The reason is: as moral forms of life,education and health
care should promote as well as manifest a valuable life-
form, which means that the relationship between teacher and
student, between care provider and patient, should manifest
a valuable life-form. Hence, it is the nature of the prac-
tices as part of a moral life-form that makes the relation-
ship moral, and not the nature of the relationship that
makes the practice moral.

As a manifestation of a moral life-form the relationship
should have an altruistic character. Altruism has been de-
fined by Rescher (1975; see also Sarvimäki 1987c, 148-158)
as giving priority to another person's needs and interests
and acting for the sake of another person. Adopted to the
educational and caring relationship this means that the edu-
cator and care provider should give priority to the needs
and interests of the students and patients and act for the
sake of students and patients. Since the same cannot be
required of the students and patients, the relationship is
asymmetrical: the tasks and duties of the actor occupying
the teacher or care provider position are not the same as
those of the actors occupying the student or patient posi-
tion. The teacher and care provider enters the relation-
ship for the sake of the student or patient and the task,
for instance, is to help the student or patient learn or
get well. But the student and the patient do not enter the

relationship for the sake of the teacher and care provider,
he enters it for his own sake, in order to learn or to get
well, for instance. The task of the student is not to help
the teacher learn nor is the task of the patient to help
the care provider get well, although it is, of course, de-
sirable that the teachers and care providers also learn
something in the interaction and develop themselves (see
also Sarvimäki 1986b, 78-82).

Knowing how to enter an educational or a caring relation-
ship can thus be seen as one aspect of knowing how to par-
ticipate in a moral form of life, which has been put forth
as one characteristic of practical knowledge in education
and health care (p.89). Since the entering of this kind of
relationship seems to presuppose an ability to give priori-
ty to the interests and needs of another person and the
ability to act for the sake of others, this knowledge de-
pends on characterological factors. Practical knowledge
that is dependent upon characterological factors again
accerding to Hartnett and Naish (1976, 116), is acquired by
developing a disposition and it belongs to that area of
practical knowledge which is not expressible in proposi-
tions. This argument can be extended to the whole moral as-
pect of practical knowledge, meaning that knowing how to
participate in a moral form of life is dependent on char-
acterological factors. And moreover: since practical know-
ledge in its fullest sense was conceived of as partici
ting in a moral life-form, practical knowledge in its f. _-
est sense becomes dependent on characterological factors.

However, the moral-characterological knowledge cannot be
considered sufficient for practical knowledge in inter-
action and co-action. Knowing how to interact and co-act
also involves knowing how to "read" an interactional si-
tuation and to "flex", i.e. adjust your own intentions ac-
cording to the situation; it involves "matching in the mo-
ment":

"I think the most important part of good teaching
is that unj'*vely human part which teachers bring
to the clas·Som transaction which could not be
programmed in advance or carried out by a computer.
Part of what teachers do can be considered to be
processing information (or acting as computers),
and this is not unimportant, yet it is what cannot
be pre-programmed that makes for the skilled teach-
ing performance. Put another way, I think that one
of the most distinct features of an excellent teach-
ing session is that it could not have been comple-
tely planned (or programmed) in advance. Teachers'
responsiveness 'in the moment' to unanticipated
happenings in the classroom is not just something
extra that they add; it is the essential ingredi-
ent of a skilled performance." (Hunt 1983b)

The process of "reading and flexing" involves according to
Hunt (1983b;1987, 147):

1. Skill in "reading"
   a. Obtaining feedback
   b. Perceiving and interpreting students and si-
      tuation
2. Skill in "flexing"
   a. Modifying intention on the basis of new perception
   b. Translating perception and intention into
      action
   c. Skill in action.

And since there are two or more participants reading and
flexing in the teaching situation, teacher and student,
the process can be described as an interpersonal transac-
tion (fig.4.4).
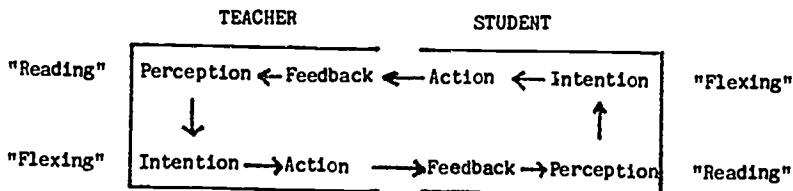
Figure 4.4 The teaching situation as an interpersonal
transaction (Hunt 1987, 147)

According to Hunt (1987, 147-148), any interpersonal trans-
action can be described by means of the model in figure
4.4. However, in most interpersonal transaction, he claims,
the participants are neither aware of perception nor in-
tention, which means that the circle goes from one parti-
cipant's feedback directly to action and then to the other
participant's feedback and directly to action. When teach-
ers are given the opportunity to reflect on their actions,
they become aware of the implicit theory "behind" their
action, uniting perception, intention and action.

Since the model in figure 4.4. is supposed to cover all
kinds of interpersonal transactions, we can assum that it
is equally applicable to health care interaction as to
teaching. The model in figure 4.3 resembles Hunt's model,
although the phases are named differently and the cc-action
aspect is not explicit in Hunt's model. In a direct interaction
'acquiring information' corresponds to perception, 'plan-
ning and deciding' to intention, 'implementation' to action,
and the next phase of 'acquiring information' (i.e. evalu-
ation) to feedback. The implicit theory would then refer to
factors among the internal action determinants; this line
of thought will be brought up a little later.

Hunt's model can be used in the same way as the main models
used in this work (fig.4.2 and 4.3) to describe and ana-
lyze a concrete, direct interaction situation or an inter-
active practice, extending over a longer period of time. In
both cases the process is described as creative in the sense
that the word was used when living was characterized as
a creative process (p.42), meaning that in education and
and health care it is seldom possible to fix a definitive
goal beforehand and implement a fixed plan. The educator
and the care provider must continually "read" the changing
situations and the reactions of the participants, they
must be prepared to alter the goals as well as the plans.

This process corresponds to what Harrison (1978, 13, 136-143; see also this work p.21) describes as designing while making: it is a process of continuous planning and revision of goals as well as implementation. It is thus different from the simple making, technical activity, which only involves implementation of fixed goals and plans (see also Collingwood 1960, 15).

As part of the creative process of living, educating and caring can also be conceived of as creative practices and creative interaction, where the participants - educators as well as students, care providers as well as patients - are involved in a continuous process of planning and implementing, reading and flexing (see also Sarvimäki 1986a and 1986b). The creative nature of life, man and nursing has also been described by Martha Rogers (1970) in her own original way. Wilenius (1976, 24-25) points out the creative nature of education, referring to Merikallio-Nyberg 1974, 15), who sees the continuous changing and modification of intention as a criterion of creative processes; she thus stresses the "flexing" nature of creative processes.

Practical knowledge in educational and caring interaction thus involves moral knowledge, creativity, and interpersonal skills like reading situations and participants and modifying intentions. Moral knowledge as well as interpersonal skills seem to require two more kinds of knowledge: knowing the other participants, and knowing oneself. If the teacher does not know the students, and if the nurse does not know the patient, it is difficult for him to give priority to the student's or patient's needs and interests and to perceive reactions and interpret them correctly. This implies self-knowledge if the teacher or nurse is to be able to distinguish between his own needs and interests and the student's or patient's,and if he is to refrain from imposing his own reactions on the other in perceiving him. He also needs self-knowledge in order to reflect upon his action and change his intentions.

F.M. Berenson has developed interesting lines of thought
about what it means to know another person. He says:

> "To know any person is to know him through acquain-
> tance, by confrontation and this involves having
> the concept of persons, understanding what sort of
> things persons are, what relations are appropriate
> to the sort of things persons are and so on.(Be-
> renson 1981, 21)."

He then goes on to show that understanding of persons is
situational: it involves persons in situations. It is also
emotional and relational: it requires some kind of emotio-
nal relationship to the person known - it is, so to speak,
through emotions that we come to know persons, not through
knowing them that we come to feel something for them.
Further, knowing another person is always personal: it in-
volves a personal relationship with the other person. Un-
derstanding another person is also a creative process: it
involves mutuality, communication and reciprocity. Know-
ing a person is then different from scientific, objective
knowledge, which, according to Berenson, is not personal.
We can also have scientific knowledge about a person but
then the personal, emotional relationship is lacking and
it is not the same type of knowledge as knowing the person.
(Berenson 1981, 21, 85-86, 105-106, 127-132, 185-186)

Understanding persons seems, in Berenson's view, to corres-
pond to Carper's (1978) esthetic and personal knowledge,
and to the type of knowledge that has been referred to pre-
viously in this work (p.54) as familiarity and knowledge
by acquain' nce. However, if it involves the concept of
persons, as Berenson claims, it also seems to require a
conceptual component, unless we assume some kind of impli-
cit concepts. And, finally, it also seems to involve a mor-
al aspect: understanding what sorts of relations are ap-
propriate to persons. Understanding a person is thus a very
complex kind of knowledge, involving a personal, moral
and emotional relationship, creativity, confrontation, and
situational understanding.

Much of what can be said about understanding persons can also be said about self-knowledge. Self-knowledge is acquired in confrontation with others as well ⊣ with oneself, it is knowledge of oneself in different action situations and involves an emotional relationship with oneself. It means being familiar with oneself as an acting person.

Knowing how to educate and care involves in a very fundamental way knowing how to interact and co-act with other actors so as to promote and manifest a valuable form of life. This knowing includes knowing how to establish and maintain an altruistic relationship, knowing the situation, knowing the other participants, knowing oneself, and knowing how to "read" and "flex" in the interactional situation. All this involves moral and characterological aspects as well as a set of skills. As co-action education and health care require not only knowing how to act in relation to other actors but also knowing how to coordinate action so as to achieve a common goal. Tuomela (1983, 77-81) uses the concept 'We-intention' to characterize this type of social action and Hellgren (1985) has adopted Tuomela's terminology in defending the thesis that teaching is a social concept. Interaction and co-action are not to be seen as two entirely separate forms of social action. We could say that all co-action involves interaction but all interaction is not co-action. It is only when interaction is coordinated so as to achieve a common goal - or when the individual intentions are subordinated under a we-intention - that it becomes co-action. Thus, knowing how to co-act, in addition to the interactional knowing how mentioned previlously, involves knowing how to form a we-intention and knowing how to coordinate action.

The treatise of interactional and co-actional knowledge in this chapter has primarily referred to the interaction and co-action between teacher and student, care provider and patient. However, since both education and health care are to a large extent team work, the thoughts concerning inter-

r-.ional and co-actional knowledge presented here can also
be applied to interaction between care providers and the
patient's family, between team memebers and between col-
leagues.

4.3.3 The complexity of interactional knowing how

Interaction situations in education and health care can be
very complex and require a broad range of interactional
knowing how. Different aspects of the interactional situa-
tion require different kinds of knowing, all unified into
coherent action.

The different aspects of the interactional situation can be
understood in terms of a modification of Habermas' action
theory. As was noted previously, Habermas connects the con-
ception of knowledge to interests, and by interests we
should understand action interests. According to the theory
of knowledge and interest (Habermas 1966 and 1975; Lesche & Madsen
1976, 21-24) there are three media by which society is main-
tained: work, language and authority. By 'work' is meant
different kinds of action by means of which man controls
causal processes and regularities - both bio-physical and
psycho-social - in order to reach an adjustment between man
and nature. Thus, while work is the medium for control of
objectified processes, language is the medium for transmis-
sion of shared meanings and traditions, and authority is
the medium for maintaining social and political power. The
three media correspond to the three knowledge interests:
the technical, the practical or hermeneutic and the eman-
cipatory. In other works Habermas (1974, 1-40;1981, 384-387,
394-395;1984) divides work into instrumental action, by
which ne means result-oriented action in non-social situa-
tions and strategic action, by which he means result-oriented
action in social situations; by instrumental action, then,
man controls physical processes and by strategic action so-
cial processes. A third type of action, according to this

classification, is communicative action, which is a form of
social interaction oriented to the reaching of understand-
ing; it involves the recognition of norms and common mean-
ings, as well as the coordination of intentions and action
and it does not always include speech acts. The crucial
difference between strategic interaction and communicative
interaction is that the former aims at controlling the
other participant's action while the latter aims at mutual
understanding and coordinated action. The emancipatory kno-
ledge interest, according to Habermas, is on a more overreach-
ing level than the technical and the practical-hermeneutic.
Accordingly, there is no special kind of action correspon-
ding to this interest. Rather, it corresponds to self-re-
flection and discourse, meaning, in a way, that man for a
while refrains from acting and instead analyzes action.
Through this process he becomes aware of distorted forms of
communication and consciousness and can return to action
with an emancipated consciousness.

That Habermas' theory of knowledge has been criticized was
noted previously (p.36) and this is true also for his theo-
ry of action - they are, after all, closely connected.
Kangas (1987, 16) mentions for instance that it must be
doubted whether self-reflection and discourse can be con-
ceived of as social and political. In clarifying the pro-
cess of self-reflection and discourse Habermas used the
psychoanalytic process as an analogy. Kangas questions this
analogy and concludes that self-reflection and discourse
are more appropriate in a therapeutic, individual context
than on the social and political level. Skirbekk (1987) on the
other hand criticizes Habermas' limited conception of the re-
lationship between man and nature. He also points out that
Habermas, in his more recent theory of action, seems to
have abandoned the knowledge-constitutive interests as they
appear in his earlier writings.

Although Habermas' theory of action is not free from cri-

ticism, it can be considered as suggestive of ideas. Thus,
attempts have been made to apply his ideas to education
and health care.

Olle Hellström (1985a;1985b;1985c)has adopted Habermas'
theory of knowledge and action to general practice and pri-
mary care. He focuses on communicative action and the
doctor-patient relationship, emphasizing mutual understand-
ing, interpretation of the patient in his total life si-
tuation, self-reflection.

Merry Scheel (1985, 136-141) characterizes nursing as an
interactional practice involving three aspects: an instru-
mental aspect, an expressive-communicative aspect, and an
emancipatory aspect. In her interpretation the instrumental
aspect includes instrumental as well as strategic action.
In nursing interaction the three aspects are integrated
into a unified whole.

Scheel does not give priority to any one aspect and does not
see them hierarchially ordered. This would, however, be a
possibility (see Sarvimäki 1986a;1986b, 140-144;1987a;1988).
Education and health care, for instance, could then be con-
ceived as primarily communicative interaction including
instrumental and strategic as well as self-reflective and
discursive aspects.

In order to clarify the complexity of interactional know-
ledge in education and health care an adaptation of a mo-
del presented by Kangas (1987, 20) and Skirbekk (1987, 51)
can be used. According to the model Habermas distinguishes
between three areas of reality (external nature, society,
and internal nature) and three types of relationship to
reality (objectifying, norm-conforming, and expressive).
Each relationship involves a special type of rationality
(objectifying = instrumental-strategical, norm-conforming =
moral-practical, expressive = esthetic- practical). Kangas
and Skirbekk differ somewhat in their views of possible

combinations of areas of reality and relations but it is
not necessary to go into that discussion here. As was no-
ted previously, discourse or self-reflection, is seen as
an activity "outside" or "above" the others (Habermas 1974,
18-28; Kangas 1987, 23-26), which means that it is not in-
cluded in the scheme. It is, in a way, a kind of communica-
tion but on another level. Its function is to question and
criticize the assumptions inherent in the other types of
rationality and action.

The three areas of reality correspond closely to the three
worlds discussed previously (e.g. pp.41-42, 88). The rela-
tionships between areas of reality, or life worlds, ratio-
nality and types of action thus form a complex scheme
(table 4.1)

AREAS OF REALITY

RELA-TION	External nature World 1 Umwelt	Society World 3 Mitwelt	Internal nature World 2 Eigenwelt	ACTION
Object-fying	Instrumental-strategic rationality			Instrumental, Strategic
Norm-confor-ming	Moral-practical rationality			Communicative
Expres-sive	Esthetic-practical rationality			Expressive

D I S C O U R S E (→ pointing to ACTION column)

Table 4.1 Types of action with respect to rationa-
lity and relations to areas of reality

In adopting this model to educational and caring interaction
the following points of departure may be brought to mind.
Firstly, that education as well as health care involves all
three worlds, i.e. all areas of reality. Secondly, that
education and health care have been characterized as mainly
moral forms of life. Since moral-practical rationality is
the rationality of communicative action, education and
health care can be seen as primarily communicative action.

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As communicative practices they should build on what Haber-
mas (1981, 385, 394-395) calls a communicative attitude:
the participants do not try to control each other but to
understand each other, to reach an agreement and to coor-
dinate their action. This could be seen as some kind of
"meta-situation" in education and health care meaning that
it has to do with the moral-practical nature of the practi-
ces, although singular, concrete interaction situations may
appear different.

Concrete interaction situation in education and health care
may be very different from each other. In a psychoanalytic
situation, for instance, the discoursive, self-reflective
aspect is very dominant; indeed, it is used as a paradigm case
of discourse (see e.g. Habermas 1975, 9). An operation, on
the other hand, where the patient is under anesthesia, places a
strong emphasis on instrumental aspects. And in education
the emphasis may sometimes be on communicative aspects,
that is, on transmission and interpretation of meanings,
and sometimes on discoursive aspects, that is, on question-
ing and reflecting. Furthermore, art therapy seems to have
a strong expressive aspect, while e.g. behaviour therapy
is more strategic. However, the model in figure 4.5 is not
mainly intended as an instrument for classifying varying
types of interaction situation. Rather, since most inter-
action situations in education and health care include a
combination of interactive aspects, it should rather be
conceived of as an instrument for analyzing different as-
pects of interaction. In all education and health care,
however, these aspects are aspects of a moral-communicati-
ve practice and all the situations mentioned here are ul-
timately communicative. The patient on the operation table,
for instance, is not just an organism or a bunch of physio-
logical processes. Even though he is under anesthesia, he is
a social person with a right to be treated with respect and
dignity. And before he has reached this stage of medical
care, he has probably been involved in a series of contacts

and consultations and agreed to the operation.

Scheel's (1985, 139) picture of nursing as interaction
with an instrumental-strategical, an expressive-communi-
cative and an emancipatory aspect can now be differenti-
ated. Health care as well as education can thus be pic-
tured as primarily moral-communicative practices with five
interactional aspects: an instrumental (interventions into
bio-physical processes), strategic (controlling the action
of a subject), communicative (transmitting and inter-
preting symbols of meaning, mutual coordination and under-
standing), expressive (expressing thoughts and feelings),
and discoursive (self-reflection, questioning and criti-
cizing action). These five aspects involve five aspects of
knowing how in educational and caring interaction, also
including the three worlds in which this knowing and acting
occurs (fig. 4.5).


```
                        Communicative
                        knowing
                           |
                           |
                           |
   Expressive        EDUCATION AND              Strategic
   knowing   ─────── HEALTH CARE     ───────    knowing
                     Communicative
                     action invol-
                     ving bio-physi-
                     cal, socio-cul-
                     tural and sub-
                     jective proces-
                     ses
   Discoursive                         Instrumental
   knowing                             knowing
```
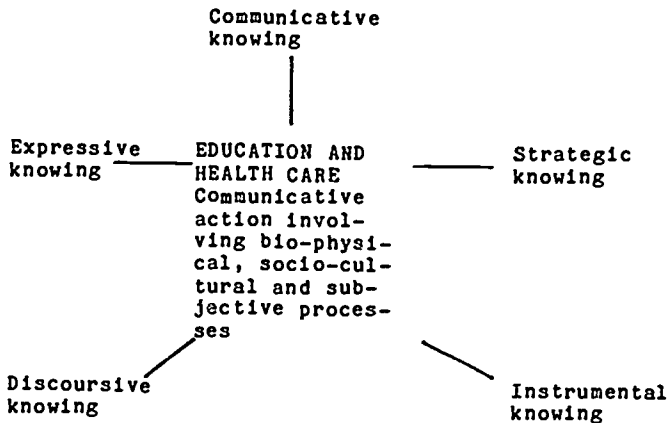
Figure 4.5   Aspects of interactional knowing in
              education and health care

Interaction and co-action in education and health care, as
it has been described in section 4.3.2, thus involves dif-

ferent aspects, each one involving a specific type of
knowing. These aspects are integrated by moral-communica-
tive knowledge into practical knowledge in education and
health care.

Some examples may clarify the aspects of interactional know-
ledge in the practices concerned.

Example 2

A young teacher - not yet very experienced - is teaching
a history class on a subject he himself finds very impor-
tant. His class consists of 28 pupils, around 14 years
of age. Some of the pupils are interested in the subject
- they listen actively and ask questions - and some seem
more or less uninterested. One group, consisting of five
pupils, acts very disrutbilngly; the pupils talk and laugh
and do not take any notice of him whatsoever. The teacher
first tries to ignore them, he goes on talking and discus-
sing just raising his voice a little. However, the noise
continues and the rest of the pupils seem overtly dis-
turbed and uneasy. At this point the teacher decides that
he must do something to restore order so that the lesson
can go on. Three alternatives cross his mind. 1. He could
raise his voice even more but beside that ignore the dis-
turbing group. This, he figures, would do no good, be-
cause this is what he has been doing now and it has not hel-
ped. 2. He might tell the disturbing pupils to leave the
class. This again might make the pupils concerned aggres-
sive against him and he feels he is not yet ready to deal
with an open conflict. He knows that two of the pupils in
the disturbing group are leading figures in the class and
they might turn the whole class against him. 3. He might
divide the class into smaller groups and give every group
a task to work on for a while. If he succeeds in this,
he will reach his goal: order will be restored and the
lesson can go on. But this alternative also keeps the
class together and the disturbing students will get a
chance to learn. 4. He might ask the disturbing pupils
what is going on and then ask them to be quiet. This, he
figures, might not be effective, because if they are
asked to be quiet they might just want to show that he can
not control them. He settles for alternative 3. and this
time attains his goal.

This educational situation can be described and analyzed
by means of the concepts and models used so far.
A. It can be conceived of as a transactional situation,
involving 29 participants "reading" and "flexing". Here

the focus has been on the teacher.
B. The situation can also be described as an action
sequence in terms of acquiring information (about the
situation in the class), planning and deciding (goal
= restored order, strategies 1-4, decision = alterna-
tive 3), implementing (implementing alternative 3)
and evaluation (order restored, lesson continues).
C. In this situation the teacher exhibited practical
knowledge in interaction in the form of strategic know-
ledge: he had a definite goal in mind and he managed
to choose and implement the appropriate strategy. His
knowledge of the situation, of the pupils, and of him-
self was a prerequisite for acting appropriately.
D. The teacher's choice of strategy in this situation
was part of his moral-communicative knowledge. His sole
intention   was not to make the pupils concerned keep
quiet but his main concern was to keep up a communica-
tive relationship and involve them in the learning si-
tuation.
Needless to say, in some other situation, in another
group, for another teacher alternative 1, 2 or 4 might
have been appropriate.
The knowledge the teacher exhibited in this situation
may not have been conscious in all respects.

Example 3

An elderly woman has been brought to the emergency ward
with a wound in her foot. She has been working in her
garden, where she stepped on a rusty nail. Now she is
very restless and upset and in pain. She thinks that the
wound is infected and is afraid that they will amputate
her foot.
At the ward she is taken care of by a nurse and a doctor.
They examine the wound and ask her about the accident.
While the nurse cleans the wound the doctor comforts the
patient. He tells her that there is no need to worry;
the wound is not very deep. They will just clean it, put in
a few stitches and give her a tetanus injection. If she
wants, they can also give her something for the pain. As
the doctor sews the wound the nurse holds the patient's
hand, talks calmingly to her and asks her how she feels. After the
treatment the doctor reassures her that everything went fine and
that she will soon be able to work in the garden again. The
nurse discusses with her how she can manage when she
gets home and asks her if she needs any help at home, in
which case they could contact a social worker. The pa-
tient says that she lives with her sister and that they
will manage just fine. Finally the nurse and the patient
decide when she is to come back to remove the stitches and
the nurse tells her to call if anything occurs.

This situation too can be described and analyzed in terms of previous concepts and models.
A. The doctor and nurse are both "reading" and "flexing". They perceive the patient's distress and reactions as well as the wound and adjust their own intentions and actions. They also perceive each other and coordinate their action; apparentl/ this doctor and nurse have worked together in similar situations before, since they do not seem to need much words in order to cooperate. They are acquainted with each other and with this kind of situation.
B. The nurse and the doctor can also be described in terms of two action systems or, in this case, as one action system with a we-intention, going through the phases of acquiring information, plann.ng and deciding, implementing and evaluating.
C. In this situation both care providers exhibit practical knowledge in interaction in form of primarily instrumental and expressive knowing how. The nurse managed to clean the wound and give the injection and the doctor managed to put in the stitches. Both exhibited expressive knowing in that they were able to express their concern for the distressed patient in words and action (comforting, taking an interest in how she will manage at home).
D. Both care providers also exhibited moral-communicative knowledge. The whole situation aimed at helping the patient and at doing it in such a way that it could be conceived of as an example of a valuable form of life.

The care providers in this example thus exhibited practical knowledge in that they acted appropriately instrumentally and expressively as well as moral-communicatively. Prerequisites for their practical knowledge was their acquaintance with this type of situation and with each other, their knowledge of wounds and their treatment, knowledge of the used drugs and their effects, and skills in implementing the chosen acts.

According to the categorization of practical knowledge in individual and collective, socio-cultural and interpersonal, it should also be possible to find a socio-cultural and interpersonal level in the practical knowledge of these individual practitioners. The socio-cultural level should reveal something about the relationship of these actions and the conception of a good society. The teacher's socio-cultural knowledge is manifested, for instance, in stressing historical knowledge as important for the pupils; we may assume he thinks it is important because it helps the pupils understand their own historical time. His choice of strategy also has a socio-cultural level. It can be seen as a manifestation of a non-authoritarian, co-operative view of human relations in society as well as in education. The interpersonal level of the teacher's knowledge is manifested in his way of dealing with the concrete situation in the

classroom, in his knowing how to involve all pupils in
the learning situation.
The socio-cultural level of the practical knowledge of
the care providers can be seen, for instance, in the
nurse's interest in the patient's home situation. We
may assume that her conception of a good society is
that it is one where people can be helped and assisted
if they cannot manage on their own and that there is
some authority they can contact in case of emergency.
The interpersonal level of knowing is manifested in the
care providers' appropriateness of action with respect
to the concrete interactional situation.

The analysis of the knowledge of individual practitioners
in educational and caring interaction shows how complica-
ted practical knowledge is, involving a complex whole of
action sequences, transactions, interactional levels and
aspects.

What has so far been discerned about what it means to have
practical knowledge can be summarized as follows.

- Practical knowledge in education and health care
  means knowing how to educate and care.
- Knowing how to educate and care means knowing
  how to participate in a moral form of life.
- Knowing how to participate in a moral form of
  life means promoting and manifesting a valuable
  life-form.
- Knowing how to promote and manifest a valuable
  life-form means acting appropriately in educatio-
  nal and caring situations.
- Acting appropriately in educational and caring
  situations means knowing how to interact instru-
  mentally, strategically, communicatively, ex-
  pressively and discoursively.
- Knowing how to interact with respect to the dif-
  ferent interactional aspects means knowing how
  to "read" (feedback, perception) and "flex" (in-
  tention, action) in an interactional situation.
- Knowing how to "read" and "flex" can also be de-
  scribed as acquiring correct information (knowing

oneself, knowing the other participants, know-
ing the situation), making appropriate plans
and decisions, implementing appropriately, and
acquiring correct information in the evaluation
phase.

The characterization can be said to concern the manifesta-
tion of practical knowledge: acting appropriately, with
all that is involved in it, is a manifestation of practical
knowledge while acting inappropriately is a manifestation
of practical ignorance. This means that practical knowledge
must also be characterized in some other way - as that of
which the appropriate action is a manifestation.

According to the action model used in this work action is
determined by three types of internal action determinants:
axiological orientation, epistemic orientation and abili-
ty. All action is thus a manifestation of a set of inter-
nal action determinants. That action is a manifestation of
these internal determinants means that they are implicit
in action whether the actor is explicitly aware of them or
not.

An actor's internal action determinats can constitute sys-
tems of knowledge or systems of ignorance. When acting
appropriately, an actor manifests systems of knowledge:
value-knowledge, factual knowledge, and procedural know-
ledge. Since the actor need not be conceptually aware of
this knowledge, he may, in his action, manifest knowledge
that he   cannot express in words. That an actor is not
aware of all the knowledge he possesses is something that
has also been pointed out by e.g. Bergson (1911, 11-13),
who says that only a part of the action dispositions that
we form - which also include our character - turn into
ideas, and by Hartnett and Naish (1976, 114), who say that
we may know far more than we can tell.

A remark on the difference between _manifesting_ knowledge
and _applying_ may be appropriate here. In manifesting knowledge in action, action is the way in which the actor
knows something and this may be the only way he knows this.
In applying knowledge in action the actor must first know
what he knows in some other way and then try to make this
knowledge . rm his action. The relationship between manifesting and applying will be discussed later. The intention
in drawing attention to this difference here is only to
make it clear that manifesting an axiological and epistemic
orientation and an ability is not the same as applying.

