Improving Waste Management Education in Schools in Moldova

Sustainable waste management in schools related to societal and organizational barriers

A Minor Field Study by Adam Mattsson
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Examiner:
Hans Thunberg, Department of Mathematics, KTH

Supervisor:
Monica Olsson, Division of Industrial Ecology, KTH

Assistant supervisor:
Jesús Piqueras, Department of Mathematics and Science Education, SU
Abstract

Poor waste management is a major issue in Moldova today, why work has been made in several areas to resolve waste problems. Still, there is no organized form of sustainable waste management. In case of implementation of such a system, the citizens must know how to use the system and be aware of the consequences that are caused by poor waste management. As a part of this, waste management education in schools has an important role. Therefore this study seeks the relation between waste management and waste management education in schools in Chisinau and also how the conditions in society affect the waste management and waste management education. Based on this, some efforts regarding how waste management in schools can become more sustainable are described.

Literature studies showed that an integrative whole-school approach regarding sustainability is a good approach for encouraging action competence in environmental problems, including waste management issues. In order to study the current conditions regarding waste management education and school waste management, four schools in Chisinau were visited where observations and interviews were made. Interviews were also made with some relevant authorities and organizations to complement collected information from school visits. Field studies showed that even though environmental education in Moldova to some extent has been implemented with an interdisciplinary strategy, there are several barriers that affect the effectiveness of this strategy. In addition, waste related problems were blamed on society rather than an insufficient waste management education in schools.

The conclusion of the study is that a whole-school concept may be implemented in schools in Chisinau in order to make school waste management more sustainable. This way waste management is taught informally as part of the school environment. To implement this concept, internal and external efforts within the areas school organization, equipment and education are suggested. A more extensive approach on educational improvements necessary for the concept’s effectiveness will be described in another study on the same topic performed by Julia Skagerberg.

Keywords: education for sustainable development, environmental education, waste management, schools, Moldova.
**Sammanfattning**


Litteraturstudierna visade att utbildning om hållbar utveckling bör integreras genom en helskolsmodell för att studenter ska få utveckla handlingskraft gällande miljöproblem, inklusive avfallshanteringsproblem. För att studera de nuvarande förutsättningarna gällande avfallshantering samt utbildning om avfallshantering i skolor så besöktes fyra skolor i Chisinau, där observationer och intervjuer gjordes. Intervjuer gjordes också med några relevanta myndigheter och organisationer för att komplettera den insamlade informationen från skolbesöken. Fältstudierna visade att även om miljöutbildning i Moldavien till viss del har implementerats med en ämnesöverskridande strategi, så finns det ett flertal faktorer som påverkar strategins verkan. Samtidigt så beskylldes avfallssrelateradeproblemen ofta på samhället snarare än på en bristfällig utbildning om miljö och avfallshantering.

Studiens slutsats är att en helskolsmodell kan implementeras i skolor i Chisinau för att göra avfallshanteringen mer hållbar. Genom detta kan avfallshantering läras ut informellt, som en del av skolmiljön. För att implementera denna modell föreslås några åtgärder inom områdena skolororganisation, utrustning och utbildning. En mer utförlig redogörelse för nödvändiga utbildningsmässiga förbättringar, som krävs för att modellen ska fungera optimalt, kommer beskrivas i en annan studie på samma ämne utförd av Julia Skagerberg.

Nyckelord: utbildning för hållbar utveckling, miljöutbildning, avfallshantering, skolor, Moldavien.
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1 Introduction

In Moldova there is today no complete form of sustainable waste management system. In the case of implementation of a sustainable waste management system, it’s important that the people are prepared for the demands this sets on them. One way to make waste management (such as waste sorting) a natural part of the everyday life is by introducing waste management to the pupils in the school environment. This study is a part of a project on improving the waste management education in schools in Moldova. The study seeks to find out how waste management in schools in Moldova can become more sustainable and how this can be a part of waste management education, based on a field study during eight weeks in 2013 in Chisinau, the capital of the republic of Moldova. This section is meant to describe the background of the study as well as aim of the study, delimitations and the structure of this report. Information on project partners will also be described.

1.1 Background

Sweden supports Moldova through Sida (further described in section 1.4.2). As a part of upcoming development work financed by Sida, Avfall Sverige is going to develop a strategy for a project involving several smaller environmental projects in Moldova. The aim of the project will be to help Moldova with implementing sustainable infrastructure. The strategy will be partly based on a few upcoming student theses regarding environmental issues in Moldova.

Pre-studies and field studies regarding this project was made in collaboration with a fellow KTH-student, Julia Skagerberg. Both our studies focus on how to improve education for sustainable waste management and the practice of waste management in schools in Moldova. In this study I have focused on the waste management in some schools and how it relates to waste management education, while Skagerberg focuses on the practice of waste management education. Therefore literature-studies, preparations and performing of field studies (including observations, interviews as well as transcriptions) has been carried through in collaboration with Skagerberg. The analyses and conclusions are though separate, since the two studies have different approaches on the subject. The expressions of opinion and conclusions that occur are therefore the writer’s own.
1.2 Aim

The aim of this project is to ascertain how waste management education and the waste management in schools can be improved in schools in Moldova. The project is divided into two studies. This study focuses on waste management in schools and the relation between schools and society regarding waste management and waste management education. The other thesis will look into waste management education.¹

In this master thesis the question at issue is;

**How can waste management in schools in Chisinau, Moldova become more sustainable?**

In order to answer this question I will discuss the following sub-questions;

- How does waste management in schools relate to waste management education?
- How does the society relate to waste management and waste management education in schools?
- What initiatives and efforts could be implemented to improve waste management in schools, considering societal problems and the relation to society?

1.2.1 Delimitations

A necessary delimitation of the project was to limit the field studies to schools in Chisinau, since the eight week Minor Field Studies (MFS) time span was considered to be too little time for performing studies on schools all over Moldova.

Regarding this study, delimitation was set to look into the relation between waste management education and waste management but not go into waste management education more extensively. Therefore grassroot barriers² related to waste management education won’t be described in any particular matter. A more extensive look into waste management education in Moldova will be done in Skagerberg’s thesis. Regarding waste management in schools, the study includes waste produced in general by students and school personnel. Results are based on interviews and observations and meant to provide a general picture of what waste is produced, not a detailed one. This means the study gives indications on what efforts to be done for a more sustainable waste management in schools. Waste produced in science subjects is not included since efforts are already made in this area, as part

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¹ Author; Julia Skagerberg.
² Definition in chapter 5.2.1.
of a project in teacher education.³

1.3 Structure of the report
The first chapter is meant to describe the background, aim and delimitations of the study as well as structure of the report and project partners. The second chapter describes theory which results from field studies are analyzed with. In the third chapter the research methodology is described. The fourth chapter provides some general information on the Republic of Moldova. In the fifth chapter the waste management in Moldova is described, focusing on Chisinau and current waste problems in the country. In chapter six results from interviews and observations at the studied schools is presented. In chapter seven the waste sorting in Chisinau is described based on interviews during field studies. The eighth chapter contains analysis and discussion on the results presented in chapter six and seven as well as suggested efforts on how schools can become more sustainable. Chapter nine contains my conclusions on the study.

1.4 Project Partners
This section will provide general information about the project partners Avfall Sverige, Borlänge Energi (commissioners) and Sida (financier for this study).

1.4.1 Avfall Sverige and Borlänge Energi
Avfall Sverige is the Swedish trade organization within waste management, consisting of about 400 members of whom most are municipalities and municipal companies.⁴ One of these is Borlänge Energi, which is a municipal energy company in the city Borlänge. The city of Borlänge is a twin-city of Chisinau, why Borlänge Energi has started some Sida-financed cooperative projects in Chisinau, for example in urban planning.⁵

1.4.1.1 Food Transports for Schools – the Borlänge Model
Around 2002, some municipalities in Dalarna decided to change their food distribution system to schools with the aim to decrease negative environmental impacts, by separating the transport

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³ TEMPUS project called SALiS (Students Active Learning in Science).
provider from the goods supplier. The basis of the model is that distributors leave their food in Borlänge center, where food is re-packed and then taken to different locations according to a fixed schedule (by night or early mornings). Truck drivers have keys to different storages in various locations where they leave the food directly without the need of any other personnel assistance. Every four years the municipality and the distributor renew the contract, which opens up for parties to express new demands, for example on environmental standards. A result of the implementation of the model was a decrease of mileage in 50-75% as well as lowered food prices, since the split of transport and goods supplier made it possible for small local food producers to enter the previously closed market. The amount of food that originates in local food suppliers increased to 20% which in turn have lowered the total environmental impact from food transports.6

1.4.2 Sida and MFS

Sida is the Swedish International Development Cooperation Agency. Through Sida, students may gain a two-month scholarship as support for field studies in developing countries, which is called the MFS-programme (Minor Field Studies). Sida’s aim with the MFS-programme is to improve knowledge on developing countries and their problems at Swedish universities.7

Sida’s strategy for cooperation with Moldova 2011-2014 is strongly emphasized on EU-adaptation as of the EU’s norms, standards and values. The strategy is carried through by around 25 projects within democracy and human rights, energy support and market development. The total financial support from Sweden is around 115 million SEK per year. Due to Moldova’s strong dependence on import of natural gas from Russia and the low energy efficiency, Sweden has helped establishing a ministry for energy efficiency and developing a long-term strategy (2013-2030) for how Moldova shall secure its energy needs.8 In this strategy it is pointed out that efficient energy use, energy saving and related actions will be especially promoted to staff education and training, university students and school pupils as well as of the wide population. As part of this promotion, several educational programs on the public awareness will be developed.9

2 Theoretical Background

This chapter describes theory which my analyses are based on. The major concepts are Sustainable Waste Management (2.1) and Education for Sustainable Development (2.2), on which the suggestions for how schools can become more sustainable will be based. The theory on Solid Waste management in Developing Countries (2.1.1) is used later in the report for analyzing the current conditions for waste separation in Chisinau.

2.1 Sustainable Waste Management

Sustainable Waste Management is a term based on the term Sustainable Development. Sustainable Development is defined as;

“...a course of action or development which focuses on environmental protection while using the available resources to meet the needs of the people at present without destroying or exhausting resources because they will be needed by future generations to sustain their lives”

Sustainable Waste Management can therefore be understood as dealing with waste in a way that contributes to the benefit of environment, economy and future generations. There are different strategies on how to achieve this goal. However the general idea is to minimize the production of waste and to take care of the waste produced in the best way possible, often by encouraging reuse and recycling thus minimizing the amount of waste put on landfills.

2.1.1 Solid Waste Management Challenges in Developing Countries

Guerrero et al. states that the three most important components regarding separation of waste are knowledge, equipment and awareness. Knowledge since decision makers who are interested in solid waste problems and familiar with new, appropriate technologies and good practices for waste management are inclined to start waste separation programs and support strategies that include better infrastructure, more efficient collection systems and low cost recycling technologies.

