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HANDBOOK
FOR PRE-SCHOOL TEACHERS

HOW TO ADDRESS ISSUES OF SOLID WASTE
REUSING AND COMPOSTING WITH PRACTICAL APPROACH



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CHAPTER I. GENERAL OVERVIEW OF CHALLENGES THAT HUMANITY IS FACING WITH ENORMOUS PRODUCTION OF SOLID WASTE

I.1 INTRODUCTION -SOLID WASTE GENERATION – A MAJOR CHALLENGE FACED BY HUMANITY

I.1.1.Waste – where does it come from?

We can say that **waste** is a substance or an object that the person who has produced it, wants to get rid of. Often we only see the waste in our trash can, and it does not make us worry, but actually **waste is a serious problem for the Planet**. Why?

In nature, the concept of waste does not exist. In fact, in biological cycles whatever is discarded by one organism becomes a resource for other living beings so that nothing is wasted and everything is transformed. Dead organisms, animal faeces, or plant remains are defined organic waste and are used as food for particular organisms known as decomposers that transform the waste products of other living beings into precious resources and are therefore very important.

Up to the last century, man behaved very much like nature. Especially in the farming society, due to the lack of resources everything was utilized and nothing was thrown as long as it was useful. Almost all that was thrown was organic and was disposed of by the decomposers in nature.

The advent of the industrial revolution and the increase in goods brought into society, also determined an increase in the consumption, and therefore an increase in the amount of waste. In fact, in the current social and productive models, after withdrawing material and energy from the environment in order to produce consumer goods, the production of waste follows. Waste is not only organic as in the pre-industrial society, but is also inorganic (as in the case of plastic) and often waste remains in the environment for a long period of time as it is not a source of food for any organism.

This implies two things:

- First of all waste is generated by us during our daily activities, and by the industries that produce the products that we make use of to live, but also
- There are no cleaners that re-use a large part of our waste, and therefore it accumulates in large quantities. Human beings are trying to find some solutions.



Waste in pre-industrial society ...

Even though in the past human beings produced small amounts of waste, the problem of where to deposit the same existed even then. Whatever could not be recycled or reutilized was often thrown on the road, with severe consequences for health. Alternatively waste was burnt or buried underground outside the inhabited centers, thus giving rise to the first waste dumps. Waste in ancient times was very different from ours. Waste was organic and consisted mainly of products that were discarded by the workshops and kitchens, human and animal waste, carcasses and their remains.

...and in the consumers' society

A big change took place in the second half of the XIX century. With the Industrial Revolution an intensive exploitation of the resources began. Industries started the mass production of items, that were more economical than those made by craftsmen and therefore more accessible to all. Soon humans passed from a frugal and semi-agricultural society, to an industrial consumer society that adopted disposable objects as

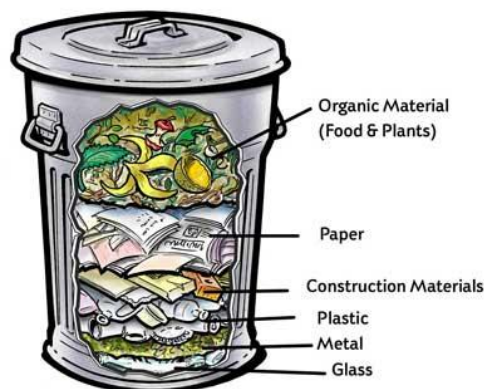
their style of life. Since some decades, objects are no longer repaired, nor are they reutilized as they can easily be replaced by other new ones. The result has been an excessive production of waste in relation to the planet's capacity to dispose of it, thus becoming the negative symbol of riches and wellbeing. With the industrial era also the kind of waste changed. Besides the increase of glass, metal and organic wastes, new materials, as for example plastic, have appeared, and as these are not biodegradable, they remain in the environment for a very long time.

1.1.2. Urban Solid Waste – definition

The waste we produce every day is defined Urban Solid Waste (USW) and includes whatever is discarded during our daily activities. All other waste is defined special waste, which includes waste produced by industrial activities, handicrafts, hospitals, etc.

In order to simplify waste management, USW is subdivided according to its composition, also known as the product fraction. There are six main categories:

- Recyclable materials (paper, plastic, glass, etc.);
- Compostable materials (kitchen leftovers, garden trimmings, etc.);
- Bulky materials (sofas, furniture, etc.);
- Durable goods, waste electrical and electronic equipment (computers, TV sets, refrigerators, etc.);
- Dangerous urban waste (batteries, drugs, car batteries, etc.);
- Residue (whatever is not classified in the previous categories)



What's in Our Garbage?

All of the cans, bottles and paper we throw away can be recycled into new things. Wood, food & yard clippings can be composted. This turns them into a healthy soil that helps new plants grow. Look in your trash to see if you can find any of these things that can be recycled, composted or reused instead of thrown away forever in a landfill.

Recyclables	Compostable
Cans	Leaves
Bottles	Grass
Plastic tubs	Branches
Paper	Food scraps
Cardboard	

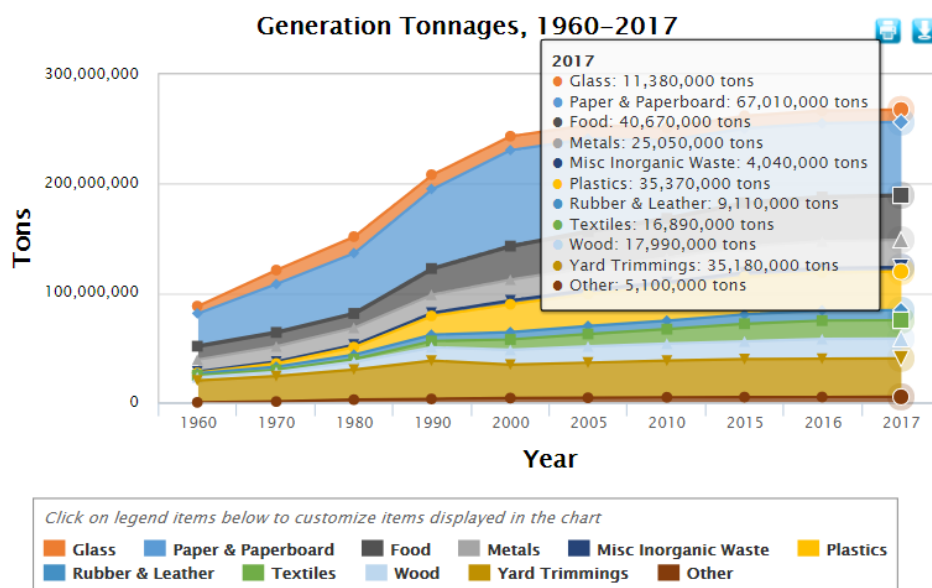
I.1.3. How much waste do we produce in reality?

Per capita **MSW (Municipal Solid Waste = solid waste)** generation increased from 4.48 pounds per person per day in 2015 to 4.51 pounds per person per day in 2017. MSW generation per person per day peaked in 2000. Paper and paperboard products made up the largest percentage of all the materials in MSW, at 25 percent of total generation.

Yard trimmings comprised the fourth largest material category, estimated at 35.2 million tons, or 13.1 percent of total generation, in 2017. This compares to 35 million tons (16.8 percent of total generation) in 1990. The decline in yard trimmings generation since 1990 is largely due to state legislation discouraging yard trimmings disposal in landfills, including source reduction measures such as backyard composting and leaving grass trimmings on the yard.

In 2017, plastic products generation was 35.4 million tons, or 13.2 percent of generation. This was an increase of four million tons from 2010 to 2017, and it came from durable goods and the containers and packaging categories. Plastics generation has grown from 8.2 percent of generation in 1990 to 13.2 percent in 2017. Plastics generation as a percent of total generation has grown slightly over the past five years.

In 2017, 2.8 million tons of selected consumer electronics were generated, representing less than 2 percent of MSW generation. Selected consumer electronics include products such as TVs, VCRs, DVD players, video cameras, stereo systems, telephones and computer equipment.



I.1.4. Challenges that we need to face

How to reduce the amount of Garbage

The Three R's – Reduce, Reuse and Recycle – teach us how we can think about garbage in a new way and help the earth.

There is only so much tin, aluminum, plastic and other materials in the world that we can use to make things. If we all reduce, reuse and recycle, we can all help to conserve these resources.

Reduce

This “R” means you stop waste before it starts! Bring a waste-free lunch by packing it in reusable or recyclable containers, such as a lunch box.

- Compost food waste in a worm bin.
- Avoid disposables. It's wasteful to only use something once and throw it away. Instead, use cloth diapers, cloth napkins, real towels and handkerchiefs; rechargeable batteries, reusable plates, glasses and cutlery silverware instead of one-time use products.

Reuse

This “R” means you or someone else will use an item over and over instead of throwing it away or recycling it.

- Use scrap paper for art projects.
- Reuse paper bags, wrapping paper, or newsprint for book covers.
- Hold a yard sale or donate clothing and toys when you don't want them anymore.
- Set up a reuse box in the classroom for used pencils, pens, folders and other items that are still usable.
- Use both sides of a sheet of paper before recycling it.

Recycle

This “R” means that something old is remade into something new. For example, when you are done drinking a soda, the can goes to a factory where it is remade into an aluminum baseball bat. A plastic milk jug can become a fleece jacket.

Surface water contamination

Waste that end up in water bodies negatively change the chemical composition of the water. Technically, this is called water pollution. This will affect all ecosystems existing in the water. It can also cause harm to animals that drink from such polluted water.

Soil contamination

Hazardous chemicals that get into the soil (contaminants) can harm plants when they take up the contamination through their roots. If humans eat plants and animals that have been in contact with such polluted soils, there can be negative impact on their health.

Leachate

Liquid that forms as water trickles through contaminated areas is called Leachate. It forms very harmful mixture of chemicals that may result in hazardous substances entering surface water, groundwater or soil.

Pollution

Bad waste management practices can result in land and air pollution and can cause respiratory problems and other adverse health effects as contaminants are absorbed from the lungs into other parts of the body. How to reduce the amount of Garbage.

Municipal wellbeing

Everyone wants to live and visit places that are clean, fresh and healthy. A city with poor sanitation, smelly and with waste matter all over the place do not attract good people, investors and tourists. Such cities tend to have poor living standards.

Recycling revenue

Cities that do not invest in recycling and proper waste control miss out on revenue from recycling. They also miss out on job opportunities that come from recycling, composting and businesses that work with them.

Better waste disposal

Imagine we all throw garbage, junk and rubbish away anyhow. Imagine there was no authority to supervise waste management activities from all the sources mentioned earlier. Imagine we all just sent our rubbish to the landfill, or just dumped them in a nearby river. What do you think will happen? A disaster! Management of MSW continues to be a high priority for states and local governments. The concept of integrated solid waste management is increasingly being used by states and local governments as they plan for the future. This management practice includes the source reduction of wastes before they enter the waste stream and the recovery of generated waste for recycling or composting. It also includes environmentally sound management through combustion with energy recovery and landfilling practices that meet current standards or newly emerging waste conversion technologies.

Waste is a resource

What if we could use waste as a resource and thereby scale down the demand for extraction of new resources? Extracting fewer materials and using existing resources would help avert some of the impacts created along the chain. In this context, unused waste also represents a potential loss.

Turning waste into a resource by 2020 is one of the key objectives of the EU's Roadmap to a Resource Efficient Europe. The roadmap also highlights the need to ensure high-quality recycling, eliminate landfilling, limit energy recovery to non-recyclable materials, and stop illegal shipments of waste.