4.3.4 Practical knowledge as a manifestation of the actor's
      axiological orientation, epistemic orientation and
      ability

If a teacher or care provider acts appropriately in different
action situations within his practice he has practical knowledge, which, in turn, indicates that he has the
value-knowledge, factual knowledge, and ability required
for the practice. Using v.Wright's (1963, 49) criteria of
knowing how we could add that he must act appropriately
on _most_ occasions in order to be described as having practical knowledge. Actually, practical knowledge can probably be graded as more or less complete: a practitioner who
always acts appropriately, despite unpredictable changes
in situation, has complete practical knowledge, while a
practitioner who always acts inappropriately has no practical knowledge.

If a practitioner acts inappropriately it can be a manifestation of value-ignorance, factual ignorance or inability, or it may be a manifestation of a combination of
these or of incapacity to integrate them into an action
sequence.

The axiological and epistemic orientation of an action sys-

tem can be clarified by using Joseph Royce's and Arnold
Powell's theory of personality as an aid. Their theory is,
as a whole, very extensive and elaborated and it is neither
possible nor necessary to go into every detail. Their main
model, however, is useful for the purpose of this study.

Royce and Powell (1983, 3-17) view the individual as a
proactive, goal-seeking system. Personality is an integra-
tive, hierarcical system that organizes the various sub-
systems. The lowest level in the hierarchy consists of a
sensory system that transduces physical energy into psycho-
logical information and a motor system that transduces
psychological information into physical energy. The next
hierarchical level consists of cognition, i.e. the trans-
formation of psychological information in order to identi-
fy environmental invariants, and of affect, i.e. transfor-
mation of psychological information into optimal arousal
states. On the third level of personality is the style-
system that integrates and modulates information by parti-
cular modes of processing and the value-system that inte-
grates and modulates information to achieve specifiable
goals. The highest level is the integrative personality,
which optimizes personal meaning by establishing a satis-
factory life style, evolving an adequate world view, and
maintaining acceptable self-images. All these systems and
sub-systems interact in complicated ways. Mainly, though,
the world view is founded in the cognitive system, which
includes the sensory system, cognition and the style sys-
tem, while life style is founded in the motor, affect and
value systems.

Generally, then, the cognitive system can be said to pro-
cess information into beliefs. Thus it corresponds to what
has been called epistemic orientation in the model used in
this work. The role of the motor, affect and value system
can generally be said to direct action and correspond to

the axiological system in the model used here. It must be remembered, however, that there is an interplay between all systems in establishing beliefs as well as in directing action. Since Royce's and Powell's model is a model of personality, it does not include the ability system which is part of the more general action model in this work.

4.3.4.1 Axiological orientation

Within the context of Royce's and Powell's personality theory the motor system, the affects and the values form a hierarchy from an organically based to an abstract axiological orientation; this hierarchy also describes in which order the systems develop (Royce & Powell 1983, 244-248).

An abstract value system is then supposed to be an important axiological system in an adult practitioner's internal action determinants.

Values can be described as relatively independent human constructs. In their collective form they are part of World 3, in their personal, individual form they belong to World 2. The function of values is to direct action. Since they indicate what is good and desirable or bad and avoidable their role is to orient the action system toward what is good and turn it away from what is bad. An actor can express his values in mainly two ways; action and speech. Values can then be manifested in action - and ultimately in a life style - and they can be used to defend or criticize actions and life styles. Values can be classified in a variety of ways depending on what the point of departure for classification is. (Hirsjärvi 1975, 16-21, 32-39; Niiniluoto 1984, 318-327; Rescher 1976)

Depending on who will be the beneficiary, Rescher (1976)

distinguishes between two main types of values: ego-
centric or selfish values and altruistic or unselfish
values. The altruistic values can extend to a larger or
smaller group (e.g. relatives, professional groups, so-
ciety) or to mankind.

On the basis of their investigations Royce and Powell
(1983, 146) hypothesize that there are three main fac-
tors in the value domain: intrinsic, self and social:

> "These three higher-order values reflect basic
> orientations toward what is important to under-
> stand cognitively and react to emotionally in the
> world. The emphasis here is on specific informa-
> tional content (styles emphasize processing mo-
> de). As such, these basic value orientations se-
> lect for specific kinds of precepts, concepts,
> and symbols, as well as specific affective reac-
> .tions. In other words, individuals have basic val-
> ue commitments that specify what is worth know-
> ing about the world, and which aspects of the
> world one should react to with feeling." (Royce
> & Powell 1983, 146)

An individual with an intrinsic value orientation tries to
develop excellency in some area or to achieve goals that
are intellectually or physically challenging. An individu-
al who is committed to self values tries to maintain his own
unique individuality and independence. A social value com-
mitment means that the individual has other people as the
point of departure for his orientation. (Royce & Powell
1983, 146-147)

There are, according to Royce and Powell (1983, 207-209),
three life styles that correspond to the three value orien-
tations: icarism, individualism, and altruism. An indivi-
dual with an icaristic life style commits himself to in-
trinsic values: what is worth living and dying for is mas-
tery in some respect. An individualistic life style means
that the individual commits himself to self-actualization,
and an altruistic life style manifests itself in dedica-
tion to the welfare of others.

Usually an individual possesses all three types of values
but the different factors may be more or less dominating.
Since education and health care have been characterized as
moral forms of life based on an altruistic relationship
(pp.101-102), we may conclude that social, altruistic va-
lu.s play an important part in these practices. These va-
lues direct the practitioner's interest toward other hu-
man beings: it is important to understand other persons and
to react to them with feeling. This does not exclude the
other value factors. The self values direct the practitio-
ner's interest toward himself, helping him to acquire
self-knowledge, to develop himself, and preserve his
independence. Intrinsic values again cz. direct the practi-
tioner's interest toward the subject of teaching, toward
the developme c of new knowledge, science and research.
Social values are, however, inspite of it all, the crucial
factor in the educational and caring practices.

Practical knowledge, manifesting itself in appropriate ac-
tion, is a manifestation of value-knowledge. In education
and health care this value knowledge is to a large extent
moral. Practical knowledge in these areas is a manifesta-
tion of moral knowledge, meaning that the practitioner ma-
nifests social, altruistic values in her action. Moral
knowledge can thus be said to be a necessary but not suf-
ficient ingredient in practical knowledge in education and
health care.

The concepts of value and value system have been considered
here as central in chzracterizing value-knowledge and
axiological orientation. There are other concepts, related
to the value-concepts, that can also be used in describing
an axiological orientation, e.g. 'ideal' and 'principle'.
An ideal consists of a set of positive values in combina-
tion with some aspect of reality. Thus, an actor's axio-
logical orientation may include e.g. ideals of man, socie-
ty, and the world. These ideals manifest themselves in the
goals of the practice concerned, which could be seen in the

analysis of the goals of health care and education (pp. 81-82). An axiological orientation also includes action principles, i.e. prescriptions about how to act or not to act in order to realize and manifest the accepted values and ideals.

Practical knowledge as manifestation of value-knowledge thus includes manifestation of values as well as ideals and principles, which, in the cases of education and health care, principally are part of an altruistic orientation.

4.3.4.2 Epistemic orientation

While value-knowledge has to do with possessing appropriate values, ideals and principles, factual knowledge has to do with possessing correct information, or correct beliefs, about the world. This knowledge is practical when manifested in action.

The system that processes information into beliefs - and ultimately into a world view - is the one Royce and Powell (1983, 15) call the cognitive system. In the action model used in this work acquiring information is seen as one of the phases of an action sequence. Since every phase is an action sequence of its own, acquiring information is an active process, which in turn is influenced by an axiological orie .tation, an epistemic orientation and ability. Furthermore, every other phase in the action sequence also involves acquiring information. There is, then, a continuous interaction between acquiring information and acting, which can be seen in Royce's and Powell's (1983, 13) model and which is also emphasized by e.g. Ulric Neisser (1982, 19-27). This interaction also includes interaction between the axiological and the epistemic orientation. According to Anna-Liisa and Jarkko Leino (Leino & Leino 1982, 7-11; Leino 1987, 1-9), the conception of man as an in-

formation processing, knowing and acting being, where thought and feeling are integrated into a functioning whole, is dominant in the so called cognitive psychology.

Although the cognitive systems - sensory systems, cognition, style - are influenced by motoric and affective as well as value processes, according to Royce and Powell (1983, 108-121, 134-143), they are also characterized by factors of their own. Cognition includes three factors: _perceiving_, _conceptualizing_ and _symbolizing_. Perceiving has to do with the organization of directly perceptible qualities of objects, while conceptualizing has to do with verbal comprehension and reasoning. Symbolizing, finally, has to do with representing numbers of objects or ideas in one single form and with the creation of cultural forms, articulated e.g. in products of art. Depending on which factor is the strongest in an individual's cognition three cognitive types can be discerned: the perceiving type, the conceptualizing type and the symbolizing type. The three cognitive factors give rise to three epistemologies: _empiricism_, _rationalism_ and _metaphorism_. These constitute the discriminating factors in the style system and are described as three different ways in which cognition and affect are integrated:

> "_Empirica. styles_ involve a commitment to relating to world through one's senses and to testing one's ideas about reality in terms of reliability and validity of observations. Affectively, there is a commitment to the arousal that comes via immediate experience.
> /.../
> _Rational styles_ involve a commitment to relating to the world through one's rational/analytical skills and to testing one's ideas about reality in terms of logical consistency. Affectively, there is a commitment to remaining aloof from the arousal effects of the immediate environment.
> /.../
> _Metaphoric styles_ involve a commitment to symbolic-metaphoric experience and to testing one's ideas or awareness about reality in terms of their universality (i.e., to constructing cognitive representations of experience that have the great-

est degree of generality)." (Royce & Powell 1983, 135)

Royce and Powell (1983, 191-196) use the terms empirical, rational and metaphorical to refer to three overreaching epistemic styles or ways of knowing. These ways of knowing represent three ways of approaching reality and this can be seen in individual life styles and world views as well as in different disciplines of knowledge. Science, for instance, represents a combination of rationalism and empiricism, art represents metaphorism, and religion represents a combination of metaphorism and rationalism. Since the three ways of knowing work on a very overreaching level, they include a variety of epistemological characteristics. Royce and Powell combine each epistemic style with a specific relevant cognitive ability and a specific truth criterion (table 4.2).

EPISTEMIC STYLES	RELEVANT COGNITIVE ABILITIES	TRUTH CRITERIA
Empirical	Perceiving	Perception-misperception
Rational	Conceptualizing	Logical-illogical
Metaphorical	Symbolizing	Universal-idiosyncratic

Table 4.2   Interaction between style and cognition in the three ways of knowing (Royce & Powell 1983, 191)

Royce's and Powell's theory of epistemic styles has been further developed and investigated in Canada by Richard Rancourt and his associates (Niday 1987; Noble & Rancourt 1987; Rancourt 1983; Rancourt & Dionne 1982) and in Finland by Jarkko Leino (1987). Rancourt (Noble & Rancourt 1987; Rancourt & Dionne 1982, 11) views the three ways of knowing as three broadly defined modalities rather than as very specific ways of knowing. They are described in the following way:

"Distinctively different, each of the three modes
has its own characteristics. Specifically, the
metaphorical mode utilizes the self-referent qua-
lity of personal/subjective experience as its most
important criterion for the discrimination and se-
lection of input data; the grounding and accep-
tance of the acquired data as knowledge is achieved
by an analogical, intuitive, and holistic reaso-
ning process. The empirical mode uses sense per-
ceptions as the important criterion for the discri-
mination and selection of input data; the ground-
ing and acceptance of accepted data as knowledge
is achieved by an inductive process of reasoning.
The rational mode utilizes logical-illogical con-
cept assumptions and beliefs as the major criteri-
on for the discrimination and selection of input
data; the grounding and acceptance of knowledge
for this mode is achieved by a deductive process
of reasoning."(Noble & Rancourt 1987)

According to Rancourt (1986) the three ways of knowing deal
with different types of data - theoretical data, facts and
experiential data - about which three types of questions
can be asked - is it logical, can it be experimentally pro-
ven, does it fit with my experience (table 4.3)

WAYS OF KNOWING	TYPES OF DATA	CRITERIA FOR ACCEPTANCE AS KNOWLEDGE
Rational	Theoretical data, knowing via thought	Is it logical? Is it theoretically sound?
Empirical	Facts, knowing via senses	Can it be experimen-tally proven?
Metaphorical	Experiential, phe-nomenological data, knowing via intui-tion and insight	Does it fit with my experience? Does it feel right?

Table 4.3   Types of data and criteria for accepting data
as knowledge in the three ways of knowing
(classification according to Noble & Rancourt
1987 and Rancourt 1986)

Compared with Royce's and Powell's classification, shown on
the previous page, Rancourt emphasizes the types of data

more than cognitive abilities. These may of course be re-
lated, because we can assume that dealing with different
types of data requires different cognitive abilities. The
three types of questions that Rancourt (1986) connects to
types of data are the same as Hunt (1987, 41) uses to
identify learning styles; learning styles can then be iden-
tifyed by using theory, resesarch, or personal experience
- of which Hunt himself prefers the last method. The empha-
sis on subjective experience seems to be stronger in Ran-
court's characterization of the metaphorical way of know-
ing than in Royce's and Powell's; the latter connects the
truth criterion to universality of the symbols or forms ra-
ther than to subjective feeling.

Royce and Powell (1983, 194-195) as well as Rancourt (1983:
Rancourt & Dionne 1982, 11) and Leino (1987, 3-7) connect
the three epistemologies to broad traditions in philosophy
and science. Thus, rationalism and empiricism can easily
be associated with the rationalistic and empiristic tradi-
tions in philosophy. Metaphorism is more difficult to clas-
sify, although generally associated with knowing in art and
the humanities (Royce & Powell 1983, 194). What makes it
difficult to clearly distinguish between the three modes of
knowing is that they seem to involve a variety of elements
that can be combined in different ways: types of data, cri-
teria of truth, special types of reason, cognitive abi-
lities etc.

Rationalism can be connected to the rationalistic theory of
knowledge represented by e.g. Plato, Descartes, and Spino-
za (pp.14-16). Plato, we can say, saw a special type of da-
ta as the source of knowledge: ideas. Since these data can
not be the object of sense impressions, they require an-
other path to knowledge: reason or thought. A parallel to
this is seen in Rancourt's view that theoretical data and
knowing via thought is the foundation of rationalism, al-
though this view probably lacks the metaphysical assumptions

of Plato's idealism. The emphasis on thought as the pri-
mary instrument for reaching knowledge is also found in
Descartes' ratio: alism. A special type of reasoning -
the axiomatic and deductive type - which is also seen as
characteristic of rationalism, can clearly be seen in Spi-
nozt's philosophy. In modern theory of knowledge the ra-
tionalistic mode of knowing is most easily associated
with formal truths, analytical and a prioric knowledge
(pp.29-30), i.e. knowledge and truth that has to do with
conceptual, logical and other types of formal relations,
since it is only this type of knowledge that can be estab-
lished by reason alone.

Empiricism as a mode of knowing is connected to the empiri-
cist tradition in philosophy (pp.16-19), represented by,
among others, Locke, Hume and Mill. A special type of data
as the source of knowledge was emphasized by Locke: sense
impressions. The primary instrument for reaching this type
of knowledge is observation or perception, a method stressed
also by Hume. The type of reasoning that starts from
observations and proceeds to generalizations and theories
is the inductive logic, which then becomes the main type
of reasoning in empiricism. Inductive logic, in turn was of
special concern to Mill. In later theory of knowledge the
empiricist ideas can be said to apply to empirical or ma-
terial truths and to synthetic and a posterioric knowledge,
i.e. with knowledge that must be established by observation.

As Royce and Powell (1983, 194-196) note, modern science -
especially as articulated in the logical empiricism - rep-
resents a combination of rationalism and empiricism. Sci-
ence cannot do without observation (except for the formal
sciences that only deal with formal truths) but the obser-
vations must be organized by concepts and reason; induc-
tive as well as deductive logic is used in science. A scien-
tific theory must be logical (rationalism) as well as ex-
perimentally or otherwise proven by observation (empiri-

cism).

While rationalism and empiricism seem fairly easy to co
cipiate in terms of type of data, instrument for achieving
knowledge, type of reason, and truth criterion, metaphorism
is more difficult to conceive of. It seems to be associated
with subjective experiences, holistic and intuitive think-
ing, analogies and metaphors (Noble & Rancourt 1987; Ran-
court 1983; Royce & Powell 1983, 194-195).

A metaphor, according to Perelman and Olbrechts-Tyteca (1969,
371-410), 's a condensed analogy. An analogy in turn con-
sists of two parts, theme and phoros. Analogical reaso-
ning has to do with the resemblance of structures, and can
be formulated: A is to B as C is to D. Perelman and Ol-
brechts-Tyteca use one of Aristotle's analogies as an examp-
le:

> For as the eyes of bats are (C) to the blaze of
> day (D), so is the reason in our soul (A) to the
> things which are by nature most evident of all (B).

A and B represent the theme, i.e. the part to which the
conclusion relates, while C and D represent phoros, i.e.
the part that serves to support the argument. In an analo-
gy, thems and phoros belong to different spheres, as in
Aristotle's analogy where phoros belongs to the sphere of
senses and the theme belongs to the intellectual or spir-
itual sphere. In a metaphor an element from phoros is con-
fused with one from the theme, which gives it a condensed
form. Metaphors are especially useful in poetic and philo-
sophical creation, according to Perelman and Olbrechts-
Tyteca, while other types of analogies are used also in sci-
ence. As they represent an imaginative type of thinking
they serve as an extension of thought and thus as a means
of invention in science. However, in order to be proved and
to meet the criteria of science, the analogy must be re-
written so that theme and phoros belong to the same cate-
gory.

Similar ideas can be found in Jacob Bronowski's essay
"Knowledge as Algorithm and as Metaphor" (Bronowski 1979,
41-63). Bronowski conceives science and art - especially
poetry - as two different languages, the algorithmic
language and the metaphorical language that represent
different formal structures. Metaphors can be used in
science as a means of imagination and invention but - and
here Bronowski agrees with Perelman and Olbrechts-Tyteca -
in order to become part of a scientific theory they must
be translated into algorithmic language.

The analogical character of metaphors as well as its spe-
cial way of treating language has also been pointed out
by Malmström (1988) and Pörn (1987) Malmström also re-
marks that metaphors seem to be founded on special asso-
ciative links and that they often include a subjective
element.

There seems then to be three types of logic: deductive, in-
ductive and analogical, of which metaphors represent a
special kind of analogical reasoning. This type of reason-
ing can be seen as "holistic" in the sense that it is a
way of conceiving a large field of data and symbolizing
it into a single form or symbol, i.e. the analogy or me-
taphor. Metaphors may be especially appropriate for sym-
bolizing experiential data, while other types of analogies
are used also to symbolize empirical fields of data (e.g.
the planetary system as an analogy for the atom). Inductive
and deductive reasoning are more concerned with specific
relations.   Both inductive and deductive reasoning are
what Jerome Bruner (1977, 69-82) calls analytical types
of reasoning while analogical reasoning is intuitive.

The picture of different types of data with respect to the
instrument for acquiring data, cognitive processes and type
of logic can now be enlarged (table 4.4).

TYPES OF DATA	INSTRUMENT FOR ACQUIRING DATA	COGNITIVE PROCESSES	DEDUCTIVE	TYPE OF LOGIC INDUCTIVE	ANALOGICAL
Theoretical data, ideas, concepts	Thought	Conceptualizing	Rationalism		
Sense impressions	Observation	Perceiving		Empiricism	
Phenomenolo- gical, experi- ential, sub- jective data	Experien- cing, fee- ling, intro- spection	Symbolizing			Metaphorism

Analytical thinking   Intuitive thinking

Table 4.4   The three ways of knowing with respect to types of data, instruments for acquiring data, cognitive processes and type of logic

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According to table 4.3, there would be a quite straight-
forward connection between types of data, the instrument for
acquiring data and cognitive processes, as they are usu-
ally conceived in the three modes of thinking. The connec-
tion to the types of logic, however, is more complicated.
According to the table, different types of logic can be com-
bined with different types of data. The "paradigm cases"
of rationalism, empiricism and metaphorism are indicated
by the straight-lined boxes. Thus, 'rationalism' usually
means that deductive logic is used within the sphere of
ideas and concepts, as in the case of axiomatic method. It
is possible, however, to combine deductive logic with sense
impressions and observations - this gives us the hypothe-
tical-deductive method of the empirical sciences. 'Empi-
ricism' in turn usually indicates the combination of obser-
vation, sense impressions, and inductive logic. Inductive
logic however can also be extended and applied to phenome-
nological data. And, finally, 'metaphorism' usually refers
to a combination of analogical reason with phenomenological
and experiential data, while it is quite possible to use
analogical reason with respect to all types of data. The
possibilities of combining deductive logic with experien-
tial data and inductive logic with ideas and concepts have
not been especially indicated in the table but they can
not be ruled out.

As has been indicated, metaphorism - and analogical reason
as a whole - seems to involve self-referential, experien-
tial and subjective elements and feelings, while inductive
and deductive reasoning - especially deductive reasoning
and rationalism as a whole - are considered more "objective"
(Malmström 1988; Noble & Rancourt 1987; Royce & Powell 1983,
135). This may have to do with the nature of intuitive and
analytical thinking which are involved in analogical-meta-
phorical and inductive-deductive reasoning, respectively.

Analytical thinking has usually been described as moving

from one step to another in a systematic way, either de-
ductively from premises to conclusions or inductively from
observations to generalisations. This process is consi-
dered as relatively free from emotions and personal experi-
ence. Intuitive thinking, on the other hand, is usually
described as holistic or global, involving a wide range of
elements at the same time. It is also considered as more
influenced by emotions, experiences, sub-conscious and un-
conscious elements. (Bastick 1982, 50-56; Black 1952, 13-
28, 291-308; Bruner 1977, 69-82; Hult & Sarvimäki 1983,
3-6, 35-45; Lindholm 1983 and 1985, 130-173; Rosing 1978,
71-86)

The self-referential, emotional, experiential intuitive
processes can thus be considered as key mechanisms in the
creation and understanding of metaphors, since these pro-
cesses give access to a wide range of associations and
feelings. In Tony Bastick's theory of intuition the so-called
emotional sets   play an important part (fig. 4.6).
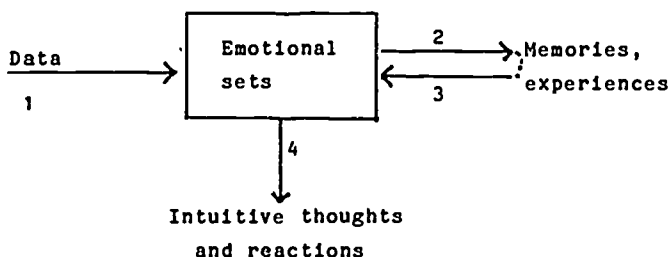
Figure 4.6   The mechanism behind intuitive thoughts
             and reactions (Bastick 1982, 111, modi-
             fied by Hult & Sarvimäki 1983, 38)

According to this theory a person in every situation is in
some emotional state. Everything a person experiences in

that situation becomes connected to this emotional state
and in this way emotional sets are built up. When the per-
son makes new perception or receives other types of data
(1), these connect to the person's emotional sets. The emo-
tional set that is activated then arouses memories and ex-
periences that has previously been connected to this set
(2). The aroused memories and experiences, in their turn,
have access to more information and more emotional sets (3),
and, as a result of this process of association and inte-
gration of new data with feelings, previous memories and
experiences an intuitive thought or reaction occurs (4).
It is the redundant information, which is supplied by the
emotional sets, that makes new and unexpected associations
possible. (Bastick 1982, 111, 354-391; Hult & Sarvimäki
1983, 38-42)

That intuitive processes are involved in metaphorism has
been stressed by Rancourt (1983 and 1986). Described in
terms of Bastick's theory, they would account for the self-
referential and emotional aspects of metaphorism as well
as for the holistic and imaginative. The metaphor would then
be the intuitive thought or reaction that is the result
of the process.

The three modes o" knowing - rationalism, empiricism and
metaphorism - are to be understood, as Rancourt (1983;
Noble & Rancourt 1987) says, as broad knowledge-accessing
modes. This indicates that there are differences not only
between the modes but probably also within the modes. A
person who is committed to sense impressions and empirical
facts, for instance, can in principle use primarily deduc-
tive, inductive or analogical (-metaphoristic) logic. And
a person who is committed to experiential and phenomenolo-
gical data may use inductive as well as analogical-meta-
phorical logic.

Another possible source of difference within the modes of

knowing conerns the level of generality on which they oper-
ate. The "substance" of rationalistic knowledge, i.e.
theoretical data, concepts, or ideas can occur singularly
and separately or be organized into systems of ideas and prin-
ciples and logical systems. Empirical knowledge, i.e. sense
data, can also occur as single observations or they can be
organized into systems of facts. As systems of facts they
are called scientific theories, which are on a more general
level than single facts and sense impressions. In metaphor-
ism, occasional subjective experiences represent a low level
of generality while universal symbols represent high gene-
rality. In Carl Gustav Jung's (1974, 67-69, 98; 1975, 11,
117) term we might say that a person who has access to his
collective unconscious and its archetypes possesses meta-
phorical knowledge of a higher generality and universality
than one who possesses only occasional personal experiences.
In terms of Bastick's theory, pictured in figure 4.6, we
can say that if the emotional sets are connected to deep
layers of consciousness, arousing pictures in the collective
unconscious (steps 2 and 3), metaphorical knowledge is
on a high level of universality. This means, at the same
time, that intuition operates on a high level, moving from
simple, immediate insights   through periods of incuba-
tion and analysis to new creative ideas (see Hult & Sarvi-
mäki 1983, 43-44, 1984a and 1984b). Works of art that
are of cultural significance represent a high level of
metaphorical knowledge in the same way as valid and reliable
scientific theories and highly abstract, logical systems
represent a high level of empirical and rational knowledge
respectively.

It is also possible for a person to move along a continuum
of generality within a specific mode of knowing, or within
all three modes, because, as Royce and Powell (1983, 229-
231) as well as Rancourt's (e.g. 1983) and Leino's (1987)
studies show, although one mode of knowing (or valuing) may

be dominant, a person exhibits all factors, traits, and
processes to different degrees (fig. 4.7).

RATIONALISM
Data: theo-
retical ideas,
concepts

Low level of   High level of
generality   generality

Single   Systems of
ideas and   ideas and
concepts   concepts

EMPIRICISM
Data: sense
impressions,
facts

Low level of   High level of
generality   generality

Single   Systems of
observations   observations
and facts   and facts

METAPHORISM
Data:
experiences

Low level of   High level of
generality   generality

Single   Experiences
personal   connected to
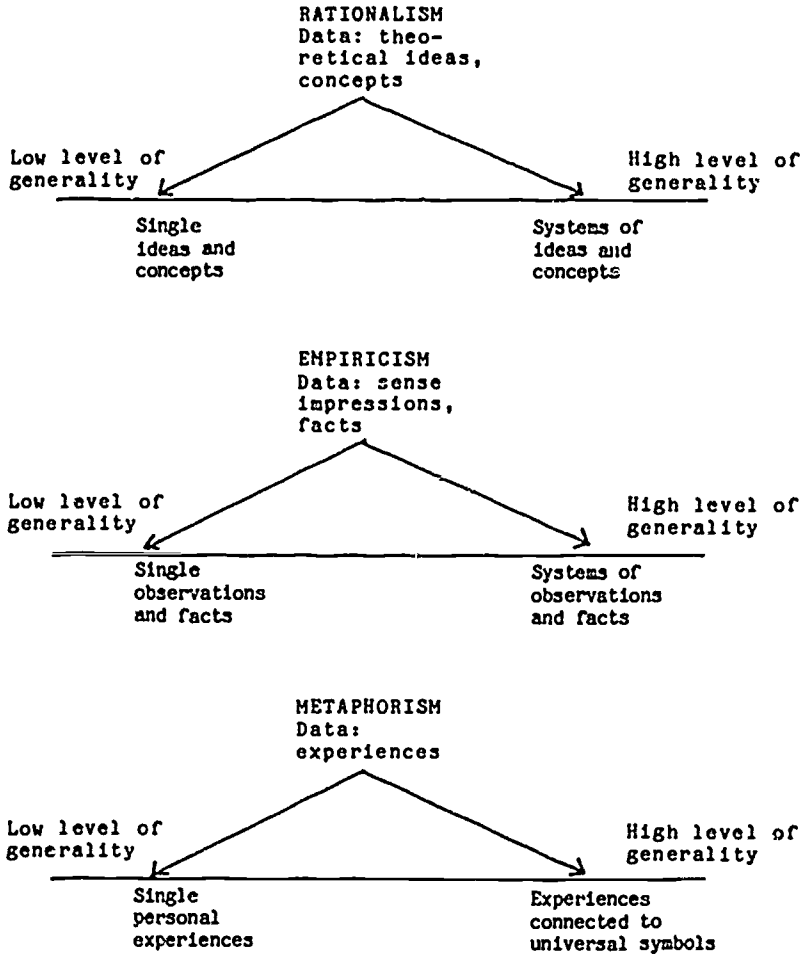experiences   universal symbols

Figure 4.7   Levels of generality within the modes of
knowing, represented as a continuum

Figure 4.7 shows a continuum from lower to higher le-
vels of generality within the modes of knowing, where the
arrows indicate the possibility of oscillating along the
continuum.

