

KATRI HÄMEEN-ANTTILA

Education Before Medication

Empowering Children as Medicine Users

Doctoral dissertation

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ABSTRACT

Education about the rational use of medicines is needed to empower patients to take a more active role during health care consultations in order to gain concordance, as suggested in the present approach. One forum for such education is school health education. However, there is a lack of suitable teaching materials about medicines for teachers. The aim of this study was to design, develop and evaluate medicine education materials disseminated via a Website (www.uku.fi/laakekasvatus, in Finnish with English introduction), which aim to empower children as medicine users.

This study consisted of three phases, which were conducted during 2002 and 2003. The study was begun with focus group discussions (FGDs) with children, which explored children's understanding of medicine-related topics, their beliefs about and attitudes toward medicines, and their autonomy in using medicines. The participating children were from three age groups 7–8 years (n=23), 10–11 years (n=39), and 13–14 years (n=19). Children's knowledge of medicines, gained through everyday life experiences, was poor. Furthermore, they had a somewhat cautious attitude toward using medicines, although many of them had used medicines independently.

Physical education teachers' and class teachers' opinions were assessed with a questionnaire to find out what topics about medicines they consider suitable to teach to children of different ages, and how important they considered medicine education as part of school health education. Altogether 284 teachers filled in the questionnaire, yielding a response rate of 71%. Almost all (93%) of the teachers responding to the questionnaire considered medicine education an important part of health education to be included in the national curriculum. However, they clearly thought that the parents (98%) bear the main responsibility for teaching children about medicines.

Using information gained from these two studies, a Website was developed about the use of medicines. The Website was piloted by a group of primary (n=11) and junior secondary (n=3) school teachers, who evaluated its usefulness. The data were collected by conducting three FGDs with these teachers. Before the FGDs, they taught their own classes three medicine education sessions based on the Website.

Major changes were made in the Website based on this evaluation, including a simpler structure, 27 activity-oriented assignments containing ready-to-use teaching materials, and lesson plans for specific age groups. The FGDs with the teachers revealed further that teachers may have firmly held attitudes toward medicines, either positive or negative, and that these attitudes may influence the messages they are willing to teach children. Three different types of teachers were found: empowering, paternalistic, and material-evaluating.

In conclusion, the involvement of both children and teachers in this process of developing and evaluating medicine education materials was very important. According to the results, medicine education is needed in Finnish schools. However, teachers are lay persons as far as medicines are concerned, and they need information and materials to be able to teach this topic.

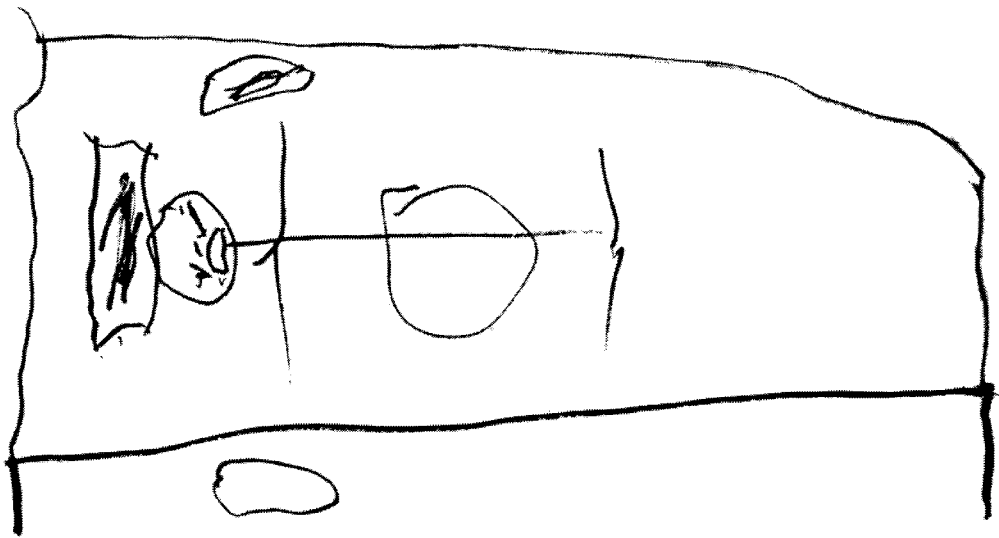
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*"This is me. I am lying in my bed
because I feel sick. I have a bucket
besides my bed and
a big tablet besides my pillow."
Ville 26.11.2005*

VILLE



To my godson, Ville

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This study was carried out at the Department of Social Pharmacy, University of Kuopio, during the years 2002–2006. “Education before medication” -slogan was created during a congress called Youth and Medicines by a group of people devoted for educating children about medicines. By using this slogan as a name for my thesis I encourage all, children as well as adults, to be educated about the proper use of medicines before using them.

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also want to thank my dear friends and colleagues Ph.D. (Pharm.) Heli Kansanaho and Ph.D. (Pharm.) Nina Katajavuori for all the great moments of science and friendship. I proudly follow your steps to become a Ph.D. (Pharm.)!

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Kuopio, February 2006

Katri Hämeen-Anttila

ABBREVIATIONS

EU	European Union
FGD	Focus group discussion
FIP	International Pharmaceutical Federation
USP	United States Pharmacopeia
OTC	Over-the-counter medicine, non-prescription medicine
Rx	Prescription medicine

OPERATIONAL DEFINITIONS OF KEY TERMS

Attitude

A settled way of thinking or feeling.

Autonomy

Freedom of action and self-determination.

Belief

A feeling that something exists or is true, a firmly held opinion.

Child, Children

Childhood can be defined differently for different purposes. According to the European Commission's proposal for a *Regulation of the Council and of the Parliament on Medicinal Products for Paediatric Use* the paediatric population means the part of the population between birth and 18 years of age ((COM(2004)599 final)). On the other hand, according to the Social Insurance Institution of Finland, children are people aged 0 and 16 years. In the empirical part of this study, I use the words "child" and "children" to refer school children 7 through 16 years of age. In the literature review, the term refers to children 0 through 18 years of age. Whenever relevant, I state the exact ages of the children.

Concordance

A new approach in the patient-practitioner relationship, where the role of the health care professional is to support the patient in constructing his or her own knowledge and attitudes toward the use of his or her medicines (Britten and Weiss 2004). The health care professional and the patient interact as equals and establish a mutual therapeutic alliance. Understanding of and respecting for the patient's view is the core of concordance.

Drug education

Education about the abuse of drugs during school health education. In Finnish: *huumevalistus*.

Drugs

Substances, not used for medical purposes and usually illegal, with narcotic or stimulant effects, e.g., marijuana, cocaine, and heroin. Medicines can also be drugs if not used for medical purposes.

Empowerment

A process of building knowledge, skills, and competencies which leads, e.g., to positive self-esteem, self-efficacy and internal locus of control, and ultimately to more control and willingness to participate in wider social settings (Zimmerman and Rappaport 1988, Rodwell 1996). An approach where an individual or a group of people define their own problems and solutions. Thus, active involvement and personal experiences are essential for the empowerment process (Kieffer 1984).

Health literacy

Personal, cognitive, and social skills that define the ability of an individual to acquire, understand, and use information to promote and maintain good health (Nutbeam 2000). Health literacy can be classified into three categories: functional, interactive, and critical health literacy.

Health locus of control

A scale based on Rotter's social learning theory, which taps the beliefs concerning internal or external control of health (Wallston et al. 1978). An internal health locus of control means that a person believes him- or herself capable of influencing his or her health. An external health locus of control implies that a person feels being controlled by powerful others, e.g., health professionals, or believes that good or bad health is due to uncontrollable factors, e.g., a matter of chance or good or bad luck.

Junior secondary school

Compulsory school for 13- through 16-year-old children in Finland.

Knowledge

Information acquired through experience or education. Awareness or familiarity gained by experience of a fact or a situation.

Medicine education

Education about the rational use of medicines as part of school health education or on encounters with health care professionals. In Finnish: *lääkekasvatus*.

Medicine Education Website, the Website

A Website about the use of medicines developed during this research process for the use of primary and junior secondary school teachers (www.uku.fi/laakekasvatus) for teaching children about rational use of medicines. In Finnish: *lääkekasvatussivut*.

Medicines

Substances registered and used for medical purposes including non-prescription and prescription medicines. According to the Medicines Act and Degree (395/1987), medicinal product means a product or substance intended for internal or external use to cure, alleviate or prevent a disease or its symptoms in humans or animals.

Paternalism

The traditional approach in encounters of a patient and a health care professional, where the professional is an expert and the patient's role is to comply with the given advice (Britten and Weiss 2004). The paternalistic approach is likely to restrict information (Itkonen 2000).

Primary school

Compulsory school for 7- through 12-year-old children in Finland.

Understanding

Ability to comprehend something, power of abstract thought, intellect.

LIST OF ORIGINAL PUBLICATIONS

This thesis is mainly based on the data presented in the following original papers, referred to in the text by the Roman numerals I–IV. The thesis also contains some previously unpublished data, specifically the results of autonomous medicine use by children (in chapter 8.1.1).

- I Hämeen-Anttila K, Juvonen M, Ahonen R, Bush PJ, Airaksinen M. How well can children understand medicine related topics? *Patient Education and Counseling* 60:171–178, 2006
- II Hämeen-Anttila K, Juvonen M, Ahonen R, Bush PJ, Airaksinen M. What schoolchildren should be taught about medicines: Combined opinions of children and teachers. *Health Education* 105:424–436, 2005
- III Hämeen-Anttila K, Airaksinen M, Lappalainen J, Bush PJ, Ahonen R. Medicine education for schoolchildren – What do the teachers think? (submitted)
- IV Hämeen-Anttila K, Airaksinen M, Vainio K, Bush PJ, Ahonen R. Developing a medicine education program in Finland: Lessons learned. *Health Policy* 2006 (in press)

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1 INTRODUCTION

“Well, it has not bothered me but – I don’t know – if I have some medicine then I don’t know or I know that it kind of helps but I don’t know how it helps or so – I just take it as much as they tell me to”

13-year-old girl

This dissertation is a reflection of what medicine education is and a suggestion of what it could be. The aim of this study was to design, develop, and evaluate medicine education materials made available to teachers via a Website. During this study, I focused on how children can learn about medicines in a school environment, and how this learning process can be improved. However, I realize that the most common educators about medicines in a child’s life are the parents, especially the mother (Chambers et al. 1997, Menacker et al. 1999, Hämeen-Anttila et al. 2005).

The present approaches to health promotion and health care emphasize the active role of the patient (WHO 1986, Bond 2004). The basic underlying idea is that, when the wishes, needs, and concerns of the person are taken into consideration and the person is given the power to choose and control his or her health, (s)he will commit to the actions needed to maintain good health or to treat him- or herself in the way most suited to that individual. This shift of power to the individual can be called a process of empowerment. Since empowerment is regarded as the core of the current approach in health care (Bond 2004), I chose the empowerment approach for this research.

School health education is one forum where the process of empowerment as a medicine user could be facilitated. However, school-based medicine education is rare worldwide. For the most part, education about medicines and the materials developed for children have tended to concentrate on chronically ill children (see, e.g., Dragone et al. 2002) and on abuse of medicines (see, e.g., Department for Education and Skills 2004). Such education will not give children the knowledge and skills about rational medicine use they would need to become empowered medicine users in the future.

In Finland, a new national curriculum of health education, including the rational use of medicines, was officially approved in January 2004 (Finnish National Board of Education 2004). However, there was a lack of suitable teaching materials about medicines for teachers. We started this research project in order to develop medicine education tools for teachers and in this way, to help teachers meet the requirements of the new curriculum.

In the literature review, I will focus on healthy children and medicines: attitudes toward medicine use, knowledge and beliefs about medicines, and autonomy in using medicines. I will exclude the extensive literature on children's understanding of health and illness. I will discuss this literature and the results from the empirical part of this study relative to the concept of empowerment.

2 FROM A PASSIVE RECIPIENT TO AN ACTIVE PARTICIPANT

Traditionally, in health care, the patient has been expected to passively obey the advice of the health care professional (WHO 2003). If this advice is not followed, the patient is considered non-compliant. Thus, the underlying approach to compliance is paternalistic (Figure 1). Stimson (1974) was among the first to criticize the paternalistic approach which has been increasingly criticized since the 1990's based on the recognition that, with such an approach, the full benefits of medicines cannot be achieved (McDonald et al. 2002). In 1997, a new approach – called concordance – was launched in the UK (Royal Pharmaceutical Society of Great Britain 1997). According to this approach, the health care professional needs to elicit and understand the patient's view of the treatment and agree about the management plan with the patient as an equal partner (Raynor et al. 2001, Britten and Weiss 2004). Thus, the very core of the concept of concordance is the recognition that the patient's views and beliefs need to be openly discussed (Stevenson 2004).

Concordance relative to medicines can be described as being based on three pillars: 1) Patients have enough knowledge to participate as partners 2) Prescribing consultations involve patients as partners 3) Patients are supported in medicine taking (Shaw 2004). These elements require that both the health care professional and the patient are actively involved during the consultation (International Pharmaceutical Federation and International Pharmaceutical Students' Federation 2005). To be able to actively participate in decision making, the patient needs information about the available treatments and skills to take responsibility for his or her own medication (Itkonen 2000). Thus, the underlying approach in concordance is empowerment (Figure 1).

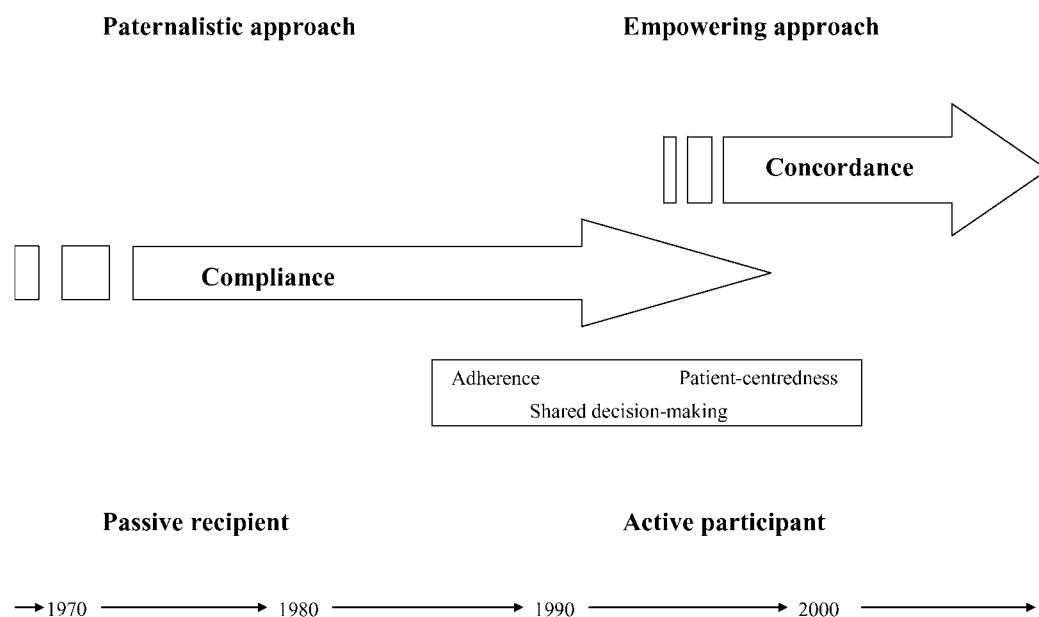


Figure 1. From a passive recipient to an active participant.

Such a shift of thinking can also be seen among children. Traditionally, children have been regarded as passive and vulnerable (Christensen 2000), irrational, and incapable of concrete thinking. They are thought to be culturally incomplete and controlled by adults. These notions are partly based on psychological research. Studies of child development suggest that children are not yet complete, but are developing through different stages into mature adults (Caputo 1995, Woodhead and Faulkner 2000).

During illness, children have been seen as particularly vulnerable and in need of adult care and therapy (Christensen 2000). The boundaries, treatment decisions, and responsibility that adults take over children confirm the position of the child as incompetent, passive, and dependent (Christensen 1998). However, there has been a shift during the past few decades from thinking of children as passive recipients of health information and care to viewing them as active partners whose competence and information needs should be considered valid by health care professionals (Kalnins et al. 1992, Bush et al. 1999, Sanz 2003). For example, some international pharmacy organizations – United States Pharmacopeia (USP) and The International

Pharmaceutical Federation (FIP) – have adopted statements pointing out that, in addition to educating children about their own medicines, children should be educated about medicine use in general during school health education (Bush et al. 1999, International Pharmaceutical Federation 2001). Such education is crucial if we want to involve the new generation of medicine users in the decisions concerning their medication. This is also in accord with the more profound change in the health care approach from compliance to concordance.

3 MEDICINE EDUCATION TODAY

Medicine education is seldom part of school health education curricula worldwide. For the most part, education about medicines focuses on abuse of medicines (e.g., Department for Education and Skills 2004), and the materials developed for children seem to focus on chronically ill children (see for example Dragone et al. 2002). However, it is difficult to make a systematic review of health education curricula worldwide because of the language barriers. In order to overcome those barriers, I sent an e-mail message through two worldwide e-mail –groups, asking if medicine education is included in the health education curriculum in any country. These e-mail groups were E-Drugs and the Social Pharmacy Network. According to the responses received through this enquiry, medicine education is not part of the health education curriculum in Belgium, Iceland, India, Ireland, Italy, Malta, or Zimbabwe. In the USA, school education focuses on anti-drug education (“just say ‘no’”) and varies greatly within and among states. Rational use of medicines is discussed at some level during health education in the UK and Scotland, where such education is obligatory, and Australia, where it is voluntary. Moldova is one of the countries where medicine education exists locally through a research project.

In the UK, drug education is an obligatory part of the curriculum (Department for Education and Skills 2004). The term “drug” refers to all drugs including medicines (OTC and Rx), volatile substances, alcohol, tobacco and illegal drugs. Drug education starts in primary school and continues throughout compulsory education. It is delivered through school subjects called Personal, Social and Health Education, and Citizenship. The National Curriculum requires schools to teach 5- through 7-year-old children (Key stage 1) about the role of drugs as medicines, and to 8- through 11-year-old children (Key stage 2) that tobacco, alcohol and other drugs can have harmful effects. 12- through 14-year-old children (Key stage 3) learn the basic facts and laws about alcohol and tobacco, illegal substances, and the risk of misusing prescribed and OTC medicines. Thus, the emphasis is on abuse of drugs, but the instruction may also touch on appropriate use of medicines and develop pupils’ competence to manage their

medication responsibly. Drug education is seen as a major component of drug prevention.

In Scotland, the health education curriculum also includes drug education (City of Edinburgh Council 2001). The term “drug” refers to legal and illegal drugs, alcohol, tobacco, and volatile substances. Drug education continues throughout compulsory education. In primary schools drug education is delivered through Health Education, and in secondary schools through Personal and Social Education. The aims of drug education include the prevention of drug abuse, the promotion of healthy lifestyles, and the development of knowledge, skills, and values to help young people make responsible health choices. Furthermore, all pupils require appropriate understanding of responsible uses of medicine and strategies for dealing with stress and pain. Safe use of medicines is learned during early primary drug education, while the focus in secondary drug education is on the risks of drug abuse.

In Australia, there is a National School Drug Education Strategy, which aims to promote the development of drug education programs throughout Australia (Department of Education Training and Youth Affairs 1999). The key goal of this strategy is “no illicit drugs in schools”. For example, in New South Wales, drug education is included as part of the Personal Development, Health and Physical Education syllabus for 7-through 10-year-old children (Board of Studies New South Wales 2001). Similarly to the UK and the USA, the emphasis is on the abuse of drugs. Since 1990, however, there has been a voluntary comprehensive drug education resource available to primary schools, called the “Tay-Kair Kit” which focuses on the rational use of medicines. Since the turn of the millennium, efforts have been made to review this kit by the Pharmaceutical Society of Australia, the Australian Council for Health, Physical Education and Recreation, and Kids Media. The main premise of this program is that positive drug education needs to demonstrate the beneficial, therapeutic use of drugs before the consequences and problems of drug abuse can be considered.

In Moldova, Drug Information Pharmacological Center (DRUGS) Moldova started a voluntary school-based peer education program, *Involving Students in the Reduction of Unnecessary Antibiotic Use for Colds and Flu*, in a school district in Chisinau in 1998 (Cebotarenco and Bush 2005). The primary goal of this research project was to reduce

inappropriate antibiotic use among students and their families, but the education also covered other aspects of rational medicine use. This intervention was well accepted, and other districts have also shown they are interested in adopting it.

4 EMPOWERMENT

The concordance approach stresses the need to involve patients as active participants in their own health care and the need for patients to gradually assume more responsibility and control over decisions concerning their health (Britten and Weiss 2004). Such a shift of power can be considered a process of empowerment. According to a concept analysis done by Rodwell (1996), the defining attributes of empowerment are: a helping process, a partnership which values self and others, mutual decision-making using resources, opportunities and authority, and freedom to make choices and accept responsibility (Table 1). Based on these attributes derived from the literature, she gives a theoretical definition of empowerment: *"In a helping partnership it is a process of enabling people to choose to take control over and make decisions about their lives. It is also a process which values all those involved."* Furthermore, she lists the consequences of empowerment as positive self-esteem, an ability to set and reach goals, a sense of control over life and change processes, and a sense of hope for the future (Rodwell 1996).

Table 1. Defining attributes and consequences of empowerment by Rodwell (1996).

Defining attributes	Consequences
Helping process	Positive self-esteem
Partnership which values self and others	Ability to set and reach goals
Mutual decision-making using resources, opportunities, and authority	Sense of control over life and change processes
Freedom to make choices and accept responsibility	Sense of hope for the future

Empowerment is a multidimensional concept, which has been studied from several perspectives and in different disciplines. It has been of interest for, e.g., health promotion (WHO 1986) and teacher education (Siitonen 1999) and is closely related to civil and human rights (Kieffer 1984, Kar et al. 1999). Most commonly, it is understood as a process (Wallerstein 1992, Lord and Hutchison 1993, Bernstein et al. 1994, Eklund

1999, Siitonen 1999), but it is also regarded as a goal (Cargo et al. 2003). Some researchers consider it as both a process and a goal (Israel et al. 1994, Rissel 1994). The process of empowerment can be seen as a sequence of building up skills and competencies through repetitive cycles of action and reflection (Kieffer 1984). Active participation is a crucial element of this process (Kieffer 1984, Zimmerman and Rappaport 1988, Lord and Hutchison 1993, Kar et al. 1999).

Empowerment cannot be given from the outside. Rather, individuals and groups must develop their own sense of empowerment and mutually define their own goals and find their solutions (Kieffer 1984, Rappaport 1987, Lord and Hutchison 1993, Rodwell 1996, Siitonen 1999). However, one person can facilitate the empowerment of another by providing supportive settings and assistive partnership (Kieffer 1984, Lord and Hutchison 1993, Rodwell 1996, Siitonen 1999). For example, a teacher may facilitate the empowerment of a class of children.

For health care professionals, including pharmacists, the empowerment approach means a need to adopt the role of a facilitator and a partner. This approach is reflected in how they communicate with medicine users (International Pharmaceutical Federation and International Pharmaceutical Students' Federation 2005). By respecting the patient's thoughts and concerns about medicines and by seeing patient counseling as based on a partnership and negotiation between equals, a pharmacist can help the patient create his or her own sense of empowerment when using medicines. However, the patient also needs to learn how to play an active role in health care encounters if a change in the paternalistic approach is wanted (Stevenson 2004). Besides patient counseling in pharmacies, the empowerment approach should also be applied when discussing the issue of informed consent during clinical trials.

4.1 Different levels of empowerment

Empowerment is a multilevel concept that can be considered at any of three levels: psychological empowerment (individual level), community empowerment, and organizational empowerment (Zimmerman and Rappaport 1988, Israel et al. 1994, Rissel 1994). These levels of empowerment are not separate, but linked with each other

(Israel et al. 1994). Thus, empowerment cannot be regarded as an exclusively individual phenomenon, but must also be considered in a wider social setting (Rappaport 1987, Israel et al. 1994).

Psychological empowerment refers to an individual's ability to make decisions and have control over his or her personal life (Israel et al. 1994). However, it has been argued that empowerment is population and context-specific, in other words, not the same for all people in all settings (Rappaport 1987, Bernstein et al. 1994). Thus, for example, empowerment may be different for children and adults.

An empowering organization is perceived as democratically managed, an organization whose members share information and power and are involved in all processes (Israel et al. 1994). The idea of an empowering organization is illustrated by The European Network of Health Promoting Schools (ENHPS) which is a joint project of three European organizations: The European Commission, the Council of Europe and the WHO Regional Office for Europe (see example WHO Regional Office for Europe 2002).