And it is possible to achieve these things. In many countries, kitchen and gardening waste constitutes the biggest fraction of municipal solid waste. This type of waste, when collected separately, can be turned into an energy source or fertilizer. Anaerobic digestion is a waste treatment method that involves submitting bio-waste to a biological decomposition process similar to the one in landfills, but under controlled conditions. Anaerobic digestion produces biogas and residual material, which in turn can be used as fertilizer, like compost.

A study from 2011 looked at the potential gains from better management of municipal waste. Its findings are striking. Improved management of municipal waste between 1995 and 2008 resulted in significantly lower greenhouse gas emissions, mainly attributable to lower methane emissions from landfill and emissions avoided through recycling. If, by 2020, all countries fully meet the Landfill Directive's landfill diversion targets, they could cut an additional 62 million tonnes of CO₂ equivalent of greenhouse gas emissions from the life cycle — which would be a significant contribution to the EU's climate change mitigation efforts.

I.2. WHY IS IT IMPORTANT TO COMPOST MY ORGANIC WASTE

Organic waste comes from plants or animals sources. Commonly, they include food waste, fruit and vegetable peels, flower trimmings and even dog poop can be classified as organic waste. They are biodegradable (this means they are easily broken down by other organisms over time and turned into manure). Many people turn their organic waste into compost and use them in their gardens.

By composting you complete the cycle by returning what you grow back to the soil to help you grow!

- **Reduces Waste Sent to the Landfill** - By composting in our backyards, we can reduce the amount of waste we send to our overburdened landfills.
- **Reduces Greenhouse Gas Emissions** – Organics buried in a landfill break down very slowly and without the presence of oxygen. When this happens – methane gas – a greenhouse gas is produced.
- **Reduces Pollution** – When organics break down without the presence of oxygen, as they do at the landfill, a toxic liquid known as leachate (the liquid that runs from a dump) is produced. Leachate can pollute our soil and drinking water sources.
- **Reduces the Need for Chemical Fertilizers and Pesticides** – Finished compost (or humus) is a rich, natural fertilizer that returns valuable nutrients back into the soil promoting the growth of healthy plants.
- **Lowers Waste Disposal Costs** – Putting less waste to the curb also means less waste has to be collected and transported; therefore lowering waste disposal costs.
- **Composting is the best solution.** One of the key advantages of on-site composting is that it produces a natural, valuable and useful product in the form of fertile compost for gardens. It also saves money
- **Draught** - Compost acts as a natural sponge, storing water and holding moisture in the soil for plants to use when needed. When it rains, water that falls on land covered in compost can actually soak into the soil, rather than washing off into the storm drains. That means that plants can draw on water (and thereby, nutrients) even days after a storm, reducing our need to water and use commercial fertilizer
- **Climate Change** - Healthy soil removes excess carbon from the air and stores it in the ground (that carbon then becomes part of trees and other plants that grow out of that soil). Depleted soil, which has less organic material, doesn't have the ability to absorb carbon
- **Healthy food** - Compost is a natural and crazy-effective fertilizer that provides your garden with all of the materials it needs to grow beautiful vegetables. We all eat, and we prefer when our food is both healthy and grown without synthetic fertilizers. Healthy soil=healthy food, healthy food=healthy people.



I.3. RAISING ENVIRONMENTAL AWARENESS AMONG KIDS

Primary education is a crucial stage in the development of a person's behavior, social awareness and selflessness. At school we learn values and behaviors that will stay with us throughout our adulthood and define who we are. That is what makes it so important to spark an interest in caring for and protecting the environment while children are still at school.

The aim of teaching children environmental education is for them to make caring for nature part of their lives, as opposed to just studying it. The idea behind this subject is for young people to develop a firm ecological mindset and use it to overcome today's environmental challenges with a proactive attitude and a strong commitment.

Environmental education also has other positive effects on young people. In 2017, Stanford University studied how this subject affects schoolchildren all the way from infant school to high school. After researching more than a hundred scientific studies published on the subject from 1994 to 2013 by other institutions, they concluded that 83% of schoolchildren improved their ecological behavior and 98% scored better in other subjects such as math and science.

Environmental education is a process for life and should be included in every primary and secondary school's syllabus, as well as in other activities such as seminars, conferences and talks. The way it is taught in the classroom should be adapted to the age and maturity of the children and should be not only theoretical but also practical, entertaining and fun.

There are plenty of activities that can be done in the playground or in a nearby park. Children can go outdoors to learn about plants, trees, rivers, birds and insects, but also about environmental problems such as pollution, gas emissions, energy consumption, recycling, good use of water and a whole host of other important aspects.

What is environmental awareness?

Environmental awareness is pretty self-explanatory. It is about being aware of the environment. The environment refers to all flora and fauna, including all marine and wildlife areas. This is particularly important, given the increasing environmental challenges we are facing, including:

- climate change
- global warming
- water scarcity
- droughts
- deforestation
- floods
- pollution

Schools must lead the conversation. Environmental awareness should be a part of the curriculum in all schools. This will encourage young people to engage in their environment to protect it and can help communities become more environmentally aware.

Some practical tips schools may adopt:

- Introduce the 3 R's: reduce waste, reuse resources, and recycle materials
- Organize tree planting days at school and tell them why trees are important to the environment
- Encourage children to switch off all appliances and lights when not in use
- Ensure taps are closed properly after you have used them and use water sparingly
- Create a booklet or activity book
- Organize eco carnival with costumes made of plastic or an eco-puppet show
- Experiments

- moving exhibitions – between schools
- Create eco gardens, bee hotels, small farms of little animals
- Give the plastic a new life

How can teachers lead by example?

Most people remember things that people did more than what they said. Teaching children what it means to be environmentally aware is important but it will have a more lasting impact if teachers can lead by example.

- For teachers, when you see litter, pick it up even if it's not yours. Those little eyes might be watching you.
- Start a recycling system in your classroom and show the children how to use it and recycle their things.

How can schools help spread the word?

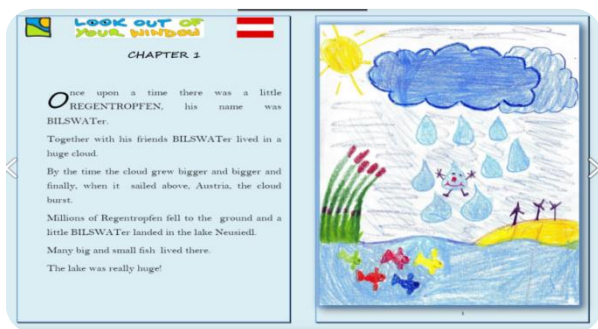
Schools should encourage parents to share their environmental knowledge to their kids at home. It would be a good idea to let the children practice at home doing small tasks like picking up their trash and throwing the garbage, or teaching them to turn off the faucet when they're brushing their teeth or washing their hands with soap and not let water run down, or shut off the lights when they're done using them. This will help them be more knowledgeable about environmental issues.

I.4. IMPLEMENTED ERASMUS+ PROJECTS AS A GOOD PRACTICE DATABASE

I.4.1. LOOK OUT OF YOUR WINDOW- RETHINK-REACT-REJOICE /2014-2017/

“We don't have time to wait for a hero who might come and save the Earth. We need to create our own heroes, we all can be a planet hero. Wake up and do something.”

Project objective: to lead pupils towards rejoicing over their newly developed ideas and to protect the environment by intelligent use of resources.



The resources covered are:

- water
- paper
- crude oil/plastic

The focus is on:

- **RETHINK:** Pupils were given information about the resource participants were focusing on.
- **REACT:** Pupils were given tasks to find ways, how to use that special resource in a more moderate and sensible way. Experiments, activities and challenges were carried out.
- **REJOICE:** In this step, pupils were encouraged to think and use the resources in a new and creative way.

As a result of the project:

- Pupils have increased knowledge about the origin of resources.
- Pupils are aware of waste production, of the finite availability of resources, they are able to use the resources sparingly and reduce their waste production.
- Pupils have changed their lifestyles minimizing their production of waste.
- They have a smart approach to sustainability.
- Pupils refrain from discarding items of negative environmental impact.
- Pupils are more open minded for the use of new technologies for contacts, researches and presentations.
- They have a willingness to share knowledge and skills.

I.4.2. IN THE FAIRY FOREST /2014-2017/

Project Objective:

The environment and its current state are of interest for many people who are afraid to see the future. Teaching kids about it in schools is the basis for nature care about Earth, because these children will once again be the ones that decide and manage the destiny of the planet. This project, aiming at pre-school pupils, is probably the best way to explain the situation to children and to show them in a playful way how to solve these problems. After the project, there will be eight small forests in eight countries. This is a social success.

The project also fulfilled a social role. All schools involved in the project cooperated with their municipal or city councils, so not only mayors, but also deputies or other community organizations participated in the accomplished tasks of their school project. Schools collaborated with general public institutions. Relations between the community, parents, but also various organizations and individuals, including private entrepreneurs, have intensified. There has been cooperation not only within the project but also other social activities have been established or continued. Events for waste removal, flowers and grass care in the park, watering. The interest of other organizations and associations that have prepared their school material for the planting of the school forest, joint actions to care for greenery and nature in towns and cities.



I.4.3. GARDENStoGROW - Urban Horticulture for Innovative and Inclusive Early Childhood Education /2017-2020/

GARDENStoGROW is a project co-financed by the Erasmus+ programme of the European Union, aimed to provide ECEC/early childhood education and care/ teachers with an innovative teaching methodology, tools and materials for fostering inclusive attitudes and key competences acquisition from a very early stage of child development (3-6), through horticulture. GARDENStoGROW includes 11 European partners – 4 universities and research centers, 2 children's museums, 1 foundation and 4 schools (2 pre-primary level). GARDENStoGROW gardens will become permanent and living “learning places” for local schools, pupils, children and families, where they can meet and learn from each other.

School gardens are spreading all over Europe, as natural places where children can have; real contact with nature, discover the origin of their food, observe flowers and vegetables growing, experiment with natural growth, learn life skills such as responsibility, cooperation and self- confidence through achieving. The project encourages the adoption of innovative and inclusive pedagogical practices at pre- school level, based on urban and social horticulture, through a series of outputs and flexible and open training programme, so that ECEC teachers can transform gardening into inclusive and effective educational activities for the development and acquisition of transversal, social, civic and intercultural competences.



GARDENStoGROW develops a balanced, transnational and complementary cooperation between: pre-primary and primary schools, children's/science museums/STEM centers, HEIs and local educational

authorities. The idea is that museum' gardens, with an active support and inputs from schools, other partners and local stakeholders, can become permanent and living "learning places" for local schools, pupils, children and families, where they can meet and learn from each other.

I.4.4. FOOD AND NUTRITION IN ECEC/2018-2020/ - FINE!

Food and nutrition are important from many points of view:

- Health and prevention of diseases and obesity,
- Proper physical and mental development,
- Reducing Food Waste and Recycling: around 89 million tons - 80 kg per capita - of food are wasted annually in EU, the associated estimated costs is 143 billion euro. In school canteens, 20 to 50% of the prepared food is waste: preschools could rethink their canteen and recycle the leftovers models.
- Lunch time is a social, relational activity and an intercultural vehicle, showing the diversity as an enriching value, with a positive impact on children
- A staggering 88 million tonnes of food are wasted every year in the EU, costing an estimated €143 billion.