In terms of the concepts and model used in this study, an
actor's mode of knowing constitutes his epistemic orien-
tation. A mode of knowing is then also an integral part of
acting, since the mode of knowing functions as an internal
action determinant.

While a person's axiological orientation includes value-
knowledge (and ignorance), his epistemic orientation in-
cludes factual knowledge (and ignorance). Here the concept
'factual knowledge' is used in a large sense, involving not
only empirical facts but all types of true beliefs. These
true beliefs can be rational, empirical or metaphorical,
in which cases they meet different truth criteria as they
have been presented by Royce and Powell, and Rancourt.
Appropriate action is a manifestation of beliefs that are
true rationally, empirically or metaphorically; true be-
liefs are embedded in practical knowledge.

Just as the actor's axiological orientation does not involve
only values and ideals but also action principles, so the
epistemic orientation does not either include only beliefs
of different kinds and at different level of generality but
also action principles. The phase of acquiring and proces-
sing information can thus be described in the following
steps.

> 1. Receiving data. e.g. about an educational or
>   health care situation, the other participants,
>   self.
> 2. Interpreting data, which involves viewing it
>   in the light of previoulsy established beliefs.
>   This corresponds to Royce's and Powell's (1983,
>   10-11) encoding and transforming data.

3. Formulating an action prescription on the
   basis of received and interpreted information
   about the situation. This corresponds to Roy-
   ce's and Powell's (1983, 10-11) transforma-
   tion and decoding data.

There is, then, as also Royce's and Powell's (1983, 10-17)
theory suggest, an "input" as well as an "output" side of
information processing and transformation.

Royce's and Powell's as well as Rancourt's descriptions
of the three modes of knowing indicate that they refer
primarily to step 1 and 2 in the information acquiring
process: the descriptions concern the type of data that
are singled out, truth criteria and cognitive abilities
involved in acquiring and processing these data. The theo-
ry presupposes, however, a continuous interplay between
knowing and acting, which implicates that the modes of
knowing are manifested also in action. In order to complete
the sequence the following three action principles can be
formulated, corresponding to the three modes of knowing:

Rationalism: Plan and implement your action on
the basis of principles and logical consistency!

Empiricism: Plan and implement your action on the
basis of empirical facts and your own observa-
tions and sense impressions!

Metaphorism: Plan and implement your action on the
basis of your personal experiences, your feelings,
imagination and intuition!

These principles can actually be conceived of as meta-
principles. They do not tell the actor exactly how to act
in a situation, only on what grounds he shall formulate
his more specific prescriptions. From these meta-principles
more specific action rules and prescriptions can be de-

rivated in various contexts and situations.

A simplified version of the modes of knowing, using Ran-
court's types of data and criteria for accepting data as
knowledge as step 1 and 2, can now be completed with the
corresponding action principles, step 3 (table 4.5).

	TYPE OF DATA	CRITERIA	ACTION PRINCIPLE
R	Theoretical ideas, con-cepts	Logic, theo-retical sound-ness	Follow principles, act consistently;
E	Sense impres-sions,	Observations, experiments	Follow empirical facts and your own observations!
M	Experiential, phenomeno-logical	Subjective ex-periences and feelings	Follow your feelings, experience, intuition and imagination!

Step 1 ⟶ Step 2 ⟶ Step 3

Table 4.5   The three modes of knowing as three ways of
receiving and interpreting data and formu-
lating action principles

Step 3 can be said to be implicit in Royce's and Powell's
as well as in Rancourt's theory. Since the modes of know-
ing are assumed to be a part of an actor's personality
(Royce & Powell 1983, 10-17), it is only natural to con-
clude that they also influence his way of acting, i.e.
not only his world view but also his life-style. Rancourt's
instrument for measuring modes of knowledge accessing
(KAMI = Knowledge Accessing Mode Inquiry) according v in-
cludes items that can be considered as measuring how the
modes of knowing are manifested in action.

In the same way as the different types of values (intrinsic,

self, social) all have their specific role in health care
and education, so the different modes of knowing complete
each other.

Rationalism makes it possible for an educator or health
care provider to establish principles, make plans and
act consistently and systematically. It also helps him pre-
sent ideas logically as well as to understand and analyze
his practice in terms of concepts, theories, and abstract
principles. According to Benner's (1984, 20-33) description
of different levels of performance, a rationalistic mode
of knowing seems to be embedded in the lowest as well as
the highest level. However, rationalism apparently has a
different role in the expert's performance than in the no-
vice's. The novice, lacking experience of the situations
where she is expected to perform, has only rules and ab-
stract concepts to rely on. This makes her performance ri-
gid (she cannot "flex") and she has difficulty in applying
the rules and concepts. The expert, on the other hand,
acts upon experience, intuition and observation, and uses
concepts and theories to analyze the situation and find new
solutions, if she is confronted with problems. Rationalism, so to
speak, transforms from rule-stating and models for action
to analysis, reflection, and problem solving.

Empiricism makes it possible for the educator or health
care provider to make correct observations in interperso-
nal situations. The ability to "read" a situation and the
reactions of the other participants can thus be seen as a
manifestation of the empirical mode of knowing. This abi-
lity has been stressed by Benner (1984, 32-33) as well as
Hunt (1903b;1987,146-149). This mode of knowing also helps
the practitioner concentrate on details and objective, em-
pirical facts.

Metaphorism, finally, makes it possible for the educator
or health care provider to relate to and utilize his own

experiences and feelings and to relate to the feelings of
students or patients. Metaphorism also makes it possible
to use imagination, and, accordingly, to be creative in
an interpersonal situation. This mode of knowing is also
stressed as important by Hunt in his view of teaching and
other types of interpersonal communication as a "reading-
and flexing" or "matching-in-the-moment" process:

> "I think that such matching to metaphoric modali-
> ty is one of many features of what I have called
> 'matching in the moment' (Hunt 1983), the split-
> second, intuitive adaptation which makes inter-
> personal communication possible.
> /.../
> I believe that the essence of teacher interpersonal
> skills is the intuitive, split-second adaptation
> which teachers make in the moment to unanticipated
> circumstances, a quality which pervades skilled
> teaching performance and which is not easily re-
> moved as a single part of that whole skilled per-
> formance." (Hunt 1983 b)

Traits that belong to metaphorism are also stressed by Ben-
ner, who sees them as embedded in the functioning of the
expert nurse:

> "The expert nurse, with an enormous background of
> experience, now has an intuitive grasp of each si-
> tuation and zeroes in on the accurate region of
> the problem without wasteful consideration of a
> large range of unfruitful, alternative diagnoses
> and solutions.
> Capturing the descriptions of expert performance
> is difficult, because the expert operates from a
> deep understanding of the total situation; the
> chess master, for instance, when asked why he or
> she made a particularly masterful move, will just
> say: 'Because it felt right.' 'It looked good.'
> Or when the expert business decisions makers are
> asked ab' t which factors they would identify and
> what weights they would give them for a hypothe-
> tical decision, the most likely response would be,
> 'Well, it all depends.'" (Benner 1984, 32)

Metaphorism, then, seems to be a necessary component of
high level performance in different areas. But, as Benner
points out, this requires much experience. Thoughts along
the same lines have been presented by Berliner (1986).

It seems, then, as if complete practical knowledge, mani-
festing itself as appropriate action in predictable as
well as unanticipated situations, requires a combination
of different modes of knowing - rational, empirical and
metaphoric. Each gives it own distinctive contribution to
practice: conceptual analysis, consistency and systemati-
zation, observation, empirical facts and details, feeling,
subjective experiences and imagination. A combination of
the three modes of knowing in action does not mean that
they have to be equally strongly represented in every
practitioner; however, every practitioner must probably be
able to manifest all the modes of knowing to some degree
and to oscillate along the continuum of different degrees
of generality: from single ideas, observations and perso-
nal experiences to systems of concepts and observations
and universal symbols.

A combination of the modes of knowing makes it possible
for the practitioner to master the complex, interactional
knowing how of education and health care: to "read" and
"flex", acquire different types of information, plan and
decide, implement and evaluate, and combine the dif.erent
aspects of interaction: communicative, strategic, instru-
mental, discoursive, and expressive. As practical know-
ledge this complex knowing how is knowing-in-action, and,
as both Elbaz (1983, 5) and Benner (1984, 32) remark,
this knowledge may be extremely difficult to account for
in concepts.

4.3.4.3 Ability

Practical knowledge, manifested in appropriate action, therefore
involves an axiological orientation and an epistemic orien-
tation. But in order to account for practical knowledge as
manifestation of internal action determinants a third type
of determinants is required: ability.

In Royce's and Powell's (1983, 86-113) theory abilities
are treated as integral parts of the other systems. Mo-
tor factors like multilimb coordination, steadiness and
reflexivity, for example, are at the same time considered
motor abilities.   And the key factors in the cognitive
system'- perceiving, conceptualizing and symbolizing -
are also treated as cognitive abilities.

In this study abilites are treated as a separate group of
internal action determinants. This does not mean that they
are considered as functionally independent. There is a con-
tinuous interaction between all determinants and processes
of the human action system. The reason for treating abili-
ties separately here is primarily a striving to emphasize
their role in practical knowledge.

Ability can be defined as the actual power to perform an
act,meaning that a given person can perform the act con-
cerned, provided with the necessary external circumstances. A
person who has the ability to perform an act can, on most
occasions, perform it; he knows how to do it. (Klausmeier
& Goodwin 1968, 34; v.Wright 1963, 48-49)

This definition shows certain similarities between practi-
cal knowledge and ability. In this study practical know-
ledge has also been characterized as knowing how to do
something; a person who has practical knowledge in educa-
ting knows how to educate - he can educate. In this text,
however, there are also important differences between prac-
tical knowledge and ability. Firstly, practical knowledge
has a moral aspect, which ability has not. Secondly, prac-
tical knowleage includes the whole practice while ability
concerns more limited acts and procedures that make up
the practice.

Knowing how to educate and how to provide health care

requires ability to perform a wide range of acts, e.g. ability to demonstrate how something is done, ability to give a lecture, ability to conduct a discussion, ability to give an injection, ability to understand another person, ability to support another person and so on. These abilities can be grouped according to the phases of the action sequence. Thus we can say that in order to have practical knowledge a practitioner must have certain abilities to acquire information, abilities to plan and make decisions, abilities to implement appropriate actions and abilities to evaluate. Most of the examples mentioned above have to do with the implementation of different acts.

The ability to perform an act requires in turn mastery of a set of skills. The ability to give a lecture, for instance, requires skill in talking and in visualizing, ability to acquire information may require skill in observing and listening, etc. This use of terms differs somewhat from v.Wright's (1963, 50). According to him skill is connected to the performance of complicated activities, not to any ability. According to the usage of terms in this study, all ability requires some kind of skills.

The terms 'practical knowledge', 'ability', and 'skill', thus constitute a hierarchy, where 'practical knowledge' refers to the practice as a whole with all its phases, aspects and levels, while 'ability' refers to the performance of specific acts and procedures and 'skill' to the mastery of techniques and processes involved in the performance of the act.

The relationship between these hierarchical levels can be clarified by some examples (table 4.6).

PRACTICAL KNOWLEDGE	ABILITIES	SKILLS
Knowing how to provide health care	1. Knowing how to assess the patient's needs	Knowing how to a. make observations b. listen c. make inferences
	2. Knowing how to teach the patient	Knowing how to a. communicate ver- ·bally b. visualize c. listen
	3. Knowing how to comfort a patient	Knowing how to a. express one's feelings · b. listen
Knowing how to educate	4. Knowing how to give feedback to a student	Knowing how to a. observe the stu- dent's reactions b. make inferences c. communicate ver- bally and non- verbally
	5. Knowing how to show a video film to a class	Knowing how to a. use the technical equipment b. choose the right moment c. observe the reac- tions to the film

Table 4.6 Examples of abilities and skills required for practical knowledge in health care and education

The examples in table 4.6 are only casual examples of abi-
lities and skills required in health care and education -
they are by no means exhaustive or systematically presented.
The main idea is to point out the difference in hierarchy
between practical knowledge, ability, and skill.

As was mentioned previously p.48), v.Wright makes a dis-
tinction between first order and second order abilities:

a person's first order ability constitutes what he can do,
his second order ability constitutes his capacity and in-
cludes abilities that he can ac,uire. Klausmeier and Good-
win (1968, 34-35) use the terms in the same way as v.Wright
- 'ability' refers to what a person can do now, 'capacity'
refers to what he might be able to do as a result of fur-
ther education or maturation. Koort (1974, 40) again uses
the terms 'actual capacity' and 'pot-ntial capacity', ma-
king 'capacity' the key term. He uses 'actual capacity' in
the same sense as Klausmeier and Goodwin, and v.Wright,
use 'ability', and 'potential capacity' in the same sense
as their 'capacity'. Pörn's (1981 and 1984a) term 'repertoi-
re' corresponds primarily to v.Wright's as well as Klaus-
meier's ~nd Goodwin's 'ability': it refers to what an actor
can do.

There may then be a discrepancy between an actor's ability
and his capacity. This discrepancy, according to Klaus-
meier and Goodwin (1968, 34), can be due to the fact that
the actor has not learned all he can learn or that he is
not yet mature enough. There may, however, also be other
factors that cause a discrepancy. Sickness, for instance,
or exhaustion and fatigue, can for a longer or shorter time
diminish an actor's ability: he cannot, for the moment, do
what he normally can. In this case we may say that the ac-
tor still has the ability - it is just for the moment im-
possible for him to exercise it. But as soon as he gets
better, he is again able to do what he could before he got
sick or exhausted. Sickness and exhaustion can in this
case be called internal obstacles for the exercise of abili-
ty. There may also be external obstacles, like lack of
necessary equipment. A person may, for instance, normally
be able to ride a bicycle. However, for the moment he may
not be able to do it, either because he has broken his leg
(internal obstacle) or because he has no bicycle (external
obstacle).

Having the ability to do something has previously in this
study (pp.53-54) been called procedural knowledge. A per-
son who has the ability and skills necessary for the per-
formance of different kinds of acts in education and
health care can thus be said to have the required procedu-
ral knowledge. Practical knowledge, accordingly, is a mani-
festation of procedural knowledge as well as of value-
knowledge and true beliefs (rationally, empirically or
metaphorically true).

4.3.5 Action schemata and implicit theories

An actor's internal action determinants - his axiological
orientation, epistemic orientation and ability - function
as an integrated whole in determining and orienting action.
This integrated whole thus includes values, ideals, beliefs,
abilities and skills as well as action principles, modes
of thinking and acting.

These integrated wholes of internal action determinants can
be equated with Piaget's action schemata and Hunt's implici.
theories.

Jean Piaget emphasizes the active nature of
knowledge in much the same way as Dewey and Lewis (pp.31-
32): there is a continuous interaction between knowledge
and action in that knowledge is acquired and built up
through action and that this knowledge determines sub-
sequent action:

> "Knowing does not really imply making a copy of
> reality but, rather, reacting to it and transfor-
> ming it (either apparently or effectively) in
> such a way as to include it functionally in the
> transformation systems with which these acts are
> linked (Piaget 1971, 6)."

This active nature of knowledge concerns, according to
Piaget (1971, 6-8), all kinds of knowledge. Knowledge

about the physical world, for instance, is acquired through
active experimentation. Even logical and mathematical
knowledge builds upon systems of operation. Thus, Piaget's
view also corresponds to Rescher's (pp.32-33) according
to which so called theoretical and scientific knowledge
also rests on practical postulates.

Knowledge, according to Piaget (1971, 7-8, 268-345), is or-
ganized into action schemata, which functions as some kind
of action code or prescription. Namely, whenever similar
situations occur, actions tend to repeat themselves. Some
action schemata according to Piaget are innate, like in-
stincts, while others are acquired. Intelligence has evol-
ved as one instrument for constructing knowledge and has,
in the same way as knowledge, an active, instrumental cha-
racter.

Neisser (1982, 24-27, 48-66) has adopted the terms sche-
me and schemata to his theory of perception and cognition.
He explains that the terms initially come from action theo-
ry but that they can also be applied to perception, since,
ultimately, perception is an activity. In perception the
schema directs the search for information. The knowledge
that is acquired then changes the scheme and, thus changed,
the new scheme directs the search for new knowledge. Neis-
ser calls this process the perception cycle. A scheme works,
in a way, both as some kind of format and as a plan: it
determines of what kind the knowledge has to be in order
to be accepted and it guides the knowledge acquiring acti-
vity.

P.J. Galperin's (1979, 59-88) terms orientation and orien-
tational connection is in some respects similar to Pia-
get's and Neisser's schemata. They refer to an actor's way
of directing his perception and action. However, Galperin
seems to exclude instinctive and automatic connections.

Orientation occurs, according to him, when the actor is con-
fronted with a new situation. Orientation is the control
of action throughout the action process and it involves
investigating the situation, clarifying the object of the
actual need, investigating alternative means for achieving
the aim, control and revision. Galperin's orientation as
action control thus resembles the conscious and reflective
control of an action sequence of the kind described in the
action model of this study.

Hunt (1977;1983b;1987) uses the concept implicit theory to
refer to the body of knowledge that is manifested in
the practice of teachers, counselors, supervisors, and
other practicians. In the transactional sequence of feed-
back, perception, intention and action, the implicit theo-
ry intervenes between perception and intention, thus
functioning as a frame of reference for interpreting per-
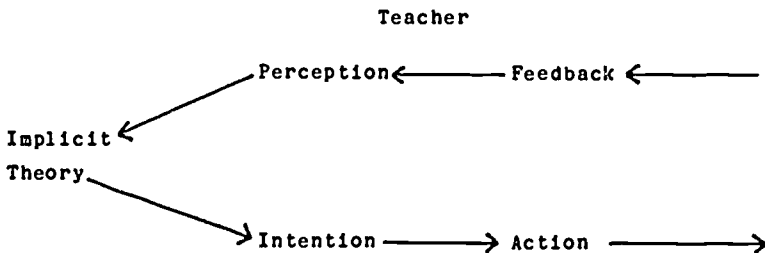ception and guiding action (fig. 4.8).

Figure 4.8   Implicit theory in action
            (Hunt 1987, 148)

The practitioner's implicit theory consists of different
elements, of which Hunt (1987, 58-81) mentions the prac-
titioner's beliefs about her work, her main concepts, her
matching models and her metaphors. That the theory is im-

plicit means that it is manifested in practice; however, the practician may not be aware of her implicit theory. In principle, it is possible to make implicit practice theories explicit, which makes it possible to reflect on one's practice and its foundations.

The idea of an implicit practice theory guiding the teacher's and counselor's work has also been put forth by Gunnar Handal and Per Lauvås. According to them a practice theory is a private construct in the teacher's mind. It is a continuously changing system of knowledge, experience, and values, relevant to the actor's teaching practice. Handal emphasizes that a practice theory - although individual - does not include elements only on the actor's level, i.e. elements that refer to individual actors and interaction between them, but also elements on the orga 'zation and system level. (Handal 1984; Handal & Lauvås 1982, 13-32)

Handal's remark that a practice theory includes elements on the actor level as well as on the organization and system level means in terms of the categories of practical know-'edge used in this work (see p.90) that it includes interpersonal as well as socio-cultural elements. Most of the elements that Hunt (1987, 58-81) mentions belong to the interpersonal level, implying that it represents more of an interpersonal practice theory, while, according to Handal, a practice theory is also a socio-cultural theory, involving values.

Of the ter ⸱esented here - action schemata, practice theory and orientation - action scheme, or schemata, seems to be the most overreaching one, referring to an integration of axiological as well as epistemic elements and ability. A practice theory again seems to involve axiological and epistemic elements but not ability; it is always implicit in the sense that it is embedded in practice but it can

also be made explicit. When a practice theory is made ex-
plicit it can be used as a means of reflective orienta-
tion. Implicit action schemata and practice theories thus
represent what Schön (1983, 50-69) calls knowledge-in-
action and knowledge-in-practice, while the explicit theo-
ries represent reflection-in-practice. The picture of the
internal action determinants can now be completed so as to
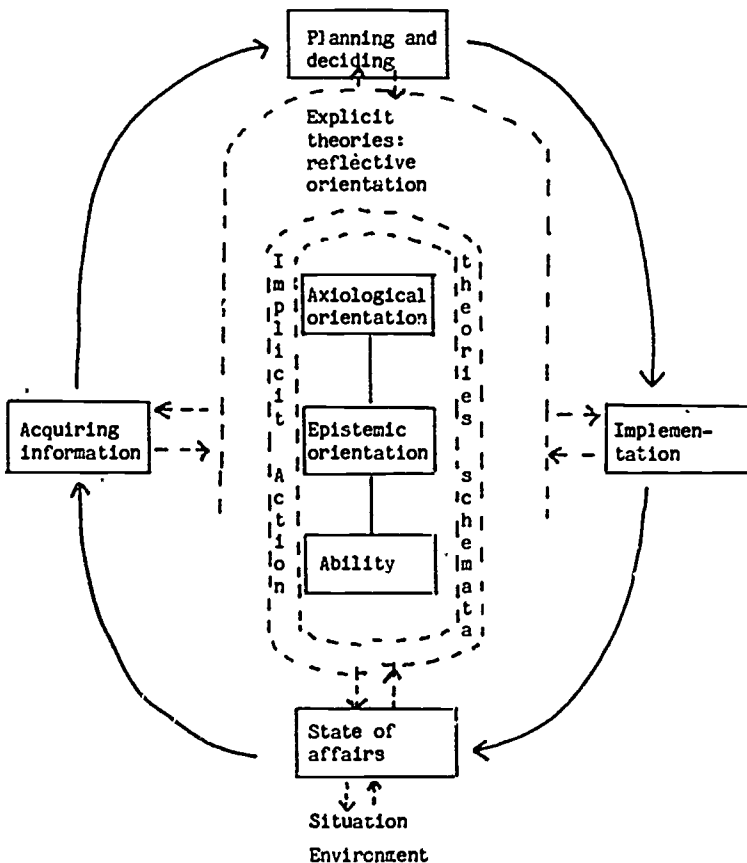include action schemata and practice theories (fig. 4.9).

Figure 4.9 The internal action determinants orga-
nized into schemata and theories in action

According to figure 4.9 the action sequence is a manifes-
tation of action schemata and implicit theories as well
as reflective orientation. These schemata and theories, em-
bedded in action, are in turn integrated wholes, involving
an axiological and epistemic orientation as well as a set
of abilities. This complex whole of action determinants
constitutes a <u>locus of action control</u>.

Appropriate action in education and health care, i.e. prac-
tical knowledge, is a manifestation of adequate schemata
and practice theories - implicit as well as explicit and
reflective. Inappropriate action, i.e. practical ignorance,
is a manifestation of inadequate schemata and practice theo-
ries. In the first case, a person exhibits knowing-in-action,
in the second case not. The schemata and theories must be
adequate with respect to the concrete interpersonal situa-
tion and with respect to the socio-cultural context. This
follows from the categorization of practical knowledge into
an interpersonal and a socio-cultural level, involving mo-
ral participation in a socio-cultural form of life as well
as "reading" and "flexing" in a concrete, interpersonal si-
tuation.

The distinction between implicit and explicit schemata and
theories is made on the basis of whether the schemata and
theories are articulated or not. The whole area of unarti-
culated knowledge, built up through direct experience, con-
frontation and acquaintaince may thus be organized into ex-
tensive schemata and implicit theories, controlling action
largely in an unreflected way. When this fund of knowledge
is articulated it becomes explicit and can be used in
conscious reflection. However, as was noted before (p.54),
some elements of practical knowledge can in principle ne-
ver be articulated, tney exi t only in action, e.g. in the
feeling for a situation or a material, or in dexterity and
the mastery of skills and techni que (see also Benner 1984,
32; Entwistle 1976, 45; Hartnett & Naish 1976, 113-115;

Polanyi 1958, 49-65).

The schemata and theories can also be either latent or manifest. Schemata and theories are manifest when they are actually exercised in practice. That they are latent means that they can be manifested when the situation so requires. A nurse, for instance, may know how to resuscitate, but as long as the circumstances do not call for her to exercise her knowledge, it remains latent. However, when the situation so requires, she can manifest her knowledge - has the adequate schemata, theories, and abilities - and act appropriately.

The distinction between latent and manifest practical knowledge is not synonymous with the distinction between implicit and explicit knowledge. A practitioner may well be able to manifest knowledge in action that is not conceptually explicit. On the other hand, he may also be able to articulate knowledge conceptually and explicitly that he is not able to manifest in action.

4.3.6   On the development and restructuring of the control system

As can be seen in the various figures depicting the action system (e.g. figures 2.3, 4.2, and 4.9), the direction of control and influence goes not only from the internal action determinants to the different phases of the sequence but also in the opposite direction. This means that there is a continuous feedback from action to locus of control. Through action not only external states of affairs a.. changed but also the internal action determinants themselves.

This has been pointed out, at least, by Dewey (1934, 104, 264 and 1963, 44-45), Piaget (1971, 6), Neisser (1982, 24-27), and Handal and Lauvås (1982, 14), who all emphasize that experience, schemata and practice theories are continually changed and modified through the process of action.

This process is generally called learning. Learning, then,
is a change in the internal action determinants that will
facilitate appropriate action in forthcoming situations.
Since man is continuously acting and interacting through-
out the process of living, learning takes place all the
time and everywhere.

David Kolb views learning as a holistic adaptation to the
world. By this he wants to say that it involves all aspects.
of the person, that it is an ongoing process, and that it
serves adaptation. In his more precise definition of learn-
ing he characterizes it as "a process whereby knowledge is
created through the transformation of experience". This
process can be described as a sequence involving four pha-
ses: 1. immediate concrete experience, 2. observations and
reflection on experience, 3. construction of a "theory",
i.e. formation of abstract concepts and generalizations,
and 4. testing implications of the "theory" in new situa-
tions. The fourth phase leads back to phase one, making
learning a four-stage cycle that is a continuous process.
(Kolb 1984, 20-38)

A conception of the learning process, based on Galperin and
Davydov, has been developed by Yrjö Engeström. According to
him a complete learning process involves six phases:
1. motivation, arising from a cognitive conflict, 2. orien-
tation, meaning that the student forms a plan or a model
about how to approach the conflict, 3. internalization, i.e.
integration of new and old knowledge into a new model,
4. externalization, meaning that the student applies the
new model in action, 5. evaluation, that is, the student
examines critically the validity and truthfulness of the
model, and 6. control, i.e. the student examines his pro-
cess of learning and tries to improve it. (Engeström 1982,
43-50 and 1984, 110)

There are some similarities between Kolb's and Engeström's

view, and also between these and the views on action and
knowledge presented in this work. Both Kolb and Engeström
describe learning as an activity involving the formation
of concepts, models and abstract generalizations through
observation and internalization, as well as active appli-
cation and testing of learned models in new situations.
The exact order and number of specific stages is not the
same, however. The general idea,in both models seems to
correspond to a general model of action. Kolb (1984, 32-33)
on his part has made a comparison between the research pro-
cess, the creative process, decision making, problem sol-
ving and learning, and concludes that they exhibit similar
features. The similarities can be explained by means of
the common structure inherent in all kinds of action Accor-
ding to the general action model used in this study, all
action involves acquiring information, planning and deci-
ding, implementation and evaluation. This structure can
thus be seen in education and health care as well as learn-
ing, research and problem solving.

Learning can occur in two ways: as a "side-effect" to some
other action sequence or as an action sequence of its own.
In various situations in daily life, for instance, in car-
rying out ordinary activities, an individual's implicit
theories and action schemata can be modified or strenthen-
ed. A personal crisis can be a source of major re-orienta-
tion: suddenly the old schemata are no longer adequate and
the individual has to develop new ones. This may require
changes in the axiological orientation, epistemic orienta-
tion or the acquiring of new abilities. Thus, the indivi-
dual develops new ways of adapting to reality. Work, tra-
velling, social life etc. - all these activities provide
learning situations. However, people probably differ as to
how apt they are to "learn from life". Some people are more
flexible and open; they seem to be involved in a constant
process of revising and developing their internal

action determinants, some seem to go through life without
anything ever happening to them - they repeat the same
schemata over and over again, despite changes in the exter-
nal environment. Kolb (1984, 35) uses an old saw to exemp-
lify this: "He doesn't have 20 years of experience, but one
year repeated 20 times". According to Kolb this can be ex-
plained by referring to the subjective and personal and the
objective and environmental side of experience the . Dewey
(1963, 39, 42) talks about. Dewey views every normal expe-
rience as an interplay between external and internal con-
ditions. Thus, we may call a person inexperienced if no-
thing has ever happened to him externally, i.e. there have
been no changes in his environment, or if nothing has hap-
pened to him internally, i.e. the external changes have not
influenced him subjectively and personally. "Learning from
life", then, which can be seen as one form of experiential
learning, presupposes experience: a personal response to
what goes on in the environment. In addition to this, 1 m-
ing also requires reflection on experience, inferences
and generalizations, and application of new knowledge in
new situations.

In educational situations learning occurs as an action
sequence of its own, since these situations are usually
designed for learning to take place. However, these si-
tuations are only a special type of life situations, where
a lot of things may be learned that are not included in
the officially planned learning process. Broady's (1986)
investigations into "the hidden curriculum" shows that
this is the case. Here, too, learning occurs as a "side-
effect" to the official learning process. "The hidden cur-
-iculum" may give rise to strong and persistent action
schemata and implicit theories, which are acquired through
acquaintance and confrontation but never reflected upon;
their persistence and strength may expressively be due to
the fact that this learning is not consciously reflected
on.