Equipment and machinery availability for managing and recycling waste are important for efficient waste management, but also to promote separation of waste to households. Awareness of citizens and

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municipal leaders on the waste management systems’ impacts in the city is important for the waste separation efficiency.\textsuperscript{11}

Well informed decision makers is essential in order to develop good integrated waste management strategies that are adapted to citizen needs, considering their ability to pay for the services.\textsuperscript{12} In addition, financial support is important for increasing recycling rates, for example to encourage recycling projects and infrastructures, recycling companies in rural areas, drop-off and buy back centers and organization of the informal sector. As the distance to the recycling bins decreases, more people will separate and collect waste at home. There are indications that high rates of recovery is a cause of tipping fees at the disposal site, thus high disposal pricing may generate more recovery of waste.\textsuperscript{13}

The operational efficiency of solid waste management is depending on the active participation of both the municipal agency and citizens. In the best of the cases, the citizens are considered co-responsible together with the municipality. It is also important that stakeholders\textsuperscript{14} have good communication transfer in order to get a well-functioning waste management system. Performing awareness campaigns is a way to encourage people in environmental concern and will to participate in solutions. In this matter, people are more likely to participate in recycling campaigns if they receive information about the benefits of recycling, how to sort the waste and participate in the designing of programs. The active involvement of the population in environmental organizations may also be important. Further, in preparing professionals and technicians in environmental fields including waste management, universities and research centers have an important role.\textsuperscript{15}

According to Ezeah & Roberts, people who struggle for economic survival deprioritize environmental considerations or feel obliged to harm the environment in order to survive.\textsuperscript{16}

\begin{itemize}
\item \textsuperscript{12} Ibid, p.228.
\item \textsuperscript{13} Ibid, p.220-221.
\item \textsuperscript{14} National and local government; municipal authorities; city corporations; non-governmental organizations (NGO’s); households; private contractors; Ministries of Health; Environment, Economy, and Finance and recycling companies
\item \textsuperscript{15} Guerrero L.A. et al. (2013), p. 222-228
\end{itemize}
2.2 Education for Sustainable Development

Teaching waste management is generally done as a part of environmental education. The two most common concepts for how to “teach environment” are called *Education for Sustainable Development (ESD)* and *Environmental Education (EE)*. I will now present these two concepts and their relation to each other.

According to Kimaryo\(^\text{17}\), Environmental Education was originally just education about the environment, but has over time turned into education *about, through and for* the environment. Education *about* the environment is basically transmission of knowledge about the environment and environmental issues. The view was that people who get this knowledge will take action and solve environmental problems in their surroundings. Environmental education *through* the environment was developed when it occurred that education about the environment was not enough after all, since this did not make people take action and solve environmental problems. The approach of education through the environment is that hands-on activities such as field studies and observations are means for developing environmental awareness and concern. The environment itself is used as a learning resource. Education *for* the environment emphasizes the aspect of ethics, focusing on individuals’ development of attitudes and concern for the environment where they assume responsibility for their actions. Through activities like negotiation and rehabilitation of degraded areas is seen as central for the learning of environmental education, one may develop action competence.\(^\text{18}\) Developing action competence is considered an ideal of political and democratic education. Striving for action competence requires a critical pedagogy theory that includes reflection and critical thinking, since action competence and democratic thinking is based on that one does not take what is given for granted.\(^\text{19}\)

For effective implementation of environmental education it is necessary to use appropriate teaching and learning methods that address the three components *about, through and for* the environment since they are interrelated.\(^\text{20}\) An advantage of this type of implementation is that all students are exposed to environmental education.\(^\text{21}\) However it demands a lot of time and resources as well as skilled teachers. Integration of environmental education into school subjects can be achieved just by taking the students outside. Environmental education should go further than just the classroom and

\(^{18}\) Ibid, p. 27-29.
\(^{19}\) Ibid, p. 50.
\(^{20}\) Ibid, p. 32 & 52.
\(^{21}\) Ibid, p. 36.
go into society, our daily activities and into nature.\textsuperscript{22} If pupils learn about waste management in the classroom, they can discuss the waste management in society (good or bad) and the impact on the environment caused by poor waste management. They can then decide to do clean-up activities (or other projects) at school or in some other place they consider important.\textsuperscript{23} Kimaryo states that children influence their parents’ environmental performance. For example, more parents admitted to be recycling waste after their children had done a course on the environment in school.\textsuperscript{24}

Education for Sustainable Development is based on the principles and values of Sustainable Development, striving for lifelong learning.\textsuperscript{25} According to Evans et al., there are different ideas of how sustainability education\textsuperscript{26} can be implemented, however researchers agree that interdisciplinary and holistic approaches (whole-school approaches) that involve all areas of the school are most effective. Areas to be involved are for example the school ethos, governance structures, physical surrounds, resource management, teaching and learning, curriculum organization and networks and partnerships between the school and the local community and organizations.\textsuperscript{27} Regarding teaching and learning methods, participatory teaching methods that motivate learners in action taking for sustainable development is essential. ESD emphasizes competences like critical thinking, collaborative decision making and visioning different scenarios and perspectives.\textsuperscript{28}

According to Kimaryo, environmental education is a component of ESD since both are means for attaining sustainable development and strive for balance between economy, ecology and society.\textsuperscript{29}

\textbf{2.2.1 Barriers and Success Factors}

Evans et al. studied sustainability education in four schools in Queensland, Australia and classified barriers regarding sustainability education into three categories: \textit{grassroot} barriers, \textit{administrative} barriers and \textit{conceptual} barriers. \textit{Grassroot} barriers are barriers that affect teachers in their daily work such as lack of time, information and content knowledge. An \textit{administrative} barrier is for

\textsuperscript{23} Ibid, p.41.
\textsuperscript{24} Kimaryo (2011), p.48.
\textsuperscript{26} In this thesis, Sustainability Education and Education for Sustainable Development will be considered equal.
\textsuperscript{28} UNESCO, \textit{Education for Sustainable Development}.
example lack of resources, since teachers’ need funding for taking time on school hours to research, plan and implement initiatives. Another barrier can be political emphasis on quantitative literacy and numeracy testing, which tends to affect sustainability education in a negative way by priorities. Conceptual barriers are conflicts between theory and practice regarding sustainability education.30

Implementation of ESD is often considered a low priority; an add-on to an already overloaded curriculum driven by only a few very dedicated teachers and employees.31 A recommended way to prevent such problems is through a whole-school approach, however it may be difficult to take on such an approach if not all school staff agrees with it. Therefore it is important that the principal works for teacher acceptance, since teachers’ attitude towards the subject affect what students learn. In addition, explicit teaching may teach students as much as the implicit curriculum.32

Regarding the internal organization, a headmaster can be an enabler or disabler regarding educational change for sustainability where the lack of teacher support is disabling.33 The headmaster should work for creating conditions and taking actions that help teachers to make initiatives. Effective headmastership for sustainability requires that headmasters trust their teachers, are trusted by their teachers and build trust with community members and external organizations in order to implement sustainability programs and projects. Through open discussion and negotiation, trust can be established and proactive headmaster support enabled, which is important for overcoming mentioned barriers related to implementation of sustainability education.34

3 Method

The aim of the project\textsuperscript{35} is to ascertain how waste management and waste management education in schools can be improved. To achieve this, literature studies and field studies were performed. At last, an analysis was done on the results found during field studies in order to discuss the question at issue\textsuperscript{36}. How literature studies, field studies and analyses were done will be presented in this chapter.

Even though this study focuses on waste management and Skagerberg’s study on waste management education, it was of mutual interest to find out how these concepts are related\textsuperscript{37}, since waste management in schools might serve an informal educational purpose outside the classroom education. A discussion on this topic is presented in chapter 8.1.

3.1 Literature Studies

Literature studies were mainly performed before the field studies but also to some extent during and after the field studies. Before the field studies focus was primarily on environmental education/education for sustainable development, waste management in developing countries and research methods. During the field studies we mainly looked into school course literature, school policy documents etc. After the field studies focus was on internet sources, primarily on Moldovan waste management and school system, in order to complement information we found during our field studies. The literature was mostly used to analyze our results from our field studies but also for preparing our field studies.

3.1.1 Literature Search

In order to find literature regarding waste management and waste management education in developing countries we used the ERIC database through KTH’s database search programme. The primary keywords which the search was based on were “education for sustainable development”, “environmental education” and “sustainable waste management”. These were accompanied with the secondary keywords “Moldova” and “developing countries” to narrow the search, however these searches gave few hits (since there are none or few published studies in this area in Moldova), why variations with the primary keywords and “developing countries” was finally used. Around 20 articles were chosen for reading, although only a few of these were later on considered useful for this study.

\textsuperscript{35} The project consists of this thesis and a thesis done by Julia Skagerberg.
\textsuperscript{36} How can waste management in schools in Moldova become more sustainable?
\textsuperscript{37} How does waste management in schools relate to waste management education?
Regarding the search of Moldovan policy documents (local and national) and other information, we firstly asked for help from our supervisor at the Chisinau City Hall and the interviewees we met. During interviews we were able to ask what policy documents that existed and if we could see them. For example we got the address to the Ministry of Education’s website this way. Another example is the national curriculum which we could look into at the Education Department of Chisinau. If our contacts and interviewees could not provide the information needed (or if we wanted to broaden our search), we used the search engine Google. However this was of limited success since our searches were limited to English, where we used keywords such as “education”, “environment”, “waste management” and Moldova”. Information found was often in Moldovan/Romanian, why we firstly asked for translation help by our supervisor at Chisinau City Hall. Secondarily we used the program Google Translate in order to understand the content. These types of translations were however often of limited quality, why it sometimes was hard to understand information translated with Google Translate.

3.2 Field Studies

According to Kullberg, you can either choose context of discovery or context of justification when doing scientific work. In the context of discovery, theories are created, while in the context of justification theories are tested. Working in the context of discovery implies qualitative studies, thus qualitative methods are used.\(^\text{38}\) In order to achieve aim of the project, interest was put in discovering how education for waste management and waste management in schools work according to the people involved (students, teachers, headmasters etc.) and let the result of these studies describe how to proceed with the studies. The idea was that this would help to clarify the complex system of educating the people in waste management, not just focusing on what is happening in schools, but also what affects what is happening in schools. This is obviously a way of discovery implying qualitative studies. Therefore an ethnographic method including observations and interviews was used. In addition, the relatively short time-span for the field studies made qualitative studies an effective way of getting a deep understanding, with a relatively small selection of study persons.\(^\text{39}\) Based on this, interviews and observations in schools were chosen as primary study methods. Some other interviews were also performed, to complement the information found during observations and interviews at schools (described further in section 3.2.3). Observations and interviews with students, teachers and headmasters were performed on four different schools in the Chisinau district. Two schools were

\(^{38}\) Kullberg B. (2004), Etnografi i klassrummet, p.53.

visited twice and two schools visited once. All schools included primary school (grade 1-4), gymnasium (grade 5-9) and lyceum (grade 10-12). One of the schools was placed in the city center (school 1), two of them were placed in different districts near the city center (school 2, 3) and one in a suburb of Chisinau (school 4).

Before every school visit and interview, we informed the interviewee about the ethics of our research. The description given to the interviewee is found in Appendix B.

### 3.2.1 Fieldwork Plan

In order to organize the observations and interviews so that they would serve the aim of the project, we used a fieldwork plan. The fieldwork plan was continuously revised, where we reconsidered what we needed to do in order to make the best possible plan for how to reach our aim. Based on what we found out at interviews, we restructured the fieldwork plan. For example we started our study with the goal to implement environmental education and therefore planned our first interview based on this, but soon we found out that there was emphasis on environment in the education. Therefore the fieldwork plan was adjusted to focus on the width of this environmental emphasis and how the education can be improved, based on a view of education for sustainable development.

The final version of the fieldwork plan can be seen in Appendix A. It shall be noted that the fieldwork plan was flexible and for our internal work only, therefore the items in the plan shall be seen as exemplary means on how to collect information, rather than absolute. The fieldwork plan was also used for revision of the interview-guide used (described further in section 3.2.4).

