

Survey of Resources for Engaging Children in Permaculture

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Children in Permaculture (CiP) is an Erasmus+ project in which seven European organisations are working together to improve the education of children in formal, informal and non-formal settings through the development of resources such as curricula, lesson plans, films and other resources. These resources will enable kindergarten and school teachers, permaculture practitioners, parents and other educators to engage in holistic, sustainable education with children based on permaculture ethics and principles.

Abstract

“Permaculture is the use of systems thinking and design principles that provide the organising framework for... creating consciously designed landscapes which mimic the patterns and relationships found in nature while yielding an abundance of food, fibre and energy for provision of local needs.” (Holmgren, 2002, pxix).

Permaculture is usually taught to adults in a permaculture design course, yet in order to create a truly permanent culture, the opportunity to learn permaculture skills should be available from an early age. The problem is that children are not normally included in permaculture education or permaculture education discourse, and there are not many resources explicitly about sharing permaculture with children. Those that do exist do not address every area of permaculture.

Hence the Children in Permaculture project was initiated to identify relevant resources and the gaps in knowledge, and to create resources to support educators in their work with children in permaculture. The first step was to create a Children in Permaculture curriculum by adapting a standard Permaculture Design Course (PDC) curriculum for adults. The broad range of topics which can be taught on a PDC were collated into six broad themes to give a coherent structure to our work and resources. These themes are: Introducing Permaculture, Living Nature, Designing, Growing Food, Built Environment and Resource Use, and Social Permaculture. We identified 316 resources (books, films, websites, lesson plans etc) in 5 languages about the field of children in permaculture. These resources were analysed by language, theme and researcher ratings.

Findings include: There is no written pedagogy for sharing permaculture with children. There are many high quality resources in the Living Nature theme (110 resources are listed), whilst there is a dearth (with only 14) in the Design theme. There is a large difference in availability of resources between languages, with 180 resources identified in English and only 22 in Romanian. There is a great diversity in how relevant the resources are to engaging children in permaculture. There is no single resource that covers all aspects of the “Children in Permaculture” curriculum.

Educators (including kindergarten and school teachers, permaculture practitioners, and parents) who are interested in sustainable living will find this survey useful because it lists recommended resources, identifies the gaps in our collective knowledge-base and initiates discussions regarding a permaculture pedagogy with children.



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Glossary

Children in Permaculture (CiP) – European project funded by Erasmus+ to explore best practice for sharing permaculture with children.

CiP – see Children in Permaculture, above.

Catalogue – a list of resources collated into a spreadsheet (with columns labelled as described in section 1.3), which will become an online database.

Curriculum – a list of themes with topics for sharing permaculture with children.

Educators – adults who educate others. In this paper, educators of children in formal, non-formal and informal settings. Educators can include school/ kindergarten teachers, classroom assistants, nursery assistants, head teachers, parents, home schoolers, childminders, scout/guide leaders, tutors, Forest School practitioners etc.

Formal education – education within a school setting.

Informal education – education at home, whether the child is also at school or not, can be done by parents, grandparents, guardians, carers, or other members of their family or community.

Lesson plan and session plan – a description of an activity which will enable the reader to understand how and why to lead the activity with children.

Non-formal education – education in an out-of-school group such as Scouts, Guides, Woodcraft Folk, after-school clubs etc.

Nursery – in the UK children attend nursery school from age 3-5 years.

Pedagogy – the method of teaching, the ‘how’ rather than the content of what is being taught.

Permaculture – the philosophy and practice of creating a “permanent culture”, as defined by Mollison and Holmgren (1978). Permaculture has become a worldwide movement encompassing practices for sustainable living.

Researchers – representatives from the seven organisations in the CiP partnership who have been working in the field of Children in Permaculture for some years, and who have gathered resources relevant to this survey. Researchers read, listened to and viewed resources, and then reviewed them in the Catalogue.

Resources – books, magazines, lesson plans, curricula, videos, podcasts, websites, stories, songs, and other material that can be used for sharing permaculture with children.

Theme - A broad subject area within the general idea of CiP curriculum. Each theme includes various topics.

Topic - A subject within each theme of the CiP curriculum. There may be numerous topics within each theme.

1. Introduction to the Survey of resources

This section outlines the background to the Children in Permaculture project, and the purpose and methodology used for the Survey of resources.