An empowering community is one in which individuals and organizations use their skills and resources collectively in order to meet their respective needs (Israel et al. 1994, Eklund 1999). The concept of community does not involve only existing municipalities or districts, but also localities or domains which share membership, values and norms, mutual influence, needs and commitment to meeting them, and emotional involvement (Israel et al. 1994). Thus, communality may be geographically defined (e.g., a neighborhood), but can also be defined differently (e.g., an ethnic group) (Israel et al. 1994).

Some authors have constructed theoretical models or theories of empowerment (Wallerstein 1992, Kar et al. 1999, Siitonen 1999). Siitonen (1999) formulated a general formal theory of human empowerment based on a combination of theoretical and empirical findings from his study about the professional growth of pre-service teachers. This theory does not aim to define the measurable qualities of an empowered person or the causal factors contributing to empowerment, i.e., to operationalize empowerment. The theory identifies four different subprocesses of empowerment: goals, capacity beliefs, context beliefs, and emotions (Table 2). According to the theory, if a person has

difficulties with some of the subprocesses, (s)he may remain disempowered. Furthermore, the theory also claims that empowerment has a catalytic effect on commitment: poor empowerment results in poor commitment, while strong empowerment results in strong commitment (Siitonen 1999). According to this theory, it can be argued that, if a person is empowered as a medicine user, (s)he is also committed to use medicines rationally. This theory gives a good example of the multidimensional nature of the concept of empowerment.

Table 2. Subprocesses of the general formal theory of human empowerment (Siitonen 1999).

Goals	Capacity beliefs	Context beliefs	Emotions
Future conditions, including the setting of personal goals; desire to succeed and to understand; participation in the setting of shared goals	Conception of self, including self-image, self-respect, and identity	Assent	Energizing action
Freedom, including freedom of choice, voluntarism, and autonomy	Self-confidence and self-esteem	Appreciation, trust, and respect	Positive feelings, including enthusiasm
Values	Self-efficacy and self-regulation	Ambience, including safety, openness, open-mindedness, and encouragement, support	Optimism
	Responsibility	Freedom of action, including personal control Authenticity Co-operation, collegiality, and equality	Ethicality, including listening to the human voice

4.2 Operationalization of empowerment

Given its multi-dimensionality, the concept of empowerment is difficult to operationalize (Rodwell 1996). The problems of measurement include questions on whether empowerment is measured as an individual or communal phenomenon, and whether it is analyzed as a process or an outcome (Wallerstein 1992, Israel et al. 1994). Some researchers even argue that it is impossible to define an empowered person and thus, to measure the dimensions of empowerment (Siitonen 1999). In any case, evaluation of empowerment requires research on numerous variables, with many different methods, and at all possible levels, in order to capture the complexity of individual and contextual changes (Rappaport 1987, Wallerstein 1992, Israel et al. 1994).

Figure 2 illustrates how I understand the concept of empowerment. Very much simplified, a person gains experiences of everyday life in several social settings and recognizes an area or domain where (s)he feels powerless, but where (s)he wants to evolve. (S)he sets goals and starts to reflect on his or her actions gaining more knowledge, skills and competencies during the process. (S)he may find a person, a mentor, or even a group of people with similar problems, values and goals who help him or her and facilitate his or her efforts to reach personal and/or common goals. During this process, (s)he recognizes his or her new talents, and e.g., his or her self-esteem, self-efficacy, and locus of control increase. (S)he also recognizes that (s)he has more control, and that (s)he wants to become more involved in different problems and issues in the wider community. Thus, (s)he has become empowered in this particular area or domain.

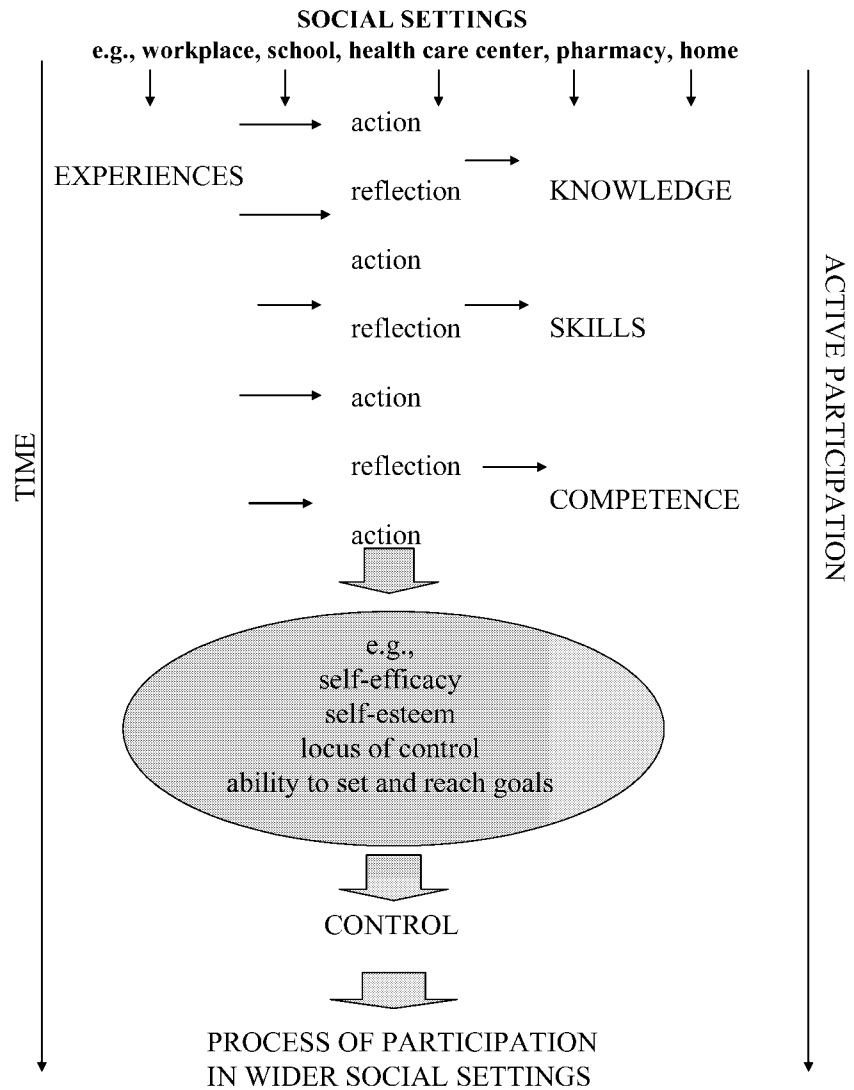


Figure 2. The process of empowerment.

4.3 Health literacy as a tool for increasing empowerment

One of the means to increase empowerment at individual and community levels in a health care setting is health literacy. Jakonen (2005, pp. 38–39) points out that health literacy can be described in four different ways: as a connection between literacy and

health, as a way to manage within the health care system, as a part of all-round education, and as a metaphor. Nutbeam (2000) illustrates this last category as follows: "*Health literacy refers to the personal, cognitive and social skills which determine the ability of individuals to gain access to, understand, and use information to promote and maintain good health.*" He classifies health literacy into three different categories: functional health literacy, interactive health literacy, and critical health literacy. Functional health literacy aims at improving the knowledge of health risks and health services and compliance with prescribed actions. Interactive health literacy focuses on developing the personal skills needed in health care settings, such as problem solving skills. The highest level of critical health literacy aims to develop skills to supporting effective social and political action as well as individual action. The three levels of health literacy progressively allow for greater autonomy and personal empowerment.

4.4 Shift of power in empowerment

The concept of empowerment includes the idea of power. Empowerment is about gaining power, authority, and ability to choose by oneself. However, it is important to note that in an empowerment approach, the power is "power to do something" not "power over something". When someone gains power by means of empowerment, the power is not taken from another person, but both persons gain (Bernstein et al. 1994, Israel et al. 1994, Rodwell 1996).

This kind of power may become problematic in the health care setting. Health professionals do have more power than their patients in terms of knowledge and skills to solve the problem and treat the illness, i.e., expert power. Furthermore, certain hierarchies are obvious in the pharmaceutical context, e.g., a prescription needed from a doctor, or non-prescription medicines that can be bought only from a pharmacy (Prout and Christensen 1996). Despite these power relations and hierarchies, an empowering approach entails facilitation of the patient in a helping partnership to create a sense of empowerment when treating his or her illness. However, the present approach in the health care setting, including the patient counseling setting in pharmacies, seems to be paternalistic (Airaksinen et al. 1994, Itkonen 2000). It seems to be hard for health care

professionals to accept that individuals should have the responsibility and accountability for their own health. The decisions concerning treatments are done based on biomedical knowledge without taking into consideration the patient's own experiences of his or her illness. Such a lack of two-way communication is far from the concordance approach and does not increase the patient's sense of empowerment.

If the patient is a child, the power imbalance is even more striking (Prout and Christensen 1996). Many studies have shown that the mother is the primary caretaker in the case of a child's illness (Aramburuzabala et al. 1996a, Almarsdottir et al. 1997, Almarsdottir and Zimmer 1998, Menacker et al. 1999). The parents, usually the mother, decide when to treat the illness with rest and home remedies, when to self-medicate, and when to consult a physician (Gerrits et al. 1996). The parents should be responsible for the decisions which concern small children. However, it depends on the individual capacities of the child at which age (s)he is able to take gradually more responsibility for such health behaviors.

Ethical issues need to be taken into consideration when discussing the allocation of power to children. For example, many adults may see giving a child responsibility for medicine use as unethical, since traditionally, children are seen as powerless, immature persons, who need protection (Christensen 1998). However, we can turn this idea upside down and ask: how ethical is it to give a child medicine and not discuss why (s)he has to take it, or maybe even force the child to take a tablet? Furthermore, if the child is not educated to make decisions concerning his or her health during childhood, how can it be expected that (s)he can make such decisions in adulthood? As with any health behavior, children should be prepared before they are given independent responsibility for that behavior.

4.5 Empowerment of children in a health care setting

Observational studies from the Netherlands and the USA have shown that children are not included as active participants in the discussions concerning their own health during visits to physicians (Pantell et al. 1982, Tates and Meeuwesen 2000, Tates and Meeuwesen 2001, Tates et al. 2002a). Physicians may address children when gathering

information about their illness and symptoms. However, when giving information about the diagnosis and directions on how to treat the illness, physicians tend to address the parents, not the child (Pantell et al. 1982, Tates and Meeuwesen 2000, Tates et al. 2002b). One study from the USA determined pharmacists' perceptions of children as customers with a questionnaire (Ranelli et al. 2000). Of the responding pharmacists (n=195), 33% reported that they communicate directly with children. Furthermore, they generally indicated that children should be active participants in the medication process. However, little is known of how pharmacists actually interact with children.

Perlman and Abramovitch (1987) discovered in their descriptive study (n=25) that 4-through 7-year-old Canadian children had specific questions they would have liked to ask the physician if they had had the opportunity, and that these questions were directly relevant to the reason for their visit. In an American study, most children, regardless of their age, reported that they would feel comfortable asking questions of doctors and pharmacists (Menacker et al. 1999). However, they also indicated that they learned about medicines from their parents, usually their mother. These results indicate that children may be more prepared to communicate with health care professionals than adults think.

The problem might be that physicians are unsure of how to involve the child and how to carry on a discussion with him or her at a cognitively appropriate level (Perrin and Perrin 1983). The age of the child influences the situation, and older children are given more information than younger (Pantell et al. 1982, Tates and Meeuwesen 2000, Tates et al. 2002b). This implies that physicians try to take into account the child's cognitive level by discussing more with older children. Furthermore, Tates et al. (2002a) discovered that the older the child, the more supportive and encouraging was the physician. If the physician adopted a supportive attitude, this activated the child to take a more active role in the consultation. These results imply a need to include communication skill courses in the curriculum in both medical and pharmacy schools, which include communication with children of different ages and developmental stages (Sleath et al. 2003). Furthermore, understanding of the concordance approach in patient counseling is needed for two-way communication (Centre for Medicines Partnership

2005, International Pharmaceutical Federation and International Pharmaceutical Students' Federation 2005).

Accepting children as active participants is important in order to enable children to develop and maintain a sense of empowerment. An empowerment approach entails acknowledging children's concerns as valid and recognizing their competence to make and implement decisions (Kalnins et al. 1992, Alderson and Montgomery 1996). This competence naturally varies among children of different ages and also among individuals. To fully understand children's perceptions, we must ask them how they interpret their world rather than measure the extent to which they have incorporated adult standards.

4.6 Empowerment in medicine education

In the context of medicine education, the empowerment approach would mean first, giving sufficient information about medicines, e.g., what should be known before taking medicines; second, teaching the skills needed to use medicines, e.g., the steps needed for taking medicines rationally, or what to do to avoid possible adverse reactions; and third, facilitating active involvement in discussions concerning the child's own medicines with health care professionals. This kind of approach would build up the skills and competencies needed by the child to gradually take more responsibility over his or her own medicine use (Figure 3). However, the empowerment approach is not about urging younger and younger children to use medicines independently or to use more medicines.

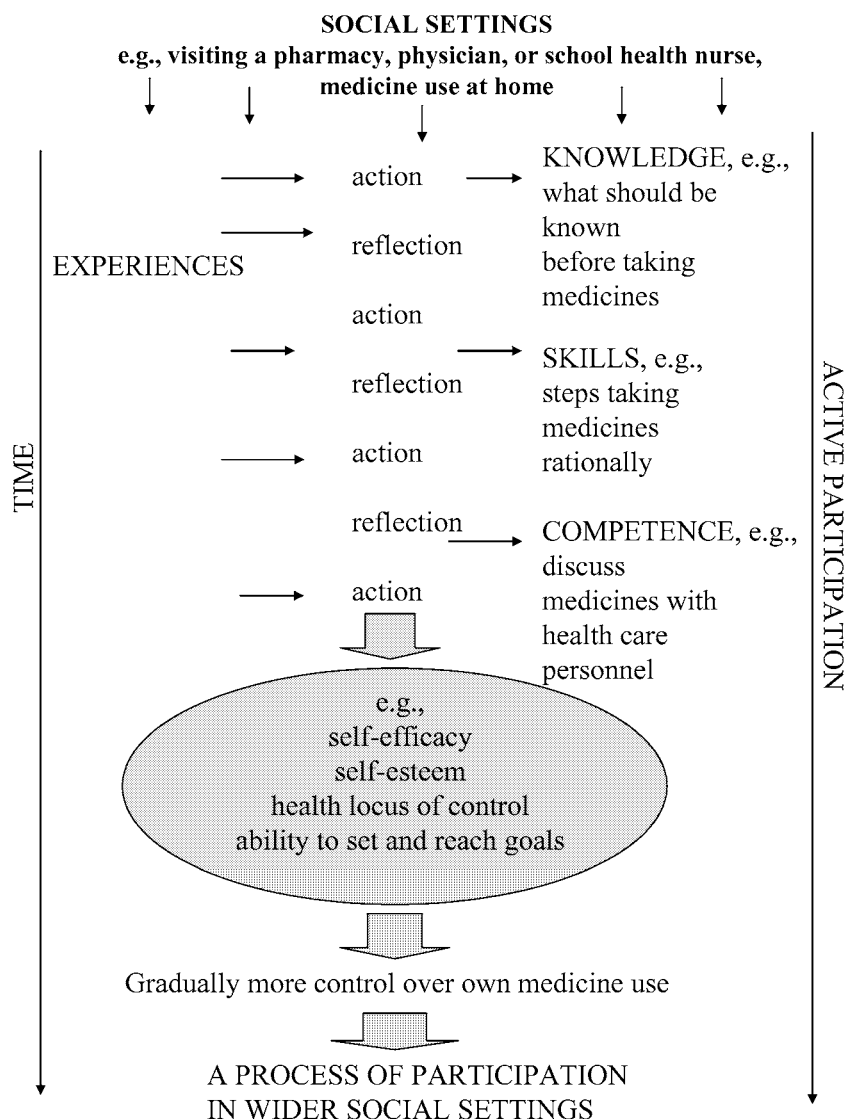


Figure 3. The process of empowerment in children's medicine use.

Empowerment in children's medicine education correlates with increasing health literacy skills. At the first level, i.e., functional health literacy, children gain knowledge and information (Table 3). At the interactive health literacy level, the aim is to have children learn the different skills needed when taking medicines. The critical health

literacy level involves the surrounding community. An example of medicine education at the highest level could be that children would act co-operatively with their local pharmacy and other health care organizations to prevent or to stop drug abuse (e.g., taking painkillers with alcohol) among local children.

Table 3. Levels of health literacy in school setting: Example of medicine education. Adopted from Nutbeam (2000) and St Leger (2001).

Health literacy level and educational goal	Content	Outcome	Examples of educational activity
Functional health literacy: communication and information	Transmission of basic information about medicines	Increased knowledge of medicines, e.g., what should be known before taking medicines, e.g., how to take, how much to take, how long to take	Classroom-based lessons Reading books and leaflets
Interactive health literacy: development of personal skills	Opportunities to develop specific skills in a supportive environment, e.g., steps toward taking medicines rationally or what to do if one gets adverse reactions from medicines	Improved capacity to act independently on knowledge, improved motivation and self-confidence, e.g., taking gradually more responsibility for medicine taking	Small group work at school; Individual tasks with the outside community involving the curriculum; Tasks of analyzing current medicine-related issues and discussions at school
Critical health literacy: personal and community empowerment	Classroom and community learning opportunities which address social inequities, determinants of health, policy development and ways of effecting change	Capacity to participate in community and societal action to bring about health improvement for disadvantaged groups	Involvement in school-community issues pointed out by students which are contrary to current policies and practices

One example of an empowering approach in the elementary school setting was the experimental child-initiated care system in the USA, where children (5 through 12 years) were encouraged to act independently when seeking care from a nurse practitioner (Lewis et al. 1977). This intervention consisted of two components. First,

the children were permitted to decide when and for what to seek attention from the school nurse, and second, they were allowed to choose the treatment for their health problem. It turned out that the children took an active role, knew when to see the nurse, and were able to make decisions concerning their health. Furthermore, the children's visiting patterns closely approximated those of adults. Okkonen (2004), who used qualitative action research to describe 5- through 6-year-old Finnish children's ideas of health and health promotion, similarly concluded that when children were given the responsibility to plan their own actions they started to take responsibility for themselves.

4.7 Competence to make decisions

One aspect of empowerment is the competence of a child to have an active role, e.g., to make a decision about treatment. Competence is not a straightforward concept. There is no simple criterion or measure of competence (Alderson and Montgomery 1996, Shaw 2001). Rather, it is a question of an individual child's competence in a particular context for a particular type of decision in particular circumstances. For example, the competence of a child choosing a treatment for common cold would probably be regarded as quite different from the competence of a child choosing whether or not to consent to have chemotherapy for cancer or surgery.

Alderson and Montgomery (1996) studied 120 8- through 15-year-old British children who had had an average of five elective surgical operations. They asked these young patients at what age they would consider themselves old enough to decide about another surgery. Most of these children indicated that they would be competent enough to have this responsibility at the age of 11–15 years. However, a wide range of different ages were indicated, ranging from 8 to 16+ years (Alderson and Montgomery 1996). In the same study, the parents were asked "At what age do you think your child can make a wise choice (about treatment)?" Most parents indicated the same age range as the children (11–15 years). Furthermore, 983 healthy school pupils (8–15 years) were asked "At what age do you think someone is old enough to decide with their physician about surgery, without their parents being involved?". The age estimates given by these school

children varied from 15 to 17 years. These results indicate that past experience influences how competent children perceive themselves to be, and the more experienced the child is, the younger the age at which (s)he sees him- or herself to be competent to make decisions concerning his or her treatment. More important than the child's age is actually his or her developmental stage: children at the same age may vary in their competency.

Similar issues of whether or not an individual child is competent will be faced in situations when a child needs to give informed consent for participation in a clinical trial. The number of such situations will be increasing in the future, because regulations encouraging the pharmaceutical companies to conduct clinical trials with children have been enacted in the USA (Federal Register 1998) and drafted in the EU (European Commission 2002, Commission of the European Communities 2004).

5 CHILDREN AS MEDICINE USERS

There is a lot of research concerning chronically ill children and their perceptions of medicines (e.g., Pradel et al. 2001, Sepponen et al. 2003). Healthy children's perceptions of medicines have been studied less often. The focus of research concerning healthy children and medicines has been on children's medicine use, mainly consumption surveys have been carried out (Klaukka et al. 1990, Kogan et al. 1994, Dengler and Roberts 1996, Stoelben et al. 2000, Hansen et al. 2003, Holstein et al. 2003), and the informants have traditionally been parents (Klaukka et al. 1990, Kogan et al. 1994).

There are some studies focusing on healthy children's attitudes, beliefs, and knowledge about medicines (Bush and Davidson 1982, Bush et al. 1985, Almarsdottir et al. 1997, Almarsdottir and Zimmer 1998, Menacker et al. 1999, Stoelben et al. 2000). Some research has been done on the autonomy of healthy children in using medicines (Bush and Davidson 1982, Bush et al. 1985, Rudolf et al. 1993, Chambers et al. 1997, Sloand and Vessey 2001, Hämeen-Anttila et al. 2005). Furthermore, several studies have explained factors that affect children's perceived benefit of medicines and expectations to use medicines (Bush et al. 1985, Bush and Iannotti 1988, Bush and Iannotti 1990, Almarsdottir and Zimmer 1998).

One of the most ambitious efforts to explore healthy children's behaviors, attitudes and knowledge about medicines was the EU-funded multi-cultural "COMAC Childhood and Medicines Project" in the 1990's (Trakas and Sanz 1992, Bush et al. 1996, Trakas and Sanz 1996). The researchers represented seven disciplines and came from nine European countries and the USA. In this collaborative project, different approaches were used, including both qualitative and quantitative research methods. Finland was one of the ten countries involved in this project (Ahonen et al. 1996, Vaskilampi et al. 1996a, Vaskilampi et al. 1996b). The COMAC project is the only study in Finland to date that has focused on healthy children's perceptions of medicines.

Appendix 1 summarizes the research done concerning healthy children's attitudes, beliefs, and knowledge about medicines and autonomy in using them. These studies have used both qualitative (Almarsdottir et al. 1997, Menacker et al. 1999) and

quantitative (Bush and Davidson 1982, Bush et al. 1985, Almarsdottir and Zimmer 1998, Stoelben et al. 2000, Englund 2004) research methodologies. The qualitative methodology used has included personal drawing interviews (Almarsdottir et al. 1997), thematic interviews (Bush et al. 1996), and focus group discussions (Menacker et al. 1999).

Thus, the research has gradually shifted worldwide toward more child-centered approaches, seeing the child as a subject with special developmental stages. Since the early nineties, children have been seen as social actors capable of subjective views and opinions about different issues (Prout and James 1997). The most recent approach to the sociological study of children is to see children as participants and co-researchers. According to this approach, children are involved in the research and contribute to its aims and methods in co-operation with the adult researcher (see e.g., Okkonen 2004).

A similar change in research approaches has also been seen in the field of social pharmacy. For example in the USA – with the longest tradition in studying healthy children and medicines – Bush and her research group compared children and their mothers as informants of the child's medicine use in the mid-1980s (Bush et al. 1985). They concluded that, whenever possible, information on children's medicine use should be obtained from the children themselves. Later, they conducted focus group interviews with school children to learn what they wanted to know about medicines and how they wanted to learn about them (Menacker et al. 1999). During this period, the quantitative methodology has been largely replaced by more qualitative approaches which involve children as subjects and social actors. However, research involving children as co-researchers is still lacking in the field of social pharmacy.

5.1 Factors affecting children's expectations to use medicines and knowledge of medicines

Several studies in the USA have explained factors which affect children's perceived benefit of medicines (Almarsdottir and Zimmer 1998) and their expectations to use medicines (Bush et al. 1985, Bush and Iannotti 1988, Bush and Iannotti 1990). Children's knowledge of medicines and internal health locus of control have been

shown to be important factors. Furthermore, the mother's medicine use and the child's prior use of medicines influence the child informant's expectations to take medicines. A Children's Health Belief Model was shown to have substantial power to explain children's expected medicine use both cross-sectionally and over a three-year period (Bush and Iannotti 1990).

Bush and Iannotti (1990) tested the Children's Health Belief Model to explain children's (8–14 years) expected medicine use concerning five common health problems. The perceived severity of illness (probability of seeing a physician for common health problems) and the perceived benefit of taking medicines for the health problem were found to have a major influence on expected medicine use. Children's knowledge about medicines and health locus of control were also shown to be significant predictors of their expectations to take medicines for common health problems (Bush et al. 1985, Bush and Iannotti 1990). The children who felt that they had control over their health (internal locus of control) and those who knew most about medicines perceived medicines as less beneficial and were thus less likely to expect to take medicines than the other children (Figure 4) (Bush et al. 1985, Bush and Iannotti 1988, Bush and Iannotti 1990, Almarsdottir and Zimmer 1998).