### 3.2.2 Selection of Schools

The schools to visit were chosen by the Education Department at City Hall, on appointment by us. Some demands were set on what schools to visit, which regarded public/private school, location, wealth and number of grades. The request was to visit public schools both in city center and in suburbs, of mixed wealth (not just the best schools), with grades from primary school to lyceum (1st to 12th grade). Initially private schools were also of interest, but due to the lack of time we decided on visiting only public schools since these are most common and therefore likely to be generalizable. In addition to these requests, some requests were made regarding the school visits. Our main interest was to perform interviews with headmasters and biology teachers (since environment is mainly taught in biology) and observe some lectures. Secondarily we were interested in interviewing teachers in other subjects and thirdly students and other school personnel. The connections were made as

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40 Moldovans start school at the age of 6.
following; firstly our supervisor at Chisinau City Hall took contact with a representative at the Education Department at Chisinau City Hall regarding our concerns. Secondly the representative at the Education Department took contact with schools that suited our requirements. Since none of us spoke Moldovan/Romanian, an interpreter was in some cases arranged from City Hall. The schools were however informed about our need of an interpreter, so they could try to arrange one for us (a teacher or a student) in case we did not have any interpreter from City Hall.

3.2.3 Observations

Before every observation was performed, an observation template inspired by Bjørndal was used in order to prepare our observations, including responsibility for note taking, focus areas etc. During the observations notes were taken primarily within the focus areas. Focus areas were social structures, school environment, teaching methods and waste management. After every work day we presented our observations to each other, going through what we’ve seen and how observations relate to the project aim and the continuous work on the project. During this process, the observations were transcribed. In addition, we continuously did new preparations after every observation, considering how the previous observation turned out and how to make the next observation even better. However, all preparations considered flexibility, since we did not know on beforehand what we would get to see and do at the school visits.

3.2.4 Interviews

Based on literature on interview-types, we decided on using a form of semi-structured group-interviews using an interview-guide, in order to get a flexible interview where we could get as much information as possible on the topics “waste management” and “environmental education”. At the schools, interviews were made with headmasters, teachers and students. Interviews were also performed with the NGO Hai Moldova, the Education Department at Chisinau City Hall, the Institute of Education Sciences and the Embassy of Sweden in Chisinau. There were different focus areas within the described topics depending on the type of interviewee, for example the interview with the Institute of Education Sciences focused on teacher education and teacher competences related to environmental education. As a result, six different types of interview-guides were developed specified for each type of interviewee. The questions on the interview-guides are shown in Appendix C. When

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42 Non-Governmental Organization.
43 NGO that organizes waste collection activities in Moldova, focusing on public participation.
44 Responsible for continuous teacher training in sciences and science-teacher education.
we started visiting schools it was not always possible to perform group-interviews due to lack of teachers that wanted or were allowed to participate. We therefore often had to adapt us to the situation. However, we prepared for these kinds of situations by reading literature on informal interviews.

3.2.4.1 Non-structured Interviews
Some interviews performed were informal; non-structured. These interviews were not planned from our side on beforehand, but took place spontaneously, often on the initiative of some other part. For example, a teacher invited us to her home where she felt free to talk about her own feelings and opinions. A non-structured interview is also known as an informal dialogue, where both parties have great freedom to angle the dialogue. The interviewer may have a vague plan and limited influence over how the conversation will proceed, however the non-structured interview may still give plenty of necessary information. The non-structured interview has the advantage that it can provide new and sometimes surprising information. The disadvantage is that it is harder to compare general and systematic answers on a questioning. As interviewer it is easy to affect the interviewee and the interviewee’s answers, which greatens the source of error for the study results. The non-structured interviews performed occurred without note-taking, instead me and my colleague talked about the interview afterwards, transcribing what we had been told.

3.2.4.2 Semi-structured Interviews
The semi-structured interviews were based on an interview-guide that we developed. An interview-guide is more or less a detailed overview over the themes and issues to be addressed during the interview. Dialogues using an interview-guide is less unstructured (semi-structured) than the informal dialogue (non-structured), but still quite unstructured. This type of interview has room for a great degree of flexibility since the interviewer can change the questions sequence based on how the interview evolves. The relatively loose form makes it suitable for group-interviews, where the purpose often is to gather rich information about a certain issue. During these interviews, we had the possibility to have one note-taker and one interviewer. This made it easier for the interviewer to adapt questions and follow-up questions based on how the interview progressed. The semi-structured interviews were also recorded, in order to ensure that no information was missed. After an interview we transcribed the recordings. These transcriptions were then put together with the note-taking from the interview, resulting in one transcription for each interview.

46 Ibid.
3.3 Analysis

After the field studies, I went through the results (transcriptions from observations and interviews), arranging them into the themes waste management in schools, waste management in society and waste management education. Then I sought out applicable literature in order to answer my follow-up questions; *How does waste management in schools relate to waste management education (1), How does the society relate to waste management and waste management education in schools (2)* and *What initiatives and efforts could be implemented to improve waste management in schools, considering societal problems and the relation to society (3)*. The theories presented in chapter 2 have been used in the analysis of the results of the field studies, resulting in a combination of the theories and the reality in Chisinau.

I used theory on ESD (chapter 2.2) and SWM (chapter 2.1) in order to discuss question (1). In order to analyze the waste sorting in Chisinau I used theory presented in chapter 2.1.1. The discussion on question (2) is based mainly on this analysis. Based on these discussions and theory presented in chapter 2 I answered question (3), which is linked to the aim of the thesis; how waste management in schools in Moldova can become more sustainable. In order to measure waste management sustainability, waste management was analyzed based on the waste hierarchy. This means schools’ approach to waste and their emphasis on prevention, reuse and recycling of waste was investigated.

3.4 Limitations

Several factors can be considered as limitations for the studies. Translation implies an extra step of interpretation, why information easier may become misinterpreted or scrambled. The translators were often teachers or students, which sometimes had trouble understanding and translating our questions correctly. Further, we had to trust that the translators did not translate wrong, since we could not verify that interviews were translated correctly. In addition, it was hard to find material regarding school education and waste management in Moldova, especially in English. Therefore a lot of information regarding this is based on interviews, which is sensible for the interviewee’s personal opinions. Our limited possibility to affect number of schools to visit and check if our requirements were met is also problematic. Further, we had little flexibility to arrange activities such as interviews at the school visits. This has made our study method less consistent, which can affect consistency of retrieved information. For example we were not allowed to go into any school canteens and at one school we only got to interview the headmaster and an English teacher. This in combination with the

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47 Presented in chapter 8.
limited time-span for our field studies resulted in few school visits. These types of difficulties are however well-known in the context of MFS.\footnote{Sandberg, C. (2007), \textit{Rättsvetenskap för uppsatsförfattare}, 2nd edition, Norstedts Juridik: Stockholm, p.76.}

Validity and reliability are scientific terms usually accompanied with quantitative studies. Validity means to describe if the scientist research what is intended. Reliability is a measurement of the accuracy of the used method. Using the terms validity and reliability in qualitative studies is problematic, since the scientist uses own skills to interpret information. Reliability may however be insured by the continuity in performing interviews, trying to complement missing information if possible, where stories are automatically corrected.\footnote{Kullberg B. (2004), p.73-76.} As part of this problem, validity of this study was hard to ensure, since field studies were performed in the context of discovery where intended research may change over time. Although, reliability was emphasized by the continuous work that was part of the fieldwork model, complementing incomplete information over time. The short time-span of the field studies was however limiting regarding this complementary work. In addition, previously mentioned translation issues affect reliability as well.
4 The Republic of Moldova

Moldova is for many Scandinavians a quite unknown country and the knowledge about it is low, therefore I will describe the country for the reader to understand why Swedish development work and Avfall Sverige’s projects in Moldova are important.

Moldova is a country in Eastern Europe lying in between Romania and Ukraine. Approximately 3,6 million people live in Moldova, where 670 000 people live in the capital city Chisinau and a total 800 000 in the whole municipality of Chisinau. The city of Chisinau is divided into five sectors; Botania, Buiucani, Centru, Ciocana and Ruscani. The three largest ethnic groups (2004) are Moldovan/Romanian (78,2 %), Ukrainian (8,4 %) and Russian (5,8 %) and the vast majority of the population (98,2 %) are Eastern Orthodox (2000).

Since Moldova became independent in 1991 the population has steadily declined, mostly due to emigration, lowered birth rates and an aging population. Around every fourth Moldovan citizen in working age work abroad, mostly in Russia, Ukraine, Italy, Spain and Portugal. Many families are depending on abroad working relatives to send home money.

4.1 Economy

Moldova is today one of the poorest countries in Europe with an average income of USD 285 per month and 20% of the population living under the poverty line. The incomes are unevenly distributed and poverty is concentrated in rural areas. Agriculture is the base for Moldova’s economy, almost 90% of Moldova is farmed and food stands for more than 50% of the export. Before, Moldova produced a third of the total wine production in the USSR and they still produce a lot of wine, why they are doing efforts for increasing their wine export to the EU. Their greatest trade partners are Russia and Romania, although there have occasionally been Russian trade barriers against Moldovan food and wine. Moldova’s energy supply is characterized by strong dependence on natural gas and electricity imports. In addition, the energy use is inefficient and Moldova has major debts for gas imports as a

result of non-market pricing, which weakens the willingness to invest in the area of energy.\textsuperscript{54} 90\% of the energy imports come from Russia, which several times have used gas a political weapon against the government in Chisinau.\textsuperscript{55}

### 4.2 EU-integration

Moldova is not a part of the EU today, but some of the political parties strive for Moldova to become a member of the EU in the future. During the last four years Moldova has been governed by three different alliance governments, all with EU-integration as primary priority. Some areas that have been discussed with the EU are a more extensive free trade area and the possibility for Moldovan citizens to travel within the EU without a visa. During the last years there have been strong tensions within the government coalitions, therefore necessary reforms that the government has committed the population and international donors to implement have been obstructed. The donations, mainly from EU, are partially for strengthening the judicial system (which is weak and characterized by widespread corruption), investments in the energy sector and raising the technical competence.\textsuperscript{56} In order to achieve EU-integration, Moldova needs to develop in several areas. Regarding sustainable infrastructure SIDA works to achieve the following goals\textsuperscript{57};

- Moldova has made its use of energy more efficient
- Development and application of EU compatible legislation and regulations in the area of energy
- Improved municipal environmental infrastructure

#### 4.2.1 Waste Management Aims

The European Union’s general strategy for Sustainable Waste Management can be seen in their description of the Waste Hierarchy.


\textsuperscript{55} Sida (2013), \textit{Utvecklingen i Moldavien}.

\textsuperscript{56} Ibid.

\textsuperscript{57} Regeringskansliet, Utrikesdepartementet (2011), \textit{p. 5-6.}
The waste hierarchy shows how to work with waste, where prevention is the main option and disposal the least favorable option.\textsuperscript{59}

In the EU-directive on waste management (directive 2008/98/EC)\textsuperscript{60} it is stated that the member states should take measures in order to treat their waste according to the waste hierarchy. Further the directive describes that;

“Any producer or holder of waste must carry out their treatment themselves or else must have treatment carried out by a broker, establishment or undertaking”\textsuperscript{61}

“Dangerous waste must be stored and treated in conditions that ensure the protection of health and the environment. They must not, in any case be mixed with other dangerous waste and must be packaged or labeled in line with international or Community regulations.”\textsuperscript{62}

Since Moldova work on a closer relationship with the EU, Moldova should work on following the EU directive and towards having a waste management according to the waste hierarchy.\textsuperscript{63}


\textsuperscript{59} Ibid.