1.1 Background to the project

“The philosophy behind permaculture is one of working with rather than against nature... of looking at systems in all their functions, rather than asking only one yield of them; and of allowing systems to demonstrate their own evolutions” (Mollison, 2009, pix)

Bill Mollison and David Holmgren coined the term ‘permaculture’ to describe the practice and philosophy of a permanent (or sustainable) culture and agriculture. By ‘permanent’ they meant that if the same practice is continued for seven generations without detriment to the environment or people, it is genuinely sustainable.

“Permaculture is the conscious design and maintenance of... systems which have the diversity, stability, and resilience of natural ecosystems. It is the harmonious integration of landscape and people, providing their food, energy, shelter and other material and non-material needs in a sustainable way” Mollison (1992, pix). This is in contrast to common agricultural and other practices which cause the depletion of essential resources, including soil, forests, biodiversity and oil, whilst causing problems including air, noise, soil and water pollution, and climate change.

Permaculture has become a worldwide movement, with people practising permaculture in most countries around the world (e.g. Never Ending Food, 2016). The Permaculture Association have listed 135 countries with organisations practising permaculture (not published). Permaculture is applied to most areas of life, including farms, businesses, villages, cities, schools, gardens, allotments, homes, and education systems. Many people appear to be applying the permaculture ethics of “Earth Care, People Care and Fair share” and principles to their practices¹, including

1 for example the readership of the Permaculture Magazine is 100,000.

in the education of children, as reported in articles in magazines, websites and social media (e.g. Permaculture Magazine, 2016).

In order for permaculture to have a sustainable, long term impact in creating a more ecologically sound future for the planet and people the role of children is key. Yet, the vast majority of resources and networks about teaching permaculture are aimed at adults rather than children. For example, during the European Permaculture Teachers Partnership, which was an Erasmus+ project, funded from 2012-2014 with 14 partner countries, the main aim was to increase the quality of permaculture teaching, but children were rarely mentioned. It is because of omissions like this that Gaye Amus was inspired to initiate a group called “Children in Permaculture” in 2012 (Children in Permaculture, 2015) to: raise awareness of the need for inclusion of children, create a network for children in permaculture, connect people who are sharing permaculture with children, and collect ideas and resources. To achieve the full objectives of this group, it was ascertained that funding would significantly enhance the speed and quality of the work, hence seven partner organisations were selected and co-wrote a project proposal for European funding. Erasmus+ funding was granted to support this project in 2015.

1.2 Children in Permaculture project summary

Children in Permaculture (CiP) includes NGO partners from Romania, UK, Slovenia, Italy and Czech Republic, and a UK state school and a kindergarten & after-school centre in Romania. It is a three year Erasmus+ project funded from Sep 2015 - Sep 2018. The CiP partners aim to improve the education of children in formal, non-formal and informal learning through the development of CiP best practices resources which will enable school and kindergarten teachers, leaders, parents and other educators to engage in a holistic, sustainable education with the children they are working with.

The specific objectives are:

1. To identify, develop and test CiP best practices resources (curricula, lesson plans,

activities and other resources) with 17+ educators of children aged 3-12 years in the 5 partner countries.

2. To improve competences and skills in outdoor permaculture education, intercultural awareness and sustainability of up to 150 school and kindergarten teachers/assistants.
3. To engage up to 250 children aged 3-6 years and 250 children 7-12 years in the 5 partner countries in opportunities to learn about the environment, climate change and sustainability.
4. To consolidate and disseminate the CiP best practices to 250 educators in the 5 partner countries and to educators throughout the EU with freely available online resources.
5. To establish a European Children in Permaculture Network with 1000 educators throughout Europe.

We have created an online platform at www.childreninpermaculture.com which will include a user-friendly database to host CiP resources. This Survey of resources is our second intellectual output. The next will be case studies and then a short film to enthuse and motivate others to follow our examples.

Throughout the CiP project the partners will develop and test curricula, lesson plans, activities and handouts for children aged 3-12 years. These will be collated into a manual. Other educators globally will be able to freely download and test these resources, give feedback, and suggest improvements.

Through this project we will be moving towards a future in which all humans are living in harmony with each other and nature, and all children can access an education based upon the ethics of earth care, people care and fair share.

1.3 The purpose of the Survey of resources

A good permaculture design starts with a survey of the landscape and people. Hence the Children in Permaculture project is commencing with a survey of the knowledge-base, resources, and people who are engaging children in permaculture.

The purpose of the Survey of resources is:

- For the project partners (the authors of this survey) to become familiar with what resources there are about Children in Permaculture.
- To create a list of recommended resources which project partners consider the key resources.
- To identify gaps in the collective knowledge-base. This will enable the project partners to create resources in areas of most need.
- To disseminate the information gathered about resources to other educators working in this field - project partners, members of the network and educators worldwide who work with children in permaculture in formal, non-formal or informal settings.