4.4 Collective practical knowledge

In organized practices like education and health care not
only separate individuals but also whole professional
groups can be conceived of as actors. Professional groups
are referred to as collective actors.

The view of a professional group as a collective actor
implies that the whole group be described as a common action
system, acquiring information, planning and deciding, im-
plementing and evaluating. It also implies that the whole
group has a common locus of action control, consisting of
an axiological and epistemic orientation and a set of abi-
lities, organized into common action schemata and practice
theories. Handal (1984) points to the collective nature of
practical knowledge when he defines practice theory as both
individual and collective, but except for him, most of the
researchers that have been referred to previously in this
study have confined themselves to the individual nature of
practical knowledge.

4.4.1 Collective practical knowledge as manifested in com-
        mon practices

When a whole professional group is referred to as a collec-
tive actor, the attention turns to the way in which this
group as a whole participates in the surrounding form of
life and what kinds of interactional patterns the collec-
tive has created; that is, we turn to the socio-cultural
and interpersonal level of practical knowledge as they are
manifested in the common practices of the professional
group concerned.

If the practice of the whole professional group - e.g.
the teachers or the caring professionals - is such as to
promote and manifest a life worth living, the group can be
said to have practical knowledge of the socio-cultural le-

vel. Here, again, moral knowledge as knowledge of a life
worth living is crucial. Since education and health care
have been characterized as moral forms of life and moral
practices, the professional groups working in these prac-
tices can be described as what Robert Brownhill (1983, 102)
calls moral communities:

> "The moral person operates in a moral community
> and they will watch his ..tions and examine the
> principles he refers to   nd the precedents he
> follows. The process c   formally analysed.
>
> His actions will be judged on the following cri-
> teria: (a) Is the action a moral one, that is,
> is the person obeying a moral rule which he claims
> has universal validity, and that therefore it
> should be applied in all circumstances that have
> the same relevant characteristics; (b) If the rule
> is acceptable then is the action consistent with
> the rule he claims he is following; (c) Is it
> applicable, that 's, is it the right rule to apply
> in the circumstan. 1; (d) Is it justifiable in
> terms of the moral code of the community? If these
> criteria are met then we can say the action will
> be accepted as a moral action."

The professional groups thus work as moral communities,
guided by common moral codes that formulate the common mo-
ral principles. The practices that the groups are involved
in are guided by common goals and follow common patterns
of interaction and co-action. These common patterns, prin-
ciples and goals manifest what the professional group as a
whole consider as a valuable form of life. If the common
practices actually succeed in manifesting and promoting
such a form of life they can be said to be a manifestation
of practical knowledge: the professional group knows how to
educate and care.

When practical knowledge is conceived as manifested in com-
mon practices, the whole professional group is treated as
one collective actor. This again means that the professio-
nal group is conceived of as being involved in social ac-
tion guided by a we-intention (see p.108).

4.4.2 Practical knowledg as a manifestation of a common
       axiological and epistemic orientation and common
       abilities

In the same way as the individual practitioner's action is
a manifestation of a set of internal action determinants,
so can the collective actor's practical .nowledge be con-
ceived of as a manifestation of a collective axiological
orientation, a collective epistemic orientation and a col-
lective set of abilities.

4.4.2.1 Collective axiological orientation

The professional group's collective axiological orienta-
tion is made up of the common ideals, values and principles
of the practitioners concerned. Since both education and
health care have been characterized as moral forms of life
and moral practices and since the collective has been cha-
racterized as a moral community, the primary values are
moral. Utilizing Royce's and Powell's (see p.123) theory of
personality and life style, we may say that the primary
values are social, altruistic values, manifesting themselves
in the moral life-form.

As collective the ideals, values and principles are part
of World 3, they do not exist only in the individual minds
of practitioners - they are common property to whcle groups
of practitioners.

The common values and principles, manifesting the profes-
sional group's view of a valuable life, are not only ex-
pressed in action. Many professions also have written co-
des that articulate the common axiological orientation.
This especially concerns different health care professions.
Example of codes specifying a common axiological orienta-
tion are The Hippocratic Oath, The Geneva Declaration, The
Hawaii Declaration, The Florence Nightingale Oath and

ICN:s ethical principles for nurses (see e.g. Achté et al.
1982, 286-324, Sundström 1984 and Bonair 1984).

Expressed in action, these oaths and declarations become
practical value-knowledge of the different professional
groups; they are manifested in an altruistic, caring re-
lationship, in trying to help another person to health and
well-being, in respecting the feelings, needs and wishes
of the other, in standing up for the weak and oppressed, in
respecting the dignity and rights of the other etc. In
short, they are manifested in the whole professional group's
striving to guarantee a good and valuable life for patients
and clients. If this is not the striving of the collective
of practitioners, practice manifests value-ignorance.

4.4.2.2 Collective epistemic orientation

The idea that different disciplines entail different ways
of thinking and knowing has been put forth by, among others,
Bruner and Phenix.

Bruner (1977, 22-24, 32-47; 1980, 74, 97-111) argues that
different subjects have different structures and, accor-
dingly, must be learned and taught in different ways. He
also supports the idea that science and art are two differ-
ent ways of knowing, entailing different grammars.

Phenix (1964, 6-12, 26-29, 53-57), reasoning along the same
lines, claims that different disciplines represent differ-
ent realms of meaning and that knowing means different
things within different disciplines: each discipline has
its own logic, its own way of gaining and validating know-
ledge.

It is this very idea that is also found in Royce's and
Powell's (1983, 194-196) theory of cognitive styles, per-
sonality and world view.

If each discipline is characterized by a specific mode of gaining and validating knowledge, it would be natural to assume that scientists and practitioners in different disciplines exhibit different modes of knowing and thinking. This assumption has been empirically investigated in Canada by Rancourt and in Finland by J. Leino.

Rancourt and Dionne (1982) have investigated teachers of different subjects and shown that they tend to have different cognitive styles, which indicates the impact of the structure and logic of the subject. Noble and Rancourt (1987) have studied varied groups of practitioners, using Rancourt's Knowledge Accessing Mode Inventory (table 4.7).

PRACTITIONER	N	M	E	R
Air traffic controllers	36	8.4	11.1	80.5
Fine arts teachers	75	52.0	37.3	10.7
Mathematics teachers	35	13.4	26.2	60.4
Musicians	15	39.3	32.1	28.6
Sciences teachers	53	9.4	73.6	17.0
Textile craftspeople	26	37.6	34.5	28.0

M=metaphorism
E=empiricism
R=rationalism

Table 4.7   Relative frequency distribution (%) of know-
ledge accessing modes of various groups of
practitioners (Noble & Rancourt 1987)

Noble's and Rancourt's results show a tendency toward meta-phorism among fine arts teachers, toward rationalism among mathematics teachers and toward empirism among sciences teachers, which is in accordance with the assumptions about the nature and structure of knowledge in these disciplines.

Leino's (1987) studies of teachers of different subjects in Finland point in the same direction as Rancourt's results. Teachers in the lower grades and in kindergarten, who

ao not teach only one specific subject or only a group of
related subjects, scored highest on metaphorism.

The intention here is not to analyze the empirical results
in detail and draw any far reaching conclusions, since, for
one thing, the empirical material available in the studies
presented is too limited for this, and for another
it would not serve the purpose of the study. What can be
pointed out, however, is that the nature of epistemic orien-
tation among educators varies, there is not one dominant
type of orientation. It varies depending on e.g. subject
and level of teaching.

Noble's and Rancourt's (1987) study of students in health
care areas show some differences between the groups (table
4.8).

SAMPLE	N	MOST COMMON MODE	LEAST COMMON MODE
Administration	32	R (40.6)	M (28.1)
Medical	45	R (46.7)	M (13.2)
Nursing	52	E (53.9)	M (09.6)

M=metaphorism
E=empiricism
R=rationalism

Table 4.8   Most and least common mode of knowledge acces-
            sing among health administration, medical and
            nursing students (adapted from Noble & Rancourt
            1987)

The sample in Noble's and Rancourt's study was taken from
a Canadian university and the point of the study was to in-
vestigate the possibility that interdisciplinary conflicts
in health care may be due to different modes of knowing and
thinking.

   (no's (1987) study, which also included nursing stude ts,
   ow some interesting differences between Canadian and
Finnish nursing students involved in the study. 28 nursing

students took part in the study. The relative frequency
distribution shows that metaphorism is the most represented
mode (table 4.9).

	M	E	R
Finnish nursing students	35.5	35.3	29.2
Canadian nursing students	28.0	39.1	32.9

M=metaphorism
E=empiricism
R=rationalism

Table 4.9   Relative frequency distribution (%) of know-
             ledge accessing modes among Finnish and Cana-
             dian nursing students (adopted from Leino
             1987, 27)

Again it must be said that the samples used in the studies
are far too small to allow for any deep analysis and not
representative. The results may of course be indicative,
in which case metaphorism would be the dominant style among
Finnish nurses while it would be the least represented one
among Canadian nurses. Rationalism, again, would be the
least represented style among Finnish nurses. Trends that are
similar to Leino's have been found by Stenbock-Hult (1988).

In his comparisons between Finnish and Canadian teachers
and teacher students as well as nursing students Leino
(1987, 25-31, 36-37) points to the fact that there is,
along the line, a higher degree of metaphorism in the Fin-
nish material than in the Canadian and also a lower degree
of rationalism. According to Leino, this may be due to
cultural differences.

Rancourt's and Leino's studies indicate that there may be
differences in the knowledge accessing mode between different
groups of practitioners in the health care area but that
there may, also be cultural differences. This also concerns
different groups of teachers. The results, however, are not

easy to interpret without more data and information,
for instance, about different kinds of background factors. Accor-
ding to the initial ideas of Bruner and Phenix, the differ-
ences in modes of knowing should be due to differences in
the structure and logic of the disciplines. But w'   '`out
the differences between medical students and   -
dents in Noble's and Rancourt's (1987) study   .   ;'ally
the disciplines themselves that are different or చ.... th.
results have something to do with the fact that nursing
students tend to be women while there are usuall; more men
among medical students? And what about the cultural differ-
ences between nursing students indicated by Leino (1987) -
can the structure and logic of a discipline be different in
different cultures?

It is possible that disciplines are different in that some
are more clearly connected to a special mode of knowing
while others are more varying. The connection between mathe-
matics and rationalism, natural sciences and empiricism,
and fine arts and metaphorism, for instance, can be consi-
dered as rather clear and these disciplines are often used
as paradigm cases of the corresponding mode of knowing.
This mode of knowing is accordingly the strongest one among
teachers in these areas (Leino 1987; Noble & Rancourt 1987;
Rancourt & Dionne 1982). However, the practice of educa-
tion as such has its own structure and logic, partly in-
dependent of the subject taught. As has been argued pre-
viously (pp.142-144) education - as well as health care -
involve all modes of knowing. Interactive practices are
very complex. Conceived of as applied disciplines they in-
volve application of knowledge from various basic discipli-
nes (Phenix 1964, 318-320) which requires the use of modes
of knowing,characteristic of the basic disciplines. Con-
ceived of as practical disciplines that also generate know-
ledge of their own, they also involve all modes of knowing.

Since the practices studied here contain different types
and modes of knowing, they are probably not fixed to one
structure and one type of logic. Different modes of knowing
and thinking can be emphasized at different times and at
different places. The impact of personal differences, cul-
tural differences and educational traditions becomes grea-
ter.

Thus, it is unlikely to find one collective, dominant mode
of epistemic orientation among health care practitioners
or among educators. Collective profiles may be found in
sub-groups and in different sc ools and traditions, much
depending on personal and cultural influence.

4.4.2.3 Collective abilities

The collective of practitioners in education and in health
care can also be said to have a common system of abilities,
including skills. These are not common in the sense of
everyone having the same abilities. Rather, the common sys-
tem of abilities is made up of the individual abilities of
each practitioner in the area.

The common abilities determine the level of procedural
knowledge of the collective.

4.4.3 Collective action schemata and implicit theories

Just as individual values, beliefs, and abilities are orga-
nized into action schemata and implicit theories, so are
the collective ones.

The common practices exercised by a professional group can
be conceived as manifestations of common action schemata,
i.e. common codes, principles and prescriptions determining
how information is acquired, how plans and decisions are
made and implemented, and how they are evaluated. The col-

lective action schemata can be viewed as <u>knowledge-in-</u>
<u>practice</u> in so `ar as the practices that manifest them
are appropriate with respect to socio-cultural context
and situation. Here it must be brought to mind that appro-
priateness does not mean that the practices be entirely
determined by the actual context; appropriate practices
also change undesirable circumstances into desirable ones.
Appropriate practices manifest and advance valuable con-
ditions - a valuable life-form.

The collective action schemata tend to repeat themselves
from time to time and are handed over from one generation
of practitioners to another. The values and ideals, models
principles and beliefs that they include compose a collec-
tive <u>theory-in-.ractice</u>. The collective theory-in-practice
include various ideals and beliefs related to the practice
concerned: a conception of health and sickness, man, socie-
ty and the world, of learning, teaching and caring. Thu_,
the elements relate to the socio-cultural as well as the
interpersonal level of practice.

Like individual action schemata and practice theories, the
collective ones can also be implicit or explicit, latent
or manifest. Implicit action schemata and theories are un-
articulated and compose, so to speak, a common fund of ex-
perience built up be the practitioners. When this common
fund of experience is articulated it becomes a common ex-
plicit theory that can be used as <u>reflection-in-practice</u>.
There are, however, elements in the collective practice
schemata that cannot be articulated, only manifested in
practice.

Every individual practitioner in health care and in educa-
tion is part of a collective, bringing his or her practi-
cal knowledge to the collective and also interpereting and
manifesting the collective's knowledge in his or her own
individual mode. Collective practical knowledge would be

impossible without tradition.

4.4.4   Tradition

Tradition is not, according to Wittgenstein (1983, 88),
something you can learn or a thread you can pick up when
you choose - any more than you can choose your ancestors;
not having a tradition one would like to have is like
being unhappily in love.

Thus we might say that a tradition is something one is born
into. It is apparently not learned in an intentional and
systematic way, like one learns how to drive a car or to
remember the content in a textbook. A tradition is rather
something one grows into without noticing it.

The concept of tradition is central in hermeneutics; actually
the mediation of tradition has been viewed as the object of
hermeneutics. According to Habermas, tradition hands down
a special form of life, including cultural productions and
techniques. Tradition has also been said to transmit a "ho-
rizon for understanding", meaning that it constitutes some
kind of "fore-knowledge" without which no understanding or
knowledge of reality is possible. Belonging to a tradition
means that one can take part in the continuous dialogue and
anticipate meaning; taking part in a tradition expressly
means belonging somewhere and being acquainted with life
and reality in a special way. It is from this "platform"
one understands new meanings and the "horizon" determines
what one can understand. After having understood the new
meanings they in their turn become part of one's fore-know-
ledge and determines further interpretations and under-
standing; this is the hermeneutic circle or spiral. The
handing down of a tradition is never a passive process.
Every new generation and every individual interprets tra-
dition from a new standpoint - more or less - bringing an
element of innovation and creativity to the process. Since

tradition is continuously re-interpreted and modified, the
"horizons for understanding" are also continuously widened.
Hermeneutics can also include a critical dimension, which
especially Habermas has emphasized. This involves critical
reflection upon the traditions to which we belong, that is,
it includes self-reflection. (Gadamer 1977; Habermas
1966 and 1975; Lindholm 1980, 52-53, 107-108, 115-123; Rad-
nitzky 1970 II, 6, 23-29; Ödman 1979, 7,38)

That practical knowledge is transmitted through tradition
has been claimed, for instance, by Polanyi (1958, 53-54,
160; 1964, 15-16, 33). He says, firstly, that an art can
not restlessly be specified and articulated. And because
of this it cannot be transmitted by prescription, i.e. by
conceptually formulated rules. Rather, it is picked up
unconsciously through imitation, examples and the acquiring
of the hidden rules of the practice or art concerned, that
is, through tradition. The transmission of practical know-
ledge through tradition presupposes submission to authori-
ty and uncritical imitation to a certain extent, says Pola-
nyi, but in spite of this, tradition is never handed down
unchanged: it is always an interpretation of the past in
the context of our immediate problems. Polanyi mentions the
practice of science as an art - the art of knowing - that
is handed down by tradition. The art lives on only where
it is continuously practiced, because the tacit components
of practical knowledge exist only in and through practice.

Thomas Kuhn (1970, 40-46, 144-159, 174-210) also analyzes
the practice of science in terms of traditions. Practi-
sing science - like practising any art - means practising
"the rules of the game". The rules, however, are very diffi-
cult to discover. They are seldom articulated but rather
handed down in education. A specific scientific tradition
can be said to include a specific paradigm, including th
common beliefs, values and techniques of the scientists.

The paradigm is always collective, it consists of the sha-
red intuitions of a group of scientists and governs the
scientific activity of that group. The paradigm is a shared
possession. Belonging to a specific tradition means sharing
the paradigm - the values, beliefs, intuitions and tech-
niques - of that tradition. The tradition determines what
is to be considered as research problems, what methods are
to be conceived of as scientific etc. Cumulative research
within a specific tradition is what Kuhn calls normal sci-
ence. Revolutionary science means that there evolves a con-
flict between rivalry paradigms, ending in the establishing
of a new paradigm, which t the same time means that a new
tradition is created.

The connection between practical knowledge and tradition is
also stressed by J.C. Nyiri (1988), who also points to tne
unspecifiable, tacit and non-propositional nature of both.
Since practical knowledge cannot be communicated through
propositions, he says, it needs another form of communica-
tion. This form is tradition, which Nyiri conceives of as
a series of repetitions of an action. Nyiri distinguishes
between primary and secondary traditions, primary traditi-
ons meaning traditions that cannot be separated from the
way tnat they are handed over and secondary traditions mea-
ning traditions that in principle can be communicated in a
discursive fashion. Nyiri investigates two theses concer-
ning the two types of traditions: the weak traditionalist
thesis that claims that there are only secondary traditions
t d the strong traditionalist thesis, which claims that
there are primary traditions. Nyiri himself defends the
strong traditionalist thesis.

Barry Smith (1988) widens the significance of practical
knowledge to include the society as a whole. He says that
the understanding of practical knowledge involves a new
understanding of society, of the rules and customs main-
tained within it.

In this work education and health care have been charac-
terized as forms of life. Referring to Habermas (1966 and
1974, 8-9) we may then say that the role of tradition is
to mediate these forms of life. Since the concept of life-
forms enters the argument in two wiys - the socio-cultural
context is conceived of as a form of life and the practices
themselves are conceived of as forms of life - there are
also two types of traditions involved. Firstly, the prac-
tices of education and health care are part of a socio-
cultural tradition, which they interp _t, re-interpret and
mediate in their own way. The socio-cultural level of
practical knowledge in these areas can be understood in
this very way: it refers to the way in which these prac-
tices interpret and mediate the life-form of which they are
part. Secondly, the practices themselves are conceived of
as forms of life that are mediated through education and
practice from one generation of practitioners to another.
In both cases knowing the form of life means knowing the
tradition in the sense of belonging to it, participating
in it - not passively but actively interpreting and re-
creating it. In both cases too the strong raditionalist
thesis can be defended: these forms of life cannot be me-
diated discursively. Since they involve tacit components
like ways of thinking and knowing, skills and actions, they
must be transmitted through practices involving these com-
ponents.

In this study, practical knowledge has been conceived of
as organized into action schemata and practice theories
embedded in the practice. This means that when the common
practices are handed dowi to the next generation of prac-
titioners, the action schemata and implicit theories are
handed down with them. The action schemata and implicit
theories can be compared to Kuhn's paradigm, implying that
comprising the collective action schemata and implicit
theories means practicing within a specific tradition.

The common, collective practices thus mediate an axiolo-
gical orientation, an epistemic orientation and a set of
abilities. Values and ideals, beliefs and modes of know-
ing, abilities and skills are re-interpreted and trans-
mitted through examples, imitation, ways of doing and think-
ing in education and in practice. This may explain, for
instance, cultural differences in these practices. Since
it is through practice and personal contact that the practi-
ces are transmitted, different traditions may evolve at
different places, the action schemata, modes of thinking
and knowing re different in different traditions. Because
the traditions of the practices are integral parts of
a socio-cultural context, it is probably also difficult to
transfer an element from one context to another.

The mediation of collectice action schemata can thus be
conceived of as continuous repetitions of patterns of
practice. In the way tradition is on the collective level
what habit is o the individual level. Forming a habit was
compared by Dewey (1934, 104) to in-habiting the world,
making it a home and a part of every experience. Habits,
the repetition of actions in similar contexts, can thus be
said to contain knowledge of the world. In the same way
the forming of a tradition means belonging somewhere and
being familiar with life and the world in a special way -
a tradition is, in a sense, also a "home". And in the same
way as a habit it involves repeating action schemata in
similar situations. Thus, traditions also contain knowledge
of the world, knowledge that is manifested and maintained
in practice, i.e. practical knowledge.

However, as in the case of scientific revolutions, tradi-
tions in education and health care may also cease to work.
Actually this means that they no longer contain practical
knowledge - the repetition of old action schemata no longer
manifests or advances a valuable form of life. This may be
due to the fact that the world has changed or that other
kinds of knowledge - especially scientific knowledge -

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starts to question the tradition. Because just as the
action schemata and implicit theories in general may con-
tain knowledge as well as ignorance, so may the tradi-
tion. A tradition that transmits action schemata that no
longer advance a valuable life-form may thus be said to
mediate practical ignorance. An innovative and creative
attitude to tradition is thus essential. The Swedish wri-
ter and critic Bengt Nerman (1982, 120) expresses this in
the following way:

> "Tradition, the cultural tradition is not dangerous
> but nor is it holy – it can be used. It is experi-
> ence changed into form, a material that the people
> who have lived before us have created." (My transl.)

In some case an actual revolution can take place in a prac-
tice. Then the old tradition is not only re-interpreted.
It is abolished and a new tradition is created instead, in-
volving wholly new action schemata and patterns of prac-
tice. This may happen if the practice concerned develops
into a state of crisis. The new tradition – just as the
new paradigm in science – implies a new interpretation of
the practice itself and, _mutatis mutandis_, also a new inter-
pretation of the world; new kinds of problems are percei-
ved, new abilities are developed. The "horizon for under-
standing" is widened.

A state of crisis within a practice usually calls for a
new orientation in Galperin's (1979, 59-88) sense of the
word. This involves conscious and intentional reflection
upon the tradition and all that it includes. In states
of crises   there is probably a strong need to make the
implicit theories and schemata explicit, to engage in col-
lective self-reflection. Since self-reflection presupposes
some kind of concepts and abstractions, it requires that
the implicit theories are articulated; self-reflection may
also make use of another type of theories – scientific
theories.

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4.5 Concluding definitions and comments

The purpose of this chapter was to investigate and argue
for theses I and II of the study, namely that the role of
knowledge in an interactive practice is to guide practice
and that knowledge consists of value-knowledge, factual
knowledge and procedural knowledge, articulated and unarti-
culated knowledge.

In this study practical knowledge has generally been defi-
ned as knowing how to educate and to provide health care.
Practical knowledge is at the same time manifested in some-
thing and a manifestation of something.

Practical knowledge is manifested in appropriate action in
education and health care. Appropriate action again means
manifesting and advancing a valuable form of life, which
implies   that the practices of education and health care
themselves be seen as moral forms of life - the whole pur-
pose of these practices in to contribute to a better life in
form of respect and solic rity, health and education, dig-
nity and a good death. Practical knowledge is manifested in
concrete interpersonal situations in the different phases
of the action sequence, in "reading" and "flexing" and in
knowing how to interact instrumentally, strategically, com-
municatively, expressively and discoursively.

Since practical knowledge is manifested in appropriate
action while practical ignorance is manifested in inapprop-
riate action, we may conclude that the role of this know-
ledge is to guide action so that the practitioners in edu-
cation and health care act appropriately and not inapprop-
riately - so that they actually do manif st and advance a
valuable form of life.

Practical knowledge can be said to be organized in action
schemata and implicit practice theories, which in their
turn manifest value-knowledge, factual knowledge and proce-

dural knowledge, i.e. values and ideals that can be uni-
versalized, empirically, rationally or metaphoric-lly
true beliefs, the required abilitius and skill3. In this
sense practical knowledge can be said to be a manifestation
of the types of knowledge formulated in thesis II.

Practical knowledge can be eitner unarticulated or articu-
lated. When it is articulated it becomes explicit. Practi-
cal knowledge is seldom entirely implicit or entirely ex-
plicit; some factors are in principle impossible to arti-
culate.

When elements of practical knowledge are made explicit,
they are formulated in explicit practice theories. The role
of knowledge articulated in explicit practice theories is
also to guide practice; the explicit practice theories can
be u ɛ6 s means of reflective orientation, while the impli-
ciu theories work as unreflective orientation.

Practical knowledge can be individual as well as collective.
As collective it is organized in common schemata and theo-
ries that are manifested in common, repeated patterns of
practice. These common schemata and theories, ʌanifesting
common value-orientation and epistemic orientation and com-
mon abilities, have evolved through tradition, which is the
main channel for maintaining and mediating practical know-
ledge. Through tradition the individual practitioner is
introduced in the life-form of the practice; he interprets
and   modifies the common fund of knowledge in his own
way. Through tradition the individual practitioner can also
get his share of the experiences built up by previous
generations of practitioners.

However, tradition not only includes the common fund of
knowledge built up by previous generations, it also con-
tains common misconceptions and prejudices. And, moreover,
action schemata and theories that worked in the past do not.

necessarily do so forever. Sometimes it is enough to re-
interpret and m _fy traditions, sometimes traditions
must be abolished and replaced by new or᷊s.

Learning takes place when inappropriate action schemata and
theories are modified or replaced by new ones that deter-
mine and orient action !n a more appropriate way. This
takes place individually as well as collectively. Learning
involves a re-orientation of action that may be necessary
because of changes in the world, in the practice itself or
in te knowledge available. Scientific research plays an im-
portant part in th᷊ re-orientation of action.

The role of science with respect to interactiv᷊ practices
like education and health care will be treated n chapter
6. Before t ᷊at some comments on theoretical knowledge may
be necessary.

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5. ON THEORETICAL KNOWLEDGE AND ITS RELATIONSHIP TO PRACTICAL KNOWLEDGE

Among the problems of this study was mentioned the question of the relationship between theoretical and practical knowledge in interactive practices like health care and education. No thesis was formulated with respect to theoretical knowledge, since, as will be argued here, theoretical knowledge is involved in practical as well as scientific knowledge. It is thus included in the theses concerning these kinds of knowledge. However, the question of theoretical knowledge and its relationship to practical knowledge 's given a chapter of its own, because it focuses on a specific domain of practical and scientific knowledge.

The concept of theoretical knowledge has been touched upon in various contexts in this study, bringing out different meanings of the term. Theoretical knowledge, on one hand, has been characterized as knowing that or propositional knowledge. On the other hand, theoretical knowledge can also be conceived of as knowledge organized in theories, in which case it concerns implicit as well as explicit theories, practice theories as well as scientific. These two ways - or actually three, because knowing that is not necessarily synonymous with propositional knowledge - of approaching theoretical knowledge may lead to different ways of conceiving the relationship between theoretical and practical knowledge.

5.1 Theoretical knowledge as knowing that or propositional knowledge

Theoretical knowledge has been defined as knowing that by several authors referred to in this study. These authors have usually equated knowing that with propositional knowledge.

Hintikka (1965; 1974, 28-31), for instance, seems to mean
that 'knowing that' is the same as 'propositional know-
ledge'. In his analysis of the conception of knowledge
among the Ancient Greek, he also sees this type of know-
ledge as 'knowing what' or 'knowing the definition'. Accor-
ding to him Socrates and Plato saw this type of knowledge
as necessary for techne, while Aristotle made a clearer
distinction between theoretical and practical knowledge.

The term 'knowing that' is used also by Ryle (1958, 49-57)
to refer to propositional knowledge but he also uses it to
cover prescriptions and sees 'knowing that' and 'knowing how'
as two quite distinct types of knowledge. Theoretical know-
ledge as 'knowing that' and 'propositional knowledge' is
also found in Hartnett and Naish (1976, 107-121), while
Pring (1976, 16-24) characterizes 'knowing that' as belief-
type of knowledge.

'Knowing that', 'propositional knowledge' and 'prescription'
however need not mean the same thing. 'Knowing that' seems
to correspond to what has been called factual knowledge or
true beliefs in this study. These true beliefs need not be
propositional. They may as well be implicit, i.e. not ex-
pressed in propositions.

In the account of practical knowledge in the previous chap-
ter, practical knowledge was said to be organized into
action schemata and implicit theories, manifesting value-
knowledge, factual knowledge and procedural knowledge. This
view of practical knowledge implies that practical know-
ledge manifests 'knowing that', i.e. true beliefs. Appro-
priate action presupposes theoretical knowledge in the sense
of true beliefs about the situation, the socio-cultural
context, one's own strengths and weaknesses etc. In short,
practical knowledge is a manifestation of knowing what is
the case.