\textsuperscript{62} Ibid.
4.3 Corruption

Corruption is a major problem in Moldova. Moldova’s Corruption Perceptions Index (2012) is 36/100, where a rate of 0 is very corrupt and 100 very transparent.\(^{64}\) Institutions that are seen as most corrupted by the public on a scale of 0-5 where 0 is very transparent and 5 is very corrupt are the Police (4.1), Judiciary (3.9), Political Parties (3.8), Public Officials and Civil Servants (3.8), Parliament and Legislature (3.7), Education (3.7) and Business and Private Sector (3.7).\(^{65}\) Several international instruments have been adopted to fight corruption, but according to Sida, they are not applied adequately why continuous work on anti-corruption is necessary.\(^{66}\) Most decision makers know that corruptive actions are contra productive, but it is easier to work with corruption than against it.\(^{67}\)

\(^{63}\) Ibid.


\(^{66}\) Regeringskansliet, Utrikesdepartementet (2011), p. 3.

\(^{67}\) Representative, Embassy of Sweden in Chisinau, semi-structured interview 2013-06-20.
5 Waste Management in Moldova

The waste management in schools depends on the waste management in society; therefore this will be described first. Since focus in this study is primarily on waste management in schools and secondarily on how the waste management in society relates to the waste management education and waste management in schools, societal waste management will only briefly be described. The descriptions are mainly based on the study by Bacal\(^68\) and the National Waste Management Strategy for Moldova\(^69\). Some descriptions are from transcripts from interviews during field studies and internet sources.

Recent years improper waste management has been affecting the local communities, threatening the environment and contributing to global emissions of greenhouse gases. Due to economic growth and increased volumes and diversity of generated waste, waste management and recycling is a local, national and international priority. Municipal waste management is generally only available in urban areas, with a coverage rate of 60-90%. Rural areas generally do not have waste management services and the most widely used method of household waste treatment is storing waste on the ground, which often is a major source of soil and groundwater pollution.\(^70\)

The waste management in Chisinau is performed by the autonomous municipal company I.M. Regia Autosalubritate, which gathers and transports MSW to landfills. The cleaning of waste in parks and streets is performed by the Green Spaces Department at City Hall. According to the Swedish embassy, there is no collaborative work regarding SWM in the society.\(^71\) There are however different initiatives for SWM. The mayor in Chisinau did recently, in May 2013, decide to place out more recycling bins. After these are placed out, there will be 500 bins for glass, 500 for cardboard and paper and 1200 for plastic bottles, plus 2000 recycling bins of another model and 7800 regular garbage cans that are already placed out located in Chisinau. The recycling bins are of size 1, 1 m\(^3\) and the garbage cans 0, 75 m\(^3\).\(^72\) There is no organized collection of hazardous waste, why for example the Swedish Embassy sends the little amount of hazardous waste they produce back to Sweden.\(^73\) There are also some plastic


\(^{70}\) Ibid.

\(^{71}\) Representative, Embassy of Sweden in Chisinau.


\(^{73}\) Representative, Embassy of Sweden in Chisinau.
bottle companies that have placed out recycling bins for plastic bottles in co-operation with the company ABS. There are some initiatives for paper recycling.

The recent years financial funding of sanitation and waste collection has been prioritized, primarily for sanitation of localities, construction and modernization of municipal landfills, elimination of unauthorized landfills and purchasing of equipment such as containers, tractors and trucks for waste collection and transportation. Some funding was for projects on implementation of integrated waste management, however most of these projects did not focus on integrated waste management since they were designed separately for one of the operations collection, transport or storage and did not consider economic efficiency and sustainability. Typically, coverage of these projects was concentrated to the rural locality.

The Ministry of Environment of the Republic of Moldova recently (2013) developed a national waste management strategy. The aim of the strategy is to develop infrastructure and services necessary to protect the environment and human health, develop legal and institutional framework required to support a gradual adaptation to EU waste management practices through international and local partnerships and attract investments that are needed for sustainable development of the sector. It is mentioned that awareness and public participation is critical to perform and support waste management at national and regional levels. It is highlighted that in order to reach strategic goals all the waste management strategies necessarily require the involvement of households, businesses and civil society in a broad public consultation, despite the increasing complexity of waste issues and changes in waste treatment systems.

5.1 Waste Management Problems

Bacal argues that the current major problems of waste management in Moldova are:

- Spontaneous and illegal dumps
- Overloaded landfills in some localities and their modest use in others
- Most landfills do not meet sanitary-hygienic and ecological security
- Deplorable condition and even lack of paved or asphalted access roads to the landfill
- Inadequate treatment of organic sludge from wastewater treatment plants

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- Animal wastes from households
- Low efficiency of public services of waste management

Even though the amount of unauthorized landfills have been decreased with 70% in recent years, around 3000 large and medium sized landfills are found annually as a result of eliminated illegal dumps reappearing in most communities. Dumps reappear because of the minor punishment of such activities, the population’s and local administration’s careless attitude, insufficient human resources as well as technical and economic studies to prevent and resolve this problem.\textsuperscript{78}

6 The Studied Schools

The purpose of this section is to present the results of the studied schools, which was collected through observations and interviews. The transcriptions were grouped into the areas organization (section 6.1) and waste management (section 6.2). The school organization is of importance since this area shows conditions that affect how waste management and waste management education is carried out. Waste management is obviously about how waste management was carried out in schools, focusing on how reuse, recycling and disposal of waste was emphasized in schools. The results are summarized in section 6.3. These results are analyzed and discussed in section 8.1 based on theory presented in chapter 2.2.1 (barriers and success factors regarding ESD) and 2.1 (sustainable waste management).

6.1 Organization

The organization of administrative divisions in Moldova is generally characterized by a hierarchical structure. On arrival to school 1 to see the principal, there was a long queue for entering the office, consisting of various school personnel. It seemed that the principal had a saying in most decisions, even smaller ones. One teacher mentioned how the principal exercises power;

“Principals want to show that they are in charge, the teacher must obey orders and do what they are told. I get reprimanded every day, even when I have not done anything wrong.”

79 The principal is obliged to follow the general plans that are ordered from the Ministry of Education, such as subject curriculums and the accompanied descriptions for how they should be followed, for example how many hours each subject should have per week, how the content should be taught etc. Further, the schools have little to say about their economy, as many administrative tasks lie on the ministry of education. However, this is about to change, as a general financial decentralization is about to take place in Moldova. 80

Environmental education in Moldova has been implemented with an integrative approach, where teachers teach a bit about environment in almost all subjects. Since it is the ministry of education that sets the curriculum, it is also the ministry that decides what content to be taught in the subjects.

80 Representative, Education Department at Chisinau City Hall, semi-structured interview 2013-06-27 & Representative, Embassy of Sweden in Chisinau.
Chapters of ecology introduced in different subjects are described in the curriculum. Regarding environmental education, it is mainly taught in biology, however there is a chapter about environment in many school books. According to the education department in Chisinau it is not possible to demand that the schools develop a plan for how environment should be involved in the education for different subjects, since this depends on the ministry of education. Therefore the schools cannot do anything about the content taught in the subjects. Extra-curricular activities after classes are the only thing possible for schools to affect.\(^81\)

Schools encourage extra-curricular projects and biology-teachers consider it necessary for learning, however these projects are often unpaid, due to the maximum hour per week salary\(^82\). The curriculum describes what content to be taught at lessons and therefore teachers are not likely to be able to perform these projects on lesson-time. Consequently, every teacher does not do these projects. In addition, they are voluntary for students. Students have mentioned that they would gladly participate if the outdoor activities were scheduled at school time instead of Saturday mornings and such.\(^83\)

In schools and in the society in general, there is a focus on awards and rewards. For example, in the schools the walls were decorated with portraits of historical persons, successful student projects and portraits of the school’s best students (based on grades). Also, several principals’ offices were filled with diplomas. When a teacher performs a project there may be no payment, therefore an award can be given in order to motivate teachers to carry through projects. Since being a teacher is a profession with low salary and low status, a way to greater one’s status is to carry through projects and get awards for them.\(^84\)

### 6.1.1 Economy

Obviously, the strained economy in Moldova affects the schools. During our visits it was noticeable that the schools were clearly functional even though the facades and interiors could be somewhat worn. Until now, most financial tasks in the schools (pay salaries, buy equipment etc.) have not been done by the schools. The financial decentralization already mentioned will affect the schools by giving them responsibility to take care of most of their internal economy. Although, the schools will after the decentralization still not be able to do some of the economic decisions, for example the teachers’

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\(^81\) Representative, Education Department at Chisinau City Hall.

\(^82\) Further described in chapter 5.1.1.

\(^83\) School 1, semi-structured group interviews with 15 12\(^{th}\) grade students during English lesson 2013-05-21.

\(^84\) English teacher, School 3, non-structured interview 2013-05-31.
salaries will still be set by regulations formed by the ministry of education.\textsuperscript{85} The teachers’ salaries are generally low, as they only get paid for 18-22h per week (which is in line with the number of hours they have lectures), although teachers have expectations on them to work much more than this.\textsuperscript{86} According to a teacher, teachers are told to develop own material in their spare time to inspire students. However the schools do not support teachers financially or practically in using creative teaching methods, which can make it expensive for teachers trying to do new and interesting lessons.\textsuperscript{87} In addition, several teachers have expressed that they are fed up with working as a teacher and that they do not want to work as a teacher anymore and definitely not for the rest of their lives. As students they believed teaching could be fun, but now their opinions have changed due to low salaries and lots of work.\textsuperscript{88} The headmaster at school 3 mentioned that this is a general problem in society, a lot of people move abroad to find work.\textsuperscript{89} According to UNESCO\textsuperscript{90}, it is mostly the young didactical personnel that are well trained and have good study results that leave the education system in order to make a living abroad.\textsuperscript{91} One teacher had two other jobs aside from teaching, and still laid time on doing practical, interesting and innovative lessons. The teacher said that the lessons were focused around real life situations such as cooking and restaurant visits. But this was not always easy to do, since her teaching methods were not appreciated by the headmaster. If she went outside with the class on lesson time, or in other ways deviated from the curriculum, the headmaster would give complaints.

“I fight with the headmaster about this almost every day. Why? Because that is what the students deserve. They need this. But I have two kids and a husband who I want to see more; therefore I want to quit my job as a teacher. But it is hard, financially.”\textsuperscript{92}

One of the schools we visited was part of a pilot project regarding this financial decentralization, which they referred to as being self-managing. The school encountered some issues in being self-managing, such as how to handle their resources, apply new personnel for accounting etc. The school staff was very open with the students about the self-management and asked them to be extra careful with the things in the school, since they would have to pay for reparations and such by themselves. The headmaster believed that, even though it was not the main purpose, schools that are self-

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{85} Representative, Education Department at Chisinau City Hall.
\item \textsuperscript{86} Headmaster, School 4, semi-structured interview 2013-05-30.
\item \textsuperscript{87} English teacher, School 3, semi-structured interview 2013-05-29.
\item \textsuperscript{88} School 3, non-structured interview with six English teachers 2013-05-31.
\item \textsuperscript{89} Headmaster, School 3, semi-structured interview 2013-05-29.
\item \textsuperscript{90} The United Nations Educational, Scientific and Cultural Organization.
\item \textsuperscript{92} English teacher, School 3, non-structured interview 2013-05-31.
\end{itemize}
\end{footnotesize}
managing will become more environmentally friendly and think more about sustainable waste management. Despite the problems the director was positive regarding the change and had talked to other schools that had come longer in the process, which were positive about the greater influence over their economy.\textsuperscript{93} In addition, several schools on the countryside are currently and will continuously be shut down due to their low count of pupils (which in turn is a result of urbanization) and the fact that they are not able to maintain their operations within the economical limits.\textsuperscript{94} This is a progress that makes the remaining schools bigger. Decision makers mean that this phase can screen out bad teachers and later on strengthen teachers’ reputation and salaries.\textsuperscript{95}