The main document is written in English. In appendices two to six there are short contributions in five languages (Czech, English, Italian, Romanian and Slovenian) summarising resources which already exist (in original or in translation) in those languages.

The aims of the survey, as identified in the successful Erasmus+ funding application, are to:

- Identify best practice (curricula, lesson plans and other resources) in permaculture education for educators in formal, informal and non-formal settings.
- Identify gaps in existing materials and practices in order to focus on developing resources specific to teaching permaculture for children in the areas where they are most needed.
- Make available a survey of the existing resources which will provide high quality learning opportunities and strengthen education and training paths of educators working in formal, non-formal and informal ways.
- Enhance the early childhood care from the start of the project, thus increasing the project's impact.

- Foster quality improvements, innovation excellence and internationalisation at the level of education and training institutions.
- Contribute to dissemination of good practice.
- Encourage the learning of languages in order to access the materials.

1.4 The methodology used in the Survey of resources

As the scope of permaculture is very broad, the first step for the Survey of Resources was to create a coherent framework to which we could relate the resources and identify gaps in the knowledge-base.

The Permaculture Association (PA)'s Permaculture Design Course (PDC) curriculum for adults was adapted to create a Children in Permaculture (CiP) curriculum. The PDC curriculum was used for a number of reasons: it is the internationally recognised standard for teaching permaculture and for demonstrating that you have an understanding of permaculture; it is clearly laid out and has been trialled in 30 years of teaching permaculture; PA recently updated their PDC curriculum so it now reflects the current best practice of permaculture education in Europe.

The PDC curriculum was grouped into six themes which loosely reflect the experience of educators working with children, whilst there is much cross-over between themes. Within each theme is a list of topics and sub-topics which are relevant to working with children aged 3-6 years and a different list for those aged 7-12 years. Lists of topics within the body of this document (such as section 3) are a collation of these two lists. For the full curriculum, please see appendix 1.

Partner organisations selected educators to read, listen to, or view resources about engaging Children in Permaculture, to enter their ratings in the spreadsheet and to co-author this Survey of Resources. These educators are herein called researchers.

A catalogue in the form of a spreadsheet was created in which to collate the details about the different resources. The catalogue included the following details about each resource:

- Title and author
- Link to the resource
- Language and available translations
- Description
- Has the researcher used this resource to lead activities with children?
- Type of resource (lesson plan, video, curriculum, book, session plan, website)
- Date of creation of the resource
- Relation to the themes of the CiP curriculum
- Relevance to age group (3-6 years, 7-12 years, or both)
- Primarily relevant to which educational setting (formal/informal/non-formal)
- Does it appear to be using or relate to a permaculture pedagogy? (Not at all/A little/ OK/ Good/ Excellent)
- Relation to permaculture ethics/principles
- Evaluation of the resources according to its highlights/strengths and its possible need for development (comments).
- Evaluation of resources according to its relevance and usefulness to the project (star-rating). (1 - not, 2 – a little, 3 - partly, 4 - very much, 5 - matching)

The catalogue contained a separate worksheet for each of the following languages: English, Slovenian, Italian, Romanian, Czech and Other (with the same column headings in each).

In order to test the catalogue, all researchers read and viewed the same three resources in English and entered data into the catalogue (without first reading what the others had written). The researchers then met to compare the way they answered the questions, and to reach a common understanding of the terms used in the catalogue and the star ratings. This was an important step in ensuring the reliability of the ratings between different researchers.

Researchers from the seven partner organisations in the European partnership reviewed resources which they had either used themselves, had been recommended by others, or otherwise found in their own language. For example, all resources recommended in the *Learning for Sustainability* monthly newsletters from January 2014 to October 2015 were reviewed and the detailed entered into the catalogue. All resources read/viewed were entered into the catalogue (even if the researcher considered it of low relevance) to give a complete listing of resources surveyed.

Once the first version of the catalogue was completed, two of the researchers (Alderslowe and Kastelic) produced an overview of all the resources, creating tables and charts in a new spreadsheet. Where the star rating given by the initial researcher was high (4 or 5), these resources were read or viewed again. Where information was missing from the catalogue, or the resources were not easily available to them (e.g. a book they could not access) they requested more information from the wider research group. They wrote a draft research paper which was then read and commented upon by the other researchers.