The FINE! Project aims to:

- stimulate awareness, knowledge, skills of participants on the main issues of nutrition and health of children, social-relational aspects of food in childhood, role of preschools in children's development and their successful lives;
- motivate respect for the environment;
- motivate preschools managers to implement strategies for the modernization and improvement of canteen system, food education, food waste prevention and recycling;
- build up a dialogue on healthy nutrition in early childhood education among organizations, decision-making bodies, beneficiaries including families;
- share the innovative and successful experiences among partnership;
- spread EU action plans, strategies, resources and materials and best practices;
- Improve cooperation and networking at European level between early childhoods providers.



CHAPTER II. SELECTION AND COMPOSTING OF ORGANIC WASTE

II.1. INADEQUATE TRETMENT OF ORGANIC WASTE

Every day we are getting more and more choked in our own waste. Instead of sitting with "folded hands" and expecting someone else to solve our problem, it's time to "sweep up our sleeves" and start to act, first of all by cleaning garbage from our own yard.

We do not expect a long way to start with the first step we will take in our surroundings, in our own household, so that we start composting.

The composting license belongs to nature, but that does not mean that a person cannot compost. On the



contrary, each of us can compost.

There is no waste for developed countries. It is either recycled, or it is used as a fuel. The rational European West recognizes waste, but in every way tries to be pragmatic and use it for a general benefit. The European Union is the goal towards which we strive. If we want to become a member of that desired family, we must change our old bad habits regarding our behavior towards the environment. First of all, the most important point towards which we will need to focus our efforts is the waste treatment.



What is composting and compost?

Composting is the oldest and most natural way of recycling organic matter. It is a decomposition process where the humidification of organic matter goes to the end, and a dark matter that looks and smells like humus, is obtained.

Composting is a process of biodegradation-controlled biological decomposition of organic matter contained in organic waste (vegetables, fruits, etc.), mixed with brown mass (dry leaves, branches, etc.) and garden soil in the presence of oxygen, microorganisms and sufficient humidity.

What is needed to create a compost?

Organic waste, composed of green and brown part. Green part is made up of fresh green plants rich in nitrogen (N) and a brown part made up of dry carbon-rich plants (C).

Microorganisms present in organic waste that assist the composting process.

Air because it contains oxygen (O) that is indispensable so that microorganisms can dissolve and use organic matter.

Water, because it makes nutrients available to microorganisms;

Gardening land, which accelerates composting because it already contains a small amount of microorganisms inside;

Heat released during the biochemical reactions when decomposition of organic matter occurs.

II.2 SELECTING/COLLECTING OF ORGANIC WASTE



What can be composted?

Brown component:

- dry leaves;
- dry plants;
- small dry branches;
- shavings;
- hay and straw;
- bread;
- egg shells;
- ash from trees;
- cut newspapers (with black color).

What can not be composted?

- plastic;
- meat residues;
- metals;
- dairy products;
- glass;
- dead animals;
- textiles;
- animal excrement;
- big branches;
- sick plants;
- bones
- coal,
- colored paper.

Green component:

- residues, that is, waste of vegetables and fruits;
- fresh (green) leaves, green plants;
- flowers;
- hedges.

Cold composting

“Cold” composting is the easiest way to reduce yard waste. The cold compost pile is basically a pile of collected yard waste. The cold compost pile decomposes very slowly and does not need to be mixed.

The new composting material is added to the top of the pile and there is no need to be mixed inside occasionally. That's why cold composting lasts longer, 1-2 years, to create a ready-made compost.

Hot composting

“Hot” composting requires frequent mixing or conversion, allowing the air to circulate through the pile. The hot pile can produce humus, i.e. ready compost for 6 to 8 weeks.

The hot compost pile rapidly reduces yard waste.

The decomposing is done when the right combination of carbon and nitrogen in yard is achieved and when microorganisms act in the presence of oxygen and water. This chemical reaction can warm up the compost pile up to 77°C.

Composting location

The composting mixture is placed in a location that is hidden from the wind, usually near some trees or shrubs, which provide sufficient consistency, but also partial shading throughout the day. In this way, the heat required for the operation of the microorganisms is maintained, and at the same time it prevents the loss of moisture, necessary for the decomposition of organic waste.

For easier transportation, the compost location should be near the place where the waste will be collected. It is important to form the compost mixture on the ground so that various types of microorganisms and worms from the soil can penetrate the mixture in order to accelerate and complete the decomposition process.

How the compost mixture is formed?

First, in the composters, a dry dye layer is placed, a kind of drainage layer, which will serve to drain the excess moisture, but also to ventilate the waste. This layer should be of a thickness of at least 10 centimeters, depending on the amount of organic waste to be composted. This layer must be of natural material that will not prevent the beneficial organisms from the ground from penetrating the compost mixture.

Then, add leaves of vegetable and fruit or organic waste to the leaves, a layer of thickness of 10 centimeters.

For more successful composting, it is important that these green waste are cleaned, and that crushing can be done with garden tools, or even easier and faster when using a vegetable crusher or bio-grinder. Moreover, it is even more important that this organic waste be kept fresh.

On this layer of organic waste shavings can be added, and they are present in large quantities during the timber cutting season. They should be cleaned from the pieces of wood, that is, they must be sifted, because only in this way will you get clean shavings.

Then, cover it with a fertile garden soil. The ground also needs to be cleansed of everything that can harm the compost, such as glass, plastic, and so on, but also from stones that can only interfere with the composting process.

In the next 3 to 4 months, the composting process takes place, during which every 7 to 10 days the mixture should be mixed with garden tools, preferably with a shovel or a hoe. At each mixing, care must be taken to turn the whole mixture over, and the compost pile should not be compacted, as it will rot.

If the weather is dry, it is necessary to moisten the mixture from time to time.

Types of composters

For easier control of the composting process, it is best to keep the compost mixture fenced or placed in composters.



They can be made of different materials, which must be natural, and they must not be protected with certain chemicals, such as paints and varnishes, because the compost will be destroyed.



Necessary conditions for composting

Microorganisms. Solid waste decomposition is the result of the conversion of their content into the building mass of the cells of the microorganisms or in the products of their metabolism.

The microorganisms that are most responsible for this conversion are from the classes of bacteria, fungi, yeasts, actinomycetes, algae and protozoa.

Nutrients. For their proper functioning, microorganisms require nutrients, primarily nitrogen and carbon sources. In terms of nitrogen: carbon C: N = 30: 1, composting takes place with the greatest intensity. For the finished compost the characteristic ratio is C: N = (10-20): 1. For simpler preparation of the compost mixture, use the rule: **brown table: green mass = 1.5 part: 1 part.**

Oxygen. Air is the basis for aerobic composting, because oxygen from the air allows oxidation of the building components of biodegradation, and thus their degradation. Thus, nutrients are transformed into mineral forms, and the process is called mineralization.

Temperature. The temperature interval in which microorganisms participate in composting is from -5 ° C to 70 ° C.

Moisture content. Water is essential for the action and reproduction of microorganisms. Since moisture is usually lacking in the compost mixture, it is necessary to add water to the compost pile.

The optimum moisture content of the composting mixture should be 50-60%, but has an average of 30-40%. In order to achieve an appropriate water ratio: air in the compost pile, necessary for humification, it is necessary that fresh waste be cut into pieces.

Particle size. Particle size (s) of the composting material affects the speed at which the process takes place of composting. Generally, the smaller pieces are composted by higher speed due to higher surface availability pieces for microorganisms, water and oxygen.

Acidity of the environment (pH). One of the basic conditions you need to provide for successful composting, is of course, the acidity of the environment (pH), which should be in the range of 6 to 9. The

low alkal environment is most suitable for the development and activity of microorganisms.

Absence of toxic substances. Toxic substances inhibit the metabolic processes of microorganisms. Their presence is, most often, consequence of unclean scrap (metal pieces, plastic, pesticides, wood treated with chemicals, etc.).

Usage of compost

If we have enough compost, we do not need any other fertilizer. The value of compost is, above all, perceived as an increase in the content of organic matter in the soil. The nutrients of the compost gradually cross into the soil, which ensures the constant supply to the plants.

Organic compost can be used for organic production, for the production of seedling, for home plants, for healing the polluted environment.

CHAPTER III. -GUIDELINES FOR PRE-SCHOOL TEACHERS HOW TO IMPLEMENT PRACTICALLY PRODUCED COMPOST IN PRODUCTION OF FRUITS VEGETABLES AND FLOWERS IN NEWLY CONSTRUCTED ECO-GARDENS

Implementation of the produced compost in production of fruit and vegetables and flowers in our newly constructed eco-garden will be shown step by step as following:

FIRST STEP—CONSTRUCTION OF THE ECO GARDEN

- **Preparing the area and constructing the raised bed**

The area where the eco garden will be constructed should be cleared and fulfilled with concrete mb20 with thickness of 10cm. Above the concrete basis the raised bed will be constructed.

Dimension of the raised bed are: length 370cm– width 120cm-high 30cm. The raised bed will be made of the laminate material with width of 5 cm with inner isolation and UV wood protection at final stage.

Frame will be divided to smaller frames with wood planes with dimensions 50cm x 50cm.





- Planting the fruits and vegetables and flowers



In our gardens kids together with their teachers planted a lot of different fruits and vegetables as following: carrots, onion, green peas, strawberries, basil, thyme, shallot, oregano, menthe, green salad, parsley, celosia sp. and other.

Equipped with boots, gardening gloves and rainwear children planted a lot of fruit and vegetable seeds in the raised beds. They used their kids' size garden tools such as: plastic shovel, plastic wheelbarrow, kids watering can, plastic gardening fork and gardening tool kit to maintain the garden.



- **Harvesting and consumption of the fruits and vegetables from the garden**

Vegetables and fruits have different growing period.



After a period of time our garden is full of colorful and healthy food ready to be consumed.



Children together with their teachers collect the vegetables and made a fresh and healthy mixed lunch.



SECOND STEP- PRODUCING COMPOST

- **Constructing the composter**

For our eco gardens we consider that composter with the capacity of 600 liters, made from polyethylene is enough to produce fertilizer which will be used accordingly.



- **Making compost**

1. On the bottom of the composter first should be added about four inches of straw, twigs, or hay at the bottom. The compounds should be easy for microorganisms to enter.



2. Add leaves, old paper materials, old coffee and tea items, and eggshells on top. Keep this layer about four inches thick.



3. You can apply a small bit of garden soil over these two layers.



4. Add about four inches of produce peelings from fruit and vegetables and rinds as well as old grass clippings. Any organic green item can work provided it is healthy and safe to add.



5. Add a small bit of water to moisten everything. Make sure you don't add too much water.

6. We can add alternating layers of compost to our bin until it becomes full.

7. Turn the compost material every few days. You can turn it on occasion to ensure the materials will break down faster.



CHAPTER IV.—OPEN EDUCATED RESOURCES -OER AND ETWINNING PLATFORM

eTwinning is an online learning platform for teachers, educators, professional associates, directors across Europe in order to enable them to work together

- Used for communication, collaboration, project development, exchange of ideas and examples of good practices, connecting with students
- The eTwinning Platform promotes the cooperation of schools in Europe and use of information and communication technologies (ICTs), providing them with help, support and ready-made tools.
- The use of the platform is free and safe
- Translated into several European languages
- In Europe, the platform is used by 471,554 teachers from 179,403 schools included in 60,047 projects

IV.1 ETWINNING PORTAL

In the eTwinning portal <http://www.etwinning.net> only the employees in primary and secondary schools and kindergartens can register.



- On the platform's home page, there is the Register field
- Clicking on this box opens a table in which the teacher introduces basic information

The e-mail arrives with a message that contains a link that needs to be clicked to complete the registration, and the newly created eTwiner defines the username and password.