Corruption is a problem in society, including the schools. For example, in some public schools parents are obliged to pay a sum of money to the school to cover for repairs and such, even though these costs should actually be covered by the municipality. There are also cases of bribing, for example students may bribe their teacher in order to get a higher grade.\textsuperscript{96} The schools’ need to attract students force them to invest in some area, some invest in good facilities, others in modern education or good school meals. Therefore schools may be tempted to accept payment in order to afford improvements.\textsuperscript{97}

### 6.2 Waste Management

There is very limited recycling performed in the schools, no recycling bins and few trash cans can be seen. At school 4 some buildings nearby had recycling bins but the school did not have any. However they took care of the leaves and branches from the trees, which were taken by car to be put in soil. They did not separate any hazardous waste; everything was thrown in the same garbage. The headmaster said that they taught students to be frugal with the school’s resources. The reason for the sparing of resources was economical, as a consequence of the pilot project regarding financial decentralization.\textsuperscript{98} In this school some waste was reused in subjects as arts and crafts, for example some students had done portraits using colored splinters of eggshells. In school 2, paper was to some extent sorted out for recycling but there was no other form of recycling.\textsuperscript{99} In school 1 some students mentioned that they did not recycle any paper at the school, which they thought was a shame since they used lots of copies of paper for projects and exam reports. They also said this type of work could

\textsuperscript{93} Headmaster, School 4.
\textsuperscript{94} Representative, Education Department at Chisinau City Hall.
\textsuperscript{95} Representative, Embassy of Sweden in Chisinau.
\textsuperscript{96} Ibid.
\textsuperscript{97} Headmaster, School 3.
\textsuperscript{98} Headmaster, School 4.
be done with electronic devices instead of printing paper. In addition, they had noticed that many students waste paper by only using one side of it.\textsuperscript{100}

The schools generally wanted to have recycling and to teach the kids to use it, but thought this was the district’s responsibility. If recycling was implemented for the schools, then they would use it, even though it could be more expensive. At school 4 there was until last year a company that took all their garbage and sorted the garbage at a factory for recycling. The company still exists but it is a private company and the school does not have a contract with them anymore. Since the company is kind of small and the distance to the factory is very long (about 150km) it was too expensive. The company that gets the garbage from the schools is the same as in the rest of the municipality. According to the education department, the Youth Council of Chisinau\textsuperscript{101} is considering a project regarding implementing recycling bins in schools, which would firstly be a pilot project. If the project would turn out successful, it would be implemented in other schools as well. During our talks with a 12\textsuperscript{th} grade English class at school 1 we asked some students if they would recycle if they had possibility to do so where they lived. All students were positive and the majority said they would surely do it. Still, the students met the question with skepticism regarding a functioning recycling system. In their view, the possibility to put waste in recycling bins does not imply one will recycle if the recycling system is not working – which is how they looked at the current waste management situation in Chisinau.

6.2.1 School Canteens

The school canteens were generally not used by all students. All schools we visited had more than 1000 students and the canteens seemed to fit about 100-200 students. The canteens could impossibly fit all students in the school, even though they had two or three different mealtimes. Therefore they were generally used by the primary school children (school 1 and 2), or by children who had trouble with food support from home (school 4). Teachers and others could pay a small amount to get lunch. A lot of older students ate at nearby restaurants instead. For example, in school 2 some older students explained that they rarely eat in school, since all upper grade students eat at the same time and their food break is only 20 minutes.

The food portions were premade by the canteen personnel in all schools. The food was served with warm tea; water had to be bought in plastic bottle from the school cafeteria. The leftovers were taken care of by the canteen personnel and thrown in a bucket. At school 4 the leftovers were thrown in the

\textsuperscript{100} School 1, semi-structured group interviews with 15 12\textsuperscript{th} grade students during English lesson 2013-05-21.

\textsuperscript{101} Council consisting of student representatives from schools in Chisinau.
garbage like everything else. However the headmaster mentioned that only around 20% (out of a total of 750 students) ate lunch and therefore they had little leftovers. The school prioritized food for kids from poor families, other kids had to pay for food. There was also some concern about the quality of the food. A teacher from school 3 claimed that the food was not good for you, and that she always ate at home. Although in school 1 the teachers were very happy with the food, the only concern was that the portions could be a bit small, since the food portions was adapted for the younger students.

There was recently a pilot-program where the Swedish buffet was implemented in six schools in Chisinau. The Swedish buffet is a concept inspired from schools in Sweden, where students choose their own food from a buffet instead of getting a pre-made portion. All visited schools wanted to try the model if possibility was given, however the headmaster at school 3 had some concern about it and thought that since students are not used to pick what they want and how much they want they might take only the tasty parts of the food. Therefore the headmaster thought there should be a variation of the original Swedish buffet in some of the schools.

6.3 Summary

A summary of the results from schools that will be analyzed and discussed in section 8.1 and 8.2 can be seen below.

- Lack of resources, which affects several areas
- Little emphasis on sustainable waste management
- Financial self-management causes increased energy conservation
- Schools are limited by curriculum regarding creation of local rules and initiatives
- There are indications on a disabling headmastership in terms of ESD
- Teachers have little flexibility in developing their own way of teaching

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102 Headmaster, School 4.
105 Headmaster, School 3.
7 Analysis of Waste Separation in Chisinau

In order to understand how society relates to waste management and waste management education in schools, I have firstly analyzed the conditions for waste separation in Chisinau based on theoretical optimal conditions. The analysis will then be used for my discussion on how society relates to waste management and waste management education.

As stated in chapter 2.1.1, knowledge among decision makers, efficient equipment and infrastructure and awareness among citizens and municipal leaders are three components important in order to achieve an efficient waste separation system. Transcriptions from interviews during the field studies have therefore been grouped into these areas, for further analysis in section 8.2. Knowledge among decision makers was hard to measure in the context of this limited study and how the research was performed. However, knowledge among decision makers is linked to the creation of environmental strategies including laws and thus also the enforcement of these. Therefore this area has been analyzed by the name “Politics and Laws”.

7.1 Politics and Laws

When asked about how to decrease littering and waste dumping, a representative for Hai Moldova (hereinafter referred to as RHM) replied that it is mainly four phases that should be emphasized based on the current situation in Chisinau. 1) Law enforcement, 2) Infrastructure (where civilians can put waste), 3) Practical lessons in schools and 4) Organizing NGO’s so that they can focus on different fields, not just where the money is. School lessons were placed third with motivation that if one learn about waste management in school, but comes home where it is not happening, one will forget what has been learned.106

The Embassy of Sweden stated that trust can be important when implementing SWM, since there was a lot of news in Sweden when sorted material was not taken care of properly in small counties.107 Thus the relation between citizens and decision makers is of importance. According to RHM there is sometimes too much time spent trying to achieve a perfect plan, since there are no perfect plans and you cannot know and prevent all risks on beforehand. A lot of planning is made but little gets done.

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106 Representative, Hai Moldova.
107 Representative, Embassy of Sweden in Chisinau.
“It is a big problem with the Department of Environment. The Minister is not appreciated since there has not happened much.”\textsuperscript{108}

At school 3, further criticism against politicians was mentioned. Firstly, politicians promise a lot before elections but do not live up to the promise. Secondly they seldom have a plan B; if something goes wrong then they do not know what to do. Thirdly, politicians are generally inflexible.

“The country needs to be developed and many want it, but it is difficult. Many young fight for change but eventually get tired since politicians do not listen or do anything about it.”\textsuperscript{109}

“Politicians don’t talk about recycling, it doesn’t work.”\textsuperscript{110}

Contrary to the view that politicians do not listen to problems, RHM mentioned a story about a landfill with some cleaning system that was positioned near the city. The ones who lived near the landfill started complaining about it and media wrote about how much it smelled there, that their children went sick etc. After a while the politicians decided to move the dump to another place farther away, to the inhabitants’ relief. However the new dump site had no cleaning system at all.\textsuperscript{111}

Politicians’ ability to carry through decisions is of course affected by economic priorities. The municipalities work with a given budget from City Hall, but this is too small and therefore they lack resources.\textsuperscript{112}

A biology-teacher at school 1 stated that those who harm the environment by polluting air or material get no fees.\textsuperscript{113} This problem was also mentioned by RHM, who said that some laws are good but they do not work in reality since the laws are not enforced, for example there are no or only small fines for breaking these laws. Additionally, environmental inspectors are only out Monday to Friday, so one can for example dump an old car on a Saturday when no inspector works without the risk of getting caught. RHM’s view on how to solve this problem originated in the idea that if everybody is considered doing wrong, nobody will care about the law. Therefore it is not possible to enforce all of the population to pay a fee, since this makes people disrespect laws and the authorities. Instead laws

\textsuperscript{108} Representative, Hai Moldova.
\textsuperscript{109} Headmaster, School 3.
\textsuperscript{110} Biology teacher, School 1.
\textsuperscript{111} Representative, Hai Moldova.
\textsuperscript{112} School 2, Semi-structured group interview with three biology teachers and five students, 2013-05-24.
\textsuperscript{113} Biology teacher, School 1.
should be adjusted gradually so that in the beginning only a few are affected, then in time the whole population is affected. In addition the fees must be so low that people can pay them, but in the same time expensive enough so that it is worth to pay for the original service instead of breaking the law. For companies it should be very expensive.\textsuperscript{114}

7.2 Equipment

The amounts of resources also determine what equipment that can be bought, which is the second of the three components mentioned. Some students said that a cause for littering on streets is that many garbage cans in the city have no cover or always stay open, which can make the wind take garbage or dogs and other animals looking for food picking out the garbage.\textsuperscript{115}

The Youth Council also mentioned that recycling is not organized and the sorted material is later put in the same garbage as the rest. The headmaster at school 4 also mentioned this, saying that there is programs on radio and TV about recycling and that the municipality has started to speak with the people about this, but it does not work.

\begin{quote}
“People who live near the school separate their waste, but the problem is that we do not have the vehicles and factories that take care of separated waste. Everything’s just put in the same truck and driven away.”\textsuperscript{116}
\end{quote}

According to the Education Department there have been some recycling bins placed out in society before, but then it did not work since people were destroying them or using them in the wrong way.\textsuperscript{117} RHM in the same way mentioned that some projects in waste management have been made in villages, but they have failed long-term due to not involving people. A few of the people use it for a year, but after a while they are back to old habits and use the tools for other activities than waste management. Instead people should help with building the system, or be part of media campaign or in other way be a part of the work. RHM believes their campaign \textit{let’s do it} (Collaborative waste collection activity\textsuperscript{118}) was successful due to the short information gap; it was close to the activists. Information that goes down the hierarchy deteriorates for each level, and only a little bit get to the

\textsuperscript{114} Representative, Hai Moldova.
\textsuperscript{115} School 1, questions to 2\textsuperscript{nd} grade students during math lesson 2013-05-21.
\textsuperscript{116} Headmaster, School 4.
\textsuperscript{117} Representative, Education Department at Chisinau City Hall.
\textsuperscript{118} \textit{Let’s Do It!} (2012), Moldova, \url{http://www.letsdoitworld.org/country/moldova?page=1}, assessed: 2013-10-16.
lowest level. When people are actively participating, they start to feel responsible for waste. It is not a science to be taught as a subject, it is an activity.\textsuperscript{119}

7.3 Awareness
A well-functioning waste management system demands good communication transfer, which leads us into the third and last component, awareness. The citizens’ awareness of waste problems and their impacts on environment affect the citizens’ approach to waste management. When the Education Department at City Hall was asked whether it is possible to encourage schools to become more sustainable, the problem with waste prevention and recycling was put on the society rather than the schools.