It was agreed that the main document about the Survey of resources would be about the resources which are available in English, as this is our common language. Researchers discussed each recommended resource. A list of resources explicitly about engaging children in permaculture was formed from the full catalogue to ensure that all the researchers were familiar with these core resources. A minimum of 3 researchers reviewed each of these resources. At least one of the authors had to be highly familiar with a resource before it reached our 'Recommended Resource' list. If anyone objected to a resource being recommended it was removed.

All of the researchers then wrote a short piece solely about the resources available in their own language. During this process, some researchers discovered resources (including resources available in English) which were not in the original analysis. The catalogue was updated, and the tables and charts were also updated to include the full listings.

2. Overview of the resources

We reviewed 316 resources about Children in Permaculture, in five different languages (Czech, English, Italian, Romanian and Slovenian) and input all into a catalogue. The catalogue lists 189 books and 56 websites, as well as other resources such as lesson plans, curriculum, session plans and videos, see figure 1 below.

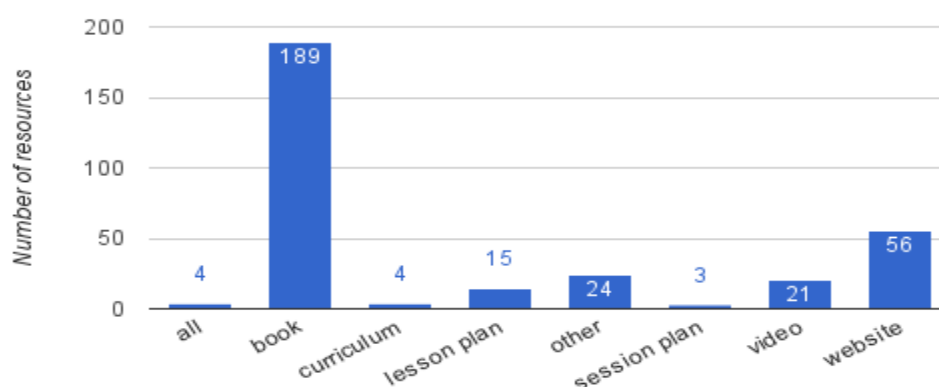


Figure 1 - Number of resources by type.

Many of these resources are specifically related to one theme of the curriculum, and are not explicitly about permaculture, indeed some were written before the word permaculture had been coined.

A detailed analysis is presented below with figures and tables summarising the data. This is followed by an exploration of the pedagogies found within these resources.

2.1 Analysis

2.1.1 Languages

The highest number of resources reviewed were in the English language, with 180 resources, followed by Czech, Italian, Slovenian and finally Romanian, see figure 2. Please note that by looking at gathered resources in all languages there appear to be fewer resources listed than if we look at each language individually and sum the total. This is because certain resources are available in more than one language. It is useful for educators to know how many resources are available in their language, as it helps to identify where more translations are required.

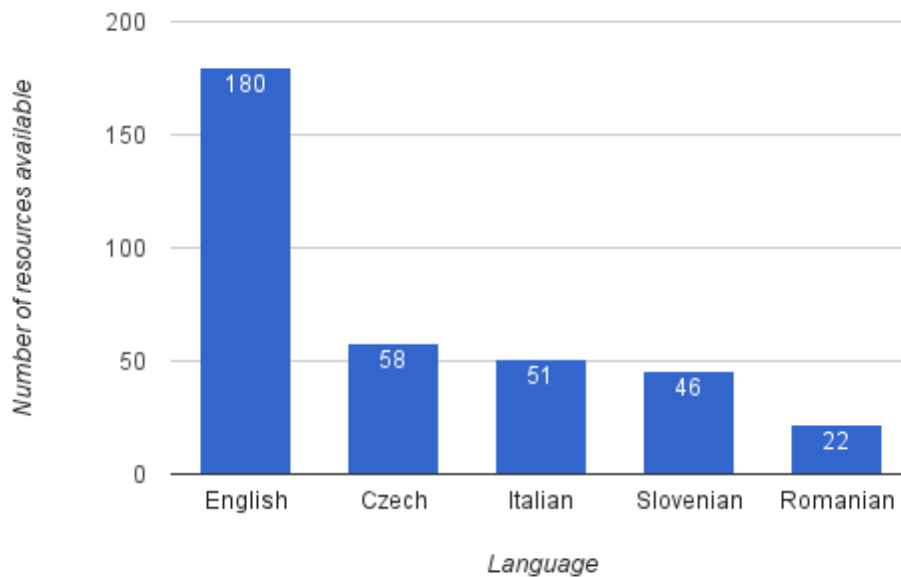


Figure 2 – Number of resources available in each language.