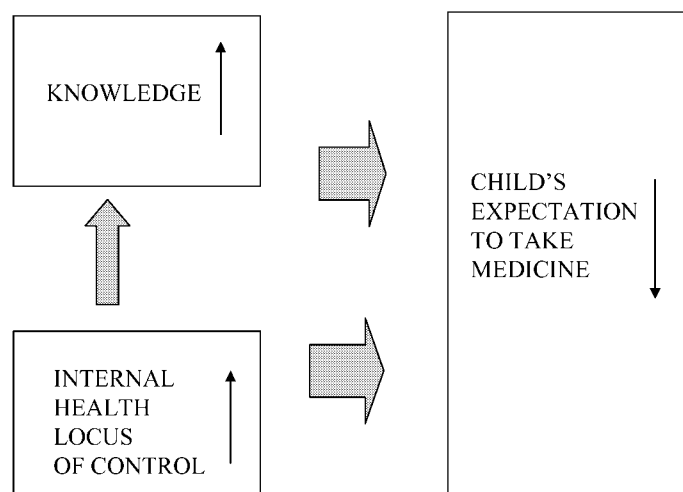


Figure 4. Influence of knowledge and internal health locus of control on the child's expectations to take medicines. (According to Bush et al. 1985, Bush and Iannotti 1988, Bush and Iannotti 1990, Almarsdottir and Zimmer 1998).

In the study of Bush et al. (1985), the mother's medicine use and the child's prior use of medicines were shown to be significant predictors of children's expectations to use medicines. Children in the grades K–6 (5–12 years) who had used medicines in the first phase of this study were more likely to use medicines three years later. Furthermore, if the mothers reported taking medicines, 41% of their children indicated taking medicines compared to 22% of the children of non-medicine-taking mothers. Bush and Iannotti (1988, 1990) also discovered a parental – especially mother's – influence on health-related orientations in general and on children's expectations to take medicines.

Children may gain either positive or, more likely, negative orientations and beliefs about medicines from their mothers (Britten 1994). It is widely known that most people say that they choose not to take any medicines if possible (Conrad 1985, Donovan and Blake 1992, Britten 1994, Britten et al. 2002, Townsend et al. 2003). However, different factors explain whether a person has a negative or a positive attitude toward medicines and medicine use, such as the time period the medicine needs to be used (Hansson Scherman and Lowhagen 2004) or the experience of the illness or symptoms

(Townsend et al. 2003, Hansson Scherman and Lowhagen 2004). Those with a negative orientation find medicine use somewhat problematic (Britten 1994). People recognize many negative aspects of medicines, i.e., that medicines are unnatural, lower the body's resistance to infections or diseases, alleviate the symptom but not the cause, and are potentially dangerous and addictive.

Almarsdottir and Zimmer (1998) discovered that 7- and 10-year-old children's knowledge about medicines was influenced by age, educational environment, and health locus of control. Educational environment was measured as the primary caregiver's education. When that was at the graduate or professional level the children's knowledge of medicines score was about one item higher (maximum 8) than that of the children whose primary caregivers had not completed college. Furthermore, children's belief in their own abilities to influence their health (i.e., high internal locus of control) was an important predictor of knowledge (Figure 4). These results confirmed the findings reported by Bush and Iannotti (1990) in their test of the Children's Health Belief Model.

5.2 Children's attitudes toward medicine use and knowledge about medicines

As expected, children's attitudes toward medicine use seem to have a pattern similar to that of adults', i.e., that medicines should be taken only for sickness and when really needed (Garcia et al. 1996, Vaskilampi et al. 1996b). In some studies, children (5–14 years) have even reported fear of using medicines (Menacker et al. 1999, Bush and Joshi 2002). In some other studies, however, children have viewed medicines quite positively and attributed their recovery to them (Almarsdottir et al. 1997).

According to children, the dangers of medicines are associated with taking a wrong medicine, someone else's medicine, medicine for a different illness, or medicine meant for an older person (Menacker et al. 1999, Bush and Joshi 2002). Furthermore, a medicine can be wrong when one takes a medicine for a serious disease that one does not have; when a child takes a medicine meant for an adult; when one is allergic to certain substances; or when one takes a medicine before breakfast (Gerrits et al. 1996). These ideas clearly reflect everyday life experiences and observations and the messages of adults to children. For example, parents may have warned a child not to take

medicines meant for adults or someone else's (e.g., grandmother's) medicines. It is interesting to note, however, that children do not have concerns about overdosage of medicines.

Certain respect for medicines is appropriate. However, a very negative attitude or even downright fear of using medicines may inhibit the attainment of a sense of empowerment. Because of fear, the child may choose not to use a medicine (s)he would need and may hence fail to assume any responsibility for his or her own medicine use. Thus, the child's self-esteem as a medicine user and internal health locus of control will remain low. Especially, if a chronically ill child fears using medicines this may have an influence on his or her everyday life.

Young children often talk about medicines by referring to their appearance, e.g., color, form or taste, name, or therapeutic purpose (Bush et al. 1985, Trakas and Sanz 1996, Almarsdottir et al. 1997, Menacker et al. 1999). Older children tend to refer to medicines by their brand name more often than younger children (Bush et al. 1985, Christensen 1996, Menacker et al. 1999). However, children in every age group sometimes identify medicines by their use (e.g., cough medicine) and their external characteristics (e.g., color, taste, dosage).

Trakas and Botsis (1996) discovered that Greek children (6–7 and 10–11 years) talked about medicines by referring to their taste. The verbalization of taste indicated not only the real taste of the medicine but also involved metaphorical meanings, such as a sweet taste being good or necessary for the body and a bitter taste being not good, not necessary, generally disliked, to be avoided and even dangerous. The taste of medicine seems to be an important factor for young children who use medicines (Den Toom and Hardon 1992, Gelder and Prout 1996). It is important to take into consideration the child's own ideas about medicines, and to discuss issues that are important for him or her. For younger children, this may even be the bad taste of the medicine. Thus, the acknowledgement of children's concerns as valid is important in order to facilitate their development of a sense of empowerment (Kalnins et al. 1992).

It has been shown in several studies in the USA, where children's knowledge of and attitudes toward medicines have been studied most widely, that the factors associated with medicine efficacy are confusing for children (Bush et al. 1985, Menacker et al.

1999). Children (5–14 years) may believe that size, taste, or color of the pill is related to how well a medicine works (Bush et al. 1985, Menacker et al. 1999). Moreover, some children believe that the place where the medicine is acquired and its price are related to its efficacy (Menacker et al. 1999). Cheap medicines and medicines bought in an ordinary store were believed to be less effective than other medicines. Almarsdottir and Zimmer (1998) tested children's (7 and 10 years old) knowledge about medicines, including their efficacy, and found that children had a medium level of knowledge, the average score being 4 (maximum 8, range 0–7). Furthermore, some studies have shown that the difference between illicit and therapeutic drugs ("good drugs" and "bad drugs") is confusing for American children (Bush and Davidson 1982, Menacker et al. 1999). This may also be the case in other countries, but evidence is missing. Moreover, little is known about how children perceive what medicines are. Stoelben et al. (2000) discovered that 54% of the German children (15–17 years) participating in their study described oral contraceptives as medicines. Furthermore, only 32% of the children gave a correct definition for "antibiotic" and 6% for "analgesic".

Children in American and Spanish studies had modest ideas of how medicines work, and the explanations they gave were quite superficial (Aramburuzabala et al. 1996b, Menacker et al. 1999). They said, for example, that "*It passes through the head and takes the headache away*" (9 years), or that "*The liquid in it drowns the cold*" (8 years) (Menacker et al. 1999).

Knowledge is the basis on which empowerment gradually develops, following the building up of skills and competencies through repetitive cycles of action and reflection (Figure 3). Thus, it is important that the knowledge children have about medicines is correct, and that they gradually gain enough knowledge to guide their decisions concerning medicine use before they begin to use medicines independently. However, these results indicate that not even older children have enough knowledge to enable the development of a sense of empowerment. Paradoxically, this may increase the use of medicines (Bush et al. 1985, Bush and Iannotti 1988, Bush and Iannotti 1990).

Children in different countries recognize the possibility that medicines may have harmful effects (Garcia et al. 1996, Menacker et al. 1999, Bush and Joshi 2002). In the study of Stoelben et al. (2000), for example, 79% of German children (15–17 years)

were aware that medicines can cause adverse reactions. This finding is not consistent in all studies, since in the study of Almarsdottir et al. (1997) 7- and 10-year-old American children did not mention any possible harmful effects of medicines. However, this difference in the results may be attributable to methodological and cultural differences in these studies and also to the age and the stage of cognitive development of the children. The level of understanding the risks of medicines is most likely higher with older children than with younger children (Garcia et al. 1996, Menacker et al. 1999).

Understanding the risks and limits of medicines is the key for children gaining more responsibility over their own medicine use. A child who does not understand the risks of medicines cannot be given autonomy over his or her medicine use. Since autonomy and control over one's decisions are goals of empowerment, such understanding is critical in order to reach empowerment.

Conflicting results have been reported on whether children realize the preventive value of some medicines. In the study of Menacker et al. (1999), American children (5–14 years) did not mention the preventive value of medicines but only mentioned their ability to cure or alleviate the symptoms of an existing illness. Almarsdottir et al. (1997) discovered that the preventive value of medicines was not mentioned in the drawing interview, but that this belief could be seen in more structured interviews. In a multi-cultural study (Trakas and Sanz 1996), a few children (7 and 10 years) from the Netherlands, Denmark, Spain, and the USA mentioned medicines, vitamins, or vaccinations as preventing illnesses. In a Finnish study, 5- through 6-year-old children mentioned taking medicine as a way to stay healthy (Okkonen 2004).

Children's faith in medicine's curative capacity varies. Actually, children (7 and 10 years) in several countries attribute recovery more to non-pharmacological treatment such as rest and special care by close family members (Trakas and Sanz 1996). 5-through 14-year-old children understood that medicines are not the only way to cure illnesses (Menacker et al. 1999); that some illnesses can be cured without medicines; that the medicines prescribed by a physician do not always make one feel better (Bush et al. 1985); and that there are some diseases for which no medicines exist (Trakas and Sanz 1996, Menacker et al. 1999).

5.3 Children's autonomy in using medicines

Self-administration of medicines is quite common among children. American schoolchildren (5–12 years) perceive themselves as active participants in their medicine use (Bush and Davidson 1982, Bush et al. 1985), and they report that they use medicines more autonomously than their mothers indicate (Bush et al. 1985). However, one study among American children (7 and 10 years) discovered that children – especially 7-year-olds – had little autonomy in declaring themselves ill and taking medicines (Almarsdottir et al. 1997). Danish children (6–11 years) reported that they took medicines by themselves, even though if the mother actually gave the medicine to the child (Christensen 1998). Children in several European countries and in the USA know well where medicines are kept at home (Bush et al. 1985, Trakas and Sanz 1996, Sloand and Vessey 2001) and thus have a possibility to take medicines without telling adults.

Sloand and Vessey (2001) concluded that 36% of the 10- through 14-year-old American children responding to their inquiry had medicated themselves independently the last time they had had any medicine. A similar percentage was reported by Bush et al. (1985) among American children from grades K through 6 (5–12 years), indicating that 36% of them had taken medicine independently. Furthermore, 25% of the children in this study reported that they had purchased medicines independently.

Rudolf et al. (1993) discovered in a study in the USA that 44% of 9- through 16-year-old campers at a residential summer camp brought medicines with them. During the camp, 25% of the younger (9–12 years) and 58% of the older (13–16 years) children self-administered medicine without consulting or informing adults. In a Finnish study among children of different ages (11–12 years, 14–15 years, and 16–17 years), 37%, 80% and 94% of the children, respectively, reported that they take medicines independently (Englund 2004). These results show the natural trend of gaining more responsibility in medicine use as children age.

One sign of autonomy is to give medicines to other children. Such action requires even more responsibility, knowledge, and skills than independent self-medication. According to Bush and her research group (1985), 15 percent of the American children

participating in the study reported having given medicine to another child independently. In the study of Rudolf et al. (1993), 8% of the younger (9–12 years) and 28% of the older (13–16 years) children shared medicines with others at a residential summer camp in the USA. The shared medicines at the camp were primarily analgesics and antihistamines/decongestants, and one camper even shared a beclomethasone metered-dose inhaler. In a more recent American study (Daniel et al. 2003), 20.1% of the girls (9–18 years) had actually borrowed or shared prescription medicines. The percentage for boys (9–18 years) was 13.4 implying that teenaged girls, especially, share prescription medicines with others. Chambers et al. (1997) found that such behavior is even more common when children are asked about sharing or borrowing pain medication. In this study, 29%–48% Canadian children (12–15 years) reported that they had shared or borrowed medication for different types of pain.

There may be differences in independent medicine use for different symptoms among children. For example, Chambers et al. (1997) studied self-administration of medicines for different types of pain in Canada. In this study, 58% to 76% of children (12–15 years) reported having taken OTC pain medication over the previous three months without first checking with an adult. According to these results, self-administration for pain seems to be more common than other types of OTC medicine use. This is not surprising in view of the fact that headache is one of the most commonly treated symptoms among children (Hansen et al. 2003, Holstein et al. 2003, Hämeen-Anttila et al. 2005) and also among the wider population (Turunen et al. 2004).

There also seem to be gender differences in independent medicine use. Girls tend to be more independent when using medicines than boys (Chambers et al. 1997, Hämeen-Anttila et al. 2005). Girls also use medicines more often than boys, and this trend increases with age (Dengler and Roberts 1996, Hansen et al. 2003, Holstein et al. 2003). Moreover, girls (14–21 years) frequently use OTC medications to manage menstrual discomfort (Campbell and McGrath 1997). Thus, independent medicine use by girls may be well justified and appropriate.

Self-estimates as to when able to self-medicate. In the study of Chambers et al. (1997), Canadian children (12–15 years) reported that they began to self-administer medication for pain when they were approximately 11 or 12 years old. In the study of

Rudolf et al. (1993) in the USA, 77% of the older children (13–16 years) and 31% of the younger children (9–12 years) attending a summer camp reported that, when at home, they independently decided when they needed medicines, and that they self-administered medicine at home. Furthermore, almost all of these children stated that they felt comfortable taking medicines without telling an adult. In the study of Alderson (1992) in the UK, younger children (8–10 years) indicated that at the age of 14 or 15 they would be old enough to see their physician on their own. Older children (13–14) considered the age of 13 a good age to see their physician on their own.

In a Finnish study, children of different ages had different views about when children can self-medicate (Englund 2004). 11- and 12-year-old children indicated that a child could self-medicate in certain situations while only 10–12 years old: if the medicine is easy to administer, if the child is taking medicine for headache, or if someone has given instructions for medicine use. 14–15-year-old children considered their own age as good to start self-medicating. However, the oldest children in this study (16–17 years) indicated that it is not an issue of age but more of an individual person and his or her personal characteristics, such as skills. They also pointed out that some medicines are easier to self-medicate, e.g., painkillers.

Sources of information concerning medicines. The most common source of information for children in the USA (5–14 years), Canada (12–15 years) and Finland (11–17 years) is the parents, especially the mother (Chambers et al. 1997, Menacker et al. 1999, Hämeen-Anttila et al. 2005). In contrast, in a German study, children (15–17 years) indicated asking information about medicines lastly from their parents (Stoelben et al. 2000). Common information sources for children included the patient package insert or the medicine package (Chambers et al. 1997, Stoelben et al. 2000) and physicians or nurses (Chambers et al. 1997, Stoelben et al. 2000, Hämeen-Anttila et al. 2005). Teachers are not normally considered a source of medicine information by children (Chambers et al. 1997, Hämeen-Anttila et al. 2005). Surprisingly, the Internet was not considered a common source of information by Finnish children, either (Hämeen-Anttila et al. 2005).

Overall, the results concerning children's autonomy in using medicines have been obtained with quantitative research methodologies. It is possible to use questionnaires to determine the amount of autonomy that children have. However, to understand the kind of situations where children use medicine independently, a more qualitative approach is needed.

Active participation in the decisions concerning children's health and medicine use is crucial in order to gain a sense of empowerment (Kieffer 1984, Zimmerman and Rappaport 1988, Lord and Hutchison 1993, Kar et al. 1999). It can be argued that without participation, empowerment cannot emerge. In this respect, results of autonomy and feelings of participation in medicine use are positive. However, autonomy in using medicines should not exist without a certain amount of knowledge and skills regarding how to use medicines rationally. With younger children, autonomy should not mean using medicines independently, but participating in decisions concerning medicines. However, it is suggested by the USP that children, their parents, and their health care providers should negotiate the gradual transfer of responsibility for medicine use in ways that respect parental responsibilities and the health status and capabilities of the child (Bush et al. 1999).

5.4 Summary of the key findings

From an empowerment perspective, the results of the literature review are contradictory. Children's knowledge about medicines seems to be poor (Bush and Davidson 1982, Bush et al. 1985, Aramburuzabala et al. 1996b, Menacker et al. 1999, Stoelben et al. 2000). Even though the knowledge is influenced by age (Almarsdottir and Zimmer 1998) even the older children may not have enough knowledge to provide a basis for the development of empowerment. Furthermore, children's attitudes toward using medicines are somewhat cautious (Vaskilampi et al. 1996b, Menacker et al. 1999). These results are not surprising against the background that health care professionals do not discuss medicines with children (Pantell et al. 1982, Menacker et al. 1999, Tates and Meeuwesen 2000, Tates and Meeuwesen 2001, Tates et al. 2002a), and that most school curricula do not include education about the rational use of

medicines (see 3). This leaves the parents as mainly responsible for teaching their children about medicines. However, the parents are most often lay persons without education about medicines. This means that they pass their own attitudes and often poor knowledge about medicines to their children.

On the other hand, the results from research on children's autonomy in using medicines show that they seem to have more autonomy than adults even realize (Bush et al. 1985) and that autonomy increases as children age (Rudolf et al. 1993, Hämeen-Anttila et al. 2005). This does not only mean that children take medicines independently but also that they feel themselves to be active participants when negotiating about taking medicines with their parents (Christensen 1996, Christensen 1998).

Relative to empowerment, these results disclose a discrepancy (Figure 5). In general, children seem to have autonomy in using medicines but their knowledge is poor. Furthermore, their somewhat cautious attitude may inhibit their developing empowerment as medicine users. According to the literature review, there is a need for educating children about medicines.

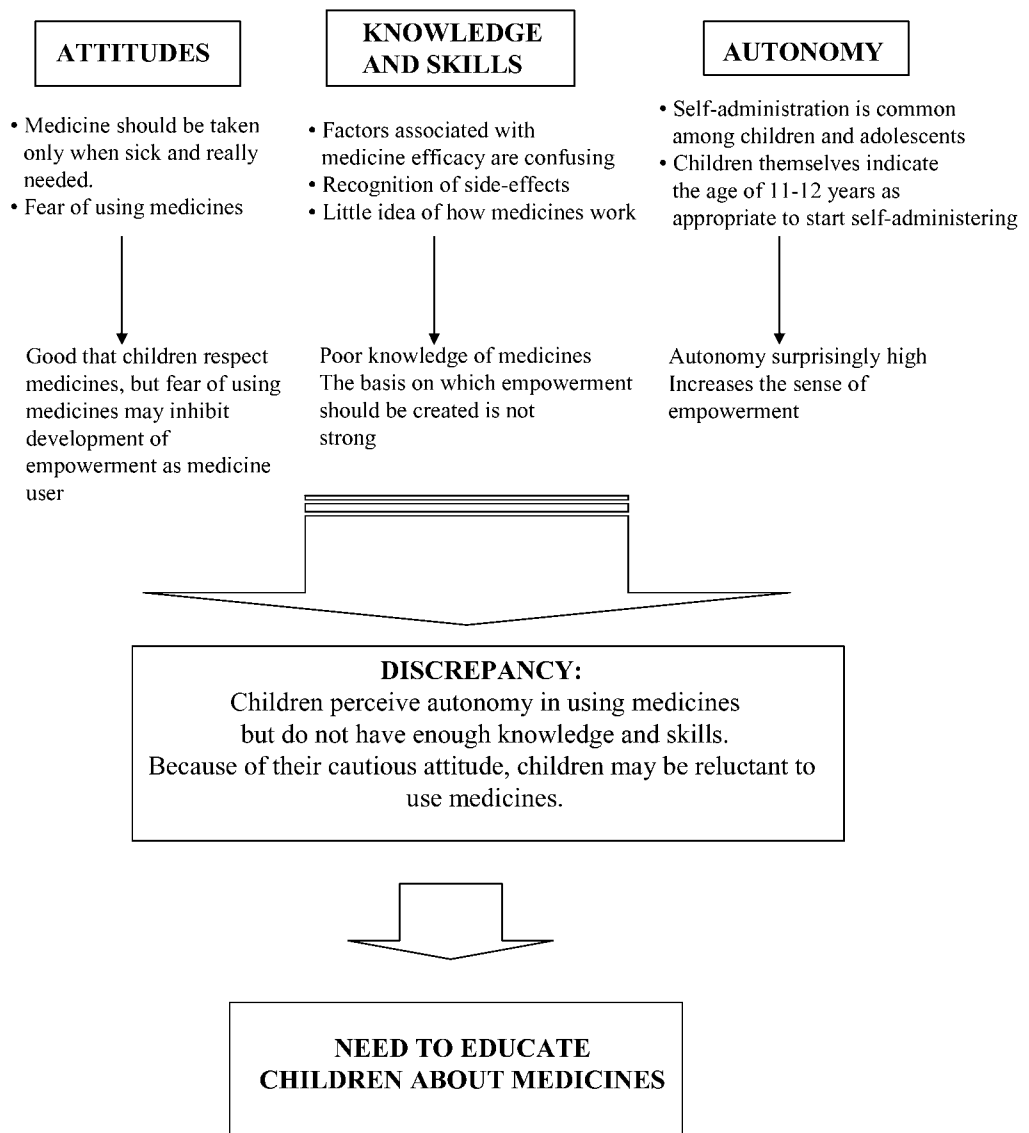


Figure 5. Summary of the literature on children's knowledge and attitudes toward medicines and autonomy in using medicines.

6 AIMS OF THE STUDY

The aim of the present study was to design, develop, and evaluate medicine education materials with an empowering approach accessible through the Internet (www.uku.fi/laahekasvatus, in Finnish with an English introduction). The specific objectives of the study were:

Prior to creating the medicine education materials:

1. To study children's attitudes, knowledge, and experiences of using medicines (I) and, furthermore, to define their autonomy in using medicines as perceived by children themselves.
2. To determine teachers' opinions about medicine education. (II, III)
3. To outline recommendations and materials for teaching children of different ages about medicines based on the opinions of children and teachers. (II, IV)

After producing the medicine education materials:

4. To determine what teachers are willing to teach children about medicines. (III)
5. To evaluate the usefulness of medicine education materials available on a Website as teaching aids. (IV)

7 MATERIALS AND METHODS

7.1 Context of this study

This research is based on the work done in the United States Pharmacopeia (USP) in the USA since the mid-nineties. In 1995, USP responded to the increasing evidence – which is described in the literature review – that children know little about medicines, but have more autonomy in the use of medicines than most adults realize. Therefore, the organization convened a multidisciplinary USP *Ad Hoc* Advisory Panel of Children and Medicines which aimed to develop model guidelines for what children should know about medicines, and how they should learn. Encouraged by the *ad hoc* panel, USP conducted research to gather information from children themselves on these issues (Menacker et al. 1999). In 1996, USP organized an open conference “Children and Medicines: Information Isn’t Just For Grownups”, which established the need and rationale for teaching children about medicines (United States Pharmacopeia 1996). After this conference, the *ad hoc* panel drafted “Ten Guiding Principles for Teaching Children and Adolescents About Medicines” which were afterward approved through a public, iterative, consensus development process including participation by 35 health-professional organizations (Bush et al. 1999). In 1998, these principles were presented as an official USP position statement. To help put the principles into practice, the *ad hoc* panel prepared a “*Guide to Developing and Evaluating Medicine Education Programs and Materials for Children and Adolescents*” (Bush 1999a). This *Guide* went through the same iterative review process that was used to develop the principles. Another international pharmacy organization, International Pharmaceutical Federation (FIP), also accepted a Statement of Principle in 2001 concerning pharmacists’ responsibility and role in teaching children about medicines (International Pharmaceutical Federation 2001). This Statement of Principle was based on the work done by USP.

In Finland, co-operation with USP about medicine education during school health education began when one of my supervisors was a visiting scientist in the USP in 1996–1997. Research co-operation was started during that time and continued in

Finland in the form of two B.Sc. (Pharm) projects, which can be regarded as pilot studies. According to these two projects, medicine education in primary and junior secondary schools was scarce, and few materials were available for teaching in Finland (Häkkinen 1998, Pakarinen 1998). Co-operation with USP was continued by assessing children's understanding of medicine-related pictograms (Kempainen 1998, Hämeen-Anttila 1999, Hämeen-Anttila et al. 2004a).