“We’re already focused on teaching sustainable living in schools, to throw waste in certain bins, not wash hands too often, not throw waste on ground etc. But the problem is with the mentality in society. When kids see other people doing opposite to what is told in schools, they start to question themselves why should I do this? It is a very complex system; there are no plans for other problems such as burning waste. You cannot show the entire system to a child on how to do with the waste from point A to point B properly. The education system is doing what it can but it is not enough. The other parts of society should do their work harder. When children go out from schools there is no responsibility from the teachers. A child cannot see the continuation of his lessons from there.”\textsuperscript{120}

Similarly, the headmaster at school 3 said that the people’s way of reasoning must be changed for the country to be able to develop.\textsuperscript{121} A few primary school children expressed that some adults know as little as a seven-year-old, and that older kids do not care about environment.\textsuperscript{122} According to RHMB, there was no environmental thinking at all in the schools in the 90’s, so everyone who grew up then have another mentality when it comes to environment.

“Sometimes it is hard to understand why they do not care – but they are totally uninformed. They do not see the connection on pouring hazardous waste into lakes and so on”\textsuperscript{123}

\textsuperscript{119} Representative, Hai Moldova.
\textsuperscript{120} Representative, Education Department at Chisinau City Hall.
\textsuperscript{121} Headmaster, School 3.
\textsuperscript{122} School 1, questions to 2\textsuperscript{nd} grade students during math lesson 2013-05-21.
\textsuperscript{123} Representative, Hai Moldova.
RHM further described that people may be unable to act by themselves. People that start volunteering for Hai Moldova think big changes will happen quickly, but when nothing happen their activity decrease. RHM believes this was partially because the organization grew too fast in the beginning, but also because the waste problem must be made attractive. Voluntary-working needs to be interactive and interesting in order to make people do it over time and participate multiple times.

“Some people have called us, asking when and where the next cleaning event is. I reply to them: It is going on all the time, everywhere! They do not realize that it can be done anytime, anywhere, by anyone.”

Another problem often mentioned regarding the people’s approach to waste is that people do not know what is in it for them considering recycling. The headmaster for grade 1-4 at school 1 mentioned that people have to get knowledge about the problems. They are not motivated if they do not see the benefits with recycling, why they should do it and therefore they need to know what happens with their waste and the collected material. According to RHM, some may think that recycling only benefits the bottle company.

“To make people motivated, they must understand the gain for them, like their role in preserving the nature. There could also be an economic gain, like getting paid in some way for recycling (deposit system) or leaving stuff like clothes for reuse.”

RHM further explained that there currently are no factories for recycling and it is hard to build a super system with recycling, biogas factories etc. from nothing, therefore it is better to start with preventing waste. In this matter there should be a change of responsibility, today there is no producer responsibility and people do not think long-term.

“Before, they had practically no waste in the countryside. They grew own food and gave the organic waste to animals, in that way almost everything disappeared. Now they have stores even on the countryside and relatives working abroad send home money. That way they may buy things in the store and waste is produced, which they just throw it in a nearby lake. People

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124 Representative, Hai Moldova.
125 Headmaster grade 1-4, School 1, conversation 2013-05-21.
126 Representative, Hai Moldova.
must see things in bigger picture. For example there is only one lake in Moldova that is good for swimming today, but 20 years ago there was no problem to swim in lakes.”

Another cause that some people do not prioritize environmental consideration is due to their economic situation.

“They do not have the time or possibility to do other things than work. If a poor person has time over to choose between voluntary work that they can learn from or to take on another paid job, the person will probably take on another job.”

“People may be aware but ignore the [waste] problem due to daily struggles. Many are poor and fight for survival for themselves and their family”.

7.4 Summary
A summary of the results regarding waste sorting in Chisinau is presented below. The content will be analyzed and discussed in chapter 8.2.

- Many people don’t prioritize waste management or think short-term
- Greater enforcement of environmental laws and higher fines for environmental crimes such as waste dumping and littering is needed
- There is public distrust towards politicians and the current waste management system
- School waste management depend on the waste management in the municipality, which lack resources and necessary equipment and factories
- Public participation in local waste management projects is of importance

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127 Representative, Hai Moldova.
128 Representative, Hai Moldova.
129 School 1, semi-structured group interviews with 15 12th grade students during English lesson 2013-05-21.
8 How Can the Waste Management in Schools Become More Sustainable?

In this chapter I will discuss some aspects regarding how the waste management in schools in Chisinau can become more sustainable, based on this limited field study in Chisinau. It shall be noted that a complete analysis of this area would require a much more extensive field study for a proper result. The results of this study can at least work as an indication on what problems that exist and how they may be solved. Improving waste management in schools towards sustainability is a complex question that I have tried to answer based on the relation between waste management, waste management education and society. Even though the purpose of this report is not to cover waste management education in schools, theory suggests that waste management education shall be implemented with a holistic approach, which may include sustainable waste management. Therefore waste management is a part of waste management education, why I will discuss their relation to each other (section 8.1). The relation between society and waste management and waste management education is necessary for understanding how societal conditions affect waste management and waste management education in schools, why this will be discussed (section 8.2). Based on these relations, I will finally describe some initiatives in the work of making schools more sustainable (section 8.3). These efforts are then summarized into internal and external efforts (section 8.4).

8.1 The Relation between Waste Management and Waste Management Education

After performing literature studies on waste management and waste management education, it was seen that waste management is best taught using a holistic approach, in order to give students not just knowledge but also action competence necessary for future participation in environmental issues. Seen from this perspective, waste management education shall be combined with practical waste management in schools since they are interlinked. Necessary efforts to achieve this end are concluded in section 8.4. The efforts are based on current conditions in schools and society. A similar concept is described in a report by WWF\(^\text{130}\).

The waste management in schools in Chisinau is currently not including sustainability in any particular matter; practically all waste is put in the same garbage bins. However there are some

emphasis on prevention and reuse of waste. The municipality is responsible for the schools’ waste management, which the schools do not seem to interfere with. Since waste management is carried out by the municipality and the schools do not have any seeable economical gain of making waste management more sustainable, they do not prioritize this.

Environmental education in Moldova has been adopted with an integrative strategy; however there are several problems that affect the effectiveness of this strategy in a negative way. In the implementation of environmental education in the schools, resources like money, time and people are important for success. Regarding this, grassroot, administrative and conceptual barriers can be found, however I will focus mainly on administrative barriers since grassroot barriers and conceptual barriers will be covered in Skagerberg’s thesis.

In general, conceptual barriers can be solved through a whole-school approach, where teacher acceptance regarding the importance of sustainability education is essential. For example this means that if teachers accept that schools emphasize environment in the education, the teacher will do this in the way it’s meant to be taught. There are however several administrative barriers that affect successful implementation of the whole-school concept. One administrative barrier is that the schools cannot do anything about the content taught in the subjects, since they are limited by the curriculum. Schools can only affect the extra-curricular activities, which occur after lecture time. In other words, this is an administrative barrier that causes several grassroot barriers. This is problematic in the view of ESD, which relies on interdisciplinary, cross-curricular projects and a flexible learning environment inspired by environmental questions of today. Another administrative barrier is that schools in Moldova lack resources, which affects both education and school surroundings. As a headmaster said, due to competition schools have to prioritize some area where they put more resources. For example, the school may compete with good equipment like computers, but then have to lower the food budget and thus food quality instead. Few extra-curricular projects are paid, why outdoor activities only are done by dedicated teachers that sacrifice their spare time for this, similar to cases from other countries where implementation of environmental education is not prioritized. Since several areas in society lack resources, there is likely no quick fix on this issue. However the financial decentralization may give schools reasons to become even more sustainable regarding waste prevention and energy conservation. Schools that have started being self-managing teach students to be sparse with resources such as electricity and water, which is good seen from an energy efficiency perspective and regarding prevention of waste. However schools can still promote the environmental benefits of
energy conservation as well as economic benefits, which can be a part of raising citizens with good environmental values, regardless of their economic situation.

Open discussions and negotiation are considered of importance when it comes to implementing this whole-school approach, since this establishes trust and a proactive headmastership, by which barriers may be easier, overcome. Informal learning in school outside the classroom is part of the whole-school approach. In this matter, waste management in school serves an educational purpose, as well as policies regarding energy conservation. School canteens can also serve this purpose. If students are allowed to pick the amount of food themselves along with proper guiding, they’ll be taught that it is reasonable to take only as much as one will manage to eat, otherwise food will go to waste.

From observations, interviews and discussions during our stay in Moldova, the impression was that organization of administrative entities in Moldova generally is characterized by a strongly hierarchical structure. In schools this was seen by a number of different trends. For example, at one school there was a long queue to the headmaster’s office. The queue consisted of various school staff, which suggests that headmasters have a saying in many types of decisions. A clear focus on awards and rewards could be seen in school, suggesting one’s status is measured by grades and diplomas. Further, headmasters said they believed in the use of certain teaching methods, but that it was not possible due to the curricula. However, some teachers felt disabled by headmaster orders regarding how to teach. In addition, a teacher mentioned that headmasters want to show that they are in charge, why the teacher got reprimanded every day. This suggests a disabling headmastership since teachers are not supported in their work. There is also improper communication between different levels in the hierarchy since teachers’ believe the headmaster disables them even though the problem is also originating in curricula. In addition, the strong hierarchy implies micromanagement which seems to disable lower levels through decreased flexibility in decision making. Although these assumptions should be considered with caution since they are based on general impressions rather than clear research results.

8.2 The Relation between Society and Waste Management and Waste Management Education in Schools

In several interviews it has been mentioned that education about waste management is not working because of the fact that waste management is not working in society. The view is that students cannot learn about something in school that is not happening in society; in that case they will forget what
they have learned. However, proper waste management in society is not a must-have to educate about waste management. Discussing a proper waste management in relation to the waste management in society can be used in the education as a means to decrease the rhetoric-reality gap and make pupils find out and create own solutions to waste problems in society. Although, the importance of a functioning waste management in society cannot be ignored. Since children influence their parents, waste management education is not just about educating the young; it is also about educating their parents in waste management. It is clear that school education together with awareness campaigns about waste management is a way to teach the population about waste management and the consequences of bad waste management. Research shows that this increases people’s environmental concern and will to participate in campaigns. This generates higher recycling rates. In addition, the distance to recycling bins is important. If recycling bins are placed farther than garbage bins, the risk is that people just through everything in the garbage bins. In any matter, people must be informed about where the recycling bins are. Again, lack of resources is a problem in terms of building a complete functional waste management system, in terms of factories and equipment like recycling bins and recycling projects. There have however been some financed projects for integrated waste management, mostly in rural areas, although they have failed since the projects did not take the whole process of waste management into account, focusing on just one or a few tasks, like transport or storage. In addition they did not including economic efficiency and sustainability. In this matter, involvement the local population in the projects is a way to increase project chance of long-term success.

The lack of trust against politicians and authorities is problematic. It is hard to say if the mistrust is justified or not, since politicians face several barriers for implementing waste management strategies, where the most severe is lack of resources. Although fines for littering or waste dumping and fees at disposal sites may be increased in order to increase recycling rates. It’s however important to carefully design services according to the citizens’ ability to pay the fees or people may dump waste since they can’t afford the disposal fee. Regaining citizens’ trust may take time even if environmentally sound decisions are made. To be honest with the citizens about how the waste management works, such as what is happening with the waste after it is been gathered, is central for building a joint confidence. Additionally, citizens must be included in the work towards a more sustainable waste management. Giving people possibility to participate may decrease the segregation between authorities and citizens and help to create a climate where the authorities together with the citizens are considered co-responsible for the waste management. Public participation improves trust since people gain a better understanding of what has been done, how and why. In the same time it teaches citizens on how the
solution works. Distrust is also reinforced by corruption and the disrespect for laws. Continued work on anti-corruption and enforcement of laws regarding waste management is therefore recommended. In all of this, good communication between authorities and citizens is central in order to create a joint confidence. These efforts are also important for school education since the public opinion affect how school personnel and students think of waste management. If the public do not believe in waste management, it is possible that teachers do not do it either, which may affect educational quality. Again, the importance of discussions based on real-life situations and democratic values in sustainability education is evident, since these may include societal problems.