2.1.2 Curriculum themes

The CiP partnership created a curriculum with six broad themes: Living nature, Design, Growing food, Built Environment and Resource Use, Social Permaculture, and Introducing Permaculture, for more detail see Appendix 1. Each resource was classified into the primary theme from the CiP curriculum that it addresses or whether it is mainly about how we teach children (pedagogy, this is titled A in the figures below). Figure 3 shows that Living Nature has the most resources, closely followed by pedagogy.

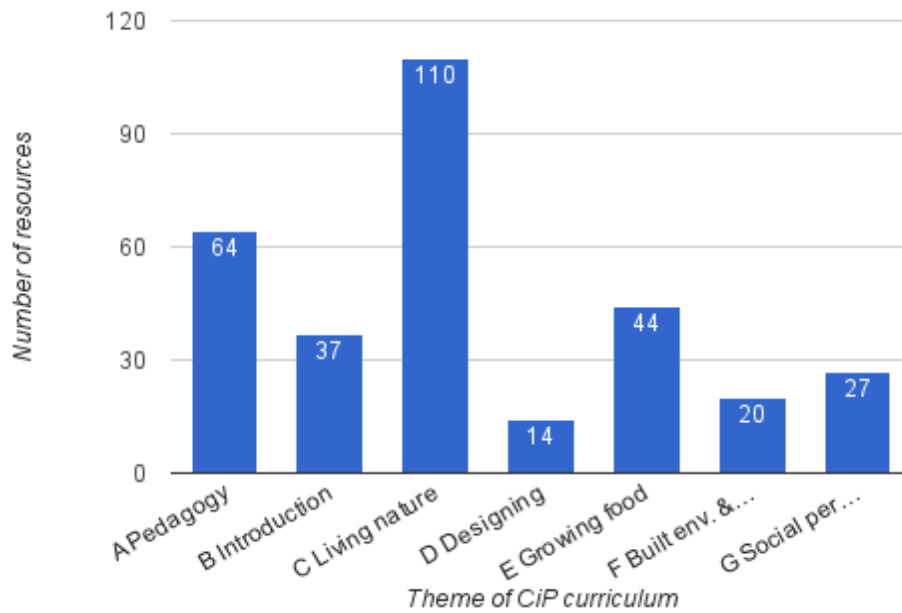


Figure 3 - Number of resources in each curriculum theme.

2.1.3 Relevance to age groups

The CiP project is aiming to address the needs of children age 3 to 12 years. In order to create resources and materials that are age- and developmental stage-appropriate we have split the age range in two groups - 3 to 6 year olds (kindergarten) and 7 to 12 year olds (primary school). This is a commonly used division in education, e.g. the UK Government (2014).

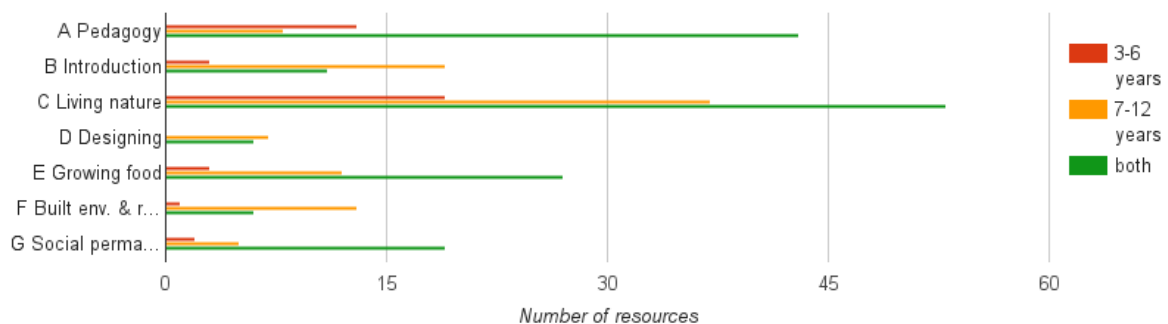


Figure 4 – Number of resources by curriculum theme and age group relevance.

Resources can either be directly for children (such as a storybook), or for adults who need to learn more about the education of children in this age group. Figure 4

indicates that most resources are appropriate for both age groups. Of the remaining resources more are appropriate for 7-12 year olds and fewer for 3-6 year olds.

2.1.4 Educational setting

Each resource was classified into the educational setting it is more relevant to, whether formal education (school), non-formal education (e.g. after-school groups, scouts, guides), informal education (home schooling) or all educational settings. Of the 316 resources, the majority (140) were listed as appropriate for all educational settings shortly followed by formal education (120). This is illustrated in figure 5 which also compares the setting to the theme of the curriculum.