We¹ wanted to pursue following the work done in the USP and influence the process of including medicine education as part of the curriculum. The timing was perfect: we started this research project in the early 2002, when the Finnish national curriculum for primary and junior secondary schools was under revision. This was also true of the health education curriculum. Until then, the main focus in health education had been on health behaviors such as eating a healthy diet, exercising, and avoiding the abuse of alcohol, tobacco, and illicit drugs, and sex education – topics which still remain among the main focuses of health education. These topics of health education had been taught under various subject headings, yet without addressing the rational use of medicines. During the revision of the curriculum, it was first suggested that the rational use of medicines should also be included in the national curriculum of health education. The curriculum was ratified in January 2004 (Finnish National Board of Education 2004), and health education, including medicines, became an obligatory subject in the junior secondary schools. In the primary schools, health education remained integrated with other subjects, such as environmental studies or biology, but according to the curriculum rational use of medicines was a topic that should be taught.

The importance of educating children about medicines was also recognized by the Finnish Ministry of Social Affairs and Health in the national policy on medicines 2003–2010 (Ministry of Social Affairs and Health 2003). The policy states that educating children about medicines is one way to increase rational use of medicines among the Finnish population.

Despite these decisions, there was a lack of teaching materials. To integrate medicines into health education, teachers would need materials targeted to children of

¹ The choices during this research were made by a research group including me, my supervisors and two undergraduate students. By “we”, I refer to this research group.

different ages and different developmental stages. The aim of this research project was to create such materials for teachers. Early in the process, we decided to present the materials in the form of an Internet Website. In this way, the materials would be easily and freely available for teachers.

7.2 Study design

This study consists of three phases that were conducted during 2002 and 2003 (Figure 6). In order to gain background information for producing the medicine education materials, we started by exploring children's understanding of medicine-related topics, their beliefs about and attitudes toward medicines, and their autonomy in using them. Furthermore, children of different ages were asked what they wanted to know about medicines. Teachers' opinions on what topics about medicines they considered suitable to teach to children of different ages were also assessed. Using the information thereby gained, a Website was developed about the use of medicines (www.uku.fi/laaekasvatus, in Finnish with an English introduction). *USP Guide to Developing and Evaluating Medicine Education Programs and Materials for Children and Adolescents* (Bush 1999a) was used during this process (see Appendix 2). The Website was pilot-tested by a group of primary and junior secondary school teachers, and its usefulness was evaluated. Finally, the Website was revised according to the results, and comprehensive medicine education materials were developed. A summary of the research methods, study participants, and methods of analysis used in the original publications is presented in Table 4.

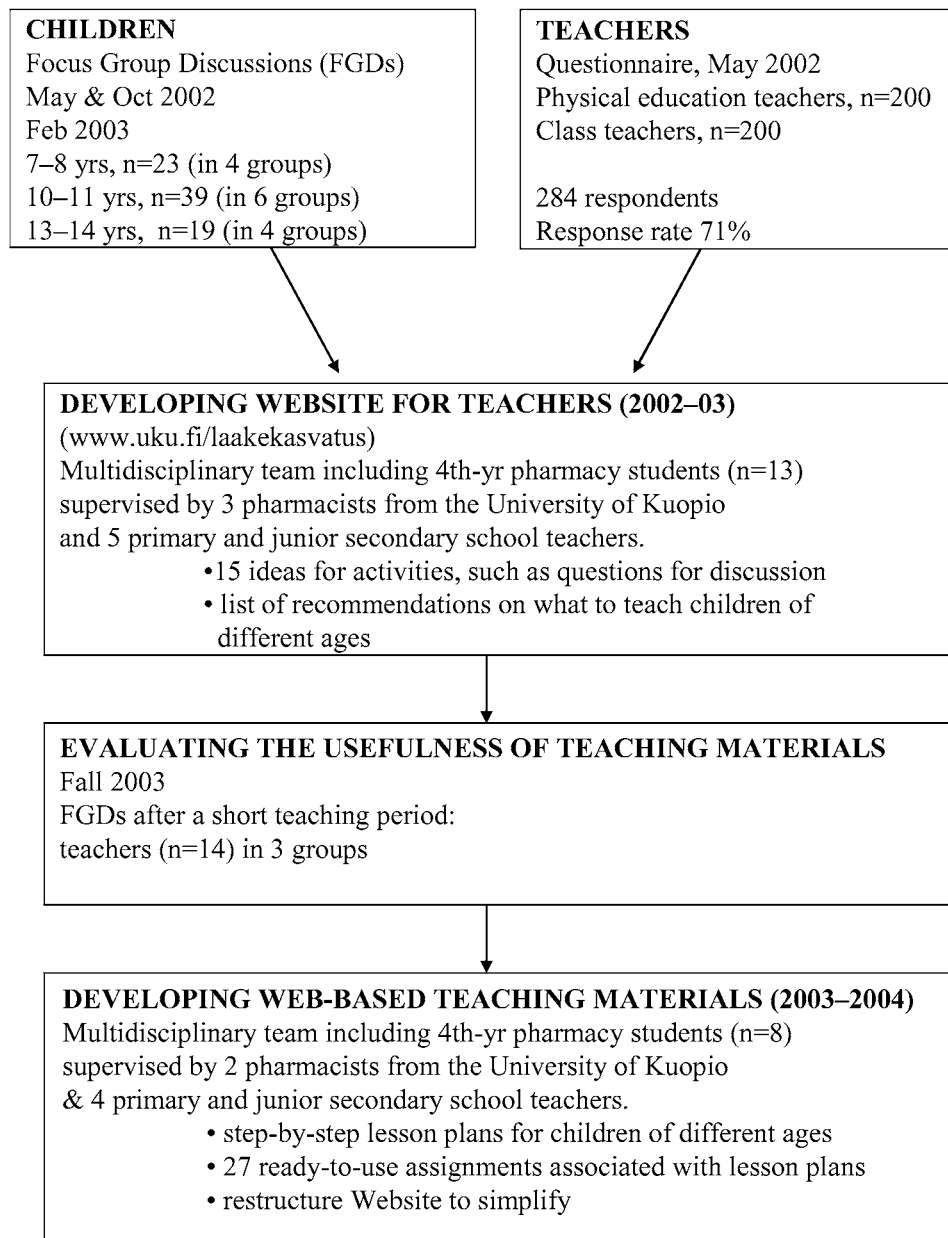


Figure 6. Schematic representation of the research and Website development process.

Table 4. Methods used in the original publications (I–IV).

Study	Study participants	Methods	Analysis methods (Patton 1990, Eskola and Suoranta 1999)
I	Children: 7–8 years (1 st grade), n=23 10–11 years (4 th grade), n=39 13–14 years (7 th grade), n=19	Focus group discussions	Deductive and inductive thematic
II	Teachers: Physical education teachers, n=200 Class teachers, n=200	Questionnaire Response rate 71%	Descriptive statistics (frequencies and percentages)
III	Primary school teachers: 1 st and 2 nd grade n=5, 4 th and 5 th grade, n=6 Junior secondary school teachers: 7 th and 9 th grade, n=3	Focus group discussions	Typology
IV	Primary school teachers: 1 st and 2 nd grade n=5, 4 th and 5 th grade, n=6 Junior secondary school teachers: 7 th and 9 th grade, n=3	Focus group discussions	Deductive thematic

During this study, we applied an empowerment approach to the methodological decisions made by, for instance, including children and teachers as participants in the study and by choosing the method of focus group discussions, which is an empowering method (Kitzinger 1994, Kitzinger 1995) (Figure 7). More importantly, the medicine education curriculum created during this study acknowledges and facilitates the empowerment approach by means of activity-oriented assignments which require participation by the children. Furthermore, school-based medicine education may be seen as a process which gradually educates children in what rational medicine use means through the school years and gives them knowledge and skills to use medicines independently and properly in the future in situations where medicines are needed. Thus, the ultimate goal is to educate future empowered medicine users. However, as Siitonen (1999) concludes, empowerment is not a permanent state, and it thus needs to

be continuously strengthened and supported by pharmacists, physicians, and other actors.

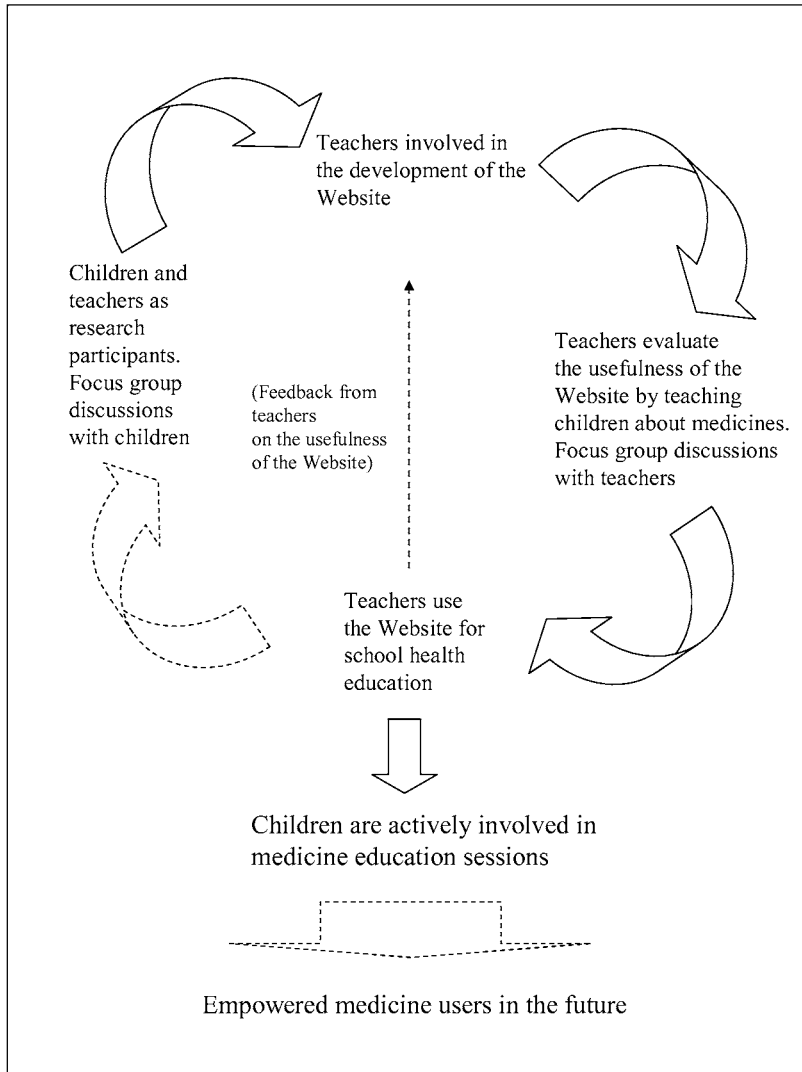


Figure 7. Empowerment approach in this study.

7.3 Focus group discussions (FGDs) with children

Since children's knowledge and understanding of medicines is still quite unexplored, especially in Finland, a qualitative approach was chosen to gain deeper understanding. We decided to use focus group discussions (FGDs) in this study in order to elicit children's own opinions on what they would like to know about medicines at different ages, and to discover what kind of experiences, knowledge, and attitudes children have concerning medicines, and furthermore, how autonomous they perceive themselves to be when using medicines (Steward and Shamdasani 1990, Hassel and Hibbert 1996). Focus group discussion (FGD) is a good method for studying people's attitudes, experiences, and beliefs (Kitzinger 1995, Hassel and Hibbert 1996). Furthermore, FGDs can be used when studying a phenomenon for which there is little information available (Basch 1987, Steward and Shamdasani 1990). FGDs have been previously used with children to study their orientations toward medicines (Menacker et al. 1999) and health (Okkonen 2004), and they have been found to be a useful method for these purposes. Group interaction can produce unanticipated responses from children, and the variety of communication and interaction may reveal dimensions of understanding that may remain untapped in one-on-one interviews (Kitzinger 1994, Kitzinger 1995). The FGD method is also empowering because it lets the participants use their own language, to develop their own ideas further in an interactive manner, and to set the priorities in the discussion (Kitzinger 1994, Kitzinger 1995). Furthermore, we assumed that it would be easier to motivate a group of children than an individual child to speak about medicines (Porcellato et al. 2002).

7.3.1 Pilot interviews

The interview guide used in the USP study (Menacker et al. 1999) with similar aims was chosen as a basis for our FGDs. In order to gain experience with the FGD method and to test the suitability of this interview guide for Finnish children, we conducted three pilot FGDs in spring 2002; two among first-graders (7–8 years) and one among seventh-graders (13–14 years). All pilot FGDs were conducted by the same facilitator

(KH-A) and the same note-taker (M.Sc. in Pharm. student). Because the aim of eliciting children's interest in what they would like to know about medicines could not be accomplished in the pilot FGDs, some changes were made in the guide (Appendix 3). These changes included the addition of a list introducing possible topics about medicines to children. The pilot FGDs were not included in the study.

A need for some aid to elicit discussion at the beginning of the FGD became evident and different options were discussed. The aids used in previous studies included drawings (Almarsdottir et al. 1997) and medicine packages (Menacker et al. 1999). However, these options were not considered suitable because of the lack of time (drawing) and because we did not want to imply advertisement of certain brands of medicine (medicine packages). We decided to introduce some USP pictograms (I, Table 1), as we had favorable experiences of using them among children (Hämeen-Anttila et al. 2004a). Furthermore, we were interested in learning how applicable pictograms would be as a teaching aid.

7.3.2 Participants

Due to the massive amount of data obtained through the FGDs, it was not possible to include schoolchildren of every age in the study. Thus, we decided to choose three reference groups. These age groups were chosen according to Piaget's Cognitive Development Theory (Piaget 1952, Shaffer 1999), in order to include children from three different developmental stages. However, the children were not tested for their level of intelligence or developmental stage. The children were aged 7–8 years (first-graders), 10–11 years (fourth-graders) and 13–14 years (seventh-graders).

We recruited the children from four public primary and junior secondary schools located in middle-class suburbs in Kuopio, Finland. After approval by the principals, informed consent was obtained from the parents (Appendix 4). On the basis of the experiences gained during the pilot interviews, we decided to ask the teachers to choose for the FGDs children who do not quarrel and who are normally talkative. Other researchers have also reported the importance of including in every group some children known to be talkative (Porcellato et al. 2002). Participation was voluntary. There were

4–9 children in each group, and altogether 23 first-graders, 39 fourth-graders, and 19 seventh-graders participated (Table 5). The children were not asked whether they had any chronic diseases but five children reported spontaneously during the FGDs having asthma and one girl having epilepsy. Furthermore, one girl reported that she had had arthritis.

Table 5. The number of children participating in the focus group discussions by age and gender.

Age	Boys	Girls	Total (n)
7–8 years (first-graders):			23
• Group 1 (May 2002)	3	3	6
• Group 2 (May 2002)	5	1	6
• Group 3 (October 2002)	3	3	6
• Group 4 (October 2002)	2	3	5
10–11 years (fourth-graders):			39
• Group 1 (May 2002)	3	3	6
• Group 2 (May 2002)	3	3	6
• Group 3 (October 2002)	3	3	6
• Group 4 (October 2002)	3	6	9
• Group 5 (February 2003)	4	2	6
• Group 6 (February 2003)	3	3	6
13–14 years (seventh-graders):			19
• Group 1 (May 2002)	1	3	4
• Group 2 (May 2002)	1	3	4
• Group 3 (October 2002)	-	7	7
• Group 4 (October 2002)	4	-	4
Total	38	43	81

7.3.3 Progression of focus group discussions

The FGDs consisted of two parts (Appendix 3). First, I showed some USP pictograms (I, Table 1) to the children and asked if they knew what kind of medicine was shown in the picture. The aim of showing pictograms was to elicit discussion about the children's own experiences and beliefs of medicines in their own words. If the children knew the medicine in the pictogram, I asked additional questions: Why did you use it? How does

it work? Why do some people have to use this kind of medicine? Why must some medicines be taken with meals or in a special schedule? The pictograms stimulated lively discussions during the FGDs and thus proved to be a good aid in conducting FGDs with children.

Second, I introduced several topics concerning medicines one by one to the children (Appendix 3) and asked them if they were interested in learning more about the topic. This list made the FGDs tiring, especially for first-graders. This choice to proceed in the FGDs diminished the empowering potential of the method and actually constituted a limitation of our study. However, the children were first given a possibility to spontaneously say what they would like to know about medicines and a few children did so. Furthermore, at the end of the interview, every child was allowed to indicate what was the most interesting topic introduced.

We collected the data by conducting 14 focus group discussions among children (Table 5). The FGDs took place in empty classrooms or school library rooms. Two FGDs were conducted in each age group in May 2002, and the analysis was started at this point. On the basis of the preliminary findings, we decided to carry out additional FGDs in order to validate the emerging themes. For this purpose, we conducted two FGDs in the same age groups in October 2002. At this point, there were already enough data to describe how well children understand medicine-related topics, i.e., the data were saturated. However, the two groups of fourth-graders interviewed in October were not talkative, and we did not gain enough information about the topics related to medicines which would interest them. This is why we decided to conduct two more FGDs among fourth-graders in February 2003.

In conclusion, we conducted four FGDs with first-graders, four with seventh-graders, and six FGDs with fourth-graders (Figure 8). Of these, all 14 were included to describe how well children understand medicine-related topics, but only 12 FGDs were included to describe which topics about medicines are considered interesting by children at different ages (Figure 9). All the FGDs were conducted by the same facilitator (KH-A), and the note-taker (M.Sc.in Pharm. student) was also the same in all cases. The discussions lasted for 29–60 minutes.

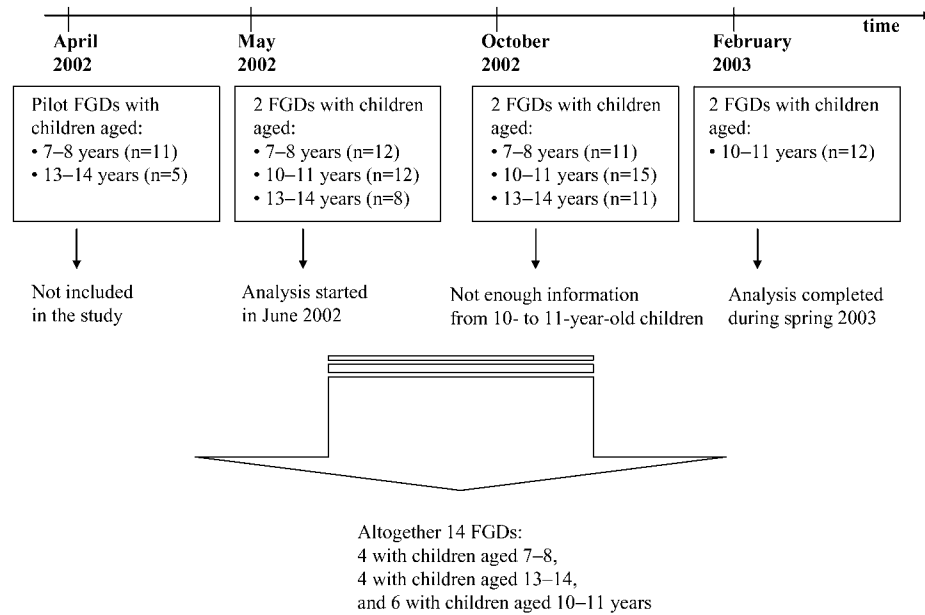


Figure 8. The progression of the focus group discussions among children.

7.3.4 Analysis

The FGDs were tape-recorded and transcribed verbatim. I reviewed the transcripts, and consulted the notes taken by the note-taker as appropriate during the process. The transcription of the FGDs was a difficult task since the children sometimes talked all at once or acted silly and sniggered with each other. However, as Porcellato with her colleagues (2002) pointed out, the first impression of unsuccessful results of FGDs changed to recognition of the value of the data gathered from the children.

The analysis was done by myself (KH-A). However, I discussed the analysis and my findings continuously with the note-taker and the supervisors in order to validate the emerging themes. I used the NVivo qualitative software to facilitate the analysis (Fraser 2000).

I used both inductive and deductive methods to analyze the data (Figure 9) (Patton 1990). The analysis unit could be a single word, a sentence, or a group of sentences representing an idea related to some concept under study. These analysis units

represented the whole group, not individual children, due to the nature of the interactive FGD data. I used deductive analysis to collect the themes introduced to the children by means of questions or pictograms: what medicines are, how medicines work, children's explanations concerning meals and dosage schedules when taking medicines, and their perceptions of how independently they use medicines.

The aims of the analysis were to:

1. discover how well children understand medicine-related topics, and their attitudes about medicines

2. discover what children of different ages want to know about medicines

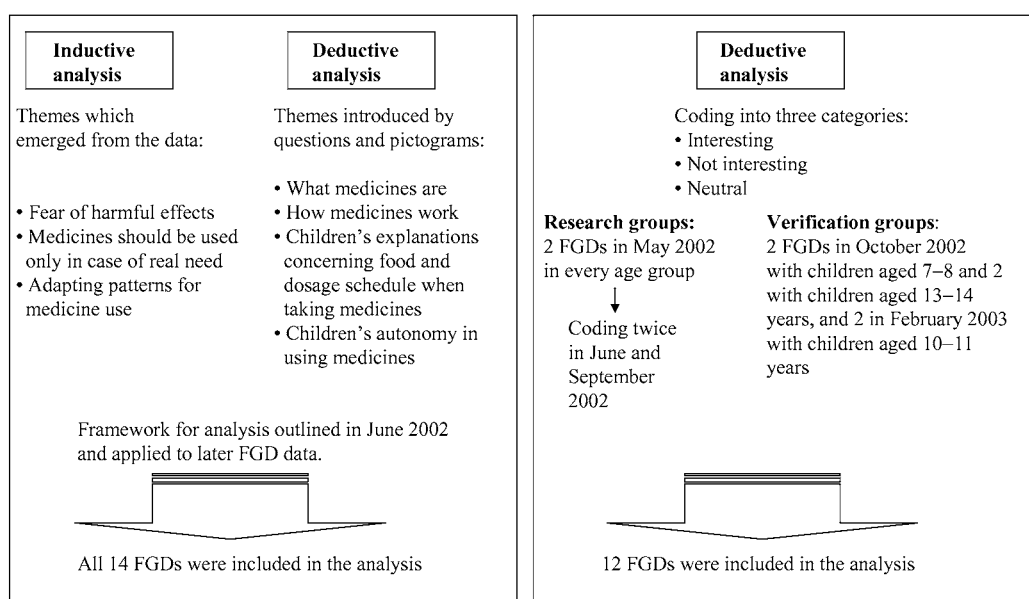


Figure 9. Progression of the analysis of the data from FGDs with children.

The aim of the inductive analysis was to recognize in the interviews the themes or categories that reflect children's attitudes toward and beliefs about medicines (Appendix 5). I started the analysis by doing simple counting and tabulations, in order to gain insight into the large amount of FGD data. Some of the categories that emerged remained the same from the beginning of the analysis, while some others were dropped or reorganized during the process. Deviant case analysis was used to ensure that the interpretations made applied to the whole data (Silverman 2001 pp. 180–184). When I

felt that no new categories related to the research questions emerged from the transcribed interviews any longer, I stopped the inductive analysis. The categories found in the inductive analyses concerning children's attitudes toward medicines were: fear of harmful effects, medicines should be used only for real need, and adapting patterns for medicine use.

In the second part of FGDs, where the aim was to discover children's opinions on what they would like to know about medicines at different ages, I coded deductively the children's responses into three categories: interesting, not interesting, and neutral topics according to the children's preferences (Appendix 5). I regarded the topic as interesting when the child indicated true interest in it, e.g., when (s)he raised his or her voice enthusiastically or started to discuss the topic in more detail. Furthermore, I regarded the topic as interesting if the child spontaneously started to talk about it. During the interviews, after I had introduced the themes to the children, I asked each child what they considered the most interesting topic(s) about medicines. I also coded these responses as interesting. If the child referred to the topic as "quite" or "rather" interesting, I regarded the answer as neutral. If the child clearly indicated that (s)he was not interested in the topic, I coded it as not interesting.

I did this coding twice on different occasions (in June 2002 and September 2002). I reviewed all the differences in coding from the tapes and corrected them. After this process, I tabulated the codings (II, Table 1).

I regarded the FGDs conducted in October 2002 (with first- and seventh-graders) and in February 2003 (with fourth-graders) as sources of verification. I considered as significant only the themes that were regarded as interesting by both groups, i.e., the research groups and the verification groups.