The crucial point is that this knowledge is not necessa-
rily articulated and explicit. As has been argued in this
study, an actor's beliefs, as well as his ideals, may well
be organized into action schemata and implicit theories
that are manifested in action but that he cannot himself
articulate explicitly.

The term 'propositional knowledge' thus seems to correspond
more closely to knowledge that in this work has been cha-
racterized as articulated and explicit, primarily to know-
ledge articulated in everyday language or theories, since,
as has been argued, knowledge can also be articulated in
works of art. Another word for 'propositional knowledge'
would then be 'conceptual knowledge'.

Finally, propositions are not the same thing as prescrip-
tions. Propositions state what is the case and can thus be
said to express conceptual theoretical knowledge. Prescrip-
tions, on the other hand, say what should or should not be
done, how one ought or ought not to act. It is a type of
conceptualized practical knowledge, since it is action know-
ledge expressed in conceptual prescriptions. However, since
the term 'practical knowledge' has been defined as knowledge
manifested in action, another term is needed for this type
of knowledge. The term 'action knowledge' could be used
here. Thus, action knowledge can be defined as knowledge
related to appropriateness and inappropriateness of action.
This knowledge can be practical, i.e. manifested in action,
or conceptual, i.e. articulated in prescriptions.

Thus it seems that the authors referred to here have used
the term 'knowing that' in twc distinct ways: 1) as knowing
what is the case (factual knowledge, true beliefs) and
2) conceptual knowledge (propositions and prescriptions).
As has been pointed out here these two meanings are not
synonymous.

5.2 Theoretical knowledge as knowledge organized in theories

It might be assumed that the term 'theoretical knowledge' have something to do with theories.

Two kinds of theories have so far been treated in this study: implicit practice theories and explicit practice theories. Both kinds of theories consist of the same elements - values and ideals, beliefs and principles - but they differ with respect to how they are expressed. Implicit theories are manifested in action while explicit theories are articulated conceptually. An implicit theory is always practical, since it is manifested in practice. An explicit theory is also oractical, if it is used as a means of reflective orientation in practice.

If by theoretical knowledge is meant knowledge organized in theories, two more kinds of theoretical knowledge can be discerned, both of which are also practical, namely knowledge organized in implicit practice theories and knowledge organized in explicit practice theories.

In the next chapter still another group of theories will be studied - scientific theories. These are theories constructed on the basis of research. This means that theoretical knowledge can also mean knowledge organized in scientific theories. If a scientific theory is used in practice it is also practical.

Thus the term 'theoretical knowledge' seems to have a variety of meanings. According to some of the meanings it is something quite different from practical knowledge. Other interpretations again see theoretical knowledge as a prerequisite for practical knowledge while others still conceive of different types of theories as related to practice in different ways.

5.3 Theoretical knowledge as practical and non-practical

The idea that theoretical and practical knowledge are not
separate but rather inextricably intertwined in one another
has been advanced by Hintikka (1974, 80-96). He claims
that theoretical knowledge, knowing that, can be part of
practical knowledge but that it does not exhaust the notion
of practical knowledge. Knowledge of the causal connections
leading up to a desired result may for instance comprise
an important part of practical knowledge. Hintikka uses the
term 'intentional knowledge' or 'informed maker's knowledge'
for practical knowledge that involves theoretical knowledge.
He refers to Anscombe (1958, 82-89), who also include an
element of theoretical knowledge in practical knowledge;
practical knowledge involving theoretical knowledge means
knowing what one is doing or acting intentionally:

> "Although the term 'practical knowledge' is most
> often used in connexion with specialised skills,
> there is no reason to think that this notion has
> application only in such contexts. 'Intentional
> action' always presupposes what might be called
> 'knowing one's way about' the matters described in
> the description under which an action can be called
> intentional, and this knowledge is exercised in
> action and is practical knowledge." (Anscombe 1958,
> 89)

Acting intentionally, then, means to act and to be able to
describe one's own action or, more precisely, to be able
to give an account of one's intention as well as acting on
that intention (Anscombe 1958, 84-88)

The importance of theoretical knowledge for practical know-
ledge is also emphasized by Entwistle (1976). In the same
way as Hintikka he seems to mean that theoretical knowledge
may be an important element in practical knowledge but that
it is not enough to account for practical knowledge:

> "Our conclusion is that the tacit component at the
> heart of all skills makes learning by practice an
> essential condition of mastery. It also signals
> caution against claiming too much for the role of
> theoretical explanations in teaching technical and

professional skills. On the other hand, reasons
have been advanced for believing that theorizing
may helpfully precede and accompany practical
learning and for the view that knowing how to do
something intelligently often depends upon refe-
rence to theoretical knowledge about the contexts
in which a skill is practised. Similarly, a pro-
per understanding of the contingent experiences
of daily life depends upon the acquisition of a
considerable cognitive repertoire." (Entwistle
1976, 50)

The idea of seeing practical and theoretical knowledge as
intertwined in one another suits the purpose of this stu-
dy well. For one thing, it has been argued that practice
constitutes the a priori of knowledge. This implies that
it is also the a priori of theoretical knowledge. Secondly,
different types of knowledge, including 'knowing that' and
implicit as well as explicit theories, have been discerned
as elements of practical knowledge.

The conception of theoretical a d practical knowledge as
being intertwined also has to do with the large
view of practical knowledge that has been advanced here.
As Anscombe (1958, 89) also points out, 'practical know-
ledge' is a larger concept than 'specialised skill'. In
this work the term 'procedural knowledge' has been used to
refer to more limited abilities and skills, while 'prac-
tical knowledge' has been used as knowledge manifested in
complex practices, involving different types of knowledge
- values and ideals as well as beliefs, principles and abi-
lities. According to this view theoretical and practical
knowledge need not be opposed to each other. Rather, highly
developed practical knowledge presupposes theoretical know-
ledge.

The following definitions of 'theoretical knowledge' and
'practical knowledge' can now be offered.

Theoretical knowledge is a view or conception of
the world or some part of it. This view consists
of a set of components and a set of relations
between these components.

>Theoretical knowledge in education and health care consists of a view or conception of the main components involved in these practices and of the relationships between these practices. This view involves descriptive as well as prescriptive elements: it is both a view of what is the case in these practices and of what should be the case.

>Practical knowledge in education and health care consists of a set of implicit action schemata and implicit practice theories, manifested in appropriate action.

According to these definitions theoretical and practical knowledge are not incompatible. Rather, practical knowledge is always a manifestation of theoretical knowledge. We might say, as also Hintikka (1974, 80-96) and Entwistle (1976) point out, that theoretical knowledge can be seen as a necessary but not sufficient prerequisite of practical knowledge.

This definition of theoretical knowledge does not specify how this knowledge is to be expressed. This offers at least the following options.

>Theoretical knowledge can be implicit and unarticulated, manifested only in appropriate action.

>Theoretical knowledge can be conceptualized by making the implicit theories explicit.

>Theoretical knowledge can be conceptualized formulating scientific theories, based or research.

Thus, theoretical knowledge in education and health care can be manifested in practice as well as conceptualized in the form of propositions and prescriptions, models and scientific theories.

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That theoretical knowledge is practical means that it is
"in-practice", manifested in action in one way or the
other. Theoretical knowledge can be "in-practice" in mainly
two ways:

> "Theoretical-knowledge-in-practice" can involve
> the manifestation of an implicit and unarticula-
> ted view of the main components, relations and
> principles in practice.

> "Theoretical-knowledge-in-practice" can involve
> the use of a conceptualized view of the main com-
> ponents, relations and principles as means of
> reflective orientation in practice.

These two ways are the same as are depicted in figure 4.9
as implicit and explicit theories in action.

Thus, there should be no doubt that theoretical knowledge
can be involved in practical knowledge. However, this
does not imply that theoretical knowledge is always "in-
practice" in this way.

An educator, for instance, may have acquired theoretical
knowledge from books or lectures that in no way influences
his teaching practice. He can repeat, describe and maybe
analyze the propositions and prescriptions but he can make
no use of them in his own teaching. Since repeating, de-
scribing and analyzing can also be viewed as forms of ac-
tivity, this educator's theoretical knowledge is in a way
"in-action", he can, for instance, use it in talk and dis-
cussions. But since he cannot use it in his teaching prac-
tice, it is not practical, "in-practice", in the sense that
this term has been used here. We can call this knowledge
non-practical.

An educator or care provider may thus have many types of
theoretical knowledge simultaneously. In his practice he
may manifest one theory, which he cannot articulate - or

which he has not so far articulated - and conceptually
he may know another theory, which he cannot use in prac-
tice: he knows practically what he does not know conceptu-
ally and he knows conceptually what he does not know prac-
tically.

Since an actor can manifest one theory practically and
express another conceptually, it is also possible that one
or the other is true while the other is not. The case of
Ignaz Semmelweis can illustrate this (the case is related
e.g. in Rosing 1978, 28-37). The Hungarian doctor Ignaz
Semmelweis worked in Vienna in the middle of the nineteenth
century. He managed - after many trials and errors - to
lower the percentage of women dying in childbirth at the
General Hospital by demanding the doctors to wash their
hands in a chloride solution before they examined the women
that had given birth. The doctors usually examined the wo-
men after having conducted obductions, washing their hands
only with soap nd water before the examination. The new
method was successful. In the terminology used in this
study we can say that the doctors washing their hands in a
chloride solution manifested practical knowledge - it was
the appropriate thing to do. Thus, the implicit theory was
also true. The conceptual explanation was however not cor-
rect. According to Semmelweis' theoretical-conceptual ex-
planation, the doctors transferred some kind of "corpse
substance" from the obducted bodies to the women; tne wo-
men obducted had also died in childbirth. Thus, knowledge
that works in practice is not necessarily accompanied by
a scientifically true explanation.

The distinction between theoretical knowledge in practice
and theoretical non-practical knowledge also brings us to
the difference between manifesting theoretical knowledge
and applying theoretical knowledge that was envisaged pre-
viously (p.120).

5.4 Manifesting and applying theoretical knowledge in practice

What it means to __manifest__ knowledge in action has been in-
vestigated quite largely in chapter 5. It means acting
appropriately, which again means that correct action sche-
mata and theories are implicit in action. This knowledge
exists __in__ practice, not as a separate element outside prac-
tice.

When theoretical knowledge is __applied__ to practice, know-
ledge must first exist in some other way and then be applied.
For instance, when students learn things conceptually in
class and then go out to apply in practice what they have
learned. Several factors may render this type of knowledge
difficult to apply:

1. The student is __unfamiliar__ with the practical situations
 and cannot see the connection between the concrete reality
she is confronted with and the conceptually organized view.
It is probably not irrelevant in what kinds of situations
knowledge is acquired. If conceptual-theoretical knowledge
is learned in classroom situatior and has been used only
verbally and in tests, the knowledge may easily become
tied to similar situations. The practical situation, e.g.
a hospital ward or a health care center, is quite different
and knowledge does not transfer automatically from one situa-
tion to another. The student must learn to "read" the new
situations if she is to apply conceptually organized know-
ledge in them.

2. The student __lacks the necessary abilities or skills__ for
application. This illuminates the point that practical
knowledge does not require only a correct theory-in-action
but also the necessary-abilities-in-action. Thus it is
possible that the student is familiar enough with the situa-
tions to be able to "read" them and that she conceptually
also knows what should be done - if someone asks her, she
can answer - but she just cannot do what the situation requi-

res. Lack of ability and skill can be due to lack of prac-
tice or talent.

These factors can be called internal obstacles to applica-
tion, because the obstacle is within the actor himself.
How these internal obstacles are to be overcome is a major
pedagogical problem in the education of practitioners in
education and health care and cannot be dealt with exten-
sively here. However, the ideas presented here point to
the importance of continuously relating conceptually learn d
knowledge to concrete sitations and to practising the
skills required. The application of knowledge to practical
situations is something that in itself must be practised.

In addition to these internal obstacles to application two
more factors can be mentioned:

3. External obstacles like <u>lack of necessary equipment</u> or
<u>lack of economic resources</u>. For instance, a doctor may
realize that his patient needs a kidney transplant
and he may also himself have the skills necessary for such
an operation. If, however, there is no suitable kidney
available, he cannot apply his knowledge in action.

4. Finally, there may be something <u>wrong with the theory</u>.
A theory may, for instance, be so general and abstract that
it has no practical implications. This has appeared to be
a problem in nursing, where quite a few so-called conceptual
models and theories have been developed. Research in the
area has however shown that many of these models and theo-
ries are difficult to relate to practical situations be-
cause of their abstract and general nature (see e.g. Kaila-
Behm 1988 and Walton 1986). Another problem with the theo-
ry may be that it is illogical or empirically false. If it
is illogical and inconsistent, it does serve the purpose
of making practice intelligible - on the contrary, efforts
to apply an illogical and inconsistent theory may obscure
reality and make it more or less unintelligible. If the
theory is empirically false, application may be impossible

or it may lead to undesirable results. In short, if a
scientific theory is to be applied in practice, it must
meet the criteria of a good theory (see e.g. Chinn &
Jacobs 1983, 131-145, Meleis 1985, 156-163 and Stevens
1979).

If the application of conceptually known theory succeeds,
it too becomes practical.

5.5   Concluding comments

According to the view presented here there is not neces-
sarily any conflict between theoretical and practical
knowledge. All practical knowledge necessarily involves
theoretical knowledge but all theoretical knowledge does
not necessarily involve practical knowledge.

If there is a conflict, it is more likely to concern the
relationship between practical and conceptual knowledge
because these can exist quite independent of each other.
What is known practically need not be known conceptually
and vice versa.

6. SCIENTIFIC KNOWLEDGE IN INTERACTIVE PRACTICES

In the previous chapter scientific knowledge was quite
generally referred to as a special type of theoretical
knowledge, that is, as knowledge organized in systems of
propositions and prescriptions called theories. Thus the
whole question of scientific knowledge could have been
treated together with the other types of theoretical know-
leuge. The problem of scientific knowledge in interactive
practices, on the other hand, is associated with questions
that concern these sciences and research areas more gene-
rally, which supports the decision to treat the problem of
scientific knowledge in a separate chapter.

This chapter deals with theses III and IV of the study, na-
mely the theses that science in interactive practices is
a way of articulating and creating knowledge that can be
used as internal action determinants in the practice con-
cerned and that the theories in interactive practices have
a direct or indirect practical purpose. These theses are
supported by the pragmatistic-constructivistic view of know-
ledge outlined in chapter 2 and by the conception of re-
search as an auxiliary or support system for practice, out-
lined in chapter 3.

The view of scientific knowledge in interactive practices
must, however, build upon a conception of science and re-
search in general.

6.1 Process and product in science

In studying the nature of science, we may approach the
the problems in two ways. The main interest can be focused
on the process of science, i.e. research, or on the pro-
duct, i.e. knowledge - primarily organized in theories.
Process and product are not independent of each other: the
main criterion of what is to be called scientific knowledge

is that it has been created in and through a process that
meets the criteria of scientific method. (See e.g. Bunge
1967, 3-45 and Niiniluoto 1980, 13)

6.1.1 Science as action system

The process of scientific research can be described as an
action sequence. This was already suggested in chapter 3,
where research was conceived as a support system for edu-
cation and health care. The research process can then be
described as proceeding through the same action phases as
action in the primary practices (fig. 6.1).

In studying science as an action sequence attention can e
focused on the individual researcher as an actor doing
science or on the whole collective of scientists involved
in a common practice. What is also brought out by viewing
research in terms of this general action model are the in-
ternal and external action determinants that influence and
are manifested in the scientific process. This is in accor-
dance with the general view of knowledge presented in chap-
ter 2: knowledge is not something that is passively received
from outside and that is independent of the knowing actor,
it is actively created in the interaction between actor and
environment; what is to be considered as knowledge is then
dependent on factors belonging to the action system as well
as on factors belonging to the situation where knowledge
is created.

Polanyi, Kuhn and Hunt have stressed thoughts along these
same lines.

Polanyi (1958, 1959 and 1964) emphasizes the personal fac-
tor in science, as well as in knowing in general, which has
also been pointed out previously in this study. Science,
facts and theories according to him are always created by
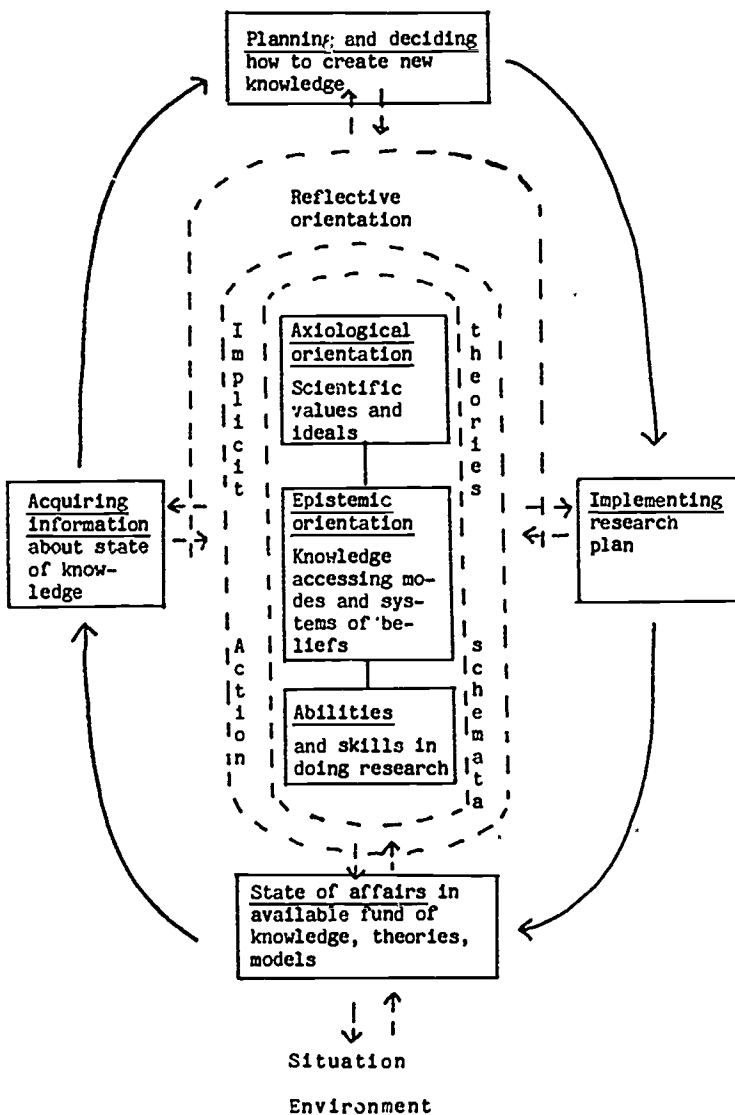
Figure 6.1   The research process as action system

individual scientists, i.e. human beings. Doing research
means mastering the art of knowing, an art that requires
personal involvement like commitment, intellectual pas-
sion and skill.

Kuhn (1970) emphasizes the collective action system rather
than the individual in his theory of scientific paradigms.
The collective paradigm, consisting of values, beliefs and
methodological priorities determines what kind of knowledge
is to be created. With the change in paradigm the pre-
requisites for creating new knowledge change.

Hunt (1977, 1983a and 1987, 105-113) again stresses the per-
sonal component as well as the external situation as fac-
tors determining research. He points out that a specific
theory cannot be isolated from the person who creates and
from the specific historical and cultural context where it
is created. According to him this concerns theories in all
sciences but especially theories of human affairs. Hunt
also claims that the fact that e.g. psychological theories
have had so little influence on practice is due to negli-
gence of this insight:

> "Writing about generalized abstractions, e.g.
> 'System I functioning is characterized by...' we
> created the illusion of generality across the
> cultures and time. I do not mean that we conspired
> to create these illusions; we were simply following
> standard convention in the so-called behavioral
> sciences. I have come to realize that this false
> presentation of psychological theories, out of con-
> text of their personal genesis and their meaning
> in time and place, detracts from their value, and
> virtually ensures that they will not influence
> practice." (Hunt 1983a, 11)

Thus, scientific theories, as well as other types of know-
ledge, are the result of interaction between man and envi-
ronment, where action constitutes the a priori of knowledge.

According to figure 6.1 the the work process in science goes

through the same phases as other action sequences. This can be illustrated by an example.

Example 4

A researcher, who has studied the relationship between theory and practice in different areas of health care education for quite some time, has come to realize that there are very few theories on how learning actually takes place in practical contexts.

Acquiring information. In having realized the lack of theory in the area of practical learning the researcher has already acquired a good deal of information. This is quite natural, because an action sequence never starts from zero. It is just a link in a long series of sequences. However, after this insight the researcher starts to gather information on this problem systematically, going through abstracts, indexes, periodicals and research reports. In this way she gets a picture of what is already known and where the gaps are. She concludes that what is needed, to begin with, is a good description of how learning in practical contexts takes place that would identify the main variables involved.

Planning and deciding. After that the researcher starts planning her study. Since she is not yet going to identify relationships or test hypotheses but rather to identify and describe the main variables involved she settles for a project involving observations, interviews and accounts in combination with critical incidents. She writes a research plan including all the necessary components and gets the required permission and means for the study.

Implementation. Implementing the research plan involves carrying out the study as well as writing a research report and communicating the findings. In this case the researcher has identified a set of variables that she concludes to be important to learning in practical contexts.

New knowledge/evaluation. The researcher herself as well as the scientific and practical community can then evaluate the significance of the knowledge created in this study: in what way has it contributed to our knowledge in this area? The researcher probably goes on to plan her next study, involving an inquiry into relationships between the variables identified.

In going through the research sequence the researcher's decisions are influenced by internal as well as external acti   determinants.

<u>Axiological orientation</u>. The researcher is guided by a
set of values and ideals concerning the process she is
involved in. First of all, she is guided by scientific
values like truth, objectivity and honesty: her primary
concern with the project is to find out what variables
are involved in learning in practice situations.
Secondly, she may also be guided by practical values
and ideals: ultimately she may hope that the knowledge
she creates will be useful in health care education.
A pre-requisite for this is, however, that her research
follows the scientific ideals. If her results are true
and objective it is more likely they will also be use-
ful.

<u>Epistemic orientation</u>. The researcher's epistemic orien-
tation consists of her knowledge accessing mode and of
the beliefs she has established up to now. These beliefs
concern the nature of the research process she is in-
volved in but also the phenomenon she is investigating.
Ultimately her beliefs include beliefs about man and the
world.

<u>Ability</u>. In order to carry out the whole project and
proceed through the sequence the researcher needs diffe-
rent kinds of abilities and skills. She needs ability
to grasp and formulate research problems, ability to
make a realistic research plan and ability to carry out
the investigation and to describe and interpret the re-
sult. In order to to do this she needs, for instance,
skill in observing, skill in reasoning and analyzing,
skill in reading and writing, etc.

The researcher's axiological and epistemic orientation
as well as her abilities are organized into <u>action sche-
mata</u> and <u>implicit theories</u>. The action schemata include
different kinds of operations involved in doing research
and the implicit theories include her values and ideals,
beliefs and principles concerning research as well as
the practice she is investigating. She probably also has
<u>explicit theories</u> concerning these practices, which she
uses consciously as reflective orientation when she ma-
kes her decisions.

The researcher's decisions are also influenced by exter-
nal action determinants. In planning how to carry out
the research she must take into account the context and
the situations where she is going to gather her data.
It is also possible that she will not get all the data
she wants or that she will have to change her timetable
due to changed circumstances.

Thus, research is also a form of practice and viewed as
practice it follows the same principles as any practice.

Much of what has been said about the primary practices can accordingly also be said about scientific practice. Some features may be pointed out:

1. Scientific practice is a creative activity. This means that it is not possible to predict the exact result of the research process - if it were, the whole process would be unnecessary. It also means that it is seldom possible to implement the research plan in detail as it has been formulated. Implementing the plan always involves unforeseen situations, interaction with other people etc., which may require a revision of the plan. In this practice too every phase constitutes an action sequence of its own and movement may also occur in different directions in the sequence. In short, the practice of science is a continuous process of insights and frustrations, trial and error, revising and abolishing old theories, formulating new ones, through which knowledge is continuously created by individuals and collectives in time and place.

2. Scientific research is a manifestation of different degrees of practical knowledge and practical ignorance in doing research. Practical knowledge manifests itself as appropriate action in the various phases of the process and it is organized into action schemata and implicit theories. The action schemata and implicit theories organizing practical research knowledge again are manifestations of an axiological orientation, an epistemic orientation and a set of abilities.

3. The action schemata and implicit theories in research can be conceived as paradigms - this parallel was also pointed out in the analysis of action schemata and implicit theories in the primary practices. On the collective level science in a specific area is a manifestation of a common paradigm, a common way of conceiving research problems, common values, principles and beliefs and common methodological priorities. The individual researcher, being part of the scientific community, usually exhibits a similar

paradigm in his or her research practice.

4. The research paradigms involve both elements that can
be articulated in concepts, propositions and prescriptions
and elements that cannot be articulated. To formulate the
elements that can be articulated is one of the tasks of
meta-science.

5. The practical knowledge in doing research is maintained
and mediated in practice and personal contacts. Like other
practices science lives on in its own traditions. Since
the practical knowledge in research involve elements that
are not conceptualized - some of which are not even possible
to conceptualize - tradition becomes a necessary channel
for communicating this knowledge. As was pointed out pre-
viously this has been emphasized by Polanyi (1958, 17, 49-
65) as well as Kuhn (1970, 40-46). Polanyi also says:

> "The rules of research cannot usefully be codified
> at all. Like the rules of all higher arts, they
> are embodied in practice alone." (Polanyi 1964, 33)

> "The art of scientific work is so extensive and
> manifold that it can be passed on from one gene-
> ration to the next only by a large number of speci-
> alists, each of whom fosters one particular branch
> of it. Therefore science can exist and continue to
> exist only because its premisses can be embodied
> in a tradition which can be held in common by a
> community." (Polanyi 1964, 56)

6. Science can develop within a specific tradition but
sometimes new traditions are created; this was described
by Kuhn (1970) in his theory of normal science and scien-
tific revolutions, i.e. doing research according to a
traditional paradigm or shifting the paradigm, which then
also involves a shift in the conception of the science
concerned and of the phenomena investigated.

Thus, the practice of science resembles in many ways the
primary practices as they have been described in chapter 5.
What distinguishes science from the previously analyzed
practices is, however, that the practice of science has its
own specific goal - scientific knowledge.

6.1.2   Scientific knowledge

At the beginning of this chapter scientific knowledge was characterized as a special type of theoretical knowledge – it is theoretical knowledge produced by research and articulated in conceptual systems.

In the previous section the research process was described in terms of a practice. However, what makes the outcome of this practice scientific knowledge is the use of the scientific method. Since this method is described and discussed in many standard works on science and research it will not be dealt with very deeply here. The main criteria of scientific method are usually considered to be objectivity, criticism, autonomy, fallabilism and progessivism (Bunge 1967, 4; Ketonen 1981, 14, 27; Niiniluoto 1984, 24-29, 35; Tuomela 1983, 113-116).

The knowledge thus produced is usually organized into a theory. According to Bunge (1967, 4, 27) theories are the core of science and they organize facts into patterns or laws. He says:

> "A science is a discipline using the scientific method for the purpose of finding general patterns (laws) (Bunge 1967, 15)."

The general criteria of scientific method can s   'y be accepted in all sciences. Or maybe it would be m   correct to say that they should be accepted, if we want to call something science. Since, ultimately, these criteria can be considered as normative and based on agreement: they are the scientific community's agreement on which criteria are to be met when calling something science or scientific knowledge.

The nature of the theories that are to be conceived as scientific is, however, not self evident. Bunge's view

that a theory ganizes facts into patterns seems general
enough to allow for different types of theories. When he
specifies these patterns into laws, he seems to limit the
patterns to a specific type. Theories specified in this
way cover for example causal theories but not necessarily
hermeneutic interpretations. However, hermeneutic inter-
pretations can well be conceived as facts organized into
patterns.

Different kinds of theories and patterns will be discussed
more extensively later, when theories in interactive disci-
plines are treated. For the time being a scientific theory
will quite generally be characterized as <u>a set of concepts</u>
<u>and sentences, constructed according to the scientific</u>
<u>method, that organize a set of data into a pattern</u>. This
characterization makes it possible to identify different
types of theories.

What is required of a theory, in addition to being justified
by the scientific method, is that it specifies some kind
of relationships between data, concepts and sentences.
Pörn (1985) has put forth a model that specifies the rela-
tionships between data, concepts and theory (fig.6.2).
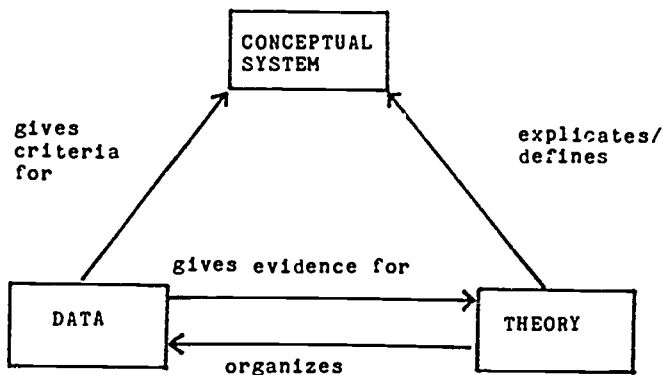
Figure 6.2   The relationships between data, concepts
and theory (modification of Pörn 1985)

One change has been made in the model in figure 5.2 compared to Pörn's original model. The arrow going from theory to data only represents theory as organizing data without specifying what this means. This change has been done in order to allow for different possibilities.