After that, each eTwiner can log in and gain access to its eTwinning Live desktop.

eTwinning Live is a personal space on the platform of each eTwiner and it is good to update regularly. To start an eTwinning project in your contact list you have colleagues with whom you want to collaborate in the project.

Each project has its own TwinSpace.

TwinSpace - part of the platform that becomes active when you start or join the project and which contains ready-to-use ICT tools to facilitate the communication of placing and exchanging different materials.

eTwinning projects proposed by the National Support Team can be rewarded with national and European eTwinning Quality Mark.

eTwinning can be an opportunity for professional development and advancement of the teacher.

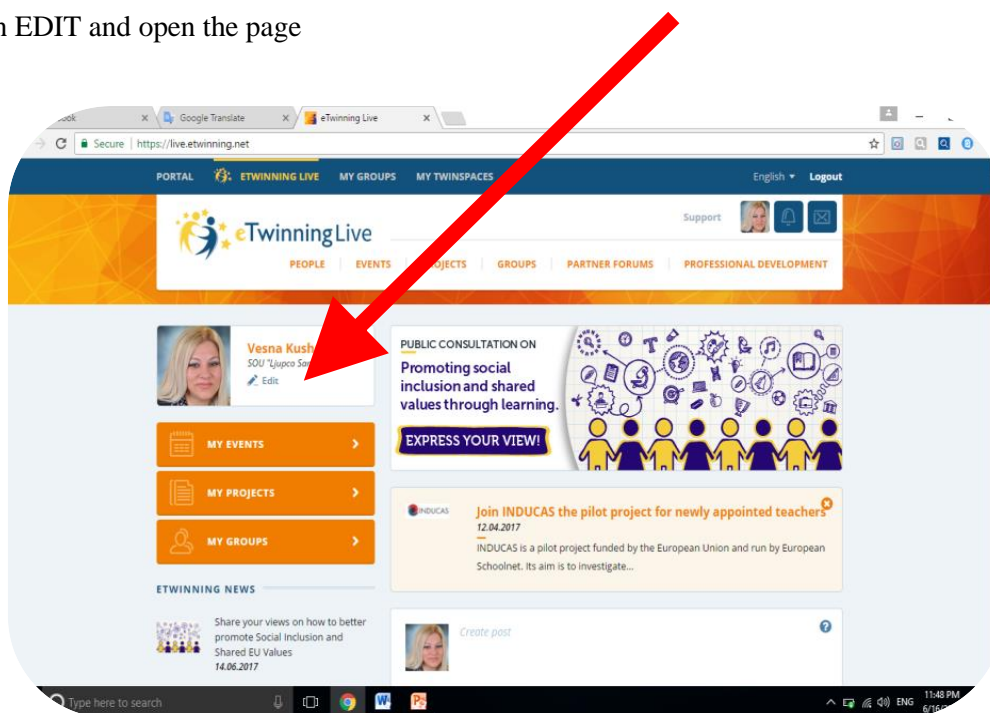
The eTwinning platform enables you to engage in various thematic groups and forums, as well as the opportunity through webinars and online trainings to develop ICT skills among teachers and students.

IV.2 ETWINNING LIVE

Start with organizing your personal page. Leave information about you, your school and the place you live in.

Enter eTwinning live and in the left corner you'll see your name.

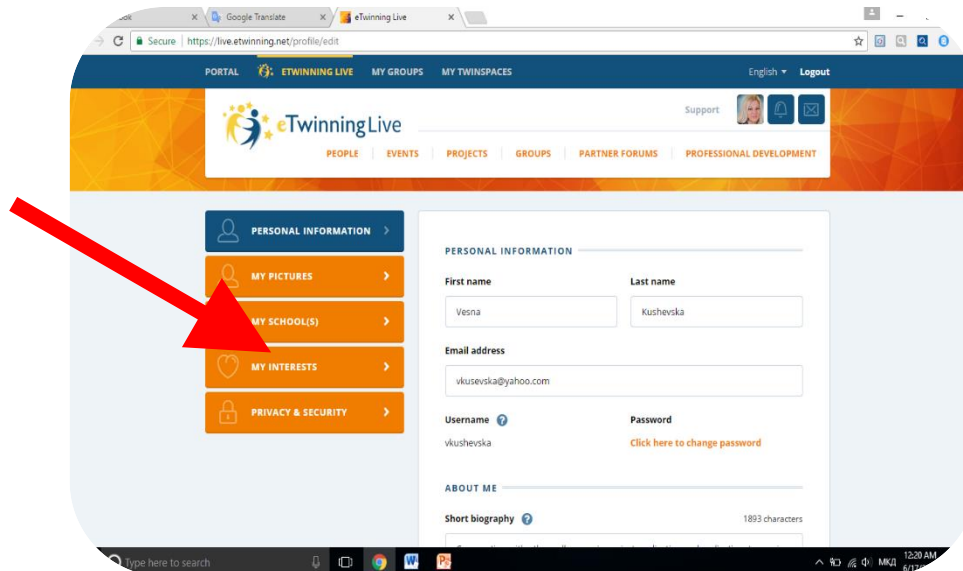
Click on EDIT and open the page



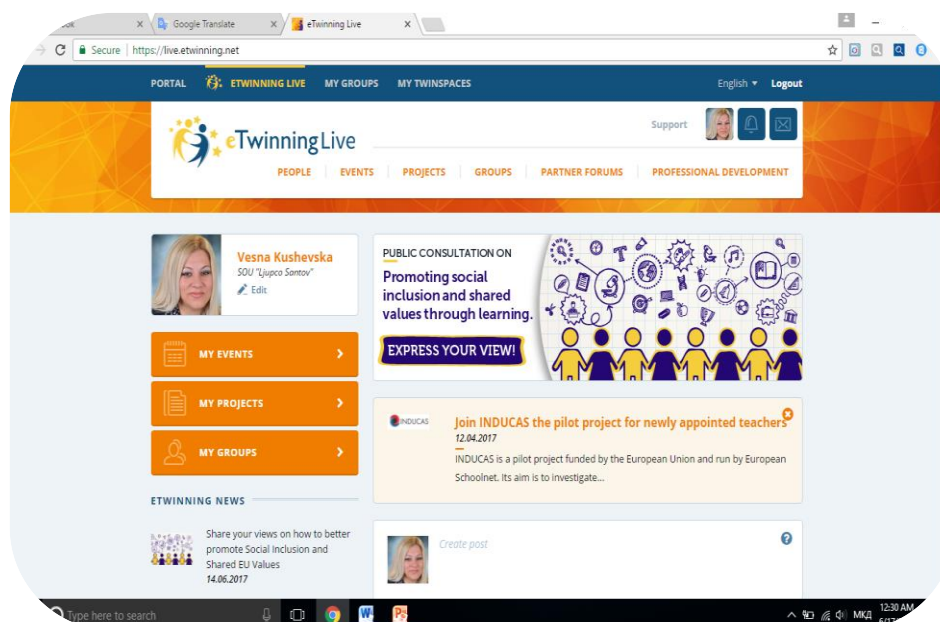
IV.2.1 Fill in all the fields of your profile

You have four points:

- personal information: (you can write about yourself, working experience, family and classes you teach)
- my pictures: upload some photos and choose one as a default picture of your profile;
- my interests: say a few words about your interests and hobbies, your attitude to teaching etc
- privacy and security: Control who can see your profile and how they can interact with your content by using the settings below.



When the profile is ready, let's get acquainted with the tools and pages of eTwinning. When you enter eTwinning live your page will look like this one.



In the top left corner you'll find PORTAL, ETWINNING LIVE, MY GROUPS, MY TWINSPACES

In PORTAL you can find useful information about tools and sources of eTwinning, news about different eTwinning events.

ETWINNING LIVE will lead you to your page

MY GROUPS will give a quick pass to the groups you take part

MY TWINSPACES will show you the projects you participate in

Then you can see your eTwinning Live with more icons to lead you to different spaces

PEOPLE - shows your contacts (people that are friends with you) and to look for partners of the projects

EVENTS - to know about all the events that will take place in Twin Space

PROJECTS will show you all your projects (closed and active)

GROUPS - shows different teachers' groups and give possibility to join them

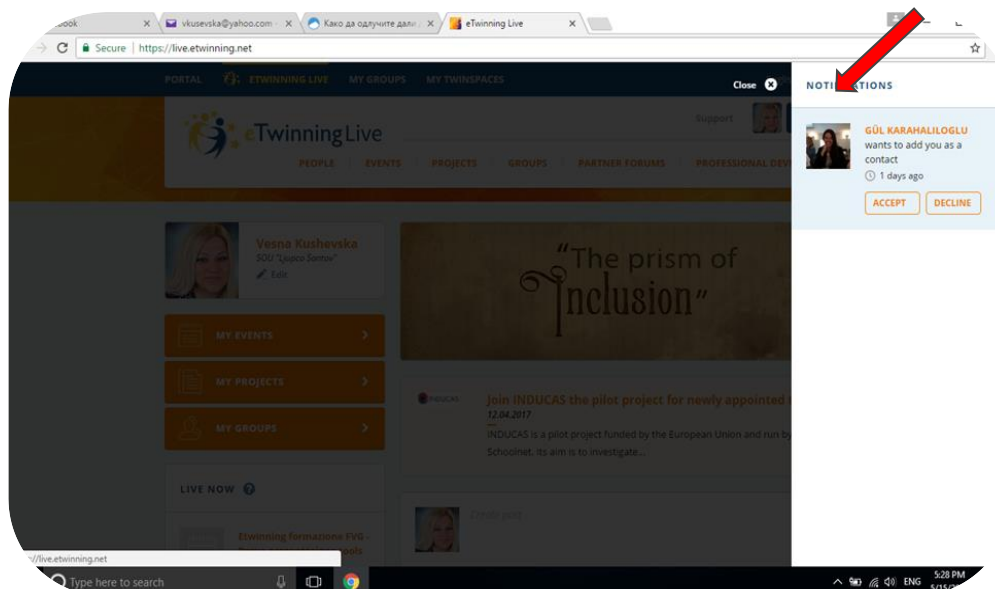
PARTNER FORUMS - helps to look for project partners and new projects

PROFESSIONAL DEVELOPMENT - a page where you can find information about interesting learning events and webinars

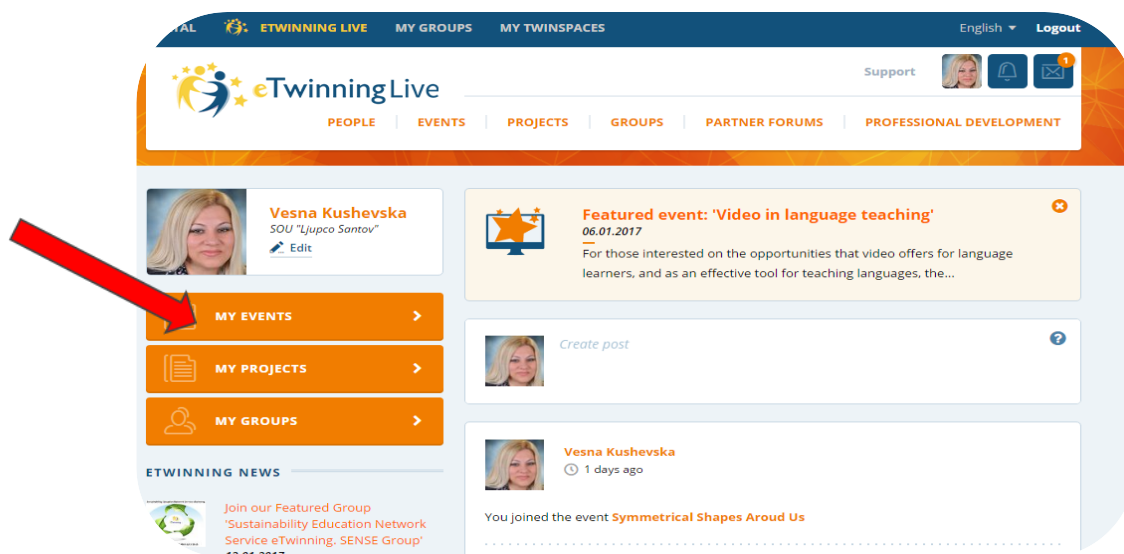
The screenshot displays the eTwinning Live interface. At the top, the 'eTwinningLive' logo is on the left, and 'Support' with user icons is on the right. A navigation bar below the logo contains tabs: PEOPLE, EVENTS, PROJECTS, GROUPS, PARTNER FORUMS, and PROFESSIONAL DEVELOPMENT. A red arrow points to the 'PEOPLE' tab. The main content area is divided into several sections. On the left, there's a user profile for Vesna Kushevska (SOU "Ljupco Santov") with an 'Edit' link. Below this are three orange buttons: 'MY EVENTS', 'MY PROJECTS', and 'MY GROUPS'. To the right of the profile is a 'Featured event: Video in language teaching' scheduled for 06.01.2017. Below the event is a 'Create post' button with a user profile picture. At the bottom, there's a 'WINNING NEWS' section with a featured event announcement from the CSS Online Events Moderator.