7.4 Questionnaire for teachers

Before making the final decision on the core topics that are important to teach to children about medicines, we also wanted to have teachers' opinions. We used a postal questionnaire to obtain generalizable results, and sent out the questionnaire in May 2002 to teachers who most commonly teach health education in Finnish schools, i.e., physical

education teachers and class teachers (Appendix 6). The questionnaire was piloted by eleven teachers in two different schools. The questionnaire was slightly changed after the pilot.

A random sample of 200 teachers from both groups were selected from the national professional associations. The questionnaire consisted of 17 structured questions and 6 open-ended questions. One of the questions (number 16) introduced 22 topics about medicines and asked the teachers to indicate what they thought were the 10 most important ones to teach to children. We also asked them to indicate at which grade these topics could be taught most appropriately. The validity of this question was not evaluated.

A total of 284 teachers responded to the questionnaire, yielding a response rate of 71%. Thirty-one percent of the respondents were men and 69% women (Table 6). Male teachers and teachers from the Province of Eastern Finland were slightly overrepresented among the respondents. Almost three-fifths (59%) of the respondents taught health education in primary or junior secondary school. Of the teachers, 79% had discussed some aspect of medicines with their class, including the importance of taking antibiotics as prescribed, or that children should not take medicines without adult supervision.

I used the SPSS release 10.0 statistical software (SPSS Inc., Chicaco, IL) to process and analyze the data, which are presented here as frequencies and percentages.

Table 6. Teachers responding to the questionnaire according to gender and province.

	Respondents		Target population	
	%	n	%	n
Gender				
Male	31	88	25	1 202
Female	69	196	75	3 594
Province				
Lapland	2	6	4	187
Oulu province	16	46	13	616
Eastern Finland	14	40	11	517
Western Finland	34	97	39	1 869
Southern Finland	34	95	33	1 596
Unknown			0	11
Total	100	284	100	4 769

7.5 Developing a Website for teachers

During the year 2003, a Website for teachers was developed on the basis of information obtained by a team of 4th year pharmacy students (n=13), 3 pharmacists (M.Sc.Pharm. and PhD.) from the University of Kuopio, and 5 primary and junior secondary school teachers. The teachers were recruited to provide the pedagogical expertise needed in the project in addition to pharmaceutical expertise.

The first version of the Website included a lot of information about medicines, such as how to use medicines rationally and how medicines work. It also included a list of recommendations on what to teach about medicines to children of different ages outlined during this study (Table 8). Furthermore, there were 15 ideas for teaching activities on the Website, such as an idea of a game, and questions for discussion.

This process was aided by a manual developed by the United States Pharmacopeia (USP), *Guide to Developing and Evaluating Medicine Education Programs and Materials for Children and Adolescents* (Bush 1999a) (see Appendix 2).

7.6 Focus group discussions (FGDs) with teachers

The usefulness of the Website was evaluated by 14 teachers in November 2003. We chose FGDs as a method for this study in order to discover the possible problems in the usefulness of the Website. We considered FGDs a suitable method since it is known to motivate more critical discussion about the topic at hand than individual interviews or some other methods (Carey 1995, Kitzinger 1995). Furthermore, FGDs are known to generate new hypotheses (Basch 1987, Steward and Shamdasani 1990, Hassel and Hibbert 1996) which we welcomed in this unstudied field.

7.6.1 Participants

We recruited the teachers for this study from public primary and junior secondary schools located in middle-class suburbs in eastern Finland. This was done by a letter addressed to first- and fourth-grade teachers in the primary schools and to the teachers

of biology and physical education in the junior secondary schools. We sent altogether 93 letters. Only two teachers responded to this letter and were enrolled in the study. We recruited four teachers using the previous contacts that we had. Four teachers were introduced by the teachers already enrolled in the study. Seven teachers were contacted by calling directly the schools and asking the principal to name teachers who might be interested in participating in the study. Three of the teachers dropped out because of a sick leave during the study.

As a result of this process, a convenience sample of 11 primary and 3 junior secondary school teachers participated in the study. There were five primary school teachers teaching 7- through 9-year-old children, six teachers teaching 10- through 12-year-old children, and three junior secondary school teachers teaching children aged 13–14 and 15–16 years. The teachers participated in three study FGDs in these groups. Primary school teachers in Finland teach their own classes all the core subjects (e.g., mathematics, Finnish, natural sciences). On the other hand, junior secondary school teachers teach one subject, in this case biology, domestic science or physical education. All junior secondary school teachers who attended the study also taught health education in their schools. The teachers' teaching experience varied from 2 to 32 years. Seven teachers had children of their own, and only one teacher was male.

7.6.2 Progression of focus group discussions

We collected the data by conducting three FGDs with the teachers. Before the FGDs, the teachers taught their own classes three medicine education sessions based on the Website (Appendix 7; III, Table 1).

The theme of discussion during the FGDs was the usefulness of the materials available on the Website for teachers (Appendix 8). The themes included the following topics: Was there enough information on the Website about medicines and medicine use? How suitable were the recommendations on what to teach children of different ages? How practicable were the ideas for teaching suggested on the Website? During the interviews, it became clear that some teachers had firmly held attitudes, either positive or negative, toward medicines, and a new aim of the study hence emerged: to

discover what kind of attitudes teachers have toward medicines, and what messages they are willing to teach children about them.

All the FGDs were conducted by the same facilitator (KH-A), and the same note-taker (M.Sc. in Pharm. student). My role as a facilitator was twofold: partly, I took a passive role during the FGDs, letting the teachers discuss the topic independently as much as possible. On the other hand, whenever the discussion of a topic came to an end, I introduced a new question. If the discussion concerned some issue not of interest for the study, such as education concerning smoking, I re-introduced one of the main themes. Furthermore, I introduced specific questions whenever the topic was not properly discussed, and in this way, I tried to urge the discussion to continue. The FGDs took place in a meeting room at the university. All three FGDs lasted for approximately one hour.

7.6.3 Analysis

The FGDs were tape-recorded and transcribed verbatim. I reviewed the transcripts, and consulted the notes taken by the note-taker as appropriate during the process. Thematic deductive analysis and typologies were used to analyze the data (Eskola and Suoranta 1999).

The aim of the thematic deductive analysis was to discover how useful the teachers considered the medicine education materials to be. During the analysis, tabulations and simple counting were used to constantly compare the differences between the groups of teachers and to make the analysis systematic and thorough.

The aim of the typological analysis was to create different stereotypes of teachers according to the data. I read through the teachers' discussions carefully several times trying to identify different thoughts, opinions, and attitudes. I used simple counting and tabulated the ideas of each teacher (Appendix 9). Based on the tabulation, I used empowering and paternalistic thoughts as a basis of each type. Empowering thoughts included efforts to involve children in the medicine taking process and to educate them to take a more active role in it. Paternalistic thinking favored keeping the children out of the medicine taking process as much as possible and emphasized the parents' role. I

included an opinion or thought describing each type in the stereotype if at least two teachers' thoughts could be categorized by it. I did not try to classify typologically the teachers as persons, but instead I took their thoughts as they were, which resulted in three stereotypes of teachers. Finally, I included the teachers in these three stereotypes according to their main characteristics. I used the NVivo qualitative software (Fraser 2000) to facilitate the analysis.

7.7 Methodological discussion

During this study, both qualitative and quantitative research methods were used to achieve all the aims of the study. By combining different methods, we were able to compare findings from different sources. This can be called triangulation, more specifically, methodologic triangulation (Patton 1990, Eskola and Suoranta 1999).

7.7.1 Reliability of data collection

Questionnaire for teachers. A widely known limitation of the survey method is the issue of whether the respondents interpret the questions as intended by the researchers (Smith 2002 pp. 43–69). This was also the case in the present study where it was not known if the teachers understood all the topics of medicine education introduced in the questionnaire (question number 16) similarly and as intended. Thus, the reliability of this question is a limitation of this study. However, the results of this question were used as part of triangulation when outlining the recommendations on what to teach children of different ages about medicines. These recommendations also included the perspective of the children and the pharmacists, and they were developed into comprehensive lesson plans after the FGDs with teachers.

This question (question 16) was difficult to answer: the teachers were instructed to choose the ten most important topics about medicines and to rate them for suitable age groups. However, the face validity of this question was tested in the pilot study, where the teachers answered it properly. The question was left in the questionnaire and was answered properly in the study as well.

Teachers were asked how important they consider medicine education as part of the health education curriculum. However, they were not asked how important they consider this topic compared to some other health-related topics, such as healthy nutrition. This would have probably diminished the ratings of the importance of medicine education which is a small topic in the total health education curriculum.

Focus group discussions with children and teachers. In all qualitative research, the subjective role of the researcher is significant during the data collection and also during the process of analysis (Malterud 2001). Actually, the researcher is the main research tool (Patton 1990, Eskola and Suoranta 1999). In FGD, especially the role of the facilitator is crucial (Basch 1987, Steward and Shamdasani 1990), and it is even more crucial when the informants are children (Porcellato et al. 2002). Next, I will critically analyze my own role during the data collection with FGDs.

Personal characteristic. I was the facilitator in all of the FGDs conducted with the children and the teachers. This was my first time conducting FGDs. However, I had previous experience of interviewing children one-on-one (Hämeen-Anttila et al. 2004a), and also about group dynamics among undergraduate students. Despite this experience, we needed to consider strategies to ensure rigor during the FGDs because of my inexperience in conducting FGDs. These strategies involved reading methodological and developmental psychology literature, getting information and advice from a researcher who had conducted interviews with children, and using pilot FGDs as a learning situation.

Pilot FGDs, which were not included in the study, were essential to gain some experience of the method. The tapes were transcribed verbatim before the study FGDs, and my ability to use open-ended questions and to probe wisely and effectively was evaluated by the research group which consisted of two of my supervisors and one undergraduate student, who acted as the note-taker during the FGDs. Furthermore, she gave me instant feedback after every FGD if necessary. My abilities and self-confidence to facilitate FGDs increased during the process, and in the last FGDs, which were made with the teachers, I could use my new talents and appreciate the real value of this interactive method.

Conducting FGDs with children and with teachers. The main difference in conducting FGDs with children and with teachers was the quantity and quality of the interaction (Porcellato et al. 2002). Interaction is the main characteristic that distinguishes FGDs from other types of group interviews, and it is hence considered an essential part of this method (Kitzinger 1994). Whereas in the FGDs with the teachers, I could follow the discussion from the side and probe only occasionally, the children needed direct questions and constant facilitating of the discussion. With the children, most discussion took place between the facilitator and one individual child at a time (Porcellato et al. 2002).

There was a lot of variation among the groups of children. Some groups interacted better and thus produced more information than others. Furthermore, there were differences between individual children in the groups: some dominated and some were more reserved. These are typical features of FGDs (Basch 1987, Steward and Shamdasani 1990), and these features could also be seen in the FGDs with teachers. A problem inherent in the FGDs with children was that, in some of the groups, all the children tended to answer similarly to the most dominant child of the group. In some other groups, however, children were also able to express mutually different opinions (Porcellato et al. 2002).

All these problems emphasize the nature of data gained from FGDs, i.e., the individual responses are affected by the group interaction (Basch 1987, Carey 1995). This is especially the case when children are involved, since their opinions may be affected more easily than those of adults in a group situation. Thus, the data gained with this method do not allow comparison of groups for gender differences or the influence of chronic illness on the understanding of medicines by an individual child.

Despite its limitations, FGD proved to be a suitable method for this study on different perspectives, and the aims of the study were achieved.

Strength of triangulation. Overall, all the methods used in this study had their limitations, which are described in the original publications (I–IV) and above. However, the strength of the findings comes from the combination of the different kinds of knowledge obtained with the different methods and the process which evolved during the research. For example, the recommendations on what to teach children of different

ages were first structured by combining the opinions of the children and the teachers (II). These recommendations were further discussed by the teachers during the FGDs (IV), and based on this discussion, they were finally elaborated into more comprehensive lesson plans in line with the teachers' comments. This process shows the possibilities and strengths of combining qualitative and quantitative data.

7.7.2 Reliability and validity of the interpretations based on the data

In addition, the subjective role of the researcher is significant during the analysis in qualitative research (Malterud 2001). This became very clear to me when deciding whether the children were interested in the introduced topics about medicines, when including some of the statements or sentences made by children in the emerging themes, or when labeling different types of teachers according to the teachers' FGD data. However, even though the results obtained with qualitative methods represents the interpretation of one researcher in a particular context and time (Patton 1990), there are some methods suggested in the literature that can be used to increase the validity and reliability of the analysis and even transferability of the results to other settings.

In order to ensure the possibility for the reader to evaluate the research, I have given detailed information about the whole process and specifically about the analysis (Mäkelä 1990). In this way, the reader may evaluate the reliability, validity and the credibility of the results I have presented. However, I will next discuss some of the methods that I have used to ensure the rigor of my analysis.

One basis for a reliable and valid analysis is tape-recording and careful transcription of the FGDs (Seale and Silverman 1997, Silverman 2001). All our FGDs were tape-recorded and transcribed verbatim. The first transcript was made by an outsider. However, I listened to all the records while simultaneously reading the transcripts. I also used notes taken by the note-taker during the FGDs when appropriate. This review of transcripts proved to be essential since I made many additions and corrections to the text based on my experience and memories of the FGDs. Furthermore, I could identify many of the children from the tapes. However, since the children tended to speak all at once and sometimes unclearly, it was not possible to identify all the children from the

tapes. This emphasizes the fact that, when analyzing FGD data the interpretations made represent the whole group, not an individual person in the group.

Counting can be a good way to start analyzing qualitative data (Eskola and Suoranta 1999 pp. 165–170). Furthermore, giving simple counts in the research report can help the readers to have an idea of how representative and widespread particular instances are in the sample (Seale and Silverman 1997, Silverman 2001 pp. 184–185). In the present research, simple counting and tabulation were a helpful starting point for me to gain more comprehensive insight into the large amount of FGD data, especially the data obtained from children. As Seale and Silverman (1997) suggest, this also served as a basis for the use of deviant case analysis and the constant comparative method (Silverman 2001 pp. 179–180). For example, a tabulation of teachers' ideas and attitudes toward medicines laid a basis for the typology of three different types of teachers (Appendix 9; III, Table 2). Moreover, the tabulation of children's attitudes toward using medicines highlighted the prevalent trend of somewhat cautious attitudes. This trend was further confirmed by the deviant case analysis, which revealed only nine children telling instances of using medicines more than needed or when not needed (Appendix 5). Since the tabulation was made according to the age of the children, it was possible to compare the ideas of children of different ages: 10- through 11-year-old children seemed to be most afraid of what would happen if one accidentally took a wrong medicine. The constant comparative method and deviant case analysis were used throughout the analysis.

These methods also ensured that the data were treated comprehensively and thoroughly (Mäkelä 1992, Eskola and Suoranta 1999, Silverman 2001). The interpretations made were not based on sporadic instances but on the whole data. Another way to ensure systematic analysis of the entire data was the use of the NVivo software (Seale and Silverman 1997, Silverman 2001). This was especially important since there was a large amount of data from the FGDs with children in this study. With the NVivo software (Fraser 2000), I could readily check if a particular set of data had already been coded for a specific theme during the analysis. The value of the software also became clear when simple searches of the whole data set were made to check when and in what contexts children used certain words, e.g., vitamins (I).

In qualitative research, the question of how much data are enough needs to be answered during each particular research process. We started with six FGDs with children in May 2002, two in every age group. The analysis was started at this point, and the framework of the analysis was laid out. At this point we needed more information about the themes which interested children of different ages, and we decided to conduct additional six FGDs in October 2002. Enough information was obtained from 7- through 8-year-old and 13- through 14-year-old children, but an additional two FGDs were still needed with 10- through 11-year-old children. After this process, the data were regarded as saturated (Mäkelä 1990).

Since a single researcher carried out the analysis, the reliability of coding had to be verified. This is why I repeated the coding of the data from the FGDs with children into three categories (topic is interesting, not interesting, neutral) on different occasions (Figure 9). Furthermore, the analytic framework was outlined in June 2002 and it was successfully applied to the subsequent FGD data. These methods are suggested to increase reliability (Silverman 2001)

In the case of the FGDs with teachers, it was impossible to increase the number of groups of teachers during the research because of the teaching period needed before the FGDs. The aim was to have 5–10 teachers teaching three different grade levels. In this way, we would have had 1–2 groups of teachers at three grade levels in our study. Unfortunately, we were not able to recruit this many teachers to participate. However, critical discussion during the FGDs resulted in an acceptable amount of data to evaluate the usefulness of the Website.

7.7.3 Generalizability of the results

Generalizability is different in qualitative and quantitative research. In quantitative research, generalizability of the results is the standard aim and a sampling procedure that leads to a representative subsection of the population of interest is used. In qualitative research, however, such random sampling is not normally possible or appropriate, and the sample size is usually too small for quantitative statistical analysis. Thus, generalizability of the results in qualitative research must be defined and

discussed differently. Eskola and Suoranta (1999 pp. 65–69) suggest that not the results but the interpretations made from the data can be generalized, or actually *transferred* to other situations and cases. Thus, the crucial aspect is not the sample size or the statistical methods but the solidity and depth of the interpretations made based on the data. Complete description is needed throughout a qualitative study in order to enable the reader to evaluate the transferability of the results. Silverman (2001 pp. 102–111) suggests several ways to ensure generalizability, including comparing one's own results to results from previous research, purposive sampling, and using new samples for later tests to support the emerging generalizations.

In this study, a random sample of class teachers and physical education teachers was selected from among the members of the respective national professional associations. Since almost all of the Finnish class teachers and physical education teachers are members of these associations, the results of the questionnaire survey can be generalized to these groups of teachers.

The FGDs with children yielded information about the children's experiences, knowledge, and attitudes toward medicines, and their autonomy in using them. The children were purposively sampled from three different age groups of schoolchildren. The results were confirmed during the research when a new sample of FGDs was successfully fitted into the first analysis framework. Even though all the children were from the same city, Kuopio, the results of previous studies are similar to ours. Thus, cautious transferability of our findings may be appropriate (Silverman 2001 pp. 102–111).

The FGDs with teachers produced a typology of teachers' attitudes toward medicines. This part of the research can be regarded as a pilot study, which produced a hypothesis that will need to be verified in a larger sample of teachers and with quantitative research methods before any generalizations can be made.

7.7.4 Ethical questions

Whenever children are involved in research, ethical issues need to be carefully considered. During the present study, we sent a letter to the parents of all children in the

study classes describing the aims and methods of the study (Appendix 4). In this letter, we said that the FGDs will be tape-recorded and emphasized the confidentiality of the interviews. We offered our phone numbers for the parents who had questions. Informed consent was asked from the parents for children of all age groups.

The teachers chose the children for the FGDs from among the children who had their parents' permission to participate. However, participation in the FGDs was voluntary, and every child could choose whether or not (s)he wanted to participate. There were some children in every class who did not want to be involved and their opinions were respected.

At the beginning of the FGDs, I explained that we were interested in learning about children's experiences of medicines and emphasized that there were no right and wrong answers (Appendix 3). Furthermore, I said that the discussion would be tape-recorded. Since the discussion concerned the children's own experiences of medicines, some children might have felt uncomfortable about that. However, even though I encouraged the children to share their experiences, if a child did not want to participate in some part of the discussion, I respected that child's silence.

I wrote the study reports in such a way that no individual child or teacher could be identified. The data from the FGDs with the children and the teachers have been used only by the research group. The tape recordings and FGD transcripts have been filed according to the instructions of the University of Kuopio.

8 RESULTS AND DISCUSSION

This was an interactive research process with both practical and theoretical aims. The results of each part of this research process were used not only to make theoretically solid interpretations, e.g., how children perceive medicines, but also to be used when developing and revising medicine education materials for teachers (IV). This interaction made the process both fruitful and challenging.

In this section, I will describe the main findings of our study and how they were used when creating and revising medicine education Website for teachers (Figure 10). Moreover, I reflect medicine education on the framework presented in the literature review. The results have been described in more detail in the original papers I–IV.

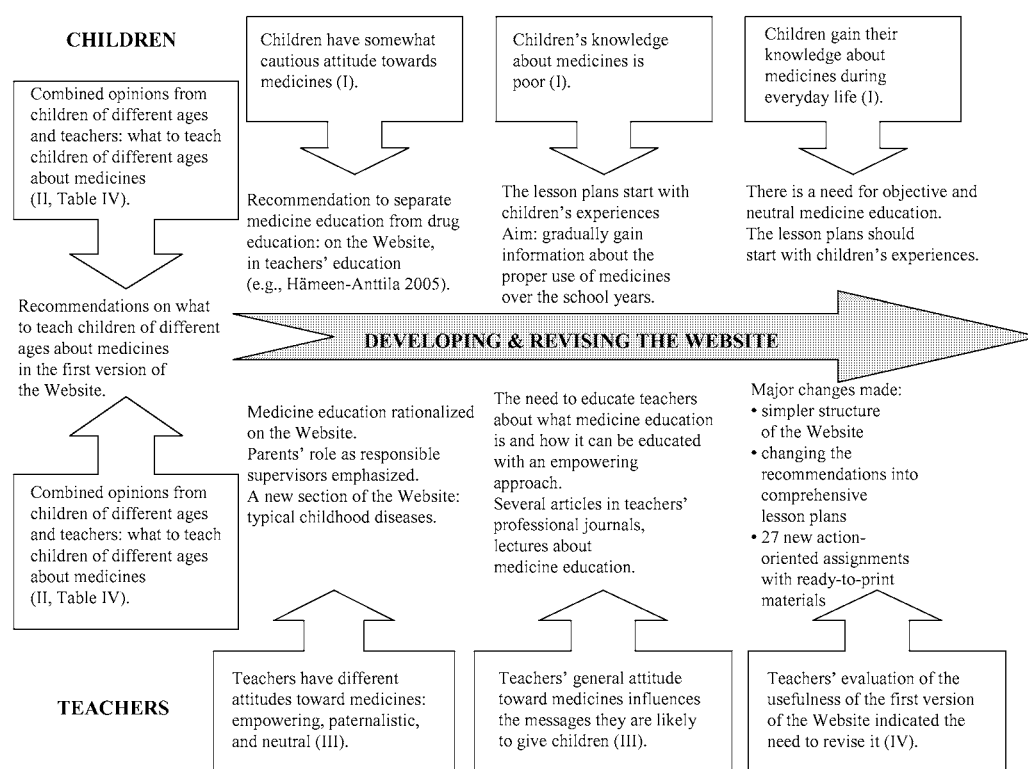


Figure 10. Summary of the core findings of the study and their influence on the development and modification of the medicine education Website for teachers.

8.1 Production of medicine education materials

Based on the literature review, there is a worldwide need for educating children about medicines. However, in order to evaluate the need for medicine education in Finland, we conducted focus group discussions with children to find out Finnish children's knowledge about and attitudes toward medicines and their autonomy in using them. We also considered it important to assess if teachers are ready to teach medicine education in Finland. This information was needed for developing medicine education materials.

8.1.1 Need for medicine education in Finland

Children's knowledge of medicines. Our FGDs with children revealed that children attain their knowledge about medicines during everyday life experiences which results in superficial knowledge (I). Our results are in accord with the results of other studies (Bush et al. 1985, Aramburuzabala et al. 1996b, Menacker et al. 1999, Stoelben et al. 2000).

In the present study, children had very superficial ideas of how medicines work. 7- through 8-year-old children said that medicines work by helping sick persons, or that medicines take the sickness away. When asked more specific questions the youngest children said that they did not know. 10–11-year and 13–14-year-old children had a better understanding: they said that medicines can cure illnesses, alleviate pain, and lower high body temperatures, and that some medicines can cheer people up.

Children had a better understanding of why some medicines needed to be taken with a special diet or in a given dosage schedule than about how medicines work (I, Table 4). They said correctly, for example, that medicine works better or has fewer adverse effects if it is taken with a certain diet or according to a certain schedule. They also made statements about very practical things, such as that tablets are easier to swallow or tasted better when taken with food, or that it is easier to remember to take the medicine with a dosage schedule.

Children's attitudes toward medicines. Most of the children in our study pointed out that medicines are not always harmless. Especially 10- through 11-year-old children

were worried about what would happen if you accidentally took a wrong medicine or medicine prescribed to somebody else. The oldest children (10–11 and 13–14 years) knew that medicines can sometimes cause adverse reactions. Some other studies suggest that the perception of risk concerning medicines emerges gradually during cognitive development (Garcia et al. 1996, Menacker et al. 1999).