8.3 Initiatives and efforts for improving waste management in schools

This chapter will present initiatives and efforts that can improve waste management in schools. The chapter is divided into three parts; organization, equipment and education. The division is based on chapter 6 and 7. This is my way of bringing together the studies on the relation between society and waste management and waste management education in schools with the relation between waste management and waste management education in order to describe how the waste management in schools can become more sustainable.

8.3.1 Organization

This section will cover organizational efforts for a successful implementation of a whole-school approach in schools. Some barriers identified were lack of resources, lack of mutual trust between headmasters and teachers and disabling headmastership. In addition, schools are limited by the curriculum in what content to be taught and how to teach it, which causes grassroot barriers such as limited possibility to carry through projects for active learning outside the classroom on lesson time. Teachers’ work cannot be micromanaged if an ESD approach shall be successful. Therefore, a revision of the curriculum is recommended, which allows headmasters and teachers to be more flexible in their work and in developing own educational initiatives.

Lack of resources is a problem that may be taken advantage of in terms of making schools more sustainable. There is a strong focus on awards and rewards in the society and in the schools, where a diploma or certificate for being a sustainable school could be a motive for schools to strive for. Some financial support for schools that meet this sustainable standard would be even stronger motivation for schools to become more sustainable. However, schools’ possibilities to implement sustainable waste management strongly depend on the municipality, why a significant societal investment on a
functioning waste management system regarding recycling is of need. Further, the possibility of implementing the Borlänge Model regarding food transports for schools might be an option for the municipality to look into. Until sustainable waste management becomes more organized and widespread, there are however other efforts that can be emphasized, in terms of prevention and reuse of waste.

It is possible to come a long way by implementing a set of school values and regulations regarding sustainability, which are meant to engage personnel and students in working towards a more sustainable school. As part of this, it is important to discuss problems and efforts on a local level in different groups. For example, there may be student councils at schools (if not, there should be) where efforts regarding sustainability and education can be brought up. In terms of administrative efforts, it is suggested to have recurrent meetings between headmaster and teachers where development of new sustainability initiatives can be addressed. In time, these meetings may include evaluation of current sustainability initiatives, as in how they are working and how they can be improved. These types of discussion-based meetings may increase trust between headmaster and teachers since both parties can acknowledge each other’s competences. This can help to empower teachers and in this direct the headmaster towards a more enabling headmastership, as the headmaster acknowledges teachers’ opinions. A representative from the student council should be able to attend these meetings and bring up suggestions from the student council. There are several types of efforts that could be addressed during such meetings. An example is how energy conservation is promoted at school. Another example is promotion of reuse of resources such as books, paper, clothes etc. in schools and how this is emphasized practically, like collection stations, or using recycled material in subjects as arts and crafts. The Swedish buffet is another project that can be implemented in schools regardless of the waste management in society and in this, the management of food waste is an issue to address.

It shall be noted that there are many initiatives working with improving the administration in different fields of society, including the education field (For example an ongoing education reform performed by the World Bank, which includes training of school directors and teachers131). However, changing administrative systems is a slow process since there are many people involved in many areas. Therefore improvement of communication channels and leadership strategies may be on the way. Continuous work in this area is however recommended in order to decrease the distance between different levels in the hierarchy in general. Regarding schools, this suggests revision of school policy documents and continued work on training school directors and teachers for increased flexibility.

131 World Bank (2013), Implementation Status and Results – Moldova Education Reform.
regarding school director leadership and teacher didactics in order to increase teachers’ trust in school directors and for improved teaching quality.

In time as sustainable waste management is implemented in society, it is recommended to start pilot projects regarding sustainable schools based on earlier efforts that might already be implemented. In this, equipment for recycling is installed together with an educational approach. For example, signs on how recycling bins should be used can be constructed. Preferably students may get this task in art or crafts, which also is an example of integrating waste management education into these subjects.

8.3.2 Equipment
In terms of achieving a functioning sustainable waste management in schools, it is of need to invest in necessary infrastructure both inside and outside the school. In school, there should be different kind of trash cans depending on the type of waste. It’s most important to divide waste into organic waste, paper, bottles (PET and glass) and other waste, since these are the major waste sources in schools. In addition, hazardous waste should be separated. Outside the school larger containers should be placed, to which school personnel sort material to the right containers. These containers are cared for by the municipal waste management system, since the municipality is responsible for the waste collection. School waste management therefore depends on an improved waste management system that includes recycling. There are a few initiatives for recycling; however the need of a greater holistic investment is evident. People in society do not believe in the current system and therefore generally do not separate waste. An improvement of waste management therefore must be both done and promoted as a serious project in order to regain people’s trust and belief in proper waste management techniques. In addition, recycling bins in society must be multiplied in order to decrease distance to recycling bins and thus increase recycling rates.

8.3.3 Education
Since this thesis does not focus on formal education, i.e. what is taught by teachers according to curricula, only improvements regarding informal education will be described. This means that learning may occur informally, outside the classroom. One of the benefits of a whole-school approach is that learning outside the classroom becomes a wider part of the school experience. For example, every time a student throws away trash, the student must choose which bin the material should go to. In time it will be natural to throw paper in the correct bin even though it is not been taught formally during a lecture. This way, the distance between theory and practice decreases. However, this type of
informal learning can be promoted in more ways than through installment of recycling bins. Regarding energy conservation, whole-school-policies can serve an educational purpose. Some policies can be to turn off lights when classroom is empty and turning off computers at end of school day. In at least one school this was already taught of economic reasons, however a policy regarding both economic and environmental concern can be developed in schools. Such policies may be especially efficient for young students (grade 1-4), since the policies are easy to learn and the earlier in life you learn them, the more likely it is that they become automatized cognitive processes.

Another example of learning waste management in school, but outside the classroom, may be envisaged by looking into the organization of school canteens. Currently, all students get the same amount of food since portions are made by canteen personnel. Implementing the Swedish buffet in schools would serve an informal lesson to students, as in not to take more food than you can eat, because otherwise it will go to waste. Due to non-access to school canteens it was hard to estimate amount of food waste, however it is likely to be a small amount compared to more developed countries. Although, there are may be other benefits aside from decrease of food waste. For example, it is less likely that students go hungry and therefore have trouble to keep up attention all school day long, if they can eat until they are full.

As part of teaching action competence, it is important to let students discuss problems based on real-life situations and think critically, especially regarding older students (grade 10-12 and somewhat for grade 5-9). In this, students should be able to perform extra-curricular projects in school (or outside school), where they themselves can figure out how to improve sustainability in schools with guidance from a teacher. Due to the strict curricula in Moldova, it is not possible to do projects outside the classroom in the context of curricula. Therefore, extra-curricular projects are made, since teachers consider outdoor activities essential for the students to learn. Although, successful education cannot rely on every teacher to be enthusiasts that lay unpaid time to help students learn as much as possible. Further, these projects seem to focus mostly on cleaning of parks and other areas. Other types of projects could be looking into the waste that is produced in schools on different levels. This way, school projects can be a way to work continually for increased sustainability in schools and in the same time serve an educational purpose. For example, a project could focus on finding out if waste from food canteens can be reduced and how this waste can be used better (like giving food to animals). Another project could be to investigate what food products are bought to school canteens and cafeterias and how waste accompanied with these products (plastics, metals etc.) could be reduced and reused. Further, a project can focus on how paper is treated in schools, looking into if
paper can be reused more extensively to reduce the amount of paper that goes to trash. These are just a few examples; however there are endless possibilities of project variations depending on school conditions. By encouraging students to do these kinds of projects and finding out that they can really improve sustainability, it is more likely that they will do similar projects at home and in society by own initiatives.

8.4 Summary
The efforts described are based on a holistic, whole-school concept. This means that environment shall be emphasized in more than just education. For example, in school values and regulations an environmental approach can be added. The efforts are divided into external and internal. External effort implementation depends on authorities and internal effort implementation depends on each school.

8.4.1 External Efforts

- **Sustainable Waste Management in the Municipality**
  Schools’ possibilities to implement sustainable waste management strongly depend on society, why a significant investment on a functioning waste management system regarding recycling is of need in society. In time as sustainable waste management is implemented in society, it is recommended to start pilot projects regarding sustainable waste management in schools.

- **Pilot Projects Regarding Sustainable Waste Management in Schools**
  In this phase, equipment for recycling is installed together with an educational approach. For example, signs on how recycling bins should be used can be constructed. Preferably students may get this task in art or crafts, which also is an example of integrating waste management education into these subjects. In school, there should be different kinds of bins depending on the type of waste. It’s most important to divide waste into organic waste, paper, bottles (PET and glass) and other waste, since these are probably the major waste sources in schools. In addition, hazardous waste should be separated. Outside the school larger containers should be placed, to which school personnel sort material to the right containers. These containers are cared for by the municipal waste management system, since the municipality is responsible for the waste collection.
• **The Swedish Buffet**
  Swedish buffet is a project that can be implemented in schools regardless of the waste management in society and in this, the management of food waste is an issue to address. Implementation of the buffet relies on authorities, however after implementation, it becomes an internal task.

• **Continuous Education for Headmasters and Teachers**
  In order to make headmasters ready for a more autonomous school, continuous education is needed in leadership strategies. Teacher education in active, participatory methods is also important.

• **Curriculum**
  Current curriculum allows little flexibility regarding ways of teaching. Therefore the ability for schools to develop initiatives and teachers to perform projects outside the classroom on lecture-time is very limited. As a result, a revision of the curriculum is needed for teachers to be able to teach waste management as theory suggests.

8.4.2 Internal Efforts

• **Implementing Values and Regulations that Emphasize Sustainability**
  It is possible to come a long way by implementing a set of school values and regulations regarding sustainability, which are meant to engage personnel and students in working towards a more sustainable school. The purpose of these values is to make it clear how the school works for sustainability. Some policies can be to turn off lights when classroom is empty and turning off computers at end of school day.

• **Enabling Headmastership**
  Headmaster and teachers may work on strengthening their relations and trust in each other. An enabling headmastership is important for the whole-school concept’s success. An enabling headmastership means teachers are encouraged and supported in their professional development and creation of new educational initiatives.
• **Recurrent Meetings on Developing the Whole-school Concept**
  Discussions and negotiations between headmaster, teachers, students and other school personnel regarding how to work towards a more sustainable school is important. In time, these meetings may include evaluation of current sustainability initiatives, as in how they are working and how they can be improved. There are several types of efforts that could be addressed during such meetings. An example is how energy conservation is promoted at school. Another example is promotion of reuse of resources such as books, paper, clothes etc. in schools and how this is emphasized practically, like collection stations, or using recycled material in subjects as arts and crafts. To make these meetings effective, problems and efforts may be discussed on a local level in different groups. For example, there may be student councils at schools where efforts regarding sustainability and education can be brought up.