Here you will also see small icons: Notifications (help you to know who wants you to add to his contacts, invites to new events or projects)

...and your Mail (here you can see the letters that were written to you and write to your partners as well.)



In the left corner under your photo you will find icons with YOUR EVENTS, YOUR PROJECTS, YOUR GROUPS where you can find information about your events (upcoming and past), your projects (active and closed) and groups you participate in.





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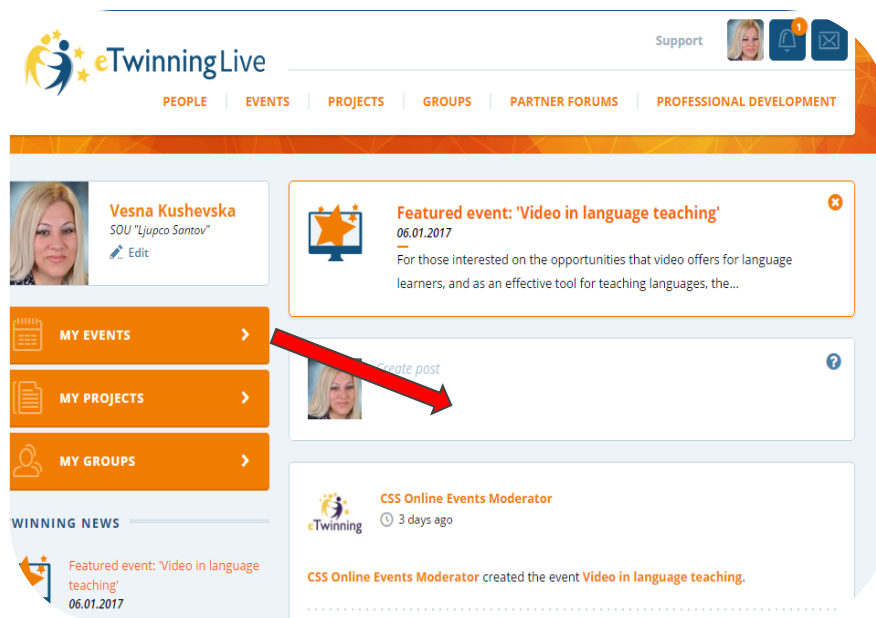


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You can leave a post about events that are important for you in the centre

You can also upload photos or files

Here, you can also see the posts of people you follow (project partners or those who are interesting to you)

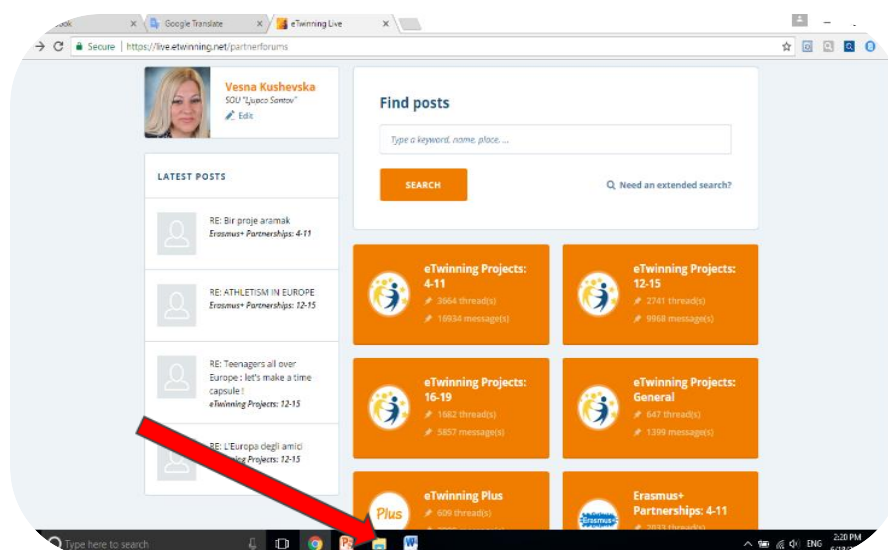


Go to PARTNER FORUMS and find eTWINNING PLUS

Click there and open the forum with the posts of the other teachers.

Look through them and leave the replies in the posts that interest you.

You can write a post yourself if you have an interesting idea about the project.





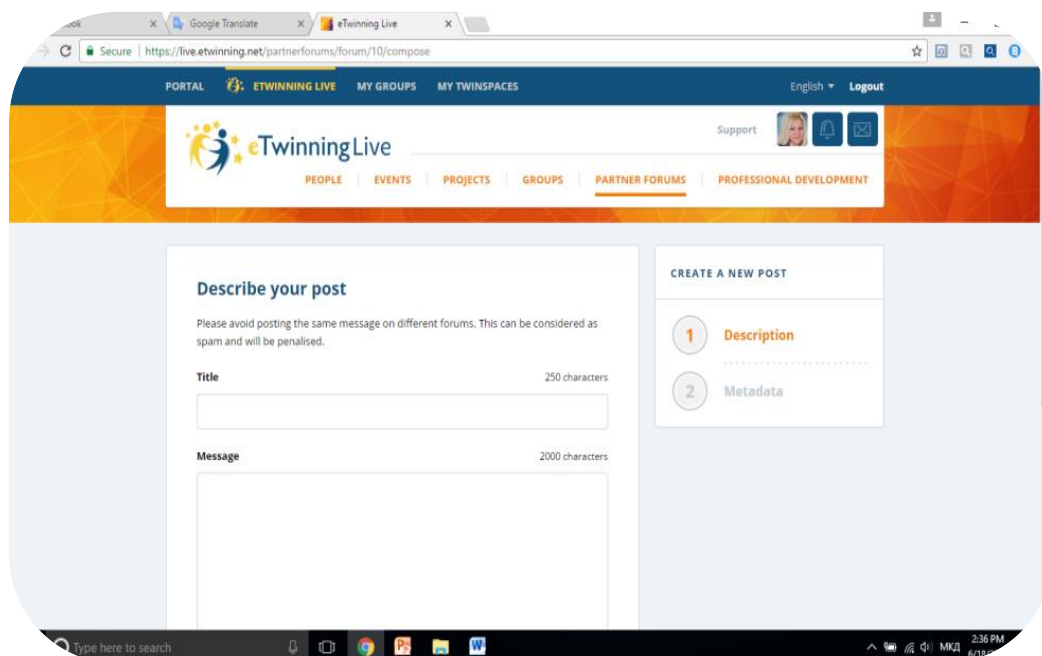
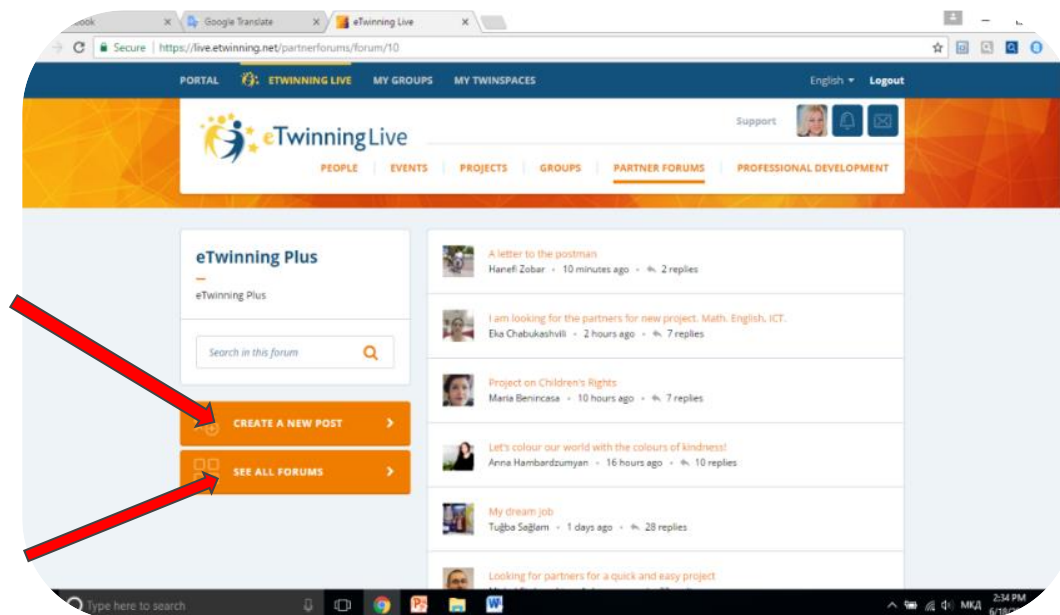
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Create your own post using the page **CREATE A NEW POST** and invite the other teachers to participate in your activities