In our study, the children in each age group said that medicines should be used only in case of real need. Only 9 children out of the total of 81 described some incident of using medicines more than needed or when not needed (Appendix 5). They said that medicines can be used if a person has terrible pain, high temperature (over 39 °C), or a disturbing cough, for example. Children used such words as ‘terrible’, ‘awful’, or ‘severe’ and said that they preferred not to take any medicines if possible. This finding may partly be a result of the current drug education in school health education. If only the negative aspects of medicines are taught and warnings provided, this cautious attitude is not surprising. The actual use of medicines in our study population was not evaluated and thus remains unknown.

Such aversion to medicines is also known among adults. It is widely known that most adults say that they choose not to take any medicines if possible (Conrad 1985, Donovan and Blake 1992, Britten 1994, Britten et al. 2002, Townsend et al. 2003). In the Finnish culture, there is a prevalent and widely accepted norm that it is more virtuous to suffer than to readily treat and alleviate discomfort (Ahonen et al. 1996, Lumme-Sandt et al. 2000). However, it seems that people may use medicines more than they say. This model of behavior seems to be passed on to children. However, such discrepancy between discourse and actual behavior may be very confusing to a child, especially one in need of regular medication.

Children’s autonomy in using medicines. In our study, children of all age groups sometimes used medicines without asking their parents. However, such independent medicine use was uncommon for 7- through 8-year-old children. The mother was normally responsible for children’s medicine taking and the father was only occasionally mentioned in this context. Children knew well where the medicines were kept at home.

The youngest children in our study (7–8 years) clearly relied on their parents when using medicines. Only four children in this age group mentioned independent medicine use. Two children used regularly nose spray, but relied on their mothers whenever taking the medicine. One boy described an occasion when his mother had forgotten to give him his tablet and he took it by himself (Table 7). Only one 7-year-old boy used independently and regularly nose spray for allergy without telling his parents every time when taking the medicine.

Even though they still clearly relied on their parents when using medicines, 10- through 11-year-old children had used medicines without telling their parents more often than the younger children. Nose sprays, painkillers, and cough medicines were used without help. These occasions were normally exceptions, e.g., the parents were not at home at the time the medicine needed to be taken. The children usually told their parents afterwards or called them asking for help. However, some children said that they are allowed to use medicines, e.g., painkillers and nose sprays, without telling their parents. They sometimes informed their parents, but sometimes did not (Table 7). Three chronically ill children (asthma and epilepsy) said that they used their own medicines independently. Some of the 10- through 11-year-old children indicated interest in learning how to take medicines so that they could use medicines independently in the future: *“So that then you would know how to take them when you’re old”*.

As expected, the 13- through 14-year-old children in our study reported more independent medicine use than the younger children. They reported using painkillers, cough medicines, medicines for allergy, and antipyretics independently. However, many 13- through 14-year-old children said that they wanted to negotiate with their mother or parents first, or that they told their parents afterwards that they had used medicines (Table 7).

Table 7. Examples how children described their autonomy in medicine use.*

7–8 years	10–11 years	13–14 years
<p>Boy: <i>Once mom forgot to give me the medicine and I took it myself.</i></p> <p>Interviewer: <i>Yes, what kind of medicine?</i></p> <p>Boy: <i>The /// pill</i></p> <p>Interviewer: <i>Did you tell your mom you took it yourself?</i></p> <p>Boy: <i>When I got back from school Daddy said I should take that medicine right away and I told him I already took it in the morning.</i></p>	<p>Boy 1: <i>I take Burana® (ibuprofen) without permission.</i></p> <p>Interviewer: <i>What do you take it for?</i></p> <p>Boys are talking simultaneously</p> <p>(Boy 2: // Sometimes, well, if I have a headache)</p> <p>Boy 1: <i>Sometimes when I go home it feels like //(?:I feel dizzy)</i></p> <p>Interviewer: <i>Do you tell your mom later that you've taken Burana®?</i></p> <p>Boy 1: <i>Well, sometimes I don't say but sometimes I do.</i></p> <p>Girl: <i>Me too, like I can take a painkiller and then all cough medicines I can take – but I have to tell about it then.</i></p> <p>Boy 1: <i>I can take something if it's really hurting bad // it's not dangerous.</i></p>	<p>Girl: <i>When I have a headache I always take medicine on my own</i></p> <p>Interviewer: <i>Yeah right – You don't need to ask your parents.</i></p> <p>Girl: <i>No.</i></p> <p>Girl 1: <i>I ask my parents – first a bit about where it hurts and then if I need to take something.</i></p> <p>Girl 2: <i>I mostly don't, because I just take some Burana®, so...</i></p> <p>Interviewer: <i>Yeah, do you tell your parents afterwards?</i></p> <p>Girl 2: <i>Yes I do.</i></p>

* // means that the children talked unclearly. If the mark is followed by brackets, I have made an interpretation about the content of the discussion.

Our results are in accord with the results of previous studies which have shown that even young children use medicines independently – at least occasionally (Bush and Davidson 1982, Bush et al. 1985, Rudolf et al. 1993, Chambers et al. 1997, Sloan and Vessey 2001, Hämeen-Anttila et al. 2005). However, conflicting findings have also been reported, and some studies have concluded that children do not have much autonomy in declaring themselves ill or using medicines (Almarsdottir et al. 1997). Nevertheless, children seem to see themselves as active participants when negotiating whether or not to take medicines, and according to the literature also when gaining understanding of illness and illness processes. These active roles of children include understanding therapies and medical examinations as symbolic boundary markers by which they are able to distinguish different stages in illness (Prout and Christensen 1996, Christensen 1998); seeing themselves as the first person recognizing that they are

ill while expressing no doubt of their own judgment (Christensen 1998); participating actively in medicine taking, e.g., by applying creams or using nasal sprays, or fighting against it (Christensen 1996, Christensen 1998); asking someone in their house to give them medicine (Bush and Davidson 1982); comforting and helping other sick persons in the family by, e.g., fetching things for them, picking flowers, or helping with domestic work (Christensen 1998).

Empowerment does not mean the same to all people in all settings (Rappaport 1987, Bernstein et al. 1994). For instance, it means different things for a preschooler and a teenager, or for children and adults. Children do not necessarily want to take the responsibility for using medicines independently. In fact, for children, medicines are not the first choice to treat illnesses (Trakas and Sanz 1996). This does not mean that children cannot be empowered, but rather that they may feel competent in other actions. As Christensen (1998) pointed out, children can describe specific actions relative to how they would comfort an sick family member, even though such actions by children may be very difficult for parents to notice and appreciate as marks of competence. Thus, active involvement of the child in the whole illness experience should be encouraged by adults, including decisions concerning medicine use. The child should have a feeling that his or her concerns are taken into account as important, and that (s)he has had a choice in deciding about the treatment.

Summary of the findings. According to our results, children have poor knowledge of medicines and gain their knowledge through everyday life experiences. However, older children, especially 13- through 14-year-old children, have a better understanding of medicines and the risks of medicines than younger children. Furthermore, children have a somewhat cautious attitude toward using medicines, but many of them have used medicines independently, the older more than the younger. These results imply a need for objective and neutral medicine education in Finland.

The results of our study are in accord with the results of studies done in other western countries showing a great similarity of children's knowledge about and attitudes toward medicines, and autonomy in using them (Bush and Joshi 2002). However, there are also differences in the children's perceptions in different studies. For example, in an American study children viewed medicines quite positively without addressing any

harmful effects to them (Almarsdottir et al. 1997) which is quite different from our results in this study. The differences like this are most likely due to different contextual factors in the families and in the larger society, including characteristics of patients, physician practices, physicians, and health care systems which influence in the medicine use patterns in different countries (Haaijer-Ruskamp 1996).

8.1.2 Teachers' opinions of medicine education

Teachers considered medicine education an important part of health education. Almost all (93%) of the teachers responding to our questionnaire thought that teaching about the use of medicines should be included in the national curriculum of health education. Furthermore, they were ready to teach about medicines (82%), especially if some teaching materials were available (93%). However, the teachers clearly thought that the parents (98%) are mainly responsible for teaching their children about medicines. School health nurses (88%), physicians (84%), pharmacists (61%), and teachers (59%) were the groups also considered responsible for teaching children. Our results are very similar to those found in the U.S. study where teachers indicated that they believe it is important to teach children about medicines but that they would need training and materials or a health educator to teach their students this subject (Bush 1999b). Furthermore, the American teachers participating in the study thought that doctors, pharmacists, and parents bear the primary responsibility of medicine education.

The role of health care professionals, i.e., school health nurses, physicians and pharmacists, as responsible for medicine education is evident, but according to the new health education curriculum (Finnish National Board of Education 2004) teachers are among the key persons educating children about the use of medicines. Their role has become increasingly important in the current situation, where school health nurses are often available only for two or three days a week in different schools. Furthermore, teachers can integrate medicine education in the whole health education curriculum, and their pedagogic expertise ensures the quality of teaching. However, teachers are lay persons with their own ideas and attitudes about medicines.

During our FGDs with teachers after the teaching period, we found three different types of teachers: empowering, paternalistic, and material-evaluating (III, Table 2). Empowering teachers wanted to teach the children some basic principles about medicine use and to encourage them to use medicines rationally and safely. Furthermore, they wanted to activate children to read the label before medicine use and thought that children should know about some medicines suitable for treating common symptoms. Paternalistic teachers felt the parents to be responsible for their children's medicine use and pointed out that it is good to educate children about the dangers of medicine use. Furthermore, a paternalistic teacher wanted to emphasize the importance of a healthful lifestyle, especially a healthful diet, and non-pharmaceutical self-care. Material-evaluating teachers commented mainly on the usefulness of the medicine education materials without expressing any attitude toward medicines.

Teachers' own medicine use habits and attitudes will inevitably influence how they will react to this new topic in the curriculum. Thus, teachers will need a positive rationale for educating children about medicines to acknowledge their own important role. They need to notice that health care professionals do not necessarily communicate with the children and that parents have not had medicine education themselves and thus are likely to be inadequate teachers and role models. Thus, teachers themselves will need education on what medicine education actually is about, and how it can be taught in an empowering way. Furthermore, teachers will need information to be able to teach it to children. Thus, one way to increase the possibilities for teachers to educate their students objectively about medicines – by supplying neutral and objective medicine education materials and information – was addressed during this study.

Summary of the findings. According to our results, teachers see medicine education as an important part of health education and are willing to teach this topic – especially if some materials are provided. However, they are lay persons and their own attitudes toward medicines may influence the messages they are likely to give their students.

8.1.3 From the first version of the Website to the revised materials

The creation of the Website was started by gathering children's interests and teachers' opinions on what could be taught about medicines to children of different ages (Table 8). According to our results, children's interests and teachers' opinions were quite similar (II). However, teachers suggested some topics related to the rational use of medicines, which the children did not regard as interesting, even though "proper use of medicines" was also considered an important topic by the oldest children (10–11 and 13–14 years). According to the teachers, "abuse of medicines" and "medicine use with alcohol" could be taught to children from 11–12 years of age onward. However, children were already interested in these topics on the fourth grade (10–11 years).

Table 8. What to teach children of different ages about medicines. Combined opinions of children and teachers.

7–8 years	10–11 years	13–14 years
Proper use of medicine	Proper use of medicine	Proper use of medicine
Purposes of medication, i.e., prevention, cure, symptom relief	Purposes of medication, i.e., prevention, cure, symptom relief	Purposes of medication, i.e., prevention, cure, symptom relief
Storage of medicines	How to read the label	How to read the label
When to use non-prescription medicines and when to treat the illness in some other way (e.g., hot drinks, rest)	Why are there sometimes adverse reactions from medicines?	How to evaluate the reliability of information sources about medicines
	How can one avoid adverse reactions?	Medicines and natural products: what's the difference?
	Abuse of medicines	How medicines work
	Medicine use with alcohol	Abuse of medicines
	Under- and overuse of medicines	Medicine use with alcohol Under- and overuse of medicines

The first version of the Website included a lot of information about medicines, such as how to use medicines rationally and how medicines work. It also included a list of recommendations on what to teach children of different ages about medicines (Table 8). Furthermore, there were 15 ideas for teaching activities, such as an idea of a game, and questions for discussion.

In order to evaluate the usefulness of the materials as teaching aids and how the empowerment approach had been implemented in it, 14 teachers taught three medicine education sessions based on the materials. According to this evaluation, major changes were made in the Website (Table 9). A detailed description of the evaluation process and the changes made in the Website can be found in IV.

Table 9. Changes made in the first version of the Website following the evaluation.

First version of the Website	Problem indicated by the teachers during the evaluation	Changes made in the Website
Information about medicines, e.g., how to use medicines rationally and how medicines work.	Website contains too much information and it is too complicated.	<ul style="list-style-type: none"> • Summaries about the information • Background information at a deeper level of the Website • Simpler structure
Website focus exclusively on medicines.	Some teachers felt that the materials encourage children to use more medicines. Teachers hoped that some other ways to treat illnesses would also be covered.	<ul style="list-style-type: none"> • New section of typical childhood diseases, which also contains information about possible means of prevention and home remedies
Recommendations on what to teach children of different ages about medicines (Table 8).	Teachers of the youngest children disagreed about what to teach about medicines for 7-through 9-year-olds children.	<ul style="list-style-type: none"> • Emphasize parents role • Emphasize that the aim in this age group (7–9 years) is to gradually educate children to learn how to discuss medicines • Letter to parents
	Teachers indicated a need for specific lesson plans for their own age group.	<ul style="list-style-type: none"> • Recommendations replaced by wider lesson plans, which contain all the information and assignments needed for each grade
Fifteen ideas for teaching activities, e.g., an idea of a game, and questions for discussion.	Teachers indicated a need for ready-to-use materials.	<ul style="list-style-type: none"> • 27 action oriented assignments containing ready-to-print forms and teaching materials
	No suitable assignments for the youngest children (7–9 years).	<ul style="list-style-type: none"> • Stories and pictures about medicine use for the youngest children

8.1.4 Implementation of the empowerment approach in the materials

The empowering approach we had chosen defined some principles that needed to be reflected on the Website. These theory-based principles included the suggestion that teachers should consider medicine education as a meaningful and important topic to

teach, that children should be considered as active participants in medicine education, that their experiences about medicines should be respected and taken as a basis for the education, and their active involvement in encounters with health care professionals should be encouraged (Kieffer 1984). Furthermore, medicine education should start early in the school years (Bush 1999a). Even though this empowering approach was chosen at the beginning of the process, the evaluation of the first version of the Website by the teachers clearly showed that we had not been able to implement it in the first version of the Website.

The main source of discordance between the empowerment approach and the opinions of the teachers appeared to be the need to educate the youngest children (7–9 years) about medicines. According to the responses to the questionnaire, the highest proportion of teachers (42%) indicated that the ages of 11–13 years or 9–11 years (25%) it would be the best ages to begin medicine education. However, there were teachers who agreed with our perspective and indicated that medicine education should begin when the children are 7–9 years old (24%). During the FGDs, the teachers of the youngest children (7–9 years) considered some of the topics that were recommended on the Website (Table 8) as information to parents, for example, what to check about your own medicine before its use (included in the proper use of medicine). These teachers considered the messages to keep away from medicines and to use them only with adults as correct to be taught to this age group. However, the instructions not to touch medicines by themselves will not give the children any basis for empowerment.

From the empowerment point of view, children should be educated in basic knowledge and skills about medicines before they can gradually gain more responsibilities and competencies in using medicines. In order to stress this point, we retained the recommendation that medicine education should start on the first school grade (II, Table IV). The USP *Guide for Developing and Evaluating Medicine Education Programs for Children and Adolescents* (Bush 1999a) recommends even younger children to be educated about medicines. For example, messages for 3-year-old children include informing adults if they find a pill. Nevertheless, the lesson plans clearly state that the messages for the youngest children (7–9 years) are merely the

basis, and that the aim is not to urge such young children to use medicines independently.

During the evaluation, it also became clear that teachers stress the importance of drug education, i.e., teaching about the dangers of abuse of medicines. Even though drug education is an important part of health education, learning such an everyday life skill as the rational use of medicine should not be underestimated. Only a few people abuse medicines, but almost all need to use medicines during their lives. Moreover, in our view, educating children early enough about the rational and proper use of medicines could be one way to prevent abuse of medicines. Thus, the comprehensive lesson plans created during the study are mainly about the rational use of medicines, i.e., medicine education. These lesson plans include information about medicine use and the 27 new actively oriented assignments focus the teaching to the main aspects of medicine education. These lesson plans and assignments encourage the teacher to start with the children's own experiences of medicines and to actively involve them in the education. Furthermore, the recommendation that medicine education should be separate from drug education in order to avoid confusion in the minds of children was placed on the Website.

8.1.5 Lessons learned

This has been a four-year process, during which the medicine education Website has been developed and revised. We hope that the lessons we have learned during this process can be used when starting other health education programs in Finland and worldwide. Besides the thoughts presented below, some recommendations are provided in IV.

Involvement of both the children and the teachers in the whole process was very important. We had five teachers serving as pedagogic experts when developing and revising the Website. We could have used these five teachers more effectively. The teachers commented on the materials at every step of the process, but they could have been more deeply involved, e.g., when actually creating the assignments. Moreover, pharmacy students could have tested the assignments in practice with the teachers. The

evaluation of the usefulness of the Website by the fourteen teachers participating in the study was extremely important: the first version of our Website had to be notably improved.

If I were to start this process all over again, children would be given more power. I would involve children in the research process and ask them to develop the aims of the research and the materials with me. For example, I would ask them to answer the question: “What would you teach to children of your age about medicines”, and maybe even involve them in the interviews. This would help us to appreciate the empowerment approach better than the list of topics that we introduced during the FGDs in this study. Of course, the curriculum would also include the perspectives of teachers and health care professionals, as suggested by the USP (Bush 1999a).

During this process, we chose to approach the users of the materials, i.e., teachers, and the target group, i.e., children. Moreover, we ourselves put the perspective of health care professionals (pharmacists) into the materials. However, the input and the perspective of school health nurses would have been valuable during this process. Their opinions of the materials and possibilities to be engaged in medicine education should be evaluated in the future.

The USP pictograms were available in the first version of our Website, whose usefulness was evaluated by the teachers. Some of the teachers in every group had used them during the teaching period, and they all found the pictograms useful as teaching tools. Thus, pictograms seem to be practicable teaching aids to elicit discussion during medicine education sessions. According to our previous study, children understood the USP pictograms quite well (Hämeen-Anttila et al. 2004a). The pictograms were left on the Website for use by teachers.

The Internet was chosen as the medium for our materials and it proved to be a good choice. Updating the materials will be easy, and we can add new assignments whenever needed. Moreover, the materials will be easily accessible to all Finnish teachers. The challenge for the future is to translate the Website into English in order to make it useful worldwide.

8.2 Reflection on medicine education

In this chapter, I will reflect on medicine education based on experiences obtained during this study and the theoretical framework applied, empowerment.

8.2.1 Medicine education in practice

Rodwell (1996) presented a model case for empowerment as a pure example of the concept. I present here a model case of empowering medicine education, using the model by Rodwell as a basis:

A teacher includes medicine education lessons in the health education curriculum. (S)he starts the discussion with his or her class by eliciting the children's experiences of medicines and medicine use. After the initial discussion, which introduces this topic to children, the children are engaged in a group work assignment to outline their own "mini-curriculum" of medicine education: "What we want to learn about medicines". Each group describes their ideas, and a shared plan is created as a result of this discussion. The aim of the second group work assignment is to decide how they want to learn, e.g., what information could be found from the Internet and which professionals might be invited for discussion. The teacher is involved in the whole process as a participant and a facilitator. (S)he asks the children questions to provoke discussion of different themes, and to share his or her contacts and ideas, e.g., to invite a pharmacist from a local pharmacy or to read a good website or book for further information. However, (s)he respects the children's freedom to make choices – if they are appropriate – and learns him- or herself what the children consider important topics about medicines. Furthermore, the children take responsibility for the "mini-curriculum" of medicine education and its progress. Some children who have a chronic disease recognize during the discussions that they share common experiences and concerns, and they decide to start meeting each other after school.

As this model case describes, using active learning methods which increase the children's awareness of their possibilities to participate is the key for the empowering approach. The aim of medicine education is not to teach children fragmented facts about

medicines, but instead, to teach them tools for using medicines rationally and to find information about medicines. Such skills, e.g., health literacy, are important today and in the future because the supply of new information about medicines is huge. Furthermore, it is important to teach children the skills to be able to evaluate the reliability of medicine-related information, especially the information found on the Internet.

During this study, children preferred the Internet as one of the main tools for how they would like to learn about medicines. Whereas the Internet seems to be an important source of health information especially for older children (Gray et al. 2005a), it does not seem to be the primary source of information about medicines (Hämeen-Anttila et al. 2005). However, this situation is likely to change in the future. Using the Internet as a teaching tool during medicine education is one way to educate children about how to evaluate the reliability of health and medicine related information – a need described by Gray et al (2005b). Unfortunately, the Website created during this study is meant for teachers. The interest that children have toward learning through the Internet highlights the need to create a Website or other interactive multimedia tools of medicines targeted specifically to children.

Other preferred ways to learn about medicines besides the Internet, according to the participating children were videos, computer games, visits to a pharmacy or a doctor, or class discussion with someone visiting the school, e.g., a pharmacist or a physician.

8.2.2 Co-operation in medicine education

Through the new health education curriculum (Finnish National Board of Education 2004), teachers are among the key persons teaching children about the use of medicines in Finland. This somewhat challenging task may be accomplished in co-operation with local health care professionals. Furthermore, medicine education may be provided by health care professionals, such as school health nurses or pharmacists. However, due to the high pupil-to-school-nurse ratio (800–1,000 pupils per school nurse, the recommendation being 600 pupils) (Tossavainen et al. 2004), school health nurses are rarely available during normal school days to participate in medicine education. Thus,

on the Website, teachers are encouraged to contact local pharmacists and engage them in medicine education. Even though the materials created during this process are targeted to teachers, any person engaged in medicine education may use them.

Medicine education in schools does not reduce the role of health care professionals but rather creates a new channel for educating empowered and rational medicine users for the future. This was also recognized by the Ministry of Social Affairs and Health in Finland (Ministry of Social Affairs and Health 2003). During school health education, it is possible to discuss the use of medicines in general, whereas the discussion in the health care setting concerns the use of one's own medicine (Bush et al. 1999). These two channels reinforce each other, the first preparing for the other (Figure 11).

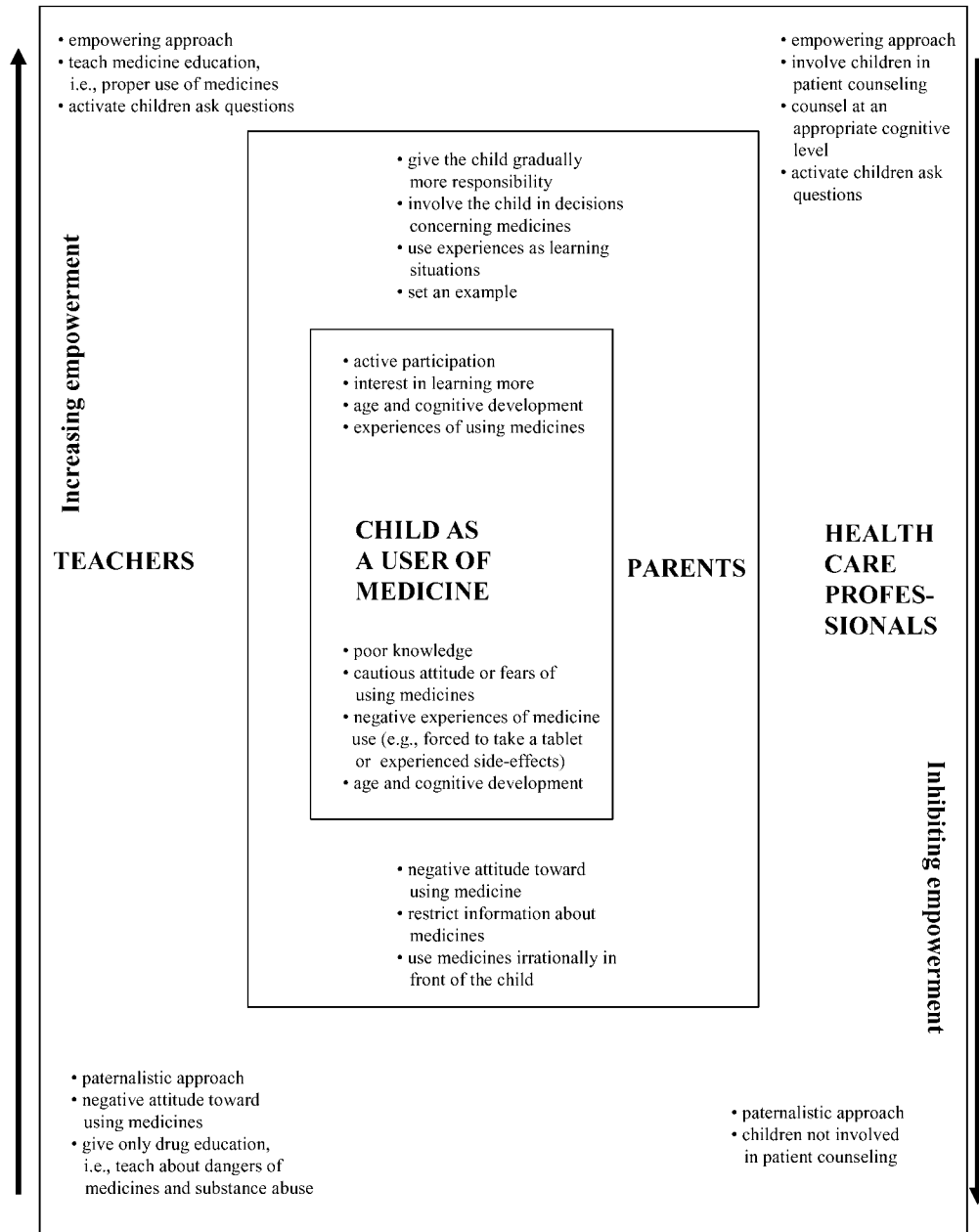


Figure 11. A reflection of medicine education.