The model can be understood as follows. Every theory is made up of a conceptual system and the concepts are defined and explicated by the theory. The theory is also related to a set of data that it organizes, e.g. by explaining relationships within the set of data. At the same time data gives evidence for or support to the theory. The concepts defined by the theory must also be related to data if the theory including the concepts be supposed to propose something about those data. Thus, data gives criteria for the concepts defined by theory. (See also Pörn 1985)

This model is applicable to all so-called factual sciences, that is, sciences that deal with the empirical reality (see e.g. Bunge 1967, 21-24). Sciences investigating education and health care belong to this category.

Knowledge organized in this way can be analyzed mainly in two ways. Bunge (1967, 15, 29) classifies them into rational or conceptual and empirical analysis. The rational or conceptual analysis deals with the logical relationships between the sentences in the theory and with definitions of and relationships between concepts. Empirical analysis deals with data and its relationships to concepts and theory.

Thus, scientific knowledge organized in theories contain both kinds of truths that were discussed previously (pp. 26-27, 29-30), namely a prioric and a posterioric, formal and empirical or material. These two types of truths thus correspond to the conceptual and the empirical side of the

scientific theory, respectively (see also Eskola 1975, 164-
172, Kaila 1939 and Niiniluoto 1980, 219-228). A scienti-
fic theory cannot do without either one of these aspects.
Purely conceptual reconstructions about the empirical
world are - as Bunge (1967, 29) says - unprovable. This is
another way of saying that pure rationalism does not apply
to the empirical world.

According to the modified constructivistic-pragmatistic
view of knowledge presented in chapter 2 the theories thus
constructed are created in the interaction between man and
his environment. As socio-cultural products they are part
of World 3 and have in that gained status as controlling
factors in the further development of the world.

Since the theories are constructed by actors, in and through
action, action is also a prioric to theory. Theories are
constructed through research and research is action: it
means experimenting, testing, gathering data, analyzing
data, conducting surveys and field studies, asking questions,
constructing and validating questionnaires etc. Thus, know-
ledge is arrived at through a series of more or less compli-
cated operations. Knowledge is always verified or falsified
by action. This was the point also made by Rescher in his
The Primacy of Practice (1973).

The scientific principles can thus be considered as practi-
cal. The whole endeavour of science is, after all, a con-
struction of generations and collectives of actors. In the
same way as knowledge in general is constructed in and
through action and then becomes a determinant of further
action, scientific knowledge too is constructed in and
through action and then becomes a control mechanism for
further action and practice. However, scientific theories
do not influence practice as straightforwardly as know-
ledge gained in the actual practice situation, since it is,
after all, constructed by another type of action, in a

different context.

The pragmatistic - or should we say neo-pragmatistic - view
of science advocated by Rescher and also adopted in this
study does not mean that the role of scientific theories
be always and only to give action recommendations. This
is the conception of the so-called behaviouralistic view of
science as opposed to the cognitivistic view, which sees
the construction of a scientific world view as the primary
purpose of science (see Niiniluoto 1980, 64-67). According
to Rescher's (1973, 3-4) view the construction of a scien-
tific world view can be said to correspond to the theore-
tical purpose of science. But, since science ultimately
is founded on principles of practice, the scientific world
view is also "practical" although it does not include
action recommendations. This is why a "theoretical" theory
- if it is true - also has practical significance (see also
Niiniluoto 1980, 67).

One of the conclusions in the previous chapter was that
all practical knowledge necessarily involves theoretical
knowledge, since action is always a manifestation of a
conception of the world and of principles about how to
act in the world. The theoretical task of science is to
refine and widen our explicit and articulated view of the
world. This can be done without any practical purpose, but
a scientific world view can none the less be used as a
mea. for reflective orientation in different areas of hu-
man action.

What has been said about scientific knowledge so far has
been quite general. When attention is turned to the prac-
tices of education and health care and to the role of
theoretical and scientific knowledge in these areas the
situation becomes more complicated. Since these practices
are very complicated, involving all "three worlds", the
nature of the theories become very complicated too. Further-

more, in studying the sciences of education and health
care we deal with two practices, ei nation or health care
on the one hand and research on the other hand, and the
relationships between them.

6.2   The sciences of interactive practices

What has been said about science and scientific knowledge
in general must also apply to the sciences of the inter-
active practices, if they are to be considered as sciences.
However, because of the complicated nature of these prac-
tices, the sciences too become complicated.

6.2.1   Attempts to classify the sciences of interactive
         practices

According to the frame of reference for this study, oultined
in chaper 3, science and research in an interactive practice
discipline is to be conceived as a second order, auxiliary
practice with respect to the interactive practice concerned.
This makes these sciences more difficult to characterize
and define than the traditional basic sciences. The main
point advancei here is that the sciences of interactive
practices should be conceived as practical sciences and
that practical sciences cannot be classified and defined in
the same way as basic sciences. However, nor is a practical
science the same as applied science. Some of these ideas
were shortly introduced in chapter 3, where the concept of
an interactive practice discipline was characterized. This
chapter will focus on the sciences within these disciplines,
the sciences being only one system in the discipline as a
whole.

Before the concept of a practical science is outlined, some
of the attempts made to classify the sciences of education
and health care according to basic sciences or applied sci-
ence will be investigated.

6.2.1.1 General classifications of sciences

The attempts to classify the sciences of education and health care according to basic or applied sciences usually take their point of departure in general classifications of sciences.

One general system of classification is presented by Bunge (1967, 21-26) (fig. 6.3). He distinguishes, first of all, between basic sciences and applied sciences. What distinguishes these types of sciences from each other is, according to him, the goal: the basic sciences have a purely cognitive aim while the applied sciences have a practical aim. The basic sciences are then divided into formal and factual sciences, the formal sciences being comprised of logic and mathematics and the factual sciences being comprised of natural sciences like physics and individual psychology and of cultural sciences like social psychology, economics, political science and history of ideas. Within the applied sciences knowledge from the basic sciences are used in research in order to achieve practical aims. Bunge also calls these sciences 'technology'. The main branches of applied science are according to him physical technologies, biological technologies (e.g. medicine), social technologies and thought technologies.

Bunge (1967, 24) himself does not seem to take a very dogmatic attitude to his own system of classification but rather invites the reader to rearrange and fill in gaps in the system. One solution that can be questioned is the placement of individual psychology among the natural sciences; this view ignores the way in which the human mind is intertwined in the surrounding culture. Human behaviour and the human mind are much too complicated to be seen only as natural phenomena. The view of medicine as biological technology is also too limited to account for medicine as a whole. It does not seem to cover e.g. social medicine, gene-
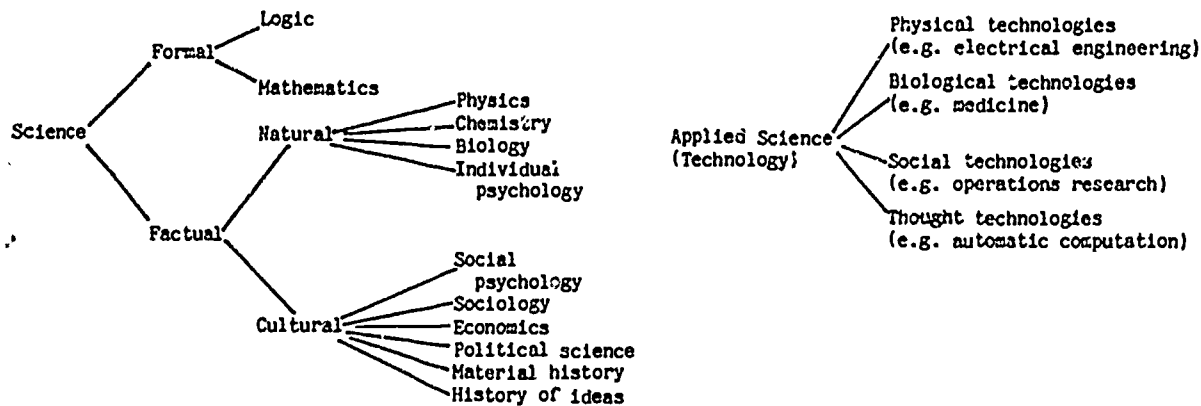
Figure 6.3 Classification of sciences according to Bunge (1)67, 24, 26)

ral practice and psychiatry. And - as will be pointed out
in this chapter - the classification of sciences only into
basic and applied overlooks the characteristic nature of
the sciences that will here be called practical.

While the distinction between basic and applied sciences
in Bunge's mcdel has to do with the aim of science, the
basic sciences are usually classified on the basis of ob-
ject of study; thus we can understand the distinction
between natural sciences as studying different aspects of
nature and cultural sciences as studying aspects of human
culture. Pörn's (1985) suggestion that an autonomuous scien-
ce should be defined on the basis of its own theoreti-
cal perspective, including assumptions about what entities
the science concerned deals with (=ontological pre-supposi-
tions) and what attributes these entities have (=categorial
pre-suppositions), can probably be applied successfully as
a principle for c'assifying basic sciences. This concerns
primarily the so-called factual or empirical sciences, which
are of the main interest here.

The distinction between natural sciences and cultural sci-
ences seems to be general accepted in the literature, but
the cultural or human sciences are often sub-divided into
social sciences and humanistic sciences (see e.g. Nurmi
1981 and Sinkkonen & Hentinen 1983).

A division of the factual or empirical sciences into three
categories is also found in Habermas' (1966 and 1975) and
Jantsch's (1975) conceptions of science, although they use
a different point of departure.

According to Habermas, whose theory was shortly presented
previously in this study (p.35), the three knowledge inter-
ests work as points of departure for classification so
that the technical interest dominates the natural sciences,
while the practical-hermeneutic interest dominates the hu-
manistic sciences and the emancipatory interest dominates

the critical social sciences. Habermas' classification
system is usually presented in the form of a table
(table 6.1)

MEDIUM	KNOWLEDGE INTEREST	TYPE OF KNOWLEDGE	RESEARCH
Work	Technical	Information	Naturalistic
Language	Hermeneutic	Interpreta-tion	Historical-hermeneutic
Autonomy Power	Emancipatory	Criticism	Critical humanistic and social

Table 6.1   Habermas' classification of knowledge inter-
ests   and science (Lesche 1971; Eskola 1975,
25; Lesche & Madsen 1976, '1; Lindholm 1979,
106)

Erich Jantsch has developed   another   way   of categor-
izing   science that can be compared with Habermas' model.
Jantsch starts out from a system theoretical frame of re-
ference. Like Habermas Jantsch (1975, 81-100) classifies
research into three categories. However, the starting
point for Jantsch is not knowledge interests but the re-
lationship between researcher and reality. He calls the
three modes of perception and inquiry 'the rational app-
roach', 'the mythological approach' and 'the evolutionary
approach':

> "-The rational approach assumes separation between
> the observer and the observed, and focuses on an
> impersonal 'it' which is supposed to be assessed
> objectively and without involvement by an outside
> observer; the basic organizing principle here is
> logic, the results are expressed in quantitative
> or structural terms, and the dynamic aspects are
> perceived as change.
> -The mythological approach establishes   a feedback
> link between the observer and the observed, and
> focuses on the relationship between a personal
> 'I' and a personal 'Thou'. Its basic organizing
> principle is feeling, the results are obtained

in qualitative terms, and the dynamic aspects are
perceived as process, or order of change.
-The evolutionary approach establishes union be-
tween the observer and the observed and focuses
on the 'we', on the identity of the forces acting
in the observer and the observed world; the orga-
nizing principle is 'tuning-in' by virtue of this
identity, and the results are expressed in terms
of sharing in a universal order of process (name-
ly, evolution)." (Jantsch 1975, 84)

The three approaches include, according to Jantsch (1975,
81-100) three types of knowledge: the rational approach
gives us know-how or means-end knowledge, the mythological
approach gives know-what and the evolutionary approach gi-
ves us know-where-to. The first approach and type of know-
ledge can be found in the natural sciences, says Jantsch,
while the second approach and its corresponding type of
knowledge can be found in art and the humanities. The third
approach is more overreaching and is used e.g. in the plan-
ning of different systems like agriculture and community
planning.

Jantsch (1975, 83) presents the three approaches in a fi-
gure to which can be added the relevant sciences (fig.6.4).

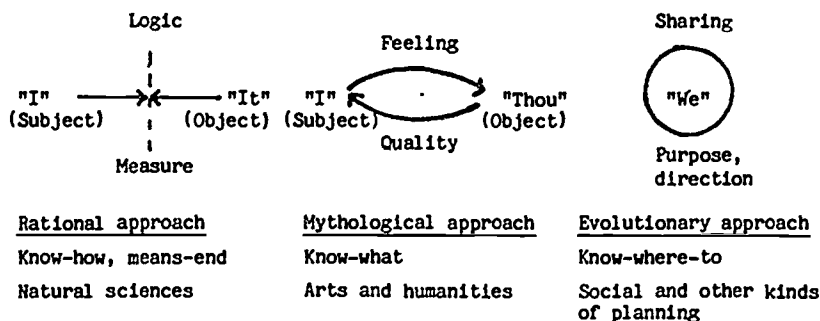| Rational approach	Mythological approach	Evolutionary approach
Know-how, means-end	Know-what	Know-where-to
Natural sciences	Arts and humanities	Social and other kinds of planning

Figure 6.4   Three basic forms of inquiry and their correspon-
ding sciences (modification of Jantsch 1975, 83)

Although there are differences between Habermas' and Jantsch's categories, there are also similarities. Jantsch's rational approach, for instance, seems to have the same characteristics and include the same kind of knowledge as Habermas' information: it includes knowledge of invariances, laws and regularities that can be used in technical means-end calculations, thus also involving control over the processes concerned. The mythological approach, being qualitative, resembles the hermeneutical-interpretative research and they are both manifested in historical-hermeneutic and humanistic research. However, Jantsch seems to emphasize the role of feeling more than Habermas. Between the evolutionary approach and the critical-emancipatory research there is no direct parallel, since Habermas' and Jantsch's different frames of reference are most clear in the descriptions of these categories. Habermas' emancipatory interest and critical research reflects his view of society and its hidden laws, while Jantsch's evolutionary approach reflects the system theoretical frame of reference, involving a view of man and the world as a unitary whole. However, in one respect the evolutionary and emancipatory approaches can be said to resemble each other. Both represent an approach of a higher order than the other two; both represent a stage of research where knowledge serves the reflection upon the laws guiding social evolution and other kinds of evolutionary processes in order to re-direct and change the course of development. Referring to the task of scientific theory we might say that theories created through emancipatory and evolutionary research prescribe new patterns for the state of affairs rather than to organize data into existing patterns.

It must be kept in mind that neither Habermas' nor Jantsch's intention was to construct a system for classifying sciences in the way as e.g. Bunge did. Rather, they investigated types of research or research approaches on the basis of

knowledge interests and relationships between scientist
and reality. Their conclusion is, however, that different
interests and different relationships are characteristic
of different categories of science. The connection between
object of study (in Bunge's terms), knowledge interest and
relationship need not be a necessary one. A researcher for
instance, may approach the social world either rationally
or evolutionarily and serve either a technical or an eman-
ciparoty interest. According to Habermas (1966; 1974, 1-24),
however, a purely technical social theory distorts man's
understanding of himself. Jantsch (1975, 99) finally sees
the three approaches as a hierarchy, where the evolutionary
approach includes the mythological, which in turn includes
the rational approach.

On the whole it seems possible to divide the factual or em-
pirical sciences into three large groups which are not
wholly separated from each other (fig.6.5).
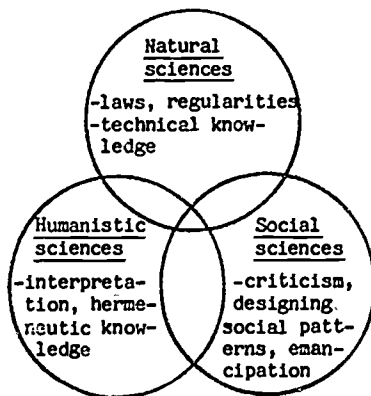
Figure 6.5   The three broad categories of basic, empi-
             rical sciences

This categorization corresponds to the generally accepted
view of groups of sciences, where the humanistic and social
sciences comprise what Bunge (fig.6.3) calls cultural scien-
ces. Here they have been combined with Habermas' ideas of
knowledge interests and Jantsch's ideas of modes of inquiry.
The model in figure 6.5 indicates that there are overlapping
areas, where the object of study may belong to two or more
categories or where alternative interests and approaches
are possible. Such overlappings are also indicated by Nurmi
(1981), who, however, views the overlappings primarily as
applied areas. The view of the basic sciences as overlapping
allows for the possibility of defining a specific science
in alternative ways. Psychology, for instance, seems to be a
science that could be classified in different ways depending
on what basic concepts are used to describe man and what
scientific approach is taken.

6.2.1.2 Attempts to classify the sciences of education and
         health care

Attempts have been made to classify the different sciences
of education and health care in one of the three main areas
or to view them as applied areas that draw on several basic
sciences.

In education, for instance, Wolfgang Brezinka represents a
view that is close to Bunge's (1967, 26) suggested view of
pedagogy as applied psychology. This view also holds a tech-
nical-rational view of education and its sciences. Accor-
ding to Brezinka (1976, 80-82, 106-111; 1977, 84, 95) the
development of personality as well as learning follow cer-
tain laws. The task of educational research is then to
describe these laws and to study how they can be applied
in order to influnce the development of the students in a
favourable way. Thus, education is described as an appli-
cation of scientific laws, whereby the educator changes the
state of the student's personality.

The technical-rational approach that Brezinka represents
has usually been called 'the applied science approach'.
This approach has been criticized for instance by Hunt
(1977 and 1987, 9-36), Tom (1984, 135-140 and 1985),
Carr (1986) and Carr and Kemmis (1986, 55-79). The core
of the criticism says that education is too complicated
to be viewed in this way, that educational interaction
is not the same as a natural process and thereby cannot
be described by a model that has been developed on the pre-
misses of natural science.

A view of educational science as humanistic or cultural has
been put forth by, among other, Wilenius (1976, 39-67 and
1979). He describes education in terms of Aristotle's and
v.Wright's practical syllogism and theory of action, con-
cluding that a humanistic, phenomenological approach is
important in describing educational situations and educatio-
nal acts. He does not, however, rule out positivistic re-
search entirely. This approach emphasizes the role of the
educator's consciousness in the educational process and
thereby also the importance of studying consciousness. An
empirical study representing this tradition is for instance
Sirkka Hirsjärvi's study Aspects of Consciousness in Child
Rearing (1981).

The humanistic science view has been stressed strongly in
in many health care areas in recent years. This concerns
especially the so-called nursing science and the more gene-
ral science of care (see e.g. Sarvimäki & Stenbock-Hult
1986). This view is represented by, among others, Pörn
(1982), Watson (1985), Dunlop (1986), Nordenfelt (1986) and
Eriksson (1987a and 1987b).

Nordenfelt (1986) justifies his conception by saying that
humanistic sciences study intentional human acts and their
products, and since caring consists of such acts, it can be

considered a humanistic science. Eriksson (1987b) again
founds her view of the science of care as a humanistic
science on three premises: 1. The starting point of caring
is the whole and living human being who experiences,
desires and creates, and who consists of body, soul and
spirit. 2. Health means being whole and experiencing one-
self as whole with respect to body, soul and spirit.
3. Caring is a natural concretization of love and the
core of caring is tending, playing and learning in a spi-
rit of belief, hope and love.

Watson describes nursing science in the following way:

> "..., if we view nursing as a human science, we
> can combine and integrate the science with the
> beauty, art, ethics, and esthetics of the human-
> to-human care process in nursing. Human science is
> based upon an epistemology that can include meta-
> physics as well as esthetics, the humanities, art,
> and empirics.
> /.../
> As a human rather than a traditional science, nur-
> sing can view human life as a gift to be cherished
> - a process of wonder, awe, and mystery. Nurses
> can choose methods that allow for the subjective,
> inner world of personal meanings of the nurse and
> the other person. We can choose to study the inner
> world of experiences rather than outer world of
> observation." (Watson 1985, 17)

Watson's way of describing nursing and nursing science thus
seems to correspond to Jantsch's mythological approach.
What is more dubious, however, is that she seems to confuse
nursing and nursing science - she talks of nursing <u>as</u> a
human science, but nursing as such is not a science - and
that she contrasts human science with traditional science.
Human sciences, indeed, have their own traditions and can
be very traditional in their own way. The point Watson
(1985, 8-10) wants to make by this distinction is that she
wants to separate nursing science from medicine by referring
nursing science to the human sciences and medicine to the
traditional sciences, by which she apparently means the
natural sciences or positivistic science.

This attempt to classify nursing science and the science of care as humanistic and medicine as natural science is not unusual but none the less not necessarily justifiable. Bunge (1967, 26), for instance, conceives of medicine as biological technology and Pörn (1982) places medicine among the natural sciences while the science of care, according to him, is a cultural science. Eriksson (1987a, 72-79; 1987b) also makes a distinction between medicine and the science of care. She places the science of care among the humanistic sciences but does not explicitly put medicine in any specific category; the question is, whether or not the premises Eriksson puts forth as the premises of the science of care could be applied to medical care and medical science as well, in the same way as Watson's (1985, 10) human science perspective (emphasizing e.g. human as subject, science as a creative process of discovery, human as mind/body/spirit gestalt of whole being and reality as subjective as well as objective).

This implies that medical science can be as humanistic and holistic as nursing science and the science of care - which makes it even more difficult to make a clear distinction between these two sciences, because many advocates of nursing and caring science expressly want to found the distinction on the difference between nursing and caring science as humanistic and medicine as natural science. The view of medicine as holistic and humanistic does not seem to be foreign among the representatives of the medical discipline. Pellegrino and Thomasma (1981) as well as Fagerberg et al. (1984, 42-56, 242-243) can be seen as representatives of a humanistic medicine, focusing on man as a human subject, a unique person with freedom and responsibility, participating in the social community and capable of caring for others. Holistic and humanistic aspects of medicine have also been stressed by e.g. Rimpelä (1976), Aro (1978), Jääskeläinen (1983) and Sorri and Seppälä (1983).

Thus, it does not seem justified to draw the line between
nursing or caring science and medical science along the
line between humanistic and naturalistic science. If we
are to talk of different sciences at all - a question that
will not be solved here, because it demands a study of
its own - these sciences are very closely related. Stoeckle
(1987, 1) says, for instance: "Medicine's task is patient
care". If this view is accepted, it would be consistent to
also see medicine as a caring science, a view suggested
e.g. by Kalkas (1987; see also Sarvimäki 1986

In addition to the natural science and humanistic science
view, attempts have been made to place the sciences concerned
among the social sciences. In the social science approach
at least two different conceptions can be seen. One is the
conception of these sciences as planning sciences, the
other is the critical science view.

An advocate of the planning science view is Ilkka Niiniluoto
(1984, 193-217). He views e.g. educational science and nur-
sing science (hoitotiede) as planning sciences, which he
sees as a special type of social science The planning scien-
ces differ from the ordinary social sciences with respect
to their practical orientation. Their goal is not only to
describe education and nursing but also to supply administra-
tors with practical knowledge, by which he means knowledge
that makes it easier for them to plan the practices of
education and nursing. He also calls this a kind of "social
engineering" approach. The practical knowledge supplied by
these sciences, according to Niiniluoto, is organized into
technical norms. Thus, they have the form: If you w it to
achieve A and think you are in situation B, you should (it
would be rational for you to) do X. Niiniluoto offers the
following example:

> If we want the citizens to have good language skills,
> instruction in the first foreign language should
> begin in second grade.

A technical norm is true if, in fact, doing X (beginning
instruction in the first foreign language in second grade)
leads to A (good language skills among the citizens). In
addition to being true the technical norm, according to
Niiniluoto, must also be relevant. This means that the goal
specified in the norm must be such that it is accepted in
society at that given time.

Niiniluoto's view of educational and nursing science seems
very limited: to describe the practices and to establish
technical norms. These tasks do not, for instance, allow
for criticism of the goals. He says that the goals must
be accepted by society - but what if the educators and nur-
ses find the goals corrupt and detrimental? Whose task is
it then to criticize the goals and whose task is it to
judge the relevance of the norms? On the whole, Niiniluoto's
view comes very close to the rational-technical approach,
although he sees these sciences as social sciences. Viewed
in the light of the praxis-techne distinction, Niiniluoto
represents the techne-view, separating means and goals,
facts and values, and eliminating the goal- and value-
aspect from science. Technical norms of the type Niiniluoto
mentions can be useful in certain strategic decisions but
if education and health care are viewed as moral forms of
life and as creative and communicative interaction, tech-
nical norms have a very limited function as organizers of
theoretical and scientific knowledge. Niiniluoto's term
'planning sciences' indicates that there might be an evolu-
tionary approach, in Jantsch's meaning, behind this view.
Niiniluoto's point of departure is however quite different
from Jantsch's. He does not emphasize the We-relation
or question the purpose and direction, which is essential
in the evolutionary approach. Rather, as a representative
of a technical view, he takes the goal for granted or
leaves it to the politicians, while science only deals with
the means.

A social science view emphasizing the emancipatory interest
can also be found in health care and education in addition
to the technical-strategic conception. Hilpelä (1980) and
Carr and Kemmis (1986) can be said to represent a critical
science of education, while Hellström (1985a, 1985b and
1985c) has adopted an emancipatory approach to the study
of general practice.

Carr and Kemmis (1986, 51-101, 155-178) analyze wgat they
call the natural scientific and the interpretative view of
educational theory and practice before they put forth
their own critical view. The natural scientific view has
much in common wich the technical-rational view of the
natural science and applied science approach as it has
been presented in this study. The interpretative view
largely corresponds to the humanistic-mythological approach.
The main criticism of the natural scientific view focuses
on the separation of means and ends, facts and values,
which according to Carr and Kemmis is not appropriate in
education. The main limitation of the interpretative view
is in their opinion the exaggeration of the subjective
aspects and isolation from the external social, economic
and political forces. The critical science that they ad-
vocate builds directly on Habermas' critical social science.
According to this view the role of theory is ultimately to
organize action, and the suggest action research as the
type of research that serves the emancipatory and critical
interest.

According to the conceptions of the sciences of education
and health care discussed here, the sciences concerned
have been classified as either natural-technological,
humanistic-hermeneutic or social-emancipatory (or strategic).
The general classification of sciences into natural, human-
istic and social constitutes the point of departure for
this categorization of the sciences of interactice practices.

There is, however, one serious limitation in the whole
endeavour of classifying sciences of interactive practices in
this way. Some of the problems have been pointed out here,
for instance the difficulty of separating different health
care sciences from each other in this way. Carr's and Kemmis'
(1986, 51-101) criticism of the natural science and the
interpretative view of the science of education is also
relevant for the health care sciences. But although this
criticism is relevant, it does not necessarily follow that
the social-emancipatory view as such is the solution. It
certainly adds something to the scene which is missing in
the other two approaches but this does not mean that the
other two have nothing at all to offer - in this respect
Wilenius (1976, 56-67) represents a balanced view.

The point is that these sciences should not be at all placed
into any one of the three categories. A classification
of the sciences of education and health care as either
natural-technological, humanistic-hermeneutic or social-
emancipatory (or strategic) necessarily leaves out two aspects while one
is emphasized. The reason why this classification scheme
is not suitable for the sciences studied here is that it
divides reality into separate categories - natural and
causal processes, subjective and intersubjective meaning,
social and political forces - and investigates each one
of these three categories of reality from its own theore-
tical perspective. As was pointed out previously (p.207),
this may be a fruitful approach in defining basic sciences.
The interactive practices concerned here, however, involve
all aspects of reality. They involve, for instance, instru-
mental interfering with objective, causal processes, stra-
tegic interventions, interpersonal communication and ex-
change of meaning, discoursive reflection and organization
of social action. They involve acting in Umwelt and Eigen-
welt as well as Mitwelt, World 1, World 2 and World 3.
This concerns teaching as well as nursing, medical care and

other sub-practices in edu~ation and health care. And
since the practices as such involve all aspects of reality,
the sciences that investigate these practices cannot be
defined on the basis of only one type of science, investi-
gating only one specific aspect of reality.

6.2.1.3 The multi-scientific view

Since the practices of education and health care involve
all aspects of reality, it is natural to assume that re-
search into these practices must - in one way or another -
combine several scientific areas This does not exclude the
possibility of creating theories specific for the practice-
concerned. This view is advanced e.g. by Nurmi (1981), w.
sees the science of education as a combination of humanis-
tic and social science and medicine as a combination of
all groups of empirical sciences, i.e. humanistic, social
and natural. Sinkkonen and Hentinen (1983), using the same
classification scheme as Nurmi, seem to place nursing
science in the same category as medicine, although they
remark that medicine involves a higher degree of natural
sciences.