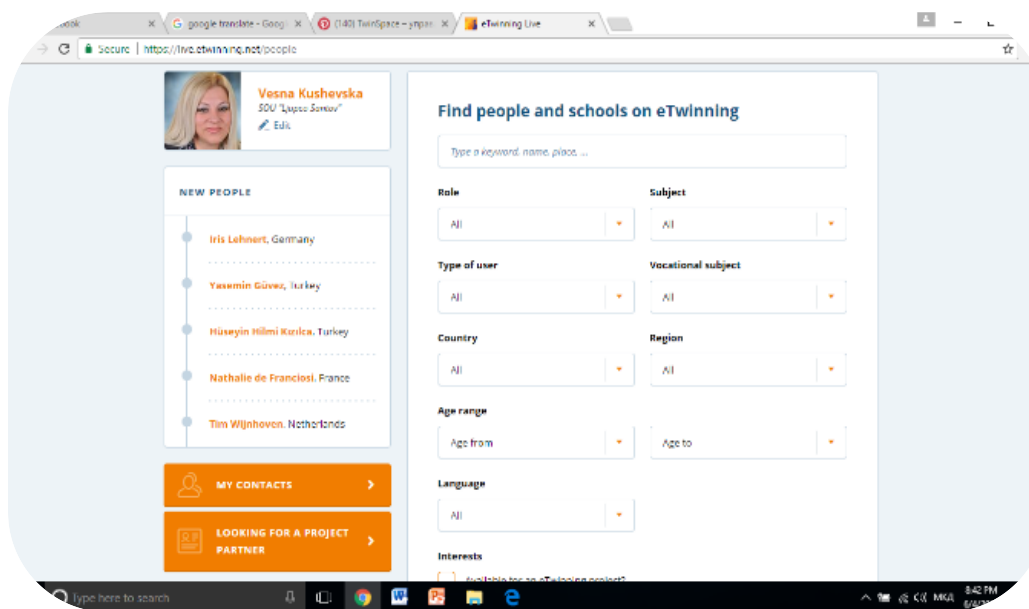
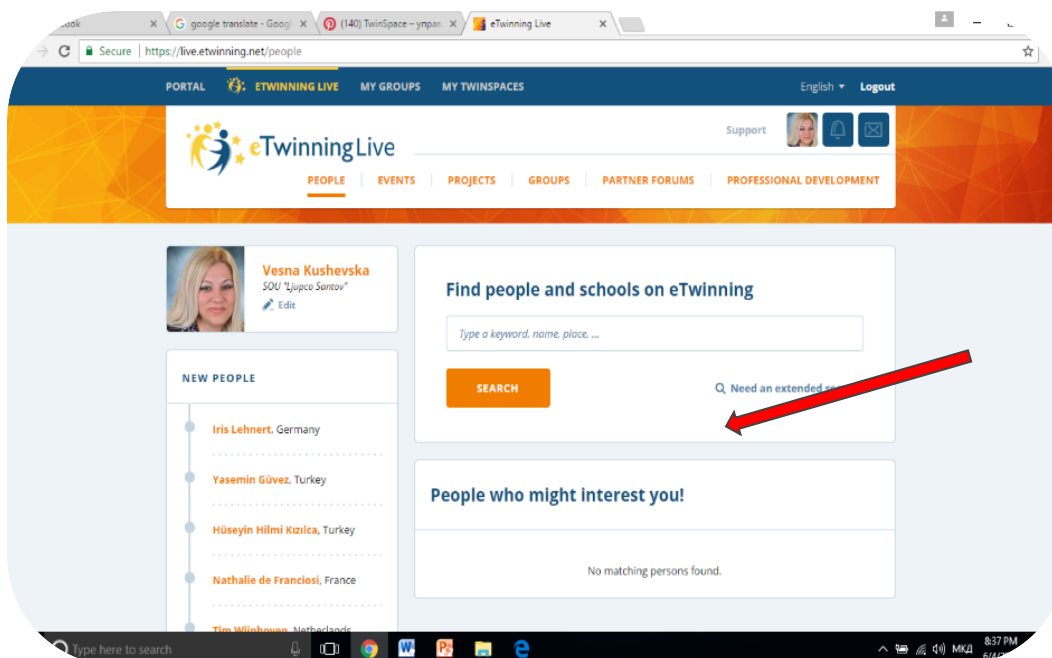
If you want to turn back to Forums - click on **SEE ALL FORUMS**



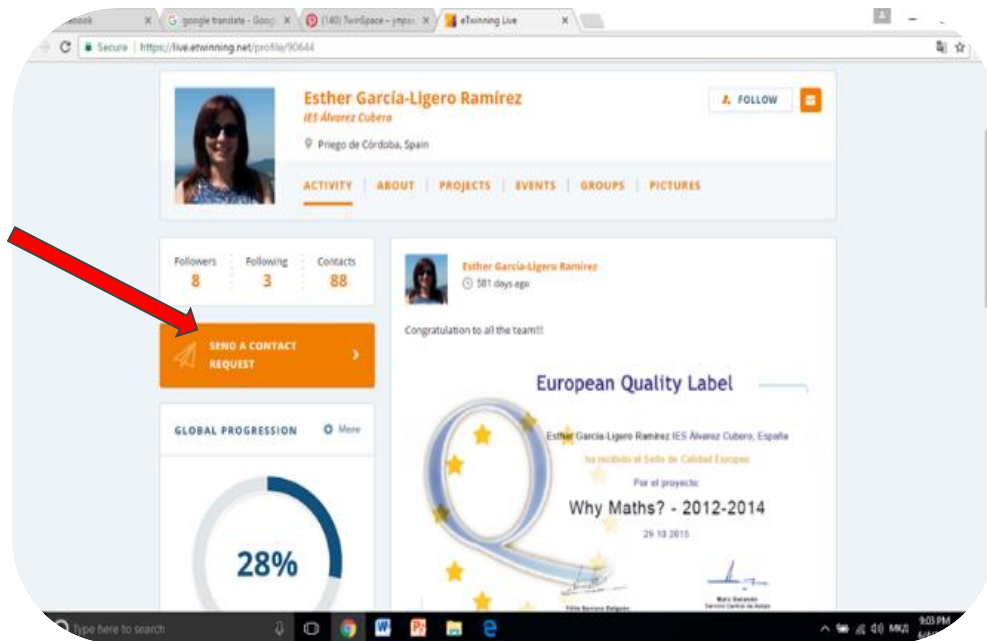


Connecting with colleagues:

- Teachers look for other colleagues registered on a platform that have the same or similar interests, working with the same or similar age groups of children, teaching the same subject or wanting to participate in certain types of projects
- On the People tab, there is a search tool to find people and schools in eTwinning



When you open a colleague profile, under the photo is a Send a contact request, which serves to invite the teacher to be part of your contacts.



When the person you are asked to connect confirms that he wants to be on your contact list, you will receive a notification in the top right corner of the desktop

Maintaining contacts with colleagues is one of the key activities for working on the platform, so we advise you to pay attention to it.

Therefore:

Updating your profile so that others can find you more easily and understand your interests;

Indicate that you are at your disposal to participate in projects;

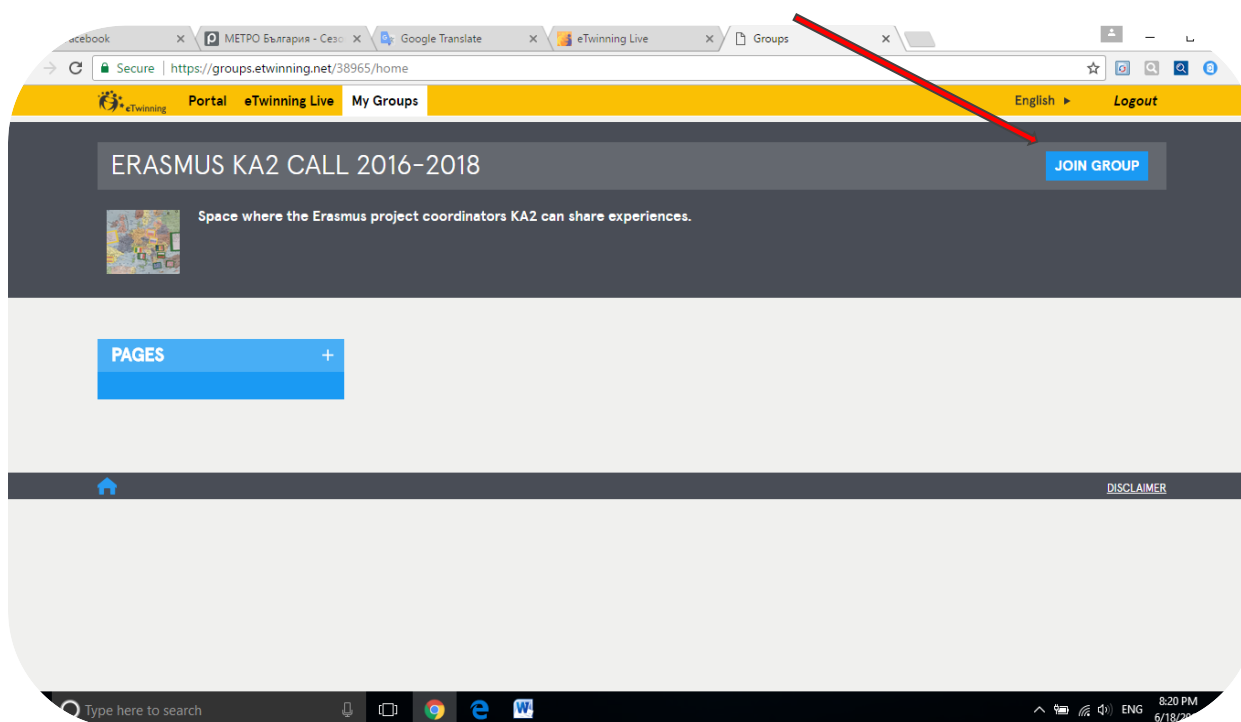
Add your profile picture;

Writing a short interesting article for yourself, for your professional interests, for your school, experiences and ideas for eTwinning projects, a language that will carry out the project

IV.3. ETWINNING GROUP

ETwinning Groups are virtual places where eTwinners meet and discuss specific topics or other areas of interest. The central support service will give you access to your group once it is approved.

To join the Group, click on the "join group" button that appears next to the group title, in the upper right corner.



Basic tools in the eTwinning Group:

Group journal: This is the place where group administrators announce the announcements and promote new activities. Members of the group cannot post but are able to comment on posted posts.

Pages: Pages will help you structure and organize your group. It is recommended that you create new pages for new topics. Subpages can also be created and their order changed. Administrators choose who can edit the pages.

Materials: Attach your pictures, videos, and documents to the material folder before uploading anywhere in the Group.

Forums: Forums are the best place for debates. Administrators can create and delete forums and topics. All members of the group can participate.

Live chat and videoconferencing tool: Use communication and video conferencing tools to keep in touch with Group members. Only administrators can set up online meetings and events.

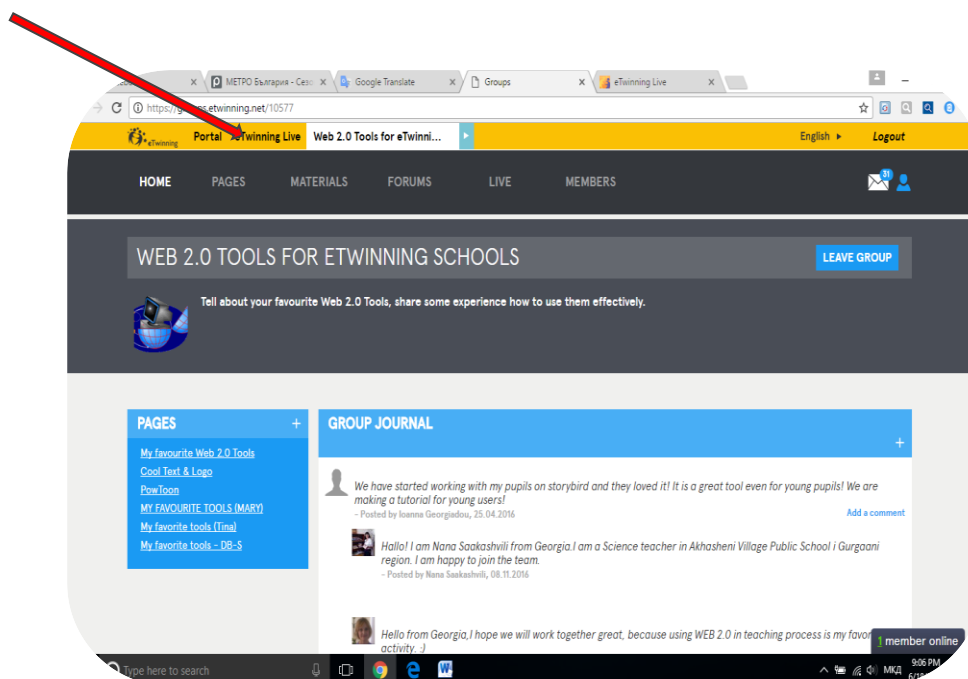
Group messages: Sending messages, newsletters or publications to members of the Group.