The role of health care professionals, i.e., pharmacists, physicians, and school health nurses, as educators is also important in encounters with children. The concordance approach means that the health care professional needs to understand and respect the attitudes, concerns and previous experiences of medicine users (Britten and Weiss 2004). When the patient is a child, special communication skills are needed. As the previous studies indicate, physicians do not talk directly to children (Pantell et al. 1982, Tates and Meeuwesen 2000, Tates and Meeuwesen 2001, Tates et al. 2002a), and this is most likely also true of pharmacists, even though no research exists. However, from the empowerment point of view, it is important that children are encouraged to express their fears and questions concerning medicines, and these concerns are discussed thoroughly at an appropriate cognitive level. These are challenges that will require a revision of the curricula in medical and pharmacy schools, e.g., education on children's cognitive development should be included.

Children at every age and stage of development have possibilities for empowerment. The starting-point is their own interest and activity in learning how to use medicines rationally. If the child is interested, the major issue is the attitudes of the surrounding adults, e.g., parents, teachers, and health care professionals – whether they are willing to respectfully, in a helping partnership, enable children to choose to take some control over and make some decisions about their lives (Rodwell 1996), even though the main responsibility for the child's wellbeing will naturally remain with the parents. Some ways for adults to help children gain a sense of empowerment could be (Hämeen-Anttila et al. 2004b):

- establishing a good relationship between the child and the care-givers from infancy
- encouraging the child to express his or her own feelings and concerns
- answering the child's questions and concerns at an appropriate cognitive level
- creating supportive social settings where the child can gradually develop the requisite knowledge, skills, and competencies, e.g., taking medicines rationally or coping with chronic disease and disability
- giving the child gradually more responsibility and autonomy when acting in different settings

Personal experiences and authenticity are at the core of empowerment learning (Kieffer 1984, Siitonen 1999). It depends on the adults what kind of models and experiences of medicine use a child will have. For example, forcing a child to take a tablet without explanations will give quite a different perspective to the child than discussing its necessity in curing the disease and negotiating with the child the best way to take the medicine. During medicine education at school, the model given by the teacher has a major role.

In conclusion, medicine education consists of co-operation between children, parents, teachers, and health care professionals. While school education concentrates on the use of medicines in general, health care professionals focus on the use of medicines by individuals (Figure 11). Parents set their children an example when using medicines in everyday life (Bush et al. 1999). Thus, medicine education is not about urging children to use more medicines or use medicines independently. On the contrary, it is about learning by participating and questioning before being granted any, and eventually all, responsibility for one's own health behavior.

9 CONCLUSIONS

Based on the results of this study, the following conclusions can be drawn:

1. Medicine education is needed in Finland, as shown by the following results of this study: Children of different ages have a lot of experiences of medicines. However, their knowledge is superficial and gained through everyday life experiences. Children's attitudes toward medicines are somewhat cautious. Children occasionally use medicines independently.
2. Teachers consider medicine education an important part of health education. However, their own attitudes toward medicines may influence the messages they are likely to give children.
3. As teachers are lay persons, they need to be educated and provided information and teaching materials in order to be able to teach medicine education. Web-based materials need to have a simple structure, and materials for different age groups should be easily available. Teachers need materials that they can readily use during the lessons, e.g., ready-to-print forms, tests, pictures, etc.

9.1 Proposals for further action

Developing the Website further

- A Website targeted for children need to be created in order to respond to the interest indicated by children and the challenges of new ideas of learning.
- Since medicine education is rare worldwide, translation the Website into English would increase the possibilities for teachers in other countries to teach this new topic.

Promoting medicine education

- Medicine education materials are effective only if the teachers and other educators find them and use them in practice. The Website created during this process needs to be promoted for teachers.
- Besides medicine education given as part of school health education, counseling children in the health care settings should be promoted. Health care professionals should communicate directly with children about their medicines. Communication skill courses during the curriculum also need to address communication with children, and how the child's cognitive development can be taken into account during communication.

Further studies are needed:

- To evaluate if medicine education based on the materials developed and revised during this process has an impact on children's knowledge about medicines and skills needed to use medicines rationally.
- To assess teachers' attitudes toward medicines by quantitative methods, to verify the results of this study.
- To evaluate the usefulness of the revised materials and the 27 new assignments.
- To evaluate how medicine education is implemented in school health education, and if the Website is used and known by Finnish teachers.

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APPENDICES

Appendix 1. Research summary of healthy children's attitudes, beliefs, knowledge, and autonomy relative to medicines.

	Participants	Methods	Primary findings
	Almarsdottir AB, Hartzema AG, Bush PJ, Simpson KN, Zimmer C. Children's attitudes and beliefs about illness and medicines: A triangulation of open-ended and semi-structured interviews. <i>J Soc Adm Pharm</i> 14:26-41, 1997 Chapel Hill, North Carolina, USA	Drawing interview: 7 years, n=34 10 years, n=23 Total, n=57 Semi-structured fever interview: 7 years, n=41 10 years, n=32 Total, n=73	Qualitative and quantitative: Open-ended drawing interview of a situation chosen by the child about an event when (s)he was injured or ill. Semi-structured fever interview about the child's experiences during a fever episode, including medicine use. • Children viewed medicines quite positively as the reason for their recovery: none of the children mentioned any harmful effects caused by medicines • Mother is the primary caretaker when the child is ill • Children did not have much autonomy in declaring themselves ill or using medicines
	Almarsdottir AB, Zimmer C. Children's knowledge about medicines. <i>Child: Glob J Child Res</i> 5:265-281, 1998 Chapel Hill, North Carolina, USA	Drawing interview: 7 years, n=34 10 years, n=23 Total, n=57 Semi-structured fever interview: 7 years, n=41 10 years, n=32 Total, n=73 Psychometric assessments: 7 years, n=49 10 years, n=52 Total, n=101	Qualitative and quantitative: Open-ended drawing interview of a situation chosen by the child about an event when (s)he was injured or ill. Semi-structured fever interview about the child's experiences during a fever episode, including medicine use. Psychometric assessments of the child (Likert-type scales, using bar graphs) • Children's knowledge about medicines was influenced by their age, child's educational environment, and child's internal health locus of control • Those children who feel that they had control over their health (internal locus of control) perceived medicines as less beneficial • Children had a medium knowledge level about medicines, average 4 correct answers (maximum 8, range 0-7)

<p>Bush PJ, Davidson FR. Medicines and "drugs": What do children think? <i>Health Educ Q</i> 9:113/209-128/224, 1982</p>	<p>Grades K (5-6 years), 2 (7-8 years), 4 (9-10 years), 6 (11-12 years) Four boys and four girls in each of these grades at two different schools Total, n=64</p>	<p>Quantitative: Structured interview including Likert-type scales, using bar graphs</p>	<ul style="list-style-type: none"> • Children viewed themselves as active participants when taking medicines • The difference between medicines and drugs was confusing for children
<p>(A pilot study for the following three researches) Washington, DC, USA</p>	<p>Bush PJ, Iannotti RJ, Davidson FR. A longitudinal study of children and medicines. In: <i>Topics in Pharmaceutical Sciences</i>, pp. 391-403, Eds. Bremer DD, Speiser P, Elsevier, New York 1985 Washington, DC, USA</p>	<p>Quantitative: Structured interview including Likert-type scales, using bar graphs Telephone interview of primary caretakers</p>	<ul style="list-style-type: none"> • Children viewed themselves as having more autonomy in medicine use than their mothers thought they would have • Factors associated with medicine efficacy were confusing for children • Younger children were more likely to refer to medicines by their physical attributes, e.g., colour, taste, rather than names, than older children • Children's health locus of control and knowledge of medicines are significant predictors of children's expectations to take medicines. • Mother's medicine use and child's prior use of medicines are significant predictors of children's expectations to use medicines.
<p>Bush PJ, Iannotti RJ. Origins and stability of children's health beliefs relative to medicine use. <i>Soc Sci Med</i> 27:345-352, 1988 Washington, DC, USA</p>	<p>grades 3-7 (8-14 years) n=300 Primary caretakers, n=270</p>	<p>Quantitative: Structured interview including Likert-type scales, using bar graphs Telephone interview for primary caretakers</p>	<ul style="list-style-type: none"> • Health related attitudes were formed early in childhood • Mother's health related orientations influenced in child's orientations and expectations to take medicines. • Those children who felt that they had control over their health (internal locus of control) and knew more about medicines, perceived medicines as less beneficial and were less likely to expect to take medicines than other children

<p>Bush PJ, Iannotti RJ. A children's health belief model. <i>Med Care</i> 28:69-83, 1990</p> <p>Washington, DC, USA</p>	<p>grades 3-7 (8-14 years) n=300</p> <p>Primary caretakers, n=270</p>	<p>Quantitative: Structured interview including Likert-type scales, using bar graphs</p> <p>Telephone interview for primary caretakers</p>	<ul style="list-style-type: none"> • Children's health belief model (CHBM) was tested to explain children's expected medicine use for five common health problems • Perceived severity of illness and perceived benefit of taking medicines had strong influence in expected medicine use • Those children who felt that they have control over their health (internal locus of control) and knew more about medicines, perceived medicines as less beneficial and were less likely to expect to take medicines than other children • CHBM has utility for predicting children's expectations to take medicines for common health problems
<p>Bush PJ, Trakas DJ, Sanz E, Wirsing RL, Vaskilampi T, Prout A. (Eds). <i>Children, Medicines, and Culture</i>. Pharmaceutical Products Press, New York 1996</p>	<p>6-7 years 10-11 years</p> <p>Denmark, n=31 England, n=33 Finland, n=51 Germany, n=26 Greece, n=88 Italy, n=65 Netherlands, n=19 Spain, n=215 USA, n=103 Yugoslavia, n=150</p> <p>Total, n=781</p>	<p>Qualitative and quantitative: Ethnographic interviews with children (drawing interview)</p> <p>Socioeconomic and health history questionnaire for parents</p> <p>Fever interview for parents</p> <p>Fever interview for children</p> <p>Home medicine cabinet inventory</p>	<ul style="list-style-type: none"> • A large cross cultural study of medicine use by children in nine European countries and the USA • Includes comparisons of results among local studies but also reports from single locations.

<p>Chambers CT, Reid GJ, McGrath PJ, Finley A. Self-administration of over-the-counter medication for pain among adolescents. <i>Arch Periatr Adolesc Med</i> 151:449–455, 1997</p> <p>Halifax, Nova Scotia, Canada</p>	<p>7th-grade, n=237 8th-grade, n=204 9th-grade, n=210 Total, n=651</p> <p>Students are from 3 public junior high schools (mean age 13)</p>	<p>Quantitative: Questionnaire</p>	<ul style="list-style-type: none"> • The most common source of OTC medicines were parents (68.5%–82.5%) and home medicine cabinets (42.9%–60.9%) • 66.7% of the participants with headache, 63.3% with stomach ache, 58.3% with ear and throat pain, 65.3% with muscle pain and 75.9% with menstrual pain self-administered medicines • Girls tended to use medicines for different pains more autonomously than boys • Students reported that they begin to self-administer medication for different types of pain at the age of 11–12,5 years
<p>Daniel KL, Honein MA, Moore CA: Sharing prescription medication among teenage girls: potential danger to unplanned/undiagnosed pregnancies. <i>Pediatrics</i> 111:1167–1170, 2003</p> <p>USA</p>	<p>9–18 years, n=1568</p>	<p>Quantitative: Questionnaire</p>	<ul style="list-style-type: none"> • 10.9% of the children reported that they have shared their prescription medications with someone else, and 13.5% that they have borrowed someone else's medication. • Girls (20.1%) shared or borrowed medicines more often than boys (13.4%)
<p>Englund A. Koululaisten oireiden kokeminen ja itsehoitilääkkeiden käyttö (Self-rated health and use of OTC-medicines among adolescents). Master's Thesis. University of Kuopio, Kuopio 2004 (in Finnish with English abstract)</p> <p>Kuopio, Finland</p>	<p>11–12 years, n=63 14–15 years, n=50 16–17 years, n=70 Total, n=183</p>	<p>Quantitative: Questionnaire</p>	<ul style="list-style-type: none"> • Children used OTC-medicines widely • Mother was the primary source of information concerning medicines • 37%, 80% and 94% of the children, respectively, reported that they take medicines independently • Girls reported themselves to be more independent medicine users than boys

<p>Hämeen-Anttila K, Englund A, Ahonen R. Miten usein koululaiset käyttävät itsehoitolääkkeitä? (How often schoolchildren use OTC-medicines? Dosis 21:182-190, 2005 (in Finnish with an English summary))</p> <p>Kuopio, Finland</p>	<p>11-12 years, n=63 14-15 years, n=50 16-17 years, n=70</p> <p>Total, n=183</p>	<p>Quantitative: Questionnaire</p>	<ul style="list-style-type: none"> • Children used OTC-medicines widely • Children treated most commonly headache with OTC-medicines. • Mother was the primary source of information concerning medicines • 71% of the children reported taking medicines mainly independently. Of the 1- through 12-years-old children, 59% reported that their parents give them medicine • Girls reported themselves to be more independent medicine users than boys
<p>Menacker F, Aramburuzabala P, Minian N, Bush PJ, Bibace R. Children and medicines: What they want to know and how they want to learn. J Soc Adm Pharm 16:38-52, 1999</p>	<p>6-14 years, n=44 Baltimore, MD 5-10 years, n=26 New York City 7-12 years n=15 Worcester, MA</p> <p>Total, n=85</p>	<p>Qualitative: Focus group discussions</p>	<ul style="list-style-type: none"> • Children were aware of the possibility that medicines may cause harmful effects • Some children reported fear of using medicines • Younger children were more likely to refer medicines by their physical attributes, e.g., colour, taste, rather than names, than older children • Factors associated with medicine efficacy were confusing for children • Mother was the primary caretaker of child's medicine use
<p>Rudolf MC, Alario AJ, Youth B, Riggs S. Self-medication in childhood: Observations at a residential summer camp. Pediatrics 91:1182-1184, 1993</p> <p>New England, USA</p>	<p>9-12 years, n=179 13-16 years, n=237</p> <p>Total, n=416</p>	<p>Quantitative: A detailed interview on the arrival at camp and a questionnaire in the end of the camp for campers who had brought medicines with them</p>	<ul style="list-style-type: none"> • 44% of the children who attended to the camp brought medicines with them (n=182) • 25% of the younger children and 58% of the older children who brought medicines self-administered them during the camp • 77% of the older children and 31% of the younger children stated that they independently decided on the need and self-administered medicine at home

<p>Sloand ED, Vessey JA. Self-medication with common household medicines by young adolescents. <i>Issues Compr Pediatr Nurs</i> 24:57-67, 2001</p> <p>USA</p>	<p>10-14 years, n=86 (mean age 12.25 years)</p>	<p>Quantitative: Questionnaire</p>	<ul style="list-style-type: none"> • 89% of the children indicated that they have access to the medicines in their household • 35% of the children had medicated themselves independently when they last needed medicine • Most of the students had made reasonable medicine choices, except in the case of gastrointestinal problems
<p>Stoelben S, Krappweis J, Rössler G, Kirch W. Adolescents' drug use and drug knowledge. <i>Eur J Pediatr</i> 159:608-614, 2000</p> <p>Dresden, Germany</p>	<p>15-17 years, n=53</p>	<p>Quantitative: Questionnaire</p>	<ul style="list-style-type: none"> • 57% of the children had taken 1-6 drugs during the two weeks preceding the study • 46% of the children obtained headache remedies from home medicine cabinets or bought them privately • The children attained at best 10 points out of a maximum of 13 in a drug knowledge test; mean 5.74 points • 54% of the children described oral contraceptives as drugs, 32% gave correct definition for "antibiotic" and 6% for "analgesic" • 79% of the children were aware of side-effects • Girls and children who regularly took drugs obtained higher scores for drug knowledge
<p>Trakas DJ, Sanz E. (Eds.). <i>Studying childhood and medicine use: A multidisciplinary approach.</i> ZHTA Medical, Athens 1992</p> <p>(A pilot study for Bush, Trakas, Sanz, et al. (Eds.) 1996, and Trakas, Sanz (Eds.) 1996)</p>	<p>6-7 years, n=40 Sweden 6-7 years, n=66 The Netherlands 6-7 years, n=60 Greece</p>	<p>Qualitative: Open-ended drawing interview</p>	<ul style="list-style-type: none"> • The book includes series of articles presented at two workshops held in Brussels, Belgium, in March and June 1989 where discussion lead to a study proposal for children and medicines (study proposal is attached in the book) • Book presents besides theoretical considerations also results from three country studies of children and medicines (Sweden, Netherlands, and Greece)

<p>Trakas DJ, Sanz E. (Eds.). Childhood and medicine use in a cross-cultural perspective: A European concerted action. European Commission Report EUR 16646 EN, Brussels 1996</p>	<p>Denmark, n=18 United Kingdom, n=33 Finland, n=46 Germany, n=26 Greece, n=88 Italy, n=65 Netherlands, n=19 Spain, n=215 USA, n=73 Yugoslavia, n=150</p>	<p>Qualitative and quantitative: Ethnographic interviews with children (drawing interview) Socioeconomic and health history questionnaire for parents Fever interview for parents Fever interview for children Home medicine cabinet inventory</p>	<ul style="list-style-type: none"> • A large cross cultural study of medicine use by children in nine European countries and the USA • Includes comparisons of results among local studies but also reports from single locations.
<p>Total, n=733</p>			

Appendix 2. Description of the USP *Guide to Developing and Evaluating Medicine Education Programs and Materials for Children and Adolescents* (Bush 1999a).

This *Guide* can be used to assess existing children's and adolescents' medicine education programs and materials, or to develop or revise such programs and materials.

The *Guide* includes following sections:

1. *Ten guiding principles for teaching children and adolescents about medicines* (Bush et al. 1999)
2. Instructions and forms for evaluating children's and adolescents' medicine education programs and materials
3. Content recommended for children's and adolescents' medicine education programs and materials
 - Key behaviors to be promoted in medicine education and examples of messages addressing key behaviours (Table 1)
 - Concepts: what children want to know about medicines
 - Answers to common misconceptions and knowledge gaps about medicines
 - Pictograms children should recognize

Table 1. Key behaviors to be promoted in medicine education and examples of messages addressing key behaviors (Bush 1999a)

-
1. Protect young children from accidental poisoning. Know what to do if child is poisoned.
 2. Take medicines wisely and safely. (Consider if taking a medicine is the best course of action. If yes, ensure the medicine is: the right one, for the right person, at the right time, the right amount, and taken the right way. See Steps in taking medicines).
 3. Always read label first. Take medicines as directed. Finish antibiotics (to prevent development of resistance).
 4. Look for reactions to medicines. Act fast if serious reactions occur.
 5. Learn whom to ask for advice on medicines – and speak up.
 6. Store medicines properly. Discard out-of-date medicines. Keep medicines out of the reach of young children.
 7. (Parents only) Keep a home medicine cabinet supplied with medicines for emergencies and for common health problems.
 8. (Parents only) Model responsible medicine use for children, especially asking questions of health care providers and decision-making about use of medicines.
 9. (Parents, teachers, health care providers only) Give children information about medicines and their proper use. Teach children how to take responsibility for medicines as they grow up.
 10. (Parents, researchers only) Give competent children (usually 7+ years), who are asked to participate in a drug study (clinical trial), sufficient information to promote their ability to provide assent after parents or guardians have given consent.
-

Examples of how the USP *Guide* was used in our project:

- Of the ten guiding principles the following are especially addressed in the materials, e.g., through the lesson plans and assignments:
 - Children's interest in medicines should be encouraged, and they should be taught how to ask questions of health care professionals, parents, and other care givers about medicines and other therapies
 - Children, their parents, and their health care providers should negotiate the gradual transfer of responsibility for medicine use in ways that respect parental responsibilities and the health status and capabilities of the child
 - Children's medicine education should take into account what children want to know about medicines as well as what health professionals think children should know
 - Children should receive basic information about medicines and their proper use as a part of school health education
 - Children's medicine education should include information about the general use and misuse of medicines as well as about the specific medicines the child is using
- Provided forms which were appropriate to use in the materials targeted for teachers were used when creating the materials. The following instructions were taken into account:
 - writing is clear and simple, medical jargon is avoided
 - information is up-to-date
 - messages are action-oriented, addressing what to do, not just what to know
 - graphics reinforce the corresponding message or action
 - lesson plans are easy to follow, interactive and participatory, including multiple learning approaches and adequate background materials
- Some of the USP pictograms were used in the assignments
- Steps in taking medicines were included as one assignment
- Key behaviors to be promoted in medicine education were addressed in different ways on the Website and its materials

Appendix 3. Focus group discussion plan for children.**INTRODUCTION**

- Introduction of the researchers, information of why there are two researchers involved
- There are no right or wrong answers, all ideas are important for us. We also want to hear different opinions, so if you do not agree with your friend, please tell us that.
- We will not tell the teacher or your parents about our discussion. The ideas of any one child will not be visible in the results, but only the views of the whole group.
- Explanation of why the discussion is recorded and notes are taken.
- This will take about an hour.
- Children are asked to tell their names.

1. USE OF MEDICINES (pictograms are used to stimulate discussion)**BEFORE USING THE PICTOGRAMS; ASK: What do you think is a medicine?**

- a. Are you familiar with medicines? What medicines do you know?
- b. What medicines have you used? (or your Grandma/Grandpa has used?)
- c. What things do you know about this medicine?
- d. For what kinds of troubles/ symptoms are medicines used?
(regularly/when needed)
- e. Why should some medicines have to be taken at a meal?
- f. How does a medicine work?
- g. Do you take medicine yourself, or does someone help you? Who?

2. WHAT CHILDREN WANT TO KNOW ABOUT MEDICINES

- a. What else would you like to know about medicines (things that you want to know about medicines, but nobody has ever told you! Ask this question about the child's own medicine)
- b. We have made a list of things that you could know about medicines. Which of these do you think are interesting/ not interesting?
 - i. The uses of medicines (when medication is needed)
 - ii. How you know which medicine is for which disease
 - iii. Ingredients of medicines/ active substances
 - iv. How medicines are made
 - v. Dosage of medicines/ how the medicine is administered
 - vi. How medicines go through the digestive system
 - vii. Why one has to follow a certain kind of diet or schedule with certain medication
 - viii. How medicines work
 - ix. Why medicines do not always help
 - x. Why medicines have adverse reactions
 - xi. How it is possible to avoid adverse reactions

- xii. Interpreting dosage instructions/ the right dosage (e.g. what does "1 tablet three times a day" mean?)
 - xiii. How to use medicines according to instructions
 - xiv. Under- and overuse of medicine
 - xv. Abuse and intoxicating use of medicines
 - xvi. Medicines and alcohol
 - xvii. How to store medicines at home
 - xviii. Difference between prescription medicines and OTC medicines
 - xix. When to use non-prescription medicines and when to treat the illness in some other way
 - xx. Differences between medicines and natural products
 - xxi. Medication of pets
 - xxii. Prices and reimbursement of medicines
 - xxiii. Assessing the reliability of information sources concerning medicines
- c. Which of these topics do you find most interesting?

3. HOW DO CHILDREN WANT TO LEARN ABOUT MEDICINES

- a. Let's pretend that we are at school and you are taught information about medicines. This list shows ways in which you could be taught. What is good or bad about these ways? Which way of learning would you prefer?
- i. a board game
 - ii. a coloring book
 - iii. an activity book with exercises
 - iv. a book one could read (what would make the book interesting?)
 - v. a poster with information on the use of medicines
 - vi. a play
 - vii. a discussion about medicines with your teacher
 - viii. a discussion about medicines with someone else, e.g. a nurse or a pharmacist
 - ix. visiting a doctor or a pharmacy
 - x. a video or a document
 - xi. a cartoon
 - xii. a story about children who have to use medicines every day
 - xiii. a computer game
 - xiv. Internet
 - xv. another way in which you would like to learn
- b. Which of these would be the best ways to learn about medicines?
- c. Is school a good place to learn about medicines?