Håkan Törnebohm (1985) also dismisses the idea of research
in practice areas representing only one scientific category.
He says:

> "Why does praxis-oriented research tend to be multi-
> scientific?
> I think that the explanation is very simple. It is
> because of the departmentalization of the URA (=the
> Universal Research Area, my comment) as a conse-
> quence of the organization of the university.
> This departmentalization, fragmentalization of know-
> ledge production, badly suits the knowledge need
> of practitioners in different developmental comp-
> lexes." (Törnebohm 1985, 21) (My transl.)

Törnebohm (1985) calls all practices developmental
complexes. A developmental complex is a combination of
different elements: nature, artefacts, the socio-cultural

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world and a private sphere. A developmental complex is
thus a specific combination of different aspects of the
world. (Fig.6.6)

P=private sphere
SC=the socio-cultural world
A=artefacts
N=nature
D=a developmental
    complex
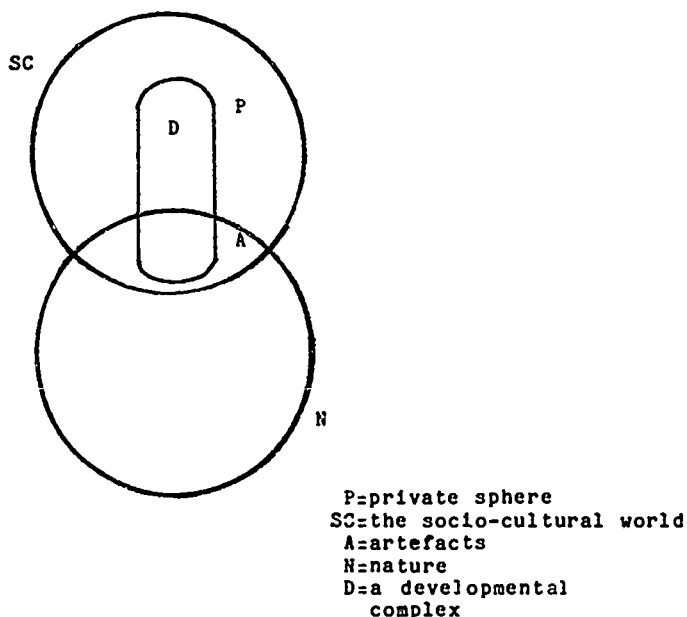
Figure 6.6 A picture of the world, including a
           developmental   complex (Törnebohm 1984 and
           1985)

Thi picture of the world can be understood in terms of
World 1, World 2 and World 3, or Umwelt, Eigenwelt and Mit-
welt, as the terms have been used in this study. Thus,
nature corresponds to World 1 or Umwelt, the socio-cultural
world and the artefacts correspond to World 3 or Mitwelt
and the private sphere corresponds to World 2 or Eigenwelt.
If practices like education and health care then are con-
ceived as developmental complexes, we can easily see, that
also in Törnebohm's view these are made up of a combination
of all elements of the world. This also means that while

the traditional basic sciences are classified on the basis
of whether they investigate aspects of nature or aspects
of the socio-cultural world, research in developmental
complexes cannot follow this distinction. It must be multi-
scientific.

Not only practices like education and nursing but also
science, according to Törnebohm (1984 and 1985) is a de-
velopmental complex. Furthermore, he says that changes in one
complex often induce changes in other complex. This is, for
instance, how science causes changes in other complexes.

Törnebohm (1985) uses medicine as an example of a multi-
scientific research area. In this area research is closely
connected with health care practice, and because of this,
research induces dramatical developmental effects. There is
a considerable amount of border crossing between science
and practice in medicine. According to Törnebohm this is
due to the fact that clinical researchers have a practical
paradigm as well as a research paradigm. The practitioners
too have both a practical paradigm and a research paradigm.
This makes it easier for the scientists to understand the
problems that the practitioners struggle with and for the
practitioners to understand and use research results.

A multi-scientific research area, according to Tornebohm
(1985), consists of three elements:

> K, that stands for one or many compartments of the
> clinical research area,
> B, that stands for one or many compartments of basic
> science and
> P, that stands for one or many practice areas towards
> which the research area is oriented.

Törnebohm calls K, praxis-oriented and B, praxis-relevant.
This means that the clinical research area is directed to-
wards the immediate solving of practical problems, while

the basic research area is only indirectly related to
praxis. There is thus an interaction between B, K and P
so that B supplies K with useful knowledge and K supplies
P with useful knowledge (fig.6.7).

$$B \rightleftharpoons C \rightleftharpoons P$$

B=basic sciences
C=clinical sciences
P=practice
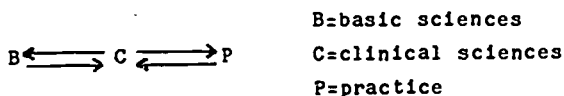
Figure 6.7   Interaction between basic science, cli-
              nical research and practice (Törnebohm
              1985, 22)

Although Törnebohm uses medicine as an example, he means
that any multi-scientific praxis-oriented research area
consists of the same elements and works in the same way.
He also discusses the ideas in relation to educational re-
search.

While knowledge, according to Törnebohm (1985) moves from
B to C and then to P, we can assume that the arrow going
in the opposite direction indicates that P supplies C with
research problems, and that C in turn supplies B with prob-
lems. This is not quite explicit but at least suggested in
Törnebohm's text.

Törnebohm (1985) very clearly states that research in a
practice area must be of value for the practice concerned.
The purpose of research is ultimately to supply the prac-
titioners with new techniques and instruments, knowing how
and knowing that. When the changes induced by research are
progressive, development takes place in practice. For this
to happen it is necessary, on the one hand, that the re-
searchers are familiar with the practice area, and, on the
other hand, that the practitioners have the ability to understand
and apply research results. The double paradigms and border
crossing within the discipline facilitate this, as Törne-
bohm points out.

Törnebohm's ideas are in many ways consistent with the
view advanced in this study. Firstly, as a research area, a
practice involves all aspects of the world in a specific
combination, in the same way as Törnebohm's developmental
complexes. Secondly, sciences investigating practices can-
not be classified in the same way as basic sciences. And,
thirdly, research in a practice area should be directly or
indirectly relevant to the practice concerned.

However, there are also differences, which will be seen la-
ter, in the section on practical sciences. The point of
departure for these differences is that Törnebohm after all
uses the distinction basic sciences - applied sciences
(i.e. clinical sciences) in his characterization of a prac-
tical research area. His view is not consistent with Bunge's
(1967, 24, 26) according to which the research areas con-
cerned here would be classified as entirely applied; after
all, there is also, in Törnebohm's view, an area of basic
practice-relevant research in e.g. education and health care
sciences. But the whole idea of distinguishing between basic
and applied science has its roots in the same rationale:
there is one area of research that investigates the foundation-
al laws and processes and another that investigates how
these can be applied to reach practical goals, and, finally,
there are the practitioners who apply this knowledge. Thus,
although the practitioners have the task of finding relevant re-
search problems, the "flow of knowledge" goes from basic
science to applied science and from there to practice. This
view then represents the approach criticized by e.g. Hunt
(1977 and 1987, 2-3, 31-32), that is, the "outside-in"
approach, according to which the theorists develop pro-
grammes for the practitioners to implement.

Some remarks must be made here. First of all, there are
certainly sub-areas of research in a practice or develop-
mental complex that can be conceived in this way. One
such area is clinical medicine. It must be kept in mind that
Törnebohm (1985) uses medicine as an example of how research

in a practice area works and it seems as if he has thought
especially of clinical medicine - even his term 'clinical
sciences' indicates this. But clinical medicine does not
exhaust the whole logic of practical research and not even
the whole logic of m.dical science. Evaluational research
as well as research in primary health care, therapeutic
interaction and social medicine is unlikely to follow this
same model. Another point to be made here is that Hunt's
(1977 and 1987, 2-3, 31-32) criticism is directed especially
towards the use of the "outside-in" approach in human inter-
action and human affairs not towards the whole approach as
such. Now, medical care is certainly human interaction and
a form of human affairs even in a clinical context,but this
does not rule out the possibility of using the "outside-in"
or basic science - applied research - implementation in some
aspects of this care. Thus we may conclude that all inter-
active practices, including medical care, are forms of human
affairs to which the basic science - applied science -
implementatio. model is not suitable in the sense that it
would account for the whole research approach in these areas.
In some aspects of this research, however, this approach
may be fruitful.

The distinction between basic science and applied science,
basic and applied research, or technology, has also been
discussed by e.g. Pörn (1982 and 1984b) and Eriksson (1986)
One theme in this discussion has been whether a science of
care (vårdvetenskap) can include an area of basic research
that is guided by a pure, intellectual and theoretical in-
terest or whether this science must always have a practical
aim. Pörn (1982 and 1984b) and Eriksson (1986, 38-44) seem to mean
that an area of basic, intellectually oriented research is
justified, while e.g. Törnebohm (1985), as was mentioned,
says that basic research in practice areas must always be
praxis-relevant and Nordenfelt (1986) emphasizes that the
most important task for this science is to find those acts
or interventions that lead to the best possible care. Törne-

bohm and Nordenfelt thus give the whole sciences in these
areas a practical aim, irrespectively of whether we talk
of basic research or clinical and applied research.

I think that this discussion about basic and applied re-
search, basic and applied science, has caused much unnecess-
ary confusion. First, we must bear in mind that there are
actually two lines of thought involved in this discussion.
On the one hand there is the distinction between basic and
applied sciences in the sense that Bunge (1967, 24, 26),
for instance, classifies sciences; according to this dis-
tinction sciences like educational and caring sciences have
sometimes been placed among different basic sciences (see
section 6.2.1.2) or they have been characterized as applied
sciences or technologies that draw their basic knowledge
from other disciplines (e.g. Phenix 1964, 318-320 and Bunge
1967, 24, 26). On the other hand there is the distinction
between basic and applied research in a specific practice
or developmental complex; this idea, put forth e.g. by
Pörn (1982 and 1984) and Eriksson (1983) does not presuppose
that the basic knowledge be derived from other sciences
but allows for the rossibility of both basic and applied
research within the same model. However, the question re-
mains whether this basic research should have a practical
relevance or whether a purely in ellectual interest is
justified as in the basic sciences.

When I say that much of this confusion is unnecessary, my
intention is to show that the notion of a practical science
may overcome these difficulties.

6.2.2 Educational and health care sciences as practical
      sciences

So far the following attempts to classify sciences in inter-
active practices have been investigated:

1. The basic science approach, according to which
the educational and health care science ave been
classified as natural, humanistic or soc_al.
2. The applied science approach, according to which
educational and health care sciences have been char-
acterized mainly as technologies.
3. The multi-scientific approach involving basic
praxis-relevant research in many basic areas and
applied praxis-oriented research.

As was noted previously, the third approach is closer to
the view advanced in this study than the other two. The
main weakness of the first approach is that it does not
take into account that the practices investigated combine
various aspects of reality. The main weakness of the second
approach is that it restricts knowledge use in action to
technical application, thus revealing a technical view on
the practices. While the third approach overcomes the limi-
tations of the first approach, it does not entirely overcome
the limitations of the second approach - it just widens the
range of basic areas to be applied.

One intention of the practical science approach is to also
overcome the limitations of the third approach. The main
points of the notion of a practical science can be stated
as follows.

- The object of study of a practical science is a
  practice; a practice again involves acting with
  respect to different aspects of reality.
- The main purpose of a practical science is to
  make the practice concerned intelligible and to
  guide practice.
- The primary practice and science are both prac-
  tices and the relationship between primary prac-
  tice and science can thus be conceived of as an
  interaction between two action systems.

6.2.2.1 Interactive practices as an object of science

The main points concerning interactive practices as an
object of science have already been put forth in this text.
These points will thus only be summarized here and orga-
nized in a synthesis.

The interactive practices of health care and education can
be conceived as moral forms of life and moral practices.
The purpose of these practices is to contribute to and
manifest a life worth living. Education and health care
involve all aspects of the world: the bio-physical aspects,
the socio-cultural aspects and the subjective and private
aspects. The sciences investigating these practices must
accordingly take into account all aspects of reality.

As forms of practices, education and health care can be des-
cribed in terms of action sequences. Action is carried out
through interaction and co-action, involving instrumental,
strategic, expressive, communicative and discoursive action.
The instrumental and strategic aspects of educational and
caring interaction may well be investigated through a ratio-
nal approach and   with a technical interest. Instrumental
and strategic action involves intervening in natural and
other kinds of processes in order to bring about an inten-
ded result, they represent a type of means-end or technical
action. Research into aspects of educational and caring
action may thus give theoretical knowledge of the processes
involved and of what to do in order to achieve the desired
results. The expressive and communicative aspects of inter-
action in education and health care involve the expression
and transmission of meaning and experiences through symbols.
Research into these aspects require a mythological and
hermeneutical approach, aiming at interpretation and mutual
understanding. Discoursive action can, in a simplified way,
be said to reveal, criticize and break down "hidden laws"
and to re-organize action. Thus conceived it involves an

evolutionary, developmental direction. The research approach
serving this aspect of interaction is the critically and
evolutionally oriented research approach, giving knowledge
of "where to".

As was mentioned previously (p.211) Jantsch sees the three
research approaches as organized into a hierachy where the
evolutionary approach includes the mythological, which in
turn includes the rational. Thus, when the research approaches
are usually connected to three different and relatively
separate groups of sciences and aspects of reality, as they
are represented in figure 6.5, the research approaches
constitute a hierarchy according to Jantsch. The hierarchi-
cal conception can be considered as especially suitable to
account for how the approaches are organized with respect
to scientific research in education and health care. In
these practices all aspects of the world are organized into
a developmental complex, which means that the research
approaches can also be conceived of as an organized whole.
If Jantsch's approaches are combined with Habermas' inte-
rests and types of research, as they were previously (p.210),
the scientific approaches thus form a hierarchy referring
to the different aspects of the reality of education and
health care (fig.6.8).

Emancipatory-
Evolutionary

Hermeneutic-
Mythological

Technical-
Rational
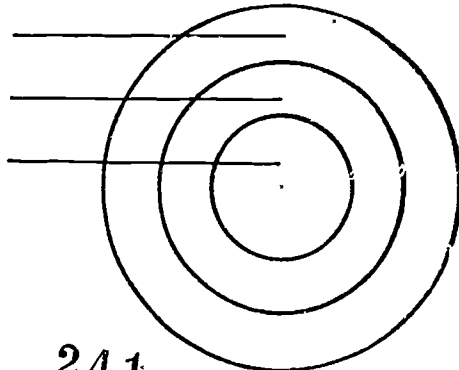
Figure 6.8 Research approaches in education and health care
           sciences (see also Sarvimäki 1985b, 191 and Sar-
           vimäki & Stenbock-Hult 1986)

This hierarchy means that the largest and most overreaching
aim of scientific research in education and the different
sub-practices of health care is to develop these practices.
This may involve searching for and determining goals, crea-
ting new working methods, developing organizations, criti-
cizing and abolishing corrupt or outdated patterns of
action etc. The hermeneutic approach is subordinate to the
evolutionary and emancipatory. It guides research through
which the meanings and experiences inherent in the practice
as a whole and in interactive situations are interpreted.
Hermeneutic understanding can be conceived as a prerequisite
of evolution in practice. It may help the actors involved to
orient towards the future. For instance, in education as
well as in health care all acts can be conceived of as sym-
bols of meaning. This is an implication of the conception
of these practices as moral-communicative practices (pp.112-
118; see also Sarvimäki 1986b, 140-144). Through the herme-
neutic-mythological approach we can investigate the symbolic
aspect of the practices concerned and thus receive knowledge
that can be used to improve the practices as communicative
situations. Educational and caring action also has an objec-
tive or objectifiable side, i.e. it involves processes that
can be measured, quantified and predicted. However, since
the practices have been cha. acterized as moral-communicative,
the objectified and technically approached processes are
only part of a larger communicative context and thus subordi-
nate to this context. For instance, objective disease symp-
toms are only one side of illness and .an be viewed as symbols
of an experiential state, communicat. .g meaning. The re-
search approach investigating the objective and objectified
processes thus c nstitute one type of research adding know-
ledge to a larger ' ole of scientific knowledge that ultima-
tely is to be used to guide action.

Scientific research in the interactive practices studied
here thus consists of combinations of approaches, investi-
gating the different aspects of action and the world. How-

ever, although all three Worlds are -nvolved in these prac-
tices, research need not be limited to the application of
knowledge that has been acquired through investigating
different areas of reality separately; this would correspond
to the applied science approach. In other words, although
the teaching-learning interaction, for instance, involves
physiological and psychological as well as social processes, a
teaching-learning theory need not be a straight application
of knowledge that has been acquired from physiology, psycho-
logy and sociology as basic sciences. The teaching-learning
interaction can be investigated as a unity of its own and
described by concepts that are not mere applications of
physiological, psychological or sociological concepts. This
is what is meant by the notion of <u>practical science</u>. The
practice concerned is treated as a distinct unity, an action
system with its own task in society and with goals of its
own. It can also be described with concepts of its own.
For instance, teacher and student, teaching and studying,
curriculum, instruction and school are examples of educatio-
nal concepts. Similarly, health and illness, patient and
care provider, nursing care and medical care are examples
of concepts by means of which health care practice is de-
scribed. Within the practices different areas of research
and theory construction can be identified. A question that
was slightly touched upon previously was whether it is
possible or fruitful to try to distinguish between separate
practical sciences within a larger practice, and, if such
attempts are made, on what grounds this separation is to be
made. This question, however, cannot be studied within the
limits of this work.

Thus, one criterion of what is meant by a practical science
is that its object of study is a practice that can be de-
scribed by means of concepts of its own. In the case of
educational and health care sciences the object is an inter-
active practice. A practical science, developing theories
of its own, is then a larger notion than an applied science,

which derives its concepts, theories and knowledge from
the basic sciences. A practical science can use applied
knowledge e.g. in solving some technological problems and
perhaps in solving other restricted problems. Applied re-
search is then not necessarily excluded from a practical
science but it does not exhaust the whole task of such a
science.

6.2.2.2   The aims of a practical science

Another point to be made with respect to practical sciences
is that the aim of these sciences is to guide practice.
This view is consistent with Wilenius'(1976, 40-41) view
of the nature of educational science. He claims that edu-
cational science should be practical in Aristotle's sense
of the word. Wilenius puts forth the thesis that educational
science should develop the consciousness of the educator
and through this serve the development of the practice of
education. However, he says, educational science seems to
have become alienated from this aim. It has turned into a
purely theoretical science, developing only the conscious-
ness of the scientists themselves.

Thesis III in this study, which includes one of the main
ideas argued for in this chapter, is consistent with
Wilenius' view. Thesis III claims that the role of these
sciences is to produce knowledge that can be used as an
internal action determinant in practice.

It is important to note that guiding practice does not in-
volve merely - and not even in the first place - giving
prescriptions for the practitioners to follow. As Wilenius
says in his thesis, it is through a development of the
consciousness of the practitioners that guidance is to
take place. If we accept this large view of what is involved
in a practical aim, the conflict between theoretical   and
practical.research turns into a pseudo-problem - that is,

if it has been conceived as a conflict and a problem to
start with. This discussion was shortly introduced pre-
viously (pp.225-226).

Those writers who want to make a clear distinction between
theoretical aims and practical aims often have a more limi-
ted view of what is to be considered as practical than what
has been advanced in this study. When Pörn (1984b), for in-
stance, claims that a science of care must be allowed a
p'rely theoretical aim as well as a practical aim, he means
by 'practical' the same as 'technological'. First of all,
he sees caring as an activity governed by technical norms,
i.e. norms that prescribe what meas'res to take in order to
achieve certain goals. Thus, this view represents what has
here been described as a technical view of this practice.
A set of technical norms comprises, according to him, a pro-
gramme for caring. The task of practice theories (vårdlära)
would then be to codify and evaluate these programmes. The
task of the science of care, again, according to Pörn, is
explain and predict phenomena, that is, to construct descrip-
tive theories. However, the purpose of these theories may
be twofold, on the one hand to serve the practice theories,
on the other hand just to serve a theoretical and intellectual
interest. Pörn calls a science the ultimate aim of which is
to serve practice a technological science. He accepts that
the science of care may have such a purpose but he also
claims that this cannot be the only aim, a purely theoreti-
cal aim, according to him, must also be allowed.

Now we can probably assume that this view of the relation-
ship between practice, programmes, practice theory and
descriptive or scientific theory also concerns other kinds
of practices, like education. It can thus be generalized
and visualized as a hie.archy of practice, programmes, and
different types of theories (fig.6.9). A hierarchy resembling
this one has been presented by Eriksson (1986, 38-44) mainly
as an interpretation of Pörn's view as it was presented in