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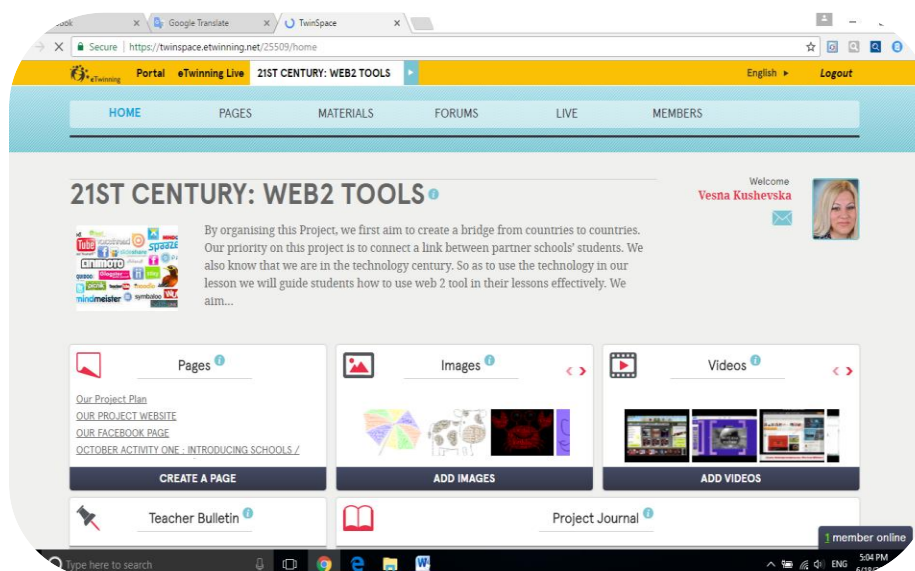


IV.4. TWINSPACE

TwinSpace is part of a platform that becomes active when you start or join the project and which contains ICT tools to facilitate the communication of the placement and exchange of different materials.

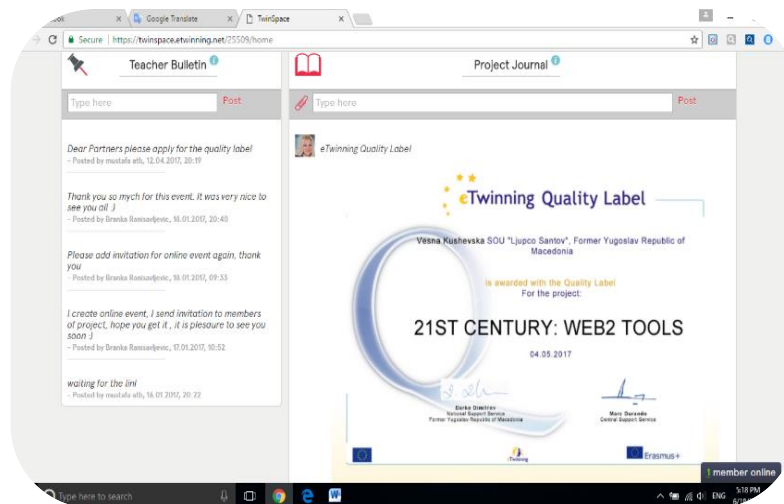
Each project has its own private TwinSpace.

TwinSpace is available as soon as your National Support Services approves your project.

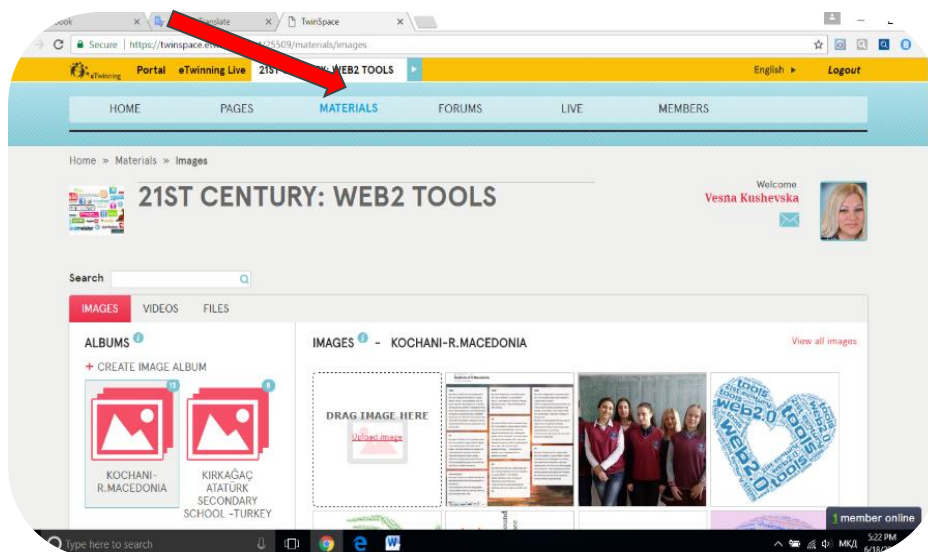




IV. 4.1. Project journal and teacher bulletin

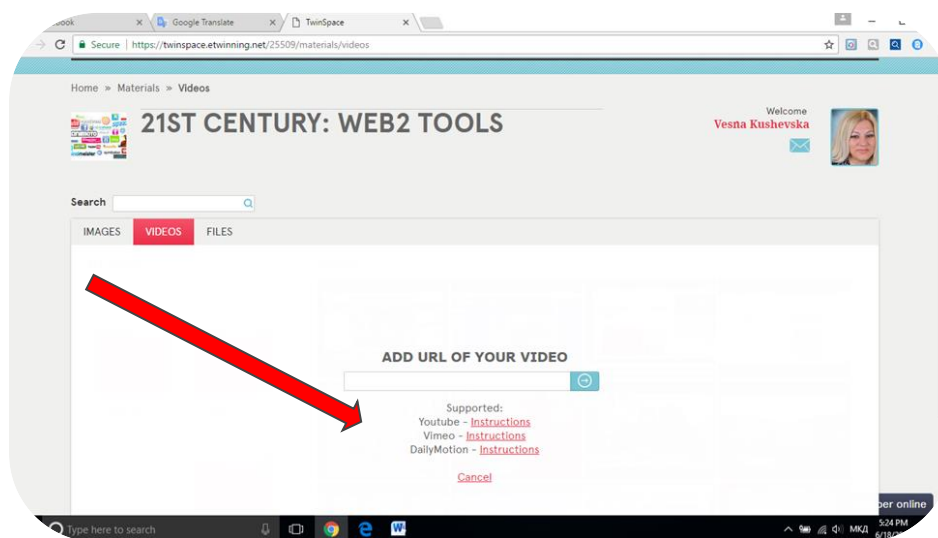
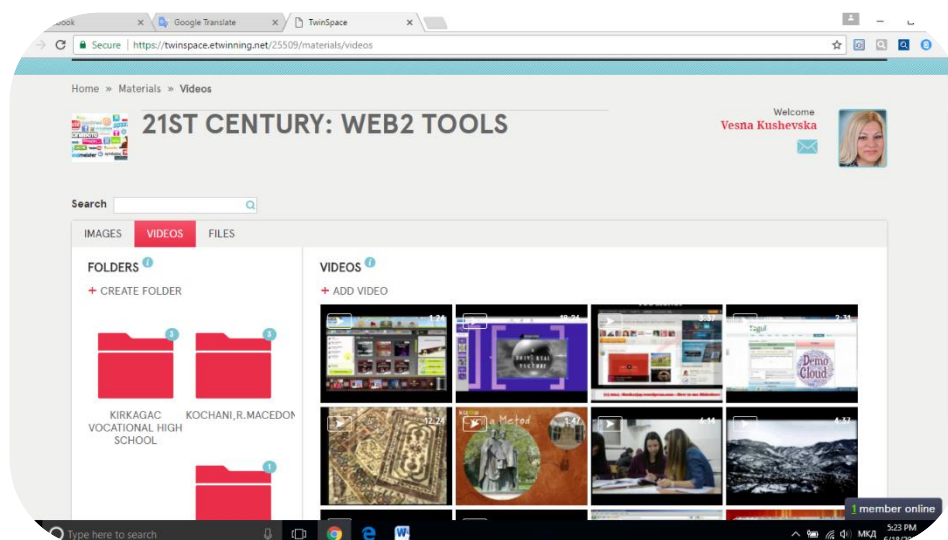


Materials: Before creating a TwinSpace page, you must place the materials that you will use. By selecting the “Materials” option you can select the type of document that you want to save. You select photos, videos and documents from your computer.



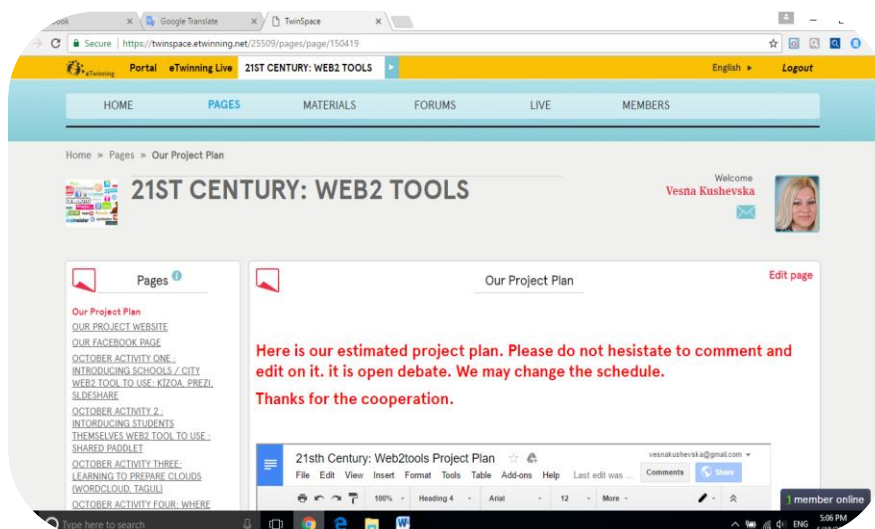


Upload videos by copying a link from YouTube, Vimeo, or Dailymotion.