CLOSING

- Thank you
- We are running out of time - last comments
- Correct possible misunderstandings

Appendix 4. Informed consent letter for parents.

Dear parents,

The attitudes we adopt towards medicines in childhood affect our way of using medicines as adults. Proper use of medicines is beneficial for an individual, but it will also bring benefit to society as a whole. Children and adolescents need objective instruction in order to learn how to use medicines when they need them.

The Department of Social Pharmacy at the University of Kuopio is doing research to find out what children and adolescents of different ages think about medicines. The aim is to find out how children could be taught proper use of medicines in Health Education classes at school. To carry out the study a group discussion will be arranged. We will discuss the use of medicines, the attitudes children have towards medicines and how they would like to learn about the proper use of medicines in groups of five to eight children. The interviews will be recorded to make the interpretation of the results easier. We will process the information with confidentiality, and the views of any one child cannot be identified in the results. The interview will take place on 3 February 2003. We hope that about 12 children would be able to participate in the interview in your child's class.

We hereby ask for permission for your child to participate in the research carried out by the University of Kuopio. Please, fill in the approval form below and return to the teacher by 28 January 2003.

Best regards,

Mirja Juvonen
M.Sc. (Pharm.) student
tel. 040-7057413

Katri Hämeen-Anttila
Researcher,
M.Sc. (Pharm.)
tel. 162497
University of Kuopio

Marja Airaksinen
Supervisor of the
study
tel. 163917
University of Kuopio

✂-----

Our daughter/son _____ class _____

is allowed to participate if willing
is not allowed to participate

in the above mentioned group discussion

One or both parents work in healthcare

Signature

Appendix 5. Examples of inductive and deductive analysis.

Example of inductive analysis: Creating the categories Fear of harmful effects, and Medicines should be used only in case of real need.

Grade	Extracts	Themes	Categories	Deviant cases (all instances found in the data of these categories, n=9)
First-grade (7-8 years)	<p>Girl 1: You see, like for me if I have a headache, a bad headache – then I can take that – I mean if it's so bad you can't stand it, you can take a medicine.</p> <p>Girl 2: I remember when – I had this bad headache, so I had to take a painkiller pill.</p> <p>Boy 1: Yeah, but no, it can be even dangerous if you take an overdose.</p> <p>Interviewer: Yeah, what can happen then?</p> <p>Boy 1: You can even die.</p> <p>Girl 3: I've learned of medicines that you must not /// medicines, that you must not give to others or so.*</p> <p>Interviewer: So where did you learn this?</p> <p>Girl 3: That's what I've been told.</p> <p>Interviewer: Yeah...</p> <p>Girl 4: And I'm like // if somebody's like offering candy you shouldn't take them.*</p> <p>Girl 3: 'Cause they can be drugs.</p> <p>Interviewer: Yeah, that's true.</p> <p>Boy 2: And then if someone you don't know gives you candy, there might be anything in them.</p> <p>Interviewer: Yeah, so you shouldn't take them.</p>	<p>painkiller can be taken for bad headache</p> <p>an overdose of medicine can be dangerous: one can die</p> <p>one should not take medicines offered by a stranger</p>	<p>Medicines should be used only in case of real need</p> <p>Fear of harmful effects</p>	<p>Girl 5: Well I had this really high fever so(?):I took this medicine and it didn't help)*</p> <p>Interviewer: So, it didn't help, so what did you do then?</p> <p>Girl 5: Well we took so much of it that it helped.</p> <p>Girl 3: There's cough medicine, and if you have a bad cough it's good to take it always.</p> <p>Girl 6: I hope I'll have a cough soon and I can take that cough medicine again.</p> <p>Interviewer: Well. How about medicines, can you die of them?</p> <p>Boy 2: No you can't. But you get healed.</p> <p>Interviewer: Yeah.</p> <p>Boy 2: If you're dying you don't die after all.</p>

**Fourth-
grade
(10–11
years)**

Boy 1: You know you shouldn't take medicine if you're just faking you're sick. Saying that I'm really sick now even if you're not. Interviewer: Yeah. Only when you're really sick, only then. Boy 2: Really sick.	one should not take medicines unless really sick	Medicines should be used only in case of real need	Boy 4: You can take it if you have some real pain // It's not dangerous.* Boy 7: We had I mean, when I was small, my big brother had cough medicine that tasted good, like liquorice, and I always took it and my big brother said it is like drug if you take too much of it, so I didn't want to take it anymore. Interviewer: Yeah. Boy 7: Unless I have a cough.
Boy 3: I've been wondering sometimes, that why then those other medicines don't have that prescription. Does it have to be secret so that — it can be dangerous! Girl 1: Someone can, if they don't know what's in there, take it by mistake. Boy 3: Yeah that's it. Boy 4: If you take too much, you die /// an overdose*	medicines can be dangerous an overdose of medicine can be dangerous: one can die	Fear of harmful effects	
Girl 2: Like you should know, almost know by heart, what medicine is what, so that you don't take a wrong one by accident if you're busy. Interviewer: Can you say more precisely why it could be interesting? Girl 3: So that you don't take too much of something.	one can take wrong medicine or too much medicine by accident		
Boy 5: If you take too much by accident, you don't remember how // it's not said on the bottle of pills how many times you have to, the doctor has forgotten to put that label which says how many times you take, like once, and then you take four or so by accident. Interviewer: Yeah, and what can happen then? Boy 5: You might get, it can happen that // or then you start...* Boy 6: Feeling dizzy. Boy 5: Feeling dizzy or you get really messed up.			

Boy 6: It's a bit like drug.

Boy 3: So at least why do they always have those side effects (laughs) and what causes them – you know shouldn't they heal. Why do they then have those side effects?

Seventh-grade (13–14 years)

Interviewer: For what kind of cough did you take?

Girl 1: Like for a bad cough (laughs)

Girl 2: When you don't get sleep at night.

Girl 1: Yeah.

Girl 3: But I normally always tell Mom when I have a headache and I need to take – but normally I say no when Mom suggests I should take some, because I hate those medicines. // I'm afraid I will develop an ulcer or something.*

Girl 4: Me too, I only take medicine if I have a headache in the evening and can't sleep, but I don't normally take them.

Girl 5: I often have this nasty pain in my legs and then I can take a painkiller pill for the night and then I can sleep 'cause I always have a lot of pain in my legs.

Girl 4: Our teacher scared us in the fifth grade by saying that if you take painkillers for some little headaches or something you can become dependent on them. That you start taking painkillers for the smallest pains and – then it makes, I don't remember what she said, that you then get some – effects.

Girl 1: I remember what was told about taking medicines with alcohol 'cause that can be fatal.

Girl 5: Like – it'd be good to inform about it, 'cause some

medicines can cause harmful effects

cough medicine can be taken for bad cough, or if one cannot sleep during the night because of cough

fear of side-effects

a painkiller can be taken if, for instance, one has such a bad headache that one cannot sleep

medicine can cause addiction

abuse of medicines can be dangerous

Medicines should be used only in case of real need

Fear of harmful effects

Girl 7: Once when I was small I tried it just for fun when my friend had it... didn't feel nice. (a nose spray)

Girl 4: Except that when I was small, I remember we always had those cherry flavoured Acerola-pills, which that taste really good You should take only one every day and I ate loads of them (laughter)

Girl 3: When you didn't know so – you could smell some glue in the arts and crafts class... (laughter)

Girl 6: Me too, I ate those Acerola-pills or whatever they were.

Girl 4: They were like candy. (laughter)

Boy 1: Some people almost live on those medicines and some girls 'cause they're anorectic and always take medicines and don't eat.

Boy 2: Well yeah, medicines, or they take vitamins.

<p>have even died of medicine overdose and Girls together: From it you could – take something. Girl 8: It can be like a drug, what was it, I don't know.</p> <p>Girl 4: I mean if you use two medicines at the same time something can happen. Interviewer: Yeah, what kinds of things could happen? Girl 4: Some side effects if they, some medicines cause, some different ingredients that don't go well together can cause. Girl 3: Maybe you start feeling bad or something.</p>	<p>Boy 1: Yeah or something like that.</p> <p>Boy 1: Many people today, if it hurts even a little – hurts in the knee when you fall down – they take something right away. Basically, you could tell a bit about other things that might help there.</p>
<p>using two medicines can cause interactions</p>	

* Mark // means that the children spoke unclearly. If the mark is followed by brackets, I have made an interpretation about the content of the discussion.

Example of deductive analysis: Is the topic "Why are there sometimes adverse reactions from medicines?" interesting for children of different ages?*

Grade	First-graders (7–8 years)			Fourth-graders (10–11 years)			Seventh-graders (13–14 years)		
Categories	Interesting	Not interesting	Neutral	Interesting	Not interesting	Neutral	Interesting	Not interesting	Neutral
Extract	-	Interviewer: Would it be interesting to know what causes those side effects when medicines are taken? Girl 2: No. Boy 3: No. Boy 4 and boy 5: No. Girl 1: No.	Interviewer: So, would you like to know what might be the reason for those side effects? Children together: Yeah.	Boy 3: So, at least why do they always have those side effects (laughs) and what causes them – you know shouldn't they heal. Why do they then have those side effects? (spontaneous comment)	-	Interviewer: Are you interested in knowing what causes those side effects? Would it be good to know? Boy 8: Yeah it'd be quite good.	-	-	Interviewer: Would you like to know, however, if medicines have side effects, what causes them? (break) Children: Yeah
Coding (II, Table 1)	- / +			+ / +++			+		

*Only the research groups from May 2002 were included

Appendix 6. Teacher questionnaire.**Dear teacher,**

The attitudes we adopt towards medicines in childhood affect our way of using medicines as adults. Proper use of medicines is beneficial for an individual, but it will also bring benefit to society as a whole. Children and adolescents need objective instruction in order to learn how to use medicines properly when they need them.

The Department of Social Pharmacy at the University of Kuopio is conducting doctoral research to learn what children need to know about medicines. Another aim of the study is to also find out how medicine education could be integrated into Health Education classes. The results of the study will be used in the curriculum development for Health Education, which was started in January 2002. We will also produce teaching materials for teachers in the fall of 2002.

A random sample of teachers in the registers of The Association of Class Teachers and The Association of Physical and Health Educators in Finland chose you to represent teachers in this survey. The answers will be processed with confidentiality and the views of any single teacher will not be identifiable in the results. **Please return the completed questionnaire by 27 May 2002** to the University of Kuopio in the enclosed return envelope. The number in the envelope is for keeping track of returned questionnaires. If you need more information about the study, kindly contact the researcher Katri Hämeen-Anttila at the University of Kuopio by phone 017 - 162 497 or by e-mail: katri.hameen-anttila@uku.fi.

Thank you for your co-operation.
Best regards,

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Instructions for completing the questionnaire:

The questionnaire contains open-ended questions and multiple-choice questions. Circle the correct alternative. You may choose more than one alternative.

1. Sex

- 1 Male
- 2 Female

2. In which province do you work as a teacher?

- 1 Lapland
- 2 Oulu
- 3 Eastern Finland
- 4 Western Finland
- 5 Southern Finland

3. How many years have you worked as a teacher? _____ years.

4. How many students are there in your school? _____ students.

5. What grades do you teach? _____

6. Do you teach Health Education?

- 1 yes
- 2 no

7. For which class/classes do you teach Health Education? _____

8. How many students are there in your class/group of students?

- 1 less than 10
- 2 10-20
- 3 21-30
- 4 31 or more

9. Have you discussed medicines in your class?

1 Yes, on which lesson? _____

2 No, why not? _____

What have you talked about medicines? _____

Please turn over

10. Do you think proper use of medicines should be discussed with the students:

A. concerning prescription medicines?

1 Yes, why? _____

2 No, why not? _____

B. concerning over-the-counter medicines available without prescription?

1 Yes, why? _____

2 No, why not? _____

11. Who do you think is responsible for teaching children about medicines (you can choose more than one alternative)?

- 1 Parents
- 2 Teacher
- 3 Nurse
- 4 Doctor
- 5 Pharmacist
- 6 Someone else, who? _____

12. Would you be ready to teach about proper use of medicine?

1 Yes

2 No, why not? _____

13. If schools were provided with teaching material for teaching about proper use of medicines, would you be interested in using the material in your teaching?

1 Yes


2 No, why not? _____

14. Do you think teaching about proper use of medicines should be integrated as a part of Health Education in the curriculum of primary and junior secondary schools?

1 Yes, why? _____

2 No, why not? _____

15. Below there is a list of the ways information about medicines could be taught to children. How important do you consider these teaching methods? Mark the five best ways to teach with the letter **B** and the two worst with the letter **W**.

- _____ a board game
- _____ a coloring book
- _____ a work book for independent study (problem-based, activating exercises)
- _____ a book
- _____ a poster with information on the use of medicines
- _____ a play
- _____ discussing medicines with one's teacher
- _____ discussing medicines with someone else, e.g. a nurse or a pharmacist
- _____ visiting a doctor or a pharmacy
- _____ a video (e.g. a documentary on medicines)
- _____ a cartoon
- _____ a story about children with chronic illnesses
- _____ a computer game
- _____ Internet
- _____ a simple picture about using a medicine
- _____ (cf. a traffic sign) 
- _____ Something else, what? _____

16. What do you think is important to tell children about medicines? In what grades should these topics be taught to children? (write down the grades (1-2, 3-4, 5-6, 7-8, 9-) on the lines next to the ten topics you consider are the most important)

- _____ Uses of medicines (when medication is needed)
- _____ How do you know which medicine is for which disease
- _____ Ingredients of medicines/ active substances
- _____ How medicines work
- _____ How medicines go through the digestive system
- _____ Why medicines do not always help
- _____ Dosage forms of medicines/ how the medicine is administered
- _____ Why medicines have adverse effects
- _____ How it is possible to avoid adverse affects
- _____ How to store medicines at home
- _____ Interpreting dosage instructions/ the right dosage (e.g. what does "1 tablet three times a day" mean)
- _____ Under- and overuse of medicine
- _____ How to use medicines according to instructions
- _____ Abuse and intoxicating use of medicines
- _____ Medicines and alcohol
- _____ Difference between prescription medicines and OTC- medicines
- _____ OTC medicines as part of self-care
- _____ How medicines are manufactured
- _____ Why one has to follow a certain kind of diet or schedule with certain medication
- _____ Differences between medicines and natural products
- _____ Price and reimbursement of medicines
- _____ Assessing the reliability of information sources of medicines
- _____ Something else, what? _____

Please turn over

Appendix 7. Instructions for teachers concerning medicine education sessions.**Dear teacher,**

Thank you for participating in our teaching experiment! In this letter you will receive instructions and the topic for the teaching period of our study.

The teaching period will take place after the fall break on the weeks 43-45. If you have agreed to conduct an interview with the children, you will receive the parental consent forms with this letter. It is recommended to ask for parental consent closer to the time of the interview. The return date is 5 November 2003. The children will be interviewed after the teaching period on the weeks 46 and 47. More precise times for the interviews will be scheduled with you personally.

We ask you to teach one lesson about the topics introduced in this letter during each week of the teaching period. You should use the teaching material we have provided in the Internet (www.uku.fi/laakekasvatus) to prepare the lessons. We chose three topics to be taught in this study. You can start familiarizing yourself with the material by looking at the links on the main page where you can find the recommendations about the topics for different age groups. There are also more ideas and instructions for teaching the topics. The material is more comprehensive than the students should be taught. The extra material is meant to be a resource for you so that you can deepen your knowledge and attain a general view about the topics.

Write down your own thoughts about the lesson and the usefulness of the teaching material after each lesson. Also write down what was the main message of the lesson that you wanted the students to learn. These notes do not have to be long (one A4 page will be enough). The most important thing is that you will have some notes to help you remember the lessons later in the group discussions. Bring your notes along to the group discussion, which we invite all the teachers who have taken part in this study to attend. The group discussions will be arranged in November on a day we will agree with all of the teachers.

Please, do not hesitate to contact us if you have questions!
Have a rewarding teaching period with medicine education!

Best regards,

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TOPICS FOR THE TEACHING PERIOD grades 1–2 (7–8 years)**Lesson 1**

LEARNING OBJECTIVE: Medicines are part of health care. Medicines are used for various purposes. They can be used to treat, heal or prevent diseases.

The aim of the first lesson is to find out through children's own experiences what medicines are and for what purposes are they used. Children will usually have their own experiences of vaccination. You can start by asking why we need vaccinations and against which diseases we are vaccinated. For what kinds of diseases have children had to go to see a doctor? What kinds of diseases have been treated with home remedies or OTC-medicines? It is useful to write down children's experiences of different diseases and medicines for the next lessons.

Lesson 2

LEARNING OBJECTIVE: To learn to identify the basic information one should know about one's medicine

The aim of the second lesson is to think together about things one should check before using a medicine. Children's experiences that came up during the first lesson are a good starting point for the discussion. What should one know about one's medicine? What would children ask about their medicines in a pharmacy, for instance? What things have children checked with their parents before using a medicine? Is it OK to take a friend's medicine? Why not?

Lesson 3

LEARNING OBJECTIVE: To learn the most common information sources where one can find more information about medicines together with one's parents.

The aim of the third and last lesson is to discuss where one can find more information about one's medicines together with the parents if needed. Children are taught, in general, what kind of information is found on the package and the package insert. Tell the children that a doctor gives the dosage and instructions on how to use certain medicines, but there are also OTC medicines and the instructions for their use may be given at the pharmacy.

TOPICS FOR THE TEACHING PERIOD grades 3–6 (10–11 years)**Lesson 1**

LEARNING OBJECTIVE: Medicines are part of health care. Medicines are used for various purposes. They can be used to treat, heal or prevent diseases.

The aim of the first lesson is to find out through children's own experiences for what purposes for which medicines are used. Discuss the difference between a prescription medicine and an OTC medicine. For what kinds of diseases have children gone to see a doctor? What kinds of diseases have been treated at home with home remedies or OTC medicines?

Lesson 2

LEARNING OBJECTIVE: To learn the basics of proper use of medicines by looking at the package and the package insert. To recognize the differences between the information on an OTC-medicine package and a prescription medicine package.

The aim of the second lesson is to go through in more detail the basics of the proper use of medicines. What should one know and take into consideration in order to use medicines properly? What information sources can one use to find out about these things? (package, package insert, label, health care personnel etc.)?

Lesson 3

LEARNING OBJECTIVE: To learn the essential instructions on how to use medicines properly.

You can use different dosage labels and/or medicine packages as teaching material, which the students can examine in groups or pairs. The children could try to figure out the suitable dosage of an OTC drug for themselves? What kinds of instructions have children had on their medicines? Has somebody been instructed to take medicine at a meal time? When would children take a medicine with a dosage instruction of "1 tablet three times a day"? How have children followed the instruction "with plenty of water"?

TOPICS FOR THE TEACHING PERIOD grades 7–9 (13–14 years)**Lesson 1**

LEARNING OBJECTIVE: Medicines are part of health care. Medicines are used for various purposes. They can be used to treat, heal, or prevent diseases.

The aim of the first lesson is to find out what medicines are and for what purposes they are used. Discuss the difference between a prescription medicine and an OTC medicine. For what kinds of diseases should one go to see a doctor? What kinds of diseases can be treated at home with home remedies or OTC medicines?

Lesson 2

LEARNING OBJECTIVE: To learn to know reliable sources of information about medicines.

The aim of the second lesson is to get to know sources of information concerning medicines. Where do adolescents usually look for information about medicines? Are all information sources reliable? Discuss at least the following information sources during the lesson: package and package insert, handbooks, health care professionals (when is there a need to consult a doctor and when a pharmacy?) and the Internet.

Lesson 3

LEARNING OBJECTIVE: To practice assessing the reliability of information sources.

The aim of the third lesson is to discuss the reliability of the information found in the Internet. Give the students an assignment to search for websites with a term "painkiller" in Google (www.google.com). The students should go through the first ten links and assess the information in them. They do not need to read the pages word for word if they are not suitable. Suitable websites, however, should be read word for word in order to be able to assess their reliability. Can one find reliable information on painkillers in Google? Which site was the most useful? And the most reliable? How was reliability assessed? Were there useless sites? And unreliable? For whom were the sites meant? Were all the sites easy to understand and read? Prepare the lesson to suit the conditions at your school. The information search can also be given as a home assignment.

Appendix 8. Focus group discussion plan for teachers.

There is Internet access available in the room, and that you can look at the Website with the teachers if needed.

- Thank you for participating in our teaching experiment and arranging your time for this interview. We appreciate it.
 - Katri will conduct the interviews, and Johanna will help her
 - The purpose is to discuss the usefulness of our Website and its materials.
 - The idea is that you should discuss as a group, while the interviewers will remain at the background. However, we will ask you some questions in between.
 - We hope that you will comment on each other's opinions and if you do not agree we definitely want to hear that, too.
 - These discussions will give us new ideas and we will develop the Website according to your wishes. A new project is already in full swing.
 - The discussion will be recorded to facilitate the analysis of the interview. It is important for us to remember everything you say here. Because of the recording it is important that people take turns to speak!
 - After the discussion we will have coffee.
 - To get started, everybody could say their names and give some general comments about the material and things that came up in the teaching and that will be recorded to help us recognize everybody's voice.
1. The general usefulness and appearance of the Website.
 - Do you like the colors and appearance of the Website?
 - Do the links work? Was it easy to surf the site?
 - How useful were the instructions on the site? Were they clear enough for a general view?
 2. Recommendations to different age groups
 - What do you think about the recommendations available for the different age groups on the Website?
 - Are the topics suggested in the recommendations suitable for the age group you teach?
 - Why not?
 3. Subject matter
 - What do you think about the subject matter of the Website?
 - Is the information written so that it is clear and easy to understand?
 - Is something essential missing?
 - Was there too much information on something/ was some topic discussed in too much detail?

4. Ideas for activities

- What do you think about the ideas for activities on the site?
- Did you try the activities?
 - How did the idea work?
 - Why didn't you try the ideas?
- Did you think of your own ideas for activities, what kind?

5. General questions about the Website

- Did the Website meet your expectations?
- How useful was the Website in practice?
- How did the children react to the teaching?
- Does the Website meet the requirements of Health Education? Is it useful in Health Education classes?
- Would you recommend the Website for your colleagues?
- Do you think that teachers will use the material?
 - Why?
 - Why not?
- How could the Website be brought to teachers' attention most effectively?

- COLLECT THE NOTES THAT TEACHERS HAVE WRITTEN AFTER EACH CLASS AT THE END OF THE INTERVIEW.

- PASS AROUND A "SCHEDULE" AND ASK THE TEACHERS TO MARK DOWN WITH THEIR OWN NAME WHEN THEY HELD THE LESSONS ABOUT MEDICINES.

Appendix 9. Typology analysis example: Construction of three different types of teachers; empowering, paternalistic and material evaluating.

Teacher (grade)	Comments on the usefulness of the materials*	Parents are responsible for their child's medicine use*	Children should also know about non-pharmaceutical self-care, not just about self-medication*	It is important to educate children about the dangers concerning medicines*	Children knew quite a lot about medicines already, and they were interested in learning more*	The importance of healthful lifestyle should be highlighted to children*	Discusses their own attitude toward medicine use*	Children should be educated about medicines and activated to take part in their use of medicine	Constructed types,**
1 (1)	IIII I**	III**	II**	II**	I**				1.P.1
2 (1)	IIII IIII III**		I**		I**				1.M.1
3 (1)	IIII IIII I**		III**		III**				1.M.2
4 (1)	IIII III**	I**	III**	I**	I**				1.P.2
5 (2)	IIII IIII**	II**	II**	II**	I**				2.P.3
6 (4)	IIII I**	III**			III**		II**		4.P.4
7 (4)	IIII I**	I**			III**				4.P.5
8 (4)	I**				III**		II**		4.E.1
9 (5)	II**				II**			I**	5.E.2
10 (4)	IIII IIII**	I**			IIII**				4.P.6
11 (4)	IIII IIII III**	II**			III**			I**	4.E.3
12 (7)	IIII IIII**			I**	I**			I**	7.E.4
13 (7)	IIII IIII IIII II**				I**		I**		7.E.5
14 (9)	IIII III**				I**			I**	9.E.6

*These themes arose from the discussions

**One mark means one mention about the topic during the focus group discussion

*** In the code, the first number indicates the grade that the teacher is teaching, capital letter indicates the stereotype of teacher (E=empowering, P=paternalistic, M= material-evaluating), and the last number is a running number of teachers in the stereotype

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