a previous article (Pörn 1982).

```
                        Theoretical ──────→ ┌─────────────────────┐
                              │             │Descriptive theories │
                              │             │with a purely theo-  │
  SCIENCE OF A PRACTICE       │             │retical aim          │
                              │             └─────────────────────┘
                        Technological ────→ ┌─────────────────────┐
                                            │Descriptive theories │
                                            │with a practical,    │
                                            │i.e. technological   │
                                            │aim- serve practice  │
                                            │theories             │
                                            └─────────────────────┘
                                                      │
                                                      ▼
                                            ┌─────────────────────┐
                                            │Practice theories,   │
                                            │codify and evaluate  │
                                            │programmes for prac- │
                                            │tice                 │
                                            └─────────────────────┘
                                                      │
                                                      ▼
                                            ┌─────────────────────┐
                                            │Programmes for prac- │
                                            │tice, sets of techni-│
                                            │cal norms            │
                                            └─────────────────────┘
                                                      │
                                                      ▼
                                            ┌─────────────────────┐
                                            │Practice, activity   │
                                            │governed by technical│
                                            │norms                │
                                            └─────────────────────┘
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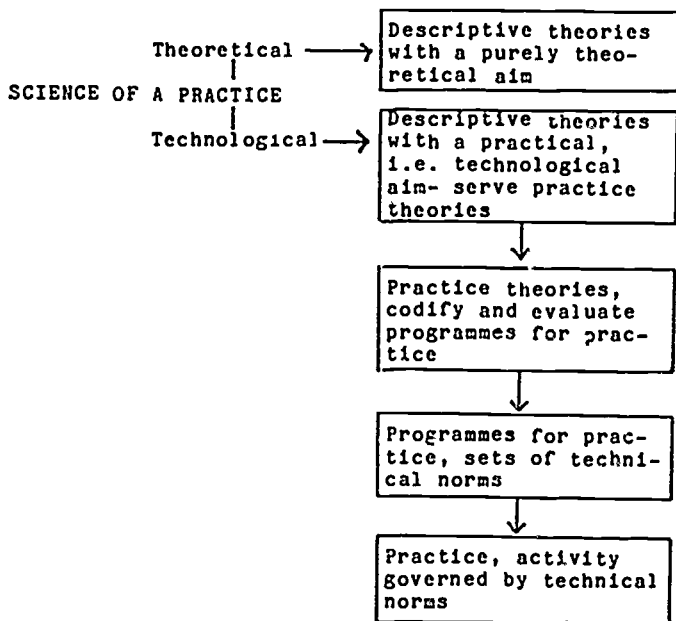
Figure 6.9   The relationship between practice, programmes
             and different types of theories (interpretation
             of Pörn 1982 and 1984)

This view of the relationship between theoretical and prac-
tical aims of a practical science can be compared with the
views of Niiniluoto (1984), Tönebohm (1985) and Nordenfelt
(1986) that have been commented on previously in this study.

Niiniluoto (1984), for instance, seems to make the same
main distinction as Pörn. The planning sciences, as he
calls them, have two aims: to describe the practice concerned
and to formulate technical norms. He does not discuss whether
the descriptive theories should only serve the formulation
of technical norms or whether they may also serve a purely
theoretical aim. At 'east he does not exclude this possibi-
lity.

Törnebohm (1985) and Nordenfelt (1986) again seem to be
of a different opinion. As was pointed out in section
6.2.1.3, research in a practice area, according to Törne-
bohm, should be either praxis-relevant or praxis-oriented,
praxis-relevant research corresponding to Pörn's descrip-
tive theories with a technological aim and praxis-oriented
research corresponding to Pörn's practice theories. Norden-
felt (1986) also advocates the view that the aim of a science
of practice (in his case a science of care) is to help
to find acts that realize the best possible practice. Thus,
Törnebohm and Nordenfelt do not take into account descrip-
tive theories with a purely theoretical aim.

According to the view advanced in this study the conflict
between theoretical and practical aims in practical sciences,
to a large extent, can be seen as a pseudo-problem that
has arised out of too limited a view of how theory enters
practice. According to Niiniluoto and Pörn scientific-theo-
retical knowledge is used in practice in the form of an appli-
cation of technical norms. Törnebohm does not use the same
terminology, but in his model too basic science enters prac-
tice through the mediation of clinical research. This is
certainly one way in which theory is applied but not the
only one. This again has to do with the complicated nature
of educational and caring practice. The technical aspect is
only one aspect.

In this study educational and health care practices have
been described as moral forms of life, as communicative and
creative interaction and co-action, as a process of "rea-
ding" and "flexing" that has an interpersonal as well as a
socio-cultural level. In this process there are not necessa-
rily any fixed goals or ready made programmes. And what the
practitioner needs is not inte the first instance a set of technical
norms to implement but a view of the practice that helps
nim to understand the situation he is involved in, that

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helps him to see the relevance of his action in a socio-
cultural context, that helps him to understand the other
participants and himself and that helps him to plan and
choose between different courses of action. To do all this
the practitioner needs more than a set of technical norms,
although this may also be useful. Since the practitioner is
not primarily an applicator of technical norms but an
actor reflecting-in-practice, he needs <u>a theory that he can
use as a means of reflection-in-action</u>. Such a theory may
well be a theory of the type that Pörn calls purely theo-
retical.

Thus, a practical aim is not the same as a technical aim.
The technical aspect is part of the practical but it is
not synonymous with it. Parts of the practical aim of re-
search can be reached by so-called technological research
but in a practical activity research with a purely theore-
tical aim, i.e. with the purpose of constructing descriptive
theories, may also be practical. Actually, a practitioner can
not do without this type of theories if he is to know what
he is doing. Then there is no real conflict between theore-
tical and practical aims: a theory that is constructed with
a theoretical aim may be very practical.

There are, then, different types of theories in a practice
area and these theories are linked to practice in different
ways.

6.2.2.3 Different types of theories in a practical science

The nature and role of theory has been discussed by seve-
ral authors in the area of education. In the health care
area theories have been discussed especially in the nursing
discipline. The discussions have concerned, among other
things, the relationship between theories in practice areas
and theories in natural and other basic sciences, and it has
also concerned the nature of practice theories.

According to D.J. O'Connor (1968, 75-76) the term 'theory' is used in four different ways:

1. as a body of related problems, e.g. theory of knowledge, value theory,
2. as an organized conceptual system without prac-tical connections, e.g. class theory and theory of numbers in mathematics,
3. as a set of rules guiding practical activity, especially activities that are complicated and systematic,
4. as a set of confirmed hypotheses, e.g. theories in natural science.

Educational theories belo g to group 3, accor-ing to O'Connor. The task of educational theories, he says, is to explain and justify the techniques that are used in education; the justi-fications must be drawn from basic sciences like psychology (O'Connor 1968, 5, 99; 1973).

On the whole O'Connor (1968, 99-103; 1973) sees the natural scien-ces as an ideal and in his opinion educational and other similar theories cannot claim to be real, scientific theories unless they reach this ideal:

> "We can summarize this discussion by saying that the word 'theory' as it is used in educational contexts is generally a courtesy title. It is justified only where we are applying well-established experimental findings in psychology or sociology to the practice of education. And even here we should be aware that the conjectural gap between our theories and the facts on which they rest is sufficiently wide to make our logical consciences uneasy. We can hope that the future development of the social sciences will narrow this gap and this hope gives an incen-tive for developing these sciences." (O'Connor 1968, 110)

O'Connor thus represents an applied science-conception of education and the theories he looks forward to are to be conceived as applications of mainly psychological and socio-logical theories. These again should be developed in the same direction as theories in the natural sciences. O'Connor's

view is thus similar to Brezinka's (1976, 82 and 1977, 84, 95) and also implies the same technical rationality as Brezinka advocates.

O'Connor's view has been criticized by, among others, Paul Hirst (1969 and 1973). According to Hirst, theories in natural sciences are no ideal for educational theories, because their role is not the same. The role of educational theories is to guide action; thus, they should be practical theories. However, if a theory is to guide educational practice, it cannot be a mere transformation of theories in natural sciences. It must also include e.g. moral and metaphysical elements. There are, according to Hirst, different kinds of practical theories depeneding on what kind of practice they are supposed to guide. Engineering, according to him, can rest on theories that are derived from the natural sciences but e.g. educational and medical theories cannot exclude the value and metaphysical elements.

The same type of discussion can be found among nursing theorists. Some of them view only decriptive theories as real, scientific theories and see the natural scientific theories as an ideal. Others again advocate practical theories as the type of theori·s that are needed in practical disciplines like nursing; the practical theories are usually considered as including elements other than the descriptive theories.

Lorraine Walker (1971) belongs to the first category of nursing theorists. She wants to reserve the term ¡'theory' for scientific, descriptive theories. 'Practical theory', according to her, is used to indicate practical principles or directives to which the term 'theory' is not suitable at all.

James Dickoff, Patricia James and Ernestine Wiedenbach, again, (Dickoff & James 1968; Dickoff & James & Wiedenbach 1968a

and 1968b) seem to mean that the aim of nursing research
is to construct theories that can be used to guide nur-
sing. They distinguish between four levels of theory:
I. Factor-isolating theories, II. Factor-relating theories
(situation depicting), III. Situation-relating theories
(predictive and promoting or inhibiting), and IV. Situa-
tion-producing theories (prescriptive). The aim then is to
reach level IV, to construct situation-producing theories
that specify the goal for the activity, that formulate pre-
scriptions for goal-attainment and that include a survey
list of those aspects of the activity that are not formula-
ted in the goal or the prescriptions but that none the less
should be payed attention to (e.g. patient, framework,
dynamics).

Naturally, much more than the books and articles presented
here has been written on theories and theory construction
in education and different health care disciplines. The
theorists chosen here, however, are often referred to and
well represent the main positions in the question of scien-
tific and practical theories in practice disciplines.

We can see that mainly two pairs of terms are used to
distinguish between the different types of theories. On the
one hand distinction is made between scientific and prac-
tice or practical theories, on the other hand between
descriptive and prescriptive theories. Since the terms
'descriptive' and 'prescriptive' tell what the theories are
supposed to do, this distinction will be used as the main
distinction here.

A descriptive theory is usually defined as a theory that
explains reality and that also can be used to predict
events. This type of theories also include theories that
interpret data. (Pörn 1984 and 1985)

If the three research approaches are used as a point of

departure, three types of descriptive theories can be
conceived of: 1. theories that include causal explanations
and quantitative connections, 2. hermeneutic, interpreta-
tive theories that re-identify data (Pörn 1985) and 3. cri-
tical, emancipatory theories that criticize data. According
to Pörn (1985), one type of description can be part of
another type. Explanations in natural sciences, for instance,
are mainly of the first type, but they include elements of
the second type that helps re-identify data before the
connections between them are sought. Theories in the huma-
nistic sciences, again, are mainly of the second type but may
include elements of the first type. According to the view
of practical sciences that has been advocated in this study
the three research approaches comprise a hierarchy involving
all approaches (fig.6.8). This means that all three types
of theories are needed in a practical science. Figure 6.8
indicates the main hierarchy of these theories, but it must
also be kept in mind that one and the same theo.v may in-
clude elements from separate types in the way suggested by
Pörn.

While the descriptive theories explain, interpret and cri-
ticize the world as it appears through a set of data, the
prescriptive theories tell how things should be and what
should be done in order to achieve and manifest what ought
to be. These theories thus include elements like those
suggested by Hirst (1969) and Dickoff and James (1968).

Descriptive theories have sometimes been compared with a
map and prescriptive theories with a design or plan. This
metaphor is used e.g. by Pörn (1988). This means, according
to him, that we use different criteria in judging the corres-
pondence between theory and reality. If the map does not
correspond to reality, we conclude that there is something
wrong with the map, i.e. with the theory. On the other
hand, if we have a design or plan of how to build a house
and the house we have built does not correspond to the
design, we conclude that there is something wrong with the

house, i.e. with reality. Pörn also calls the descriptive
theories 'theories of practice' and the prescriptive theo-
ries 'theories for practice' and concludes, as in his
previous articles (Pörn 1982 and 1984), that both types of
theories are justified in a practice discipline like nur-
sing. The conclusion may also be made that by 'descriptive
theories' Pörn means the same as 'scientific theories' and
by 'prescriptive theories' the same as 'practical theories',
in Walker's sense of the words, since he explicitly refers
to Walker in the previous articles.

As was argued previously in this study (pp.235-236), the
idea that these two types of theories are justified in a
practice discipline is quite acceptable. What was criticized
was rather the view that it is only the second type of
theories that is used in practice and that the function of
the first type - with respect to practice - is only to serve
the second type. This conception expresses a very limited
view of how practitioners work, for instance, within health
care and education. If we want to use the map and plan
metaphor, we can say that a practitioner needs not only a de-
sign or plan but also a map. This again has to do with the
complicated nature of these practices. As creative processes
- a view that has been advanced in this work - these prac-
tices do not involve only "making" according to a fixed
design or recipe but "designing while making", to use Har-
rison's (1978, 13, 136-143) terms. This is also what is
involved in the conception of these practices as praxis
rather than techne. Since praxis does not separate means
from ends and facts from values in the same way as techne,
the praxis-view also has implications for what is to be
conceived of as a practical theory.

Now we can return to the conception of a practical theory
and to theses III and IV, namely that science i. an inter-
active practice is a way of articulating and creating
knowledge that can be used as an internal action determinant

and that the theories constructed in these sciences should
be conceived of as practical irrespectively of whether
their purpose is directly practical or theoretical.

6.2.2.4 Practical theories

One of the main ideas argued for in this work is that know-
ledge is an internal action determinant, since man, as a
knowing being, is at the same time a living and acting
being. The role of knowledge is to guide human living and
acting. This also concerns scientific and other kinds of
theoretical knowledge, since they are - as the term indicates -
only special kinds of knowledge.

This becomes especially apparent in practices like education
and different areas of health care, which are conceived of
as forms of life and action systems. The role of theories
in these practices can thus be said to guide practice. But,
if they are to guide practice, they cannot include only
technical norms and prescriptive programmes, since these
are insufficient as guides of practice in these areas.

A practical theory, in the sense of a "guide", should in-
clude a range of various elements, of which the following
ones are to be seen as examples:

> - causal and other types of similar descriptions
>   and explanations,
> - descriptions and frameworks that can be used to
>   re-identify data,
> - descriptions and frameworks that can be used to
>   criticize prevailing conditions in the practi-
>   ces,
> - specifications of the goal or the goals that
>   give direction to the practice,
> - principles and prescriptions that are to be fol-
>   lowed,
> - values that are to be realized.

This list of examples indicates that a practical theory
is not to be conce' ed of only as a set of technical
norms. It may also include, as Hirst (1969) points out,
moral and metaphysical elements. The need for ethical
guidelines is indeed recognized by Pörn (1984) but he sees
them as separate from the practice theory; Nordenfelt
(1986) seems to be of the same opinion.

If practical theories are to include all - and maybe even
more - elements mentioned,it is unlikely for one and the
same theory to do everything that is expected of a prac-
tical theory. As e.g. Walker and Avant (1983, 4-9) point
out,there are different levels of theory: meta-theory,
grand theory, middle-range theory and practice theory.
According to the conception of practical theory advocated
in this work such a theory is not restricted to what
Walker and Avant call practice theory (specification of a
desired goal and a set of prescriptions for the achieve-
ment of the goal) but rather there may be different levels
of practical theories. A practical theory on the meta or grand
level is likely to also include metaphysical and explicit
value elements. Walker's and Avant's practice theory
corresponds more with e.g. Pörn's concept and involves what
might be called, i. the context of this study, an instrumen-
tal or strategic theory - which again can be seen as one
type of practical theory, or as a practical theory on a
specific level, but not as an exhaustion of the notion of
a practical theory. Thus, within a practice discipline
a wide range of practical theories are needed - stratetic
and instrumental theories, ethical theories, critical
theories etc. These can be combined in different ways.

Now we can also return to the figure representing the re
lationship between data, concepts and theory (fig.6.2, p
200). A similar type of model can be used to describe how
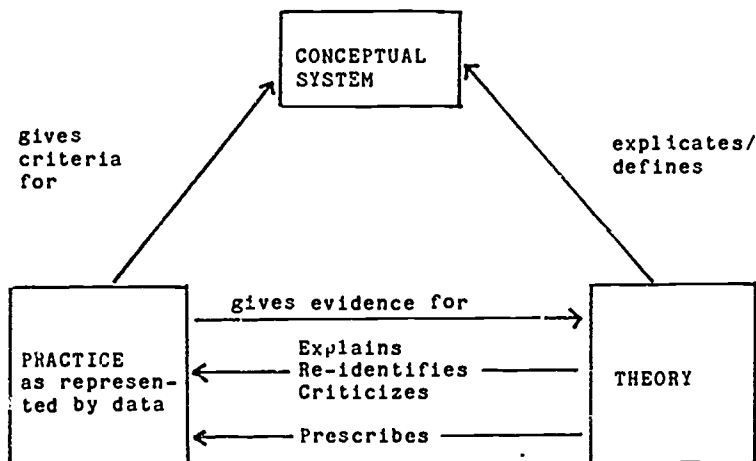a practical theory with its different elements works (fig.
6.10).

Figure 6.10 Connections between theory and practice

In figure 6.10 data represents a specific practice, e.g.
education or health care; data is gathered from this spe-
cific practice. In the same way as in figure 6.2 data
provides criteria for the concepts that are explicated and
defined by the theory. The link between theory and prac-
tice is however slightly different. As in figure 6.2 the
theory explains and re-identifies data but, since criti-
cal theory was added to the scientific approaches, theory
can also be said to criticize practic: as it is represented
through available data. In addition to this, theory also
prescribes practice. When theory is conceived of in this
wide and differentiated way, data gives evidence for some
elements of the theory but not for all. The critical and
prescribing elements involve value judgments, which are
no. supported by data in the same way as the explaining
and re-identifying elements. This again has to do with the
nature of the map-elements as systems of actuality and the
design- or plan-elements as systems of ideality (Pörn 1988).

The actuality and ideality aspect of a practical theory
can be understood against the background of what a theo-
ry is supposed to do within the framework of a practice.
If a theory is conceived of as an internal action deter-
minant, e.g. as in figure 4.9 (p.153), the function cf
theory is on the one hand to interpret, explain and criti-
cize data, that is, the acquired information. This involves
the map elements of the theory, or the actuality system:
the actor tries to achieve explain and interpret what is
the case and understand data in a critical way. When the
actor is involved in the planning and deciding phase again
he utilizes the ideality system in designing what courses
of action to implement. Thus, a theory that is to guide
action - a practica. theory - presupposes descriptions as
well as prescriptions.

6.3 Science and practice

The role of science in a practice discipline is thus to
create theories that can be used as guides in practice.
This view corresponds to Wilenius' (1976, 39-41) conception
of the science of education as a support system for the
practice of education. Science in a practice discipline is
thus simultaneously a science of and for practice. Accor-
ding to Nurmi (1981), all science is actually to be conceived
of as a social institution that strives to guide practical
activity.

The view of science in e.g. education and health care as
action systems guiding the primary practices is presented
in figure 3.1 (p.68). Science is here conceived of as a se-
cond order action system together with education and admi-
nistration (see also Wilenius 1976, 39).

The view of practices of different orders within a practice
discipline can be compared with the indivudual as compri-

sing action systems of different orders. This view has
been elaborated e.g. by Frankfurt (1971) and Pörn (1981
and 1984b).

Man can be described as an agent or a subject, whose
action runs through the same phases as all action systems.
As a first order action system man acts in relation to
the environment and other agents. However, due to his
symbol-making capacity and consciousness, man is also a
self-conscious and self-reflecting being. This means that
man can acquire knowledge of himself and his action, and
also, that he can control himself as an action system and
develop himself. These processes can be conceived of as
second order activities, since the object of the activities
is man himself. Man's second order action systems can be
said to have primarily three functions with respect to his
first order action system: 1. an informing function, meaning
that man can acquire self-knowledge and, consequently, take
a reflective attitude towards himself, 2. a controlling
function, meaning that man can develop self-control; he can,
for instance, decide whether or not to act upon his first
order will, 3. a developing function, meaning that man can
consciously set out to change his first order action sys-
tem. (See also Sarvimäki 1986b, 27-28, 167-168)

The second order systems of a practice can be said to per-
form the same tasks. They acquire information of the first
order practice and investigate it critically. They control
the primary practice and develop it. All three secondary
practices perform all three tasks in their own way. The re-
search system thus acquires information of the primary
practice and investigates it critically. Research also
controls primary practice and contributes to the development
of the primary practice. Scientific research performs its
tasks by creating theoretical knowledge that can be used as
internal action determinants.

6.4   Theories in, of and for action

The relationship between science and practice can thus
also be seen as a relationship between different types of
theories in action and as a result of action.

As was pointed out previously, the descriptive theories nave
often been called theories of practice while the prescrip-
tive theories have been called theories for practice (Pörn
1982 and 1984b). As I have argued in the previous
section,a practical theory - i.e. a theory guiding practice -
is a theory of as well as a theor) ... . If by a scientific
theory is meant a theory that is a product of scientific
activity, a practical theory may well be scientific: it can
be a result of empirical as well as other types of investi-
gations, e.g. ethical, conceptual, philosophical, etc. This
view of what is meant by a scientific theory is then larger
than e.g. Walker's (1971) and Brezinka's (1978, 38) views
according to which only theories that have here been called
'theories of' can be called scientific. All practical theo-
ries are not scientific. They can also be a result
of traditionally inherited conceptions and principles.

In addition to theories of and for practice theories in prac-
tice have been treated in this study. A theory in practice
is one that is actually used in practice - either implicitly
as embedded in action or explicitly as a means of reflective
orientation. The possibility of the technical norms being
implicit is also recognized by Pörn (1984), but according
to the view advanced here all ''ements of a theory may be
implicit. If a scientific theory is used in action, it be-
comes a theory-in-action.

The relationship and development of the different types of
theory can be described as follows. The starting point of
the interaction between the different types of theory starts

with practice. Practice is always a manifestation of an
implicit theory but it is also always primary to the ex-
plicit theory. Entwistle (1976, 46) puts it in the following
way:

> "For, logically, practice is prior to theory. It
> is not possible to formulate theoretical maxims
> pertinent to a skill aside from prior existence of
> the skill in fact or in imagination."

The implicit theory can be made explicit through everyday
reflection on and articulation of experiences or a theory
can be constructed through different kinds of scientific
research. In this way we get theories of and for practice.
These can be used in the practice as reflective orientation.
By means of theory the actors explain, interpret and criti-
cize their practice as well as formulate prescriptions to
be implemented. (Fig.6.11)

DP=deciding&planning
I =implementation
SA=state of affairs
AI=acquiring infor-
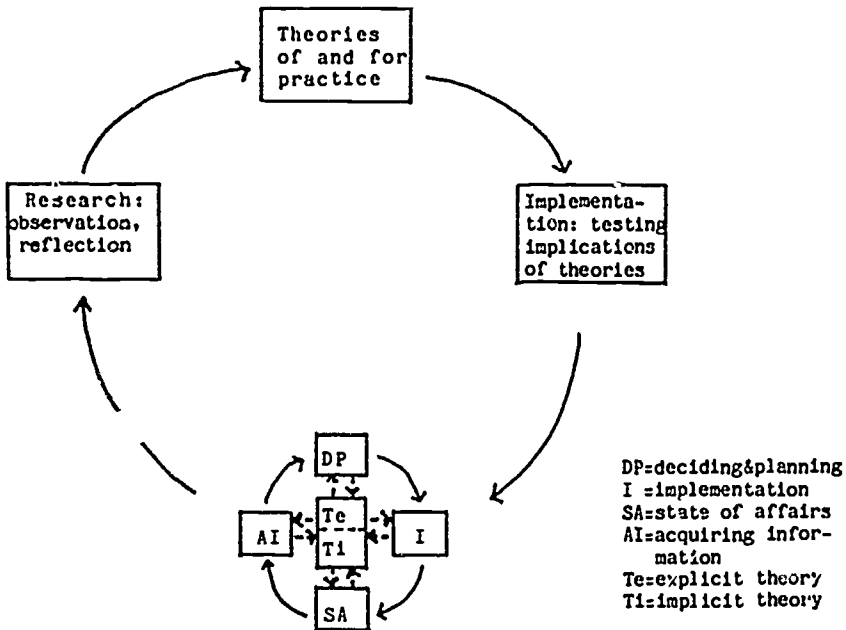   mation
Te=explicit theory
Ti=implicit theory

Figure 6.11 Theories in, of and for practice

In figure 6.11 the practical process, the scientific pro-
cess and the learning process are united. The practical
process, guided by implicit and explicit theories-in-
action, constitutes the starting point of the developmental
process. The phases in the research process correspond to
the phases in the process of experiential learning as pre-
sented by Kolb (see p.175). The relationship between prac-
tice and research can thus be conceived as a process of
learning, where the use of new theories-in-action can help
the practitioners to guide their action in new ways. Practice
and research thus constitute a common action system, where
a close interaction between the various action systems can
promote a common developmental process.

7. DISCUSSION AND CONCLUSIONS

This study started out with the classical definition of
knowledge as a well justified true belief and with Ans-
combe's _emark that this view of knowledge has been domi-
nating epistemology, setting, for instance, the whole
question of practical knowledge aside. By investigating
knowledge in interactive practice disciplines, like educa-
tion and health care, I have wanted to widen the conception
of knowledge in these disciplines as well as generally.

The rationale underlying the study follows the aims and
theses, which correspond to each other. I shall use these
aims and theses in structuring the discussion.

Aim 1. To formulate a view of the role of knowledge in an
interactive practice.
Thesis I. The role of knowledge in an interactive practice
is to guide practice.

This thesis was founded on the pragmatistic epistemology of
e.g. Dewey and Lewis. The fact that it is g'ren this prag-
matistic background ultimately means that this conception
of the role of knowledge is not restricted to interactive
or other kinds of practice. Ultimately it means that the
role of knowledge in general is to guide action. It must t
emphasized, however, that this interpretation of pragma-
tism does not necessarily mean the same as useful, in the sense
that the only role of knowledge is to supply the means for
achieving certain ends. Rather, it means that there is a
constant interplay between knowledge, action and values
and that knowledge which is supposed to guide action must
guide not only towards the achievement of certain ends but
also towards a wider orientation in reality, to the setting
of goals, to evaluation of action and so on. When an
actor acts appropriately he is said to have practical
knowledge.

Aim 2. To investigate and clarify different types of knowledge in an interactive practice.
Thesis II. The different types of knowledge in an inter-active practice consist of value-knowledge, factual know-ledge and procedural knowledge; some knowledge is unarti-culated, some articulated.

In the context of an interactive practice like education and health care, value-knowledge stands primarily for moral knowledge, since the practices concerned are characterized as moral forms of life. Factual knowledge is interpreted in a way that may be larger than the usual conceptions of factual knowledge. Here factual knowledge refers to systems of belief that are constructed through empirical, .ational and metaphorical processing of information. Procedural know-ledge refers to the mastery of abilities and skills. These types of knowledge can be manifested in action and they can be articulated in everyday language, in art and in scien-tific theories. When these types of knowledge are manifested in action they guide the acquiring of information and planning and deciding as well as implementation and evalua-tion. Practical knowledge is a manifestation of all three types of knowledge.

Aim 3. To investigate and formulate a conception of science in an interactive practice discipline.
Thesis III. Science is a way of articulating and creating new knowledge that can be used as an internal action deter-minant in the practice concerned.

Science in an interactive practice discipline is a science of interactive practice as well as a science for interactive pra ...ce. It is a practical science in the old Aristotel·an sense. Sciences of interactive practices are difficult to classify in the same way as basic sciences, since the object of these sciences involves all aspects of reality. Thus, these sciences must combine various approaches and theore-

tical perspectives. The role of these sciences is to
help the practitioners explain, interpret and critically
understand their practice and to help them acquire infor-
mation, plan and decide action as well as implement and
evaluate action. The practical role of these practices is
also formulated in the conception of the sciences as
auxiliary or support systems for the primary practice.

Aim 4. To clarify the concept of theory in an interactive
practice discipline and to investigate different types of
theories.
Thesis IV. The theories of an interactive practice can have
both a theoretical and a directly practical purpose but
the theoretical purpose is also indirectly linked to the
practical.

Since the role of knowledge, according to the view presented
in this work, is to guide action directly or indirectl ,
this is also the role of knowledge organized into theories.
In this respect there is no actual conflict between so-
called descriptive and prescriptive theories. The view that
only prescriptive theories are practical, i.e. used as
guides in practice, reveals a limited conception of how
practitioners work. The theory that is manifested and
applied in action cannot be merely a set of technical norms.
A practitioner also needs a view of the situation and the
context in which he works, he needs to understand himself
as well as the other participants, th is, he needs a
descriptive theory. According to this view of how a practi-
tioner works,he is seen as a reflective and creative being
who uses theory as a means of reflective orientation.
In a practice discipline three types of theories can be
seen: theories of practice, theories for practice and theo-
ries in practice. They all have their distinctive roles and
feat res. The relationship between research and practice
can ul mately be seen as a process of common learning and
development.

As a general conclusion of the investigation made, we can put forth that the classical and largely accepted definition of knowledge as well justified true beliefs is too limited to account for all kinds of knowledge. By the study of knowledge in interactive practices I have wanted to point out that in these practices true beliefs are only one type of knowledge. Since this is so in the interactive practices it must also be so generally. Many of the scientists referred to in this work have indeed realized this and suggested other kinds of knowledge like personal knowledge, esthetic knowledge, moral knowledge, practical knowledge, procedural knowledge and familiarity. By studying these kinds of knowledge in the context of an action system, I have tried to achieve some kind of coherence and systematization of these types of knowledge. The different types of knowledge have thus been understood as parts of different internal action determinants.

Since the definition of knowledge as well justified true beliefs is too narrow and refers to only one type of knowledge we need a larger definition that covers all types. The definition I want to suggest is: <u>Knowledge is correct information</u>. This definition is not to be considered as new and original in the sense that it is the conclusion of this sole study. Rather, it is the view of knowledge that seems to be either implicitly or explicitly accepted in the so-called cognitive psychology and pedagogy and information theory In his book <u>Knowledge and the Flow of Information</u> Fred Dretske (1981, 85-105), for instance, criticizes the classical definition of knowledge and also suggests a view of knowledge that puts knowledge in an information theoretical perspective. This view of knowledge can then also be seen as corresponding to the view dominating many of the studies used here, although they do not always explicitly define knowledge (see e.g. Leino 1987, Leino & Leino 1982, Neisser 1982, Rancourt 1983 and Royce & Powell 1983).

If tne definition of knowledge as correct information
is accepted, it is also important to adopt a large view
of man as an acting and information-processing being.
What I mean is that if information is conceived of as
only being organized into systems of beliefs this defi-
nition offers no improvement. However, accorcing to the
view advanced by Royce and Powell and carried on by e.g.
Rancourt and Leino, man is, in an very large sense, conce ed
of as an acting and information-processing being, where
information is processed not only by so-called cognitive
or intellectual systers but also by affective systems,
value systems and psycho-motor systems.

As a processor of information man is also an actor, not
just a speculative observer. This leads us back to the
epistemological points of departure in this study. Infor-
mation processing is part of an action system: a ion
constitutes the a priori of information-processin, nd
action is also influenced by the information processing
activity and by the product of this activity, that is,
information organized in differe. sub-systems.

The internal action determinants can thus be conceived of
as systems organizing information in different ways. In-
furmation is organized into procedures, beliefs and value
systems. Information is also organize' into action schemata
and theories-in-action. Further, information can be arti-
culated and inarticulated and it can be organized in tra-
ditions, habits, principles and scientific theories. In
short, information can be organized in all the ways that
have been treated in this study. The view of knowledge as
correct information thus seems to better suit the conception
advocated in this study than the classical defini-
tion. Well justified true beliefs are only one type of
system organizing information.

However, according to the definit n now accepted,

information must also be correct.

This does not change the position or present any obstacles
that cannot be overcome. Throughout the treatment of the
different types of knowledge different truth criteria have
also been discussed ¬nd these criteria, <u>mutatis mutandis</u>, can
be seen as criteria o¯ correctness of information.

The concept ¬n ¬f knowledge thus accepted can be applied
both to man as an acting processor of informa ion and to
information as it is processed within an inte active prac-
tice discipline. In botn cases information is seen as part
of an action system, on the one hand being influenced by
that action system, o¬ the other hand influencing it. Con-
sidering interactive practices like education and different
sub-practices of health care, we may thus conclude that
all types of knowledge are also needed within this kind of
action system. In the Introduction to this work I remarked
that some scientists and writers ¬ these disciplines put
high hopes on the role of science and theory in these areas
while others question their importance. According to the
conception put forth here, scientific knowledge may have an
important but still limited function. Knowledge organized
in scientific theories can help the practitioner in his
reflective orientation and serve him in his search for re-
levant means,but this knowledge can never rule o t the im-
portance of the otl¬r types of knowledge. Interactive prac-
tices are very complex and pre-suppose the processing of
information at different levels and in different ways at
the same time. All information involved for instance in an
interactive situation can never be entirely coded and arti-
culated in explicit theories. The doctor, the nur¬¬ ¬r the
teacher must always be prepared to act spontaneously, to
perceive the unique features of each situations, to react
on the feelings and sudden expressions of the others and
to observe his or her own reactions.

The reason why scientific knowledge and research seem to

have difficulties in reaching teaching and the nursing practice
may be due to the irrelevance of the theories produced. They
do not help the practitioners to understand the work they
are doing and they cannot be used to formulate goals or
find means. This possibility was commented on previously.
In this respect I do not think that qualitative and phe-
nomenolog cal research is he solution - which some nursing
researchers seem to clai   hey may be right in their cri-
tique of previous nursir   earch as being too positivistic
but the problem is not solved by going from one extreme to
the other. As I have tried to show here, the interactive
practices involve all aspects of reality and thus they must
also be investigated with different approaches. One type
of research is not sufficient to account for the practice
as a whole.

Another reason why scientific knowledge does not seem to be
significant for practitioners in education and nursing,
however, may also be due to the vast variety of knowledge
involved in these practices as a whole. A person may well
be able to teach if he has the necessary procedural know-
ledge, the relevant values and a functioning implicit theory,
even if he possesses no scientific knowledge of teaching.
As long as everything goes well he may not feel any need of
scientific knowledge. Scientific knowledge may increase his
awareness of what he is doing · if the scientific theories
are relevan'. - but all teachers do not necessarily see the
importance of this. In this respect medical practice pro-
bably differs from teaching. Although medicine as a whole
need not be classified as a natural science, many aspects
of medical practice pre-suppose knowledge of natural pro-
cesses and technical-instrumental knowledge on a scientific
basis. This has led to a closer relationship between prac-
tice and research in medicine than in e.g. education.

If scientific knowledge is to be relevant in e.g. teaching
and nursing it must have something to offer the practitio-

ners. This again presupposes a closer relationship
between practice and research than there seems to be
now.

This study of knowledge in interactive practice disci-
plines has been focusing on knowledge in the primary practi-
ces and in research practice. Education and administration
as secondary or auxiliary practices have been left outside
the study in order not to split the investigation over too
wide an area. The connections between these practices and
the primary practice requires a study of its own - or two
separate studies. However, one consequence of this inv stig-
ation for may be pointed out: since an interactive
practice involves a wide variety of knowledge, this variety
must be considered in the education of practitioners. Scien-
tific and other kinds of theoretical knowledge is not enough.
A practitioner who is going to be involved in human affairs
like teaching and providing health care of different types
also needs personal-moral knowledge, technical and other
kinds of skills and abilities, familiarity with a wide range
of situations etc. Moral education, practising skills and
getting acquainted with the practical contexts should then
be important features in all education of this type of
practitioners. Education should also involve knowledge on
the socio-cultural level, i.e. knowledge that helps the
practitioner to understand the world in which he practices.

In this study I have mostly referred to interactive practices
generally, indicating that the line of argumentation and
the conceptions presented concern all types of interactive
practices. On the other hand, the literature and the exam-
ples used are mainly taken from education and health care.
Health care again has been represented primarily by nursing
and to a smaller extent also by medicine. The reasons for
t.. choice were presented in chapter 3, and to these may
be added that teaching and nursing have been chosen because
they are practices that I have been involved in myself,

in research and practice as well as in education. My know-
ledge of medicine is much more limited, confined to the
elements of medicine that are involved in nursing and to
literature and discussions on the subject.

The research area thus chosen is in one respect very wide.
The practices and sub-practices differ from each other in
ways that have not been taken into consideration. In teach-
ing, for instance, much attention has not been payed to
the role of the subject taught - except for indirect references
in the discussion of disciplines and knowledge accessing
modes. Health care is also a very w.de area, including
different types of sub-practices and tasks that have not
been analyzed separately. On the other hand there are also
interactive practices that have not been inc¯ided in this
study, social work and different types of servi e for in-
stance. However, since I have concentrated my analysis on
quite general features of interactive practices, practice
in general, theoretical and practical knowledge, the nature
of practical sciences and different types of theories, much
of the argumentation should be applicable to all kinds of
interactive practice disciplines - and to some extent to
practice disciplines in general.

Since the area investigated is quite large, all problems
have not been analyzed in detail. The nature of practical
sciences and practical theories, for instance, requires
further analysis. However, my intention has primarily been
to study the main types of knowledge and to formulate a
frame of reference and some epistemological starting points
for the study of knowledge in interactive practice disci-
plines. This study can then be followed up by other studies,
for instance:

- studies of education and administration as parts
  of interactive disciplines,
- detailed analyses of practical sciences and
  practical theories,

- empirical studies of how different types of
  practitioners actually use knowledge,
- empirical studies of how to integrate theory
  and practice in research, practice and educa-
  tion.

An investigation of these and other related problems could
give us a better understanding of knowledge in general and
of knowledge as it is utilized in practice disciplines.
This understanding again might help us to dir 't education
and research in practice areas so that they can guide
practice and be practical in the widest sense of the word.

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