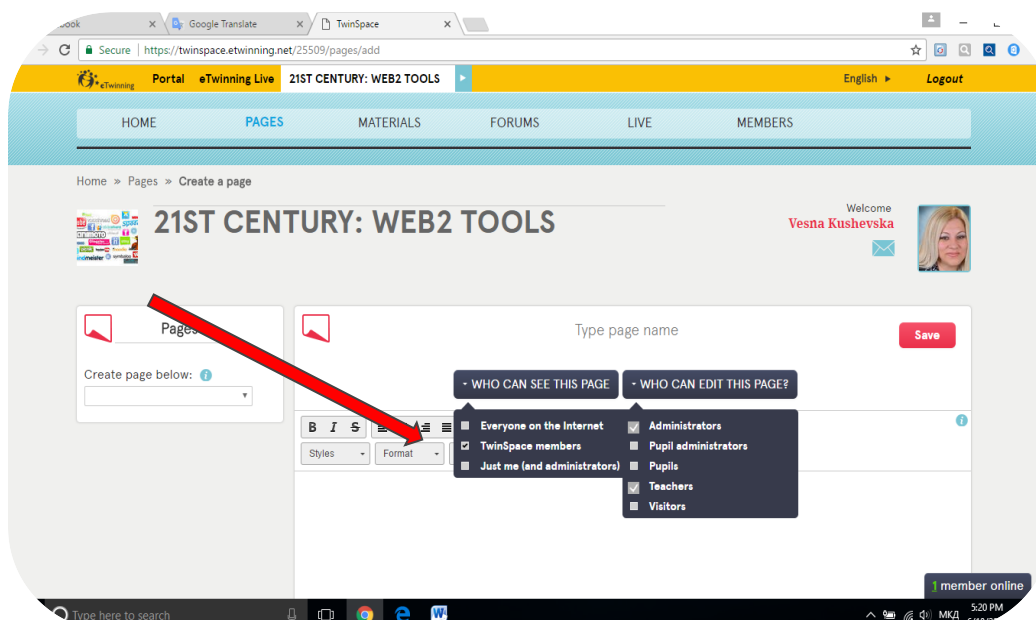




Page: When you have materials, that is, the results of the project that you want to show, choosing the “Pages” option will open the option for the “Create Page” option.

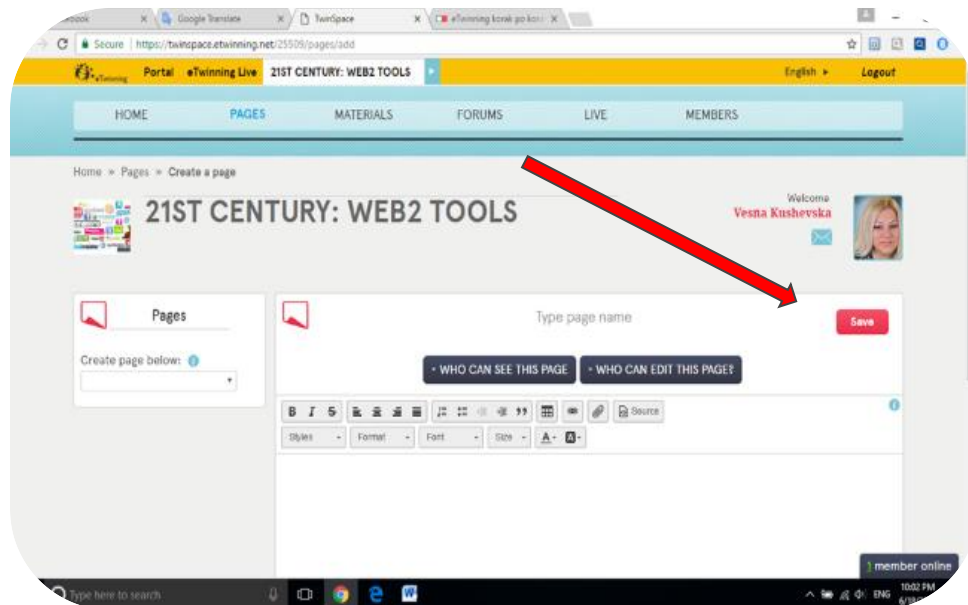


When creating a new page, it's important to pay attention to the orders you can make before saving it. This applies specifically to the „WHO CAN SEE THIS PAGE“ option. If you stay on the option to be seen only by site administrators, it will write beside the page's name (Draft) and will not be viewable or edited by anyone else. However, these small sites should be a place for joint work and collaboration between partner schools, as well as the results that have emerged as part of the collaboration.

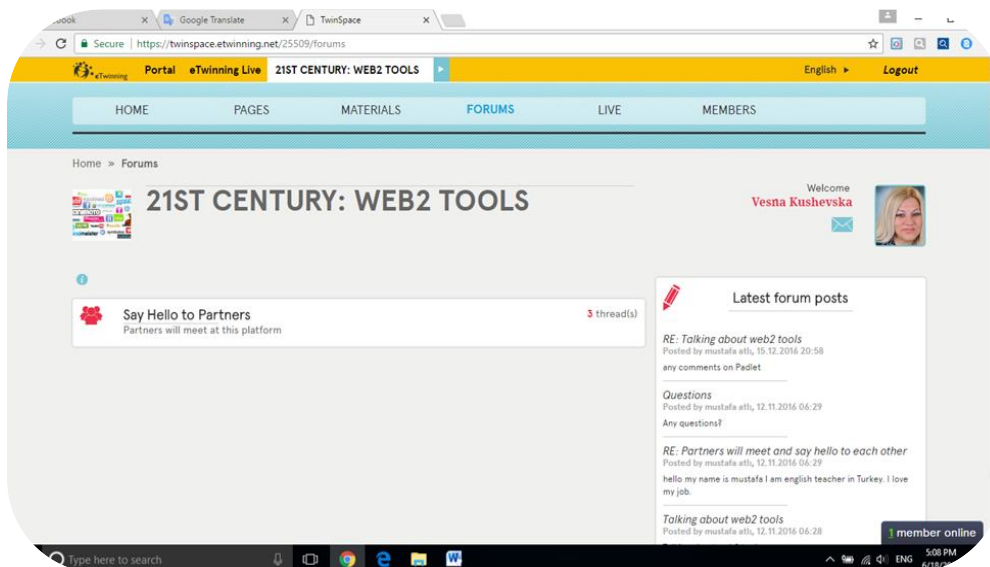


In order to be able to save the page, it must have content in the form of text, images, videos or documents. Choose what you want to put on the page by clicking on the “spy” that will take you to the materials you

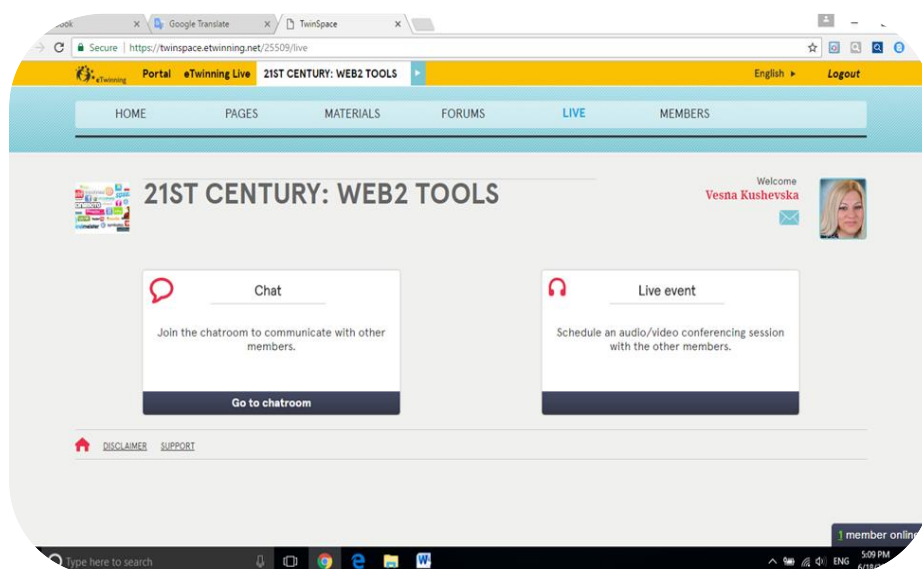
have stored on Twinspace. When you have arranged the page, do not forget to use the red “Save” button to save the changes.



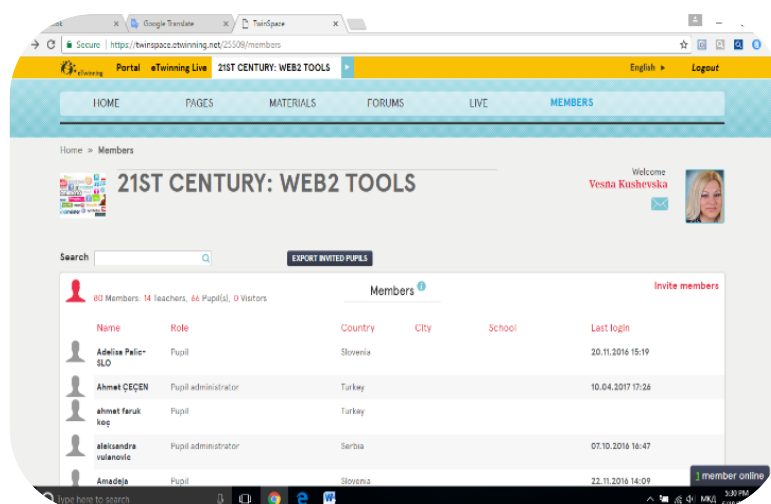
Forums: Forums are the best place for debates. Administrators can create and delete forums and topics. All members can participate.



Live: Use the communication and video conferencing tools „live“ to get in touch with members. Only administrators can set up online meetings and events.



Members: Since it is important for eTwinning projects to include students, and to enable collaboration among students from partner schools, this can be done by choosing the „Members“ option.



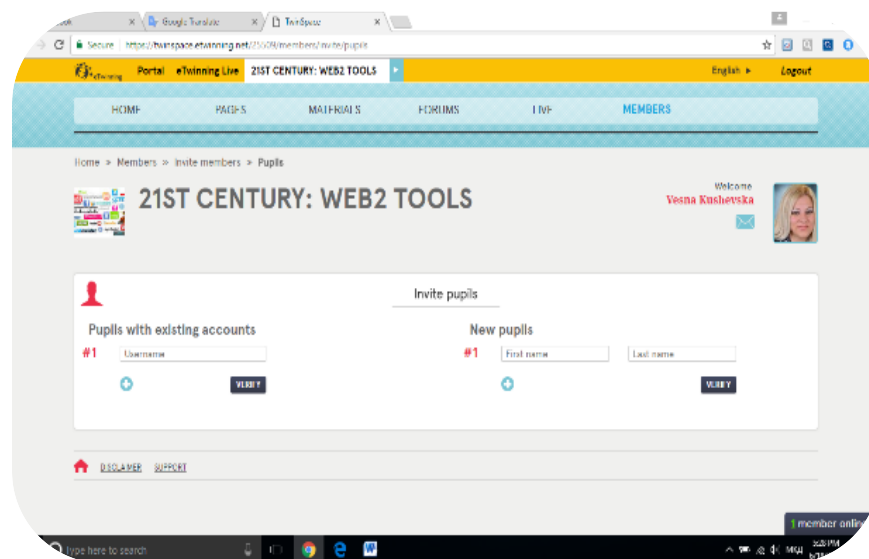
The „Pupil (s)“ option will appear on the screen. When you are a new to eTwinning, you need to write the Student Name and Surname under „New pupils“ because they still do not have their own account. When you write the student's first name and surname, you will automatically be offered a User Name and you will enter the password yourself. You must obey this data because the students will be able to join them with all subsequent projects.



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Project participants- students can comment on posts in the project journal and topics in the Forums, but cannot open new Forums, communicate with each other, and create and edit pages.

Used links for eTwinning:

<https://www.youtube.com/watch?v=byFIAUhCZXs>

<https://www.youtube.com/watch?v=oEBjkbEkH-I&t=182s>

<https://www.youtube.com/watch?v=YyEuLLcYqwo&t=42s>

<https://www.youtube.com/watch?v=i038jAQnRp4>

<https://www.slideshare.net/AleksandraDanilovic/mrezni-modul-2112016-3-webinar>

<https://www.slideshare.net/natasaljubicklemse/etwinning-bez-granica1-webinarljik-67510792>

<https://www.slideshare.net/europeanschoolnet/content-hr>

<https://www.slideshare.net/europeanschoolnet/communication-interaction-hr>



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