• **Implementing Initiatives Regarding Sustainability Education**
  As a result of the meetings, initiatives on how to make sustainability education better will be suggested. After this, initiatives may be implemented. Projects on sustainability are important for the development of action competence where meetings may result in suggestions on what kinds of projects that may be performed. For example, a project can focus on how paper is treated in schools, where students can look into if paper can be reused more extensively to reduce the amount of paper that goes to trash. Another example is performing a recycling campaign in the neighborhood near the school. The aim is that these projects occur during school time. Projects may also be interdisciplinary, which gives students opportunity to do tasks within several subjects within the context of the project.
9 Conclusions

In this chapter I will summarize my research results and make proposals on how to continue the work on making school waste management more sustainable and educating the population in waste management all over Moldova.

The result of this study suggests that through a holistic, whole-school approach waste management can be taught as a part of sustainability education. Some of the work is already done since environment have been somewhat integrated into several school subjects. However, other efforts that should come with integration, as active and participatory teaching methods, interdisciplinary teaching, as well as learning through the nature seem to be limited. Educational efforts regarding this will be addressed in Skagerberg’s thesis on this project. Further, this holistic approach has to be adapted to the conditions in the schools, where there in Moldova today are several barriers. Lack of resources in governmental budget is one big problem. The strong hierarchy, such as detailed policy descriptions for how teachers should teach, is another. Such barriers affect for example: a functioning waste management in society and therefore also in schools; possibility to exercise waste management and perform projects on sustainability on school time; possibility for teachers to get paid for extra-curricular projects and to choose teaching methods they believe in. Therefore, both internal and external efforts that focus on school organization, equipment and education are of need. A summarized description of these efforts can be seen in section 8.4. Due to the lack of organized waste management today, efforts can be divided into two phases, one phase before implementation of a waste management system in society and one after this, however this is only preferred if implementation of the waste management system is estimated to take several years. Otherwise, pilot projects regarding this whole-school approach, called “sustainable schools”, may be implemented in one phase along with the implementation of the waste management system.

These studies were focused on schools in Chisinau, why conditions in rural areas must be investigated in order to make these studies applicable on schools in rural areas as well. General ideas on efforts regarding organization and education might be easily adapted to conditions in rural areas, however waste management conditions may be harder to adapt based on this study. In such areas, it might be better to strive for a self-management regarding supply of food and water, taking care of organic waste and minimizing investments of industrially produced products since there are no organized waste collection systems in rural areas of Moldova today.
Educating the population in proper waste management is not an easy task. Many may be aware of the problems that exist, but ignore the problems since they may have worse problems to deal with right away, or are not able to solve the problems by themselves. Waste management education is about more than raising awareness; it is about teaching action competence through participatory methods, critical thinking and democratic values. The prevention of waste is just one bit of the problem with waste and pollution in Moldova. When trying to achieve prevention of waste that civilians produce, it is a good way to start by educating the young about waste management in schools. But the action alone is not enough. Teaching waste management through schools can be a slow process since the elder generation is passively included and rely on the transmission of values and information through the younger population. A part of the holistic experience is to show the same waste values taught in schools in the rest of the society. Therefore it is necessary to inform about waste through campaigns and engaging the localities to participate in the implementation of sustainable waste management. Here NGOs have an important role for awareness raising and campaign performing. Therefore further studies on informing the society about waste problems and the cooperation with NGO’s in this matter are recommended.
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Appendix A – Fieldwork Plan

- Examine the current conditions regarding sustainable waste management in schools
  - Emphasis on sustainable waste management in the curriculum
  - Practical waste management
- Interviews with teachers, principals and other school staff regarding education for sustainable waste management
- Interview with teacher education representative, regarding the necessity of teacher education
- Investigate waste management stakeholders (for example waste management companies, Chisinau City Hall and schools)
  - Legislation, directives, international agreements
  - Current cooperation between stakeholders
  - Current plans for improving the waste management in Chisinau
- Interviews with political stakeholders regarding what administrative measures need to be done when implementing environmental education in schools (changes in the curriculum etc.)
- Interviews with NGOs regarding waste management problems, solutions and public participation
Appendix B – Description of Interview

Background
We are two students from the Royal Institute of Technology in Stockholm, Sweden, who are in Chisinau to write our master thesis. Our project is initialized by a Swedish Waste Management and Recycling association called Avfall Sverige.

Our aim is to investigate how to educate the population of Moldova about sustainable waste management. There are plans on improving the waste management in Chisinau and Moldova and therefore the population needs to be educated in how to use for example recycling bins.

Ethics of Research

● The participants of our research will be anonymous as well as the name of the school.
● Any recorded material will only be used by us and not display in the result or given to any third party.
● If an interpreter is participating, he/she will be informed about the ethics of the research such as the anonymity of the participants.
● We will not interview or record any person under the age of 18 without allowance from their guardian.

Personal information from the interviewee

● Gender
● Age
● Educational background
● Years working
● Description of work and working tasks
Appendix C – Interview-guides

Questions for regarding waste management education and waste management in schools

● What do you think is the best way to teach about recycling and waste management to the population?
● Is the emphasis on sustainable development/environmental knowledge in school enough today?
● How do you think one can make the students concerned about the environment and of waste management?
● Is there something you would like to change about the curriculum, regarding environmental education?

● Do you support teachers in doing outdoor projects with emphasis on environmental education for students?
  ○ Why/why not?
  ○ If so, are they supposed to do it on school time or after school?
    ■ Why/why not?
    ■ Are they paid when doing these kinds of projects?
    ● If no - who decides whether the teachers should get paid or not?
  ○ Several biology teachers we’ve spoken to have argued the importance of teaching students holistic environmental knowledge by engaging them in outdoor, practical projects. What do you think about this?
● Do you have any contact or experience of working with NGOs such as Hai Moldova?
  ○ Do you think students can benefit from cooperation between schools and NGOs, for example garbage-collecting activities?
● Do teachers have the possibility to teach interdisciplinary?
● Do all teachers have the education needed to teach about SWM
● Do the teachers get any kind of further education
  ○ Who is in charge for this?

● How do you participate in the work with environmental questions at your school?
● If a project for making schools in Moldova becoming more sustainable regarding waste management was initiated, would you be willing to actively make sure the school implements the project? (for example; recycling, continuous measuring of how much food is thrown away, campaigns showing students how to be more aware of the waste they generate etc.)
● Does the school have own policy documents?
● Who determines what type of lamps to use in the school?
● What do you do with hazardous waste today?

● Can students participate in activities organized outside the regular curriculum?
Questions for teachers

- Is the emphasis on sustainable development/environmental knowledge in school enough today?
- How do you think one can make the students concerned about the environment and of waste management?
- If recycling was implemented today, do you think the students have the necessary knowledge needed in order to recycle?
- Do you think the students have action competence needed in order to actively participate against environmental problems, such as recycling?
  - How do you see this action competence?
- Is there something you would like to change about the curriculum, regarding environmental education?
- What do you think is the best way to teach about recycling to the people?
- What teaching methods do you use to teach students about waste management and environmental problems?
  - Why these methods?
  - Do you engage students in any outside-activities in your teaching in education for the environment?
- Do you have any contact or experience with NGOs such as Hai Moldova?
  - Do you think students can benefit from cooperation between schools and NGOs, for example garbage-collecting activities?

Questions for NGO’s

- What are your thoughts about informing about waste management in schools?
- What do you think is the best way to teach the population about recycling and sustainable waste management?
- We’ve heard that some problems in Moldova exist due to the people’s mentality, how they relate to the problems. Do you think this is a problem regarding waste management?

- What are your main tasks?
  - How do you organize your work?
  - How do you work with minimizing the waste in Moldova?
- Who do you co-operate with?
  - Do you have any contact or experience with working with schools?
    - What do you think about organizing teacher education?
Do you think students can benefit from a co-operation between schools and NGOs, for example garbage-collecting activities?
○ Are there any other NGO’s you co-operate with?

- How is the waste management organized in Chisinau and Moldova?
  ○ Who is responsible?
  ○ Currently there is an initiative for placing out recycling bins in Chisinau, what do you think about this?
  ■ What happens with the collected material?
- What are the main issues regarding waste management in Chisinau, and Moldova?
- Do you know any active projects regarding waste management?
- Would you want to change anything regarding how the waste management is organized?
  ○ What would that be, and how should the change be carried out?
- Do you know something about the waste management in schools?

Questions for the Embassy of Sweden in Chisinau
- Vad gör ni i Moldavien?
- Är det annorlunda att arbeta i Moldavien från Sverige?
  ○ Hur?
- Är Moldavien ett korrupt land?
  ○ Hur visar sig detta?
  ○ Hur påverkar korruptionen ert arbete i landet?
- Hur fattas beslut vanligtvis i landet?
- Hur ska vi gå tillväga för att göra en skillnad i skolan i Moldavien?
- Hur ska vi gå tillväga om vi vill ändra avfallshanteringen i Chisinaus skolor?
- Hur arbetar ni med miljöfrågor i landet?
- Har ni arbetat någonting mot en hållbar avfallshantering?
- Hur uppfattar du befolkningens inställning till miljöfrågor och avfallshantering?
- Har ni samarbetat någonting med skolor i Moldavien?
- Hur har ett sådant samarbete gått till/sett ut?

Questions for ISE
- What is the Institute of Education Sciences main tasks?
  ○ How does the teacher education work?
  ○ Which teachers are educated?
  ○ Which teachers are educated in Education for Sustainable Development/Environmental Education (EE)?
  ○ Which institution is responsible for the teacher education?
  ○ Which institution is responsible for the further education of teachers?
● Do you have any contact or experience with environmental NGOs such as Hai Moldova?
  ○ What do you think about organizing teacher education together with an environmental NGO?

● What subjects [do you think] deals with Environmental Education (EE) in general and Sustainable Waste Management (SWM) in particular?

● What do you think of the emphasis on sustainable development (SD)/environmental education (EE) in the school today?
  ○ Can you describe how the EE in Moldova works?
  ○ What can be improved?

● Is there a possibility for teachers to get paid for extra-curricular projects?
● How free are the teachers to plan their own teaching?
● Is it possible for teachers to work together in projects, interdisciplinary?
● What do you know about the SALiS (student active learning in science) project?

Questions for the Education Department at Chisinau City Hall

● Which are the policy documents related to the school today?
  ○ What does these say about environmental education?
● Is there any difference regarding the environmental education in the different programs (humanistic vs. real sciences)?

● How do you work with educating students in waste management?
● How do you work with environmental questions in schools?
● How are you working with environmental school projects?
  ○ How do you come up with project ideas?
  ○ How do you organize them?
● How do you work with bringing schools together in waste management education?
● How do you support (with for example awards or payment) environmental projects made by students or teachers in schools?
● How do you handle the results from these projects, do you take any action?

● Do you know if any special courses or programmes about environmental issues are about to be introduced in the schools?
● Do you know if there are any upcoming changes regarding environmental education in the policy documents?
● Can you tell us more about the decentralization of the schools?
  ○ What will be affected?
  ○ How much of the budget will the schools decide over?
○ Will principals be able to choose to give teachers more than 22 hours per week in payment, for example for making projects with students besides the regular education?
○ Will every school in Moldova have the same course literature or will schools be able to choose material themselves?

● Who is responsible for the waste management at the schools in Chisinau?
● Would the municipality be able to pay for recycling bins or other more sustainable solutions regarding waste management in the schools?
● Are there any awards a school could get if it was environmentally sustainable?
  ○ If not - would it be possible to introduce one?
● These are some concrete examples from the Swedish National Agency for Education of what the municipality can do to improve the environmental education in schools:
  ○ Plan a further education regarding environment for all the employees in schools
  ○ Demand that the schools develop a plan for how environment should be involved in the education for the different subjects
  ○ A plan worked out centrally for how the environmental education shall be driven with an ongoing progression between different levels.
  ○ Would it be possible to implement these examples in schools in Chisinau?
  ○ Who would be responsible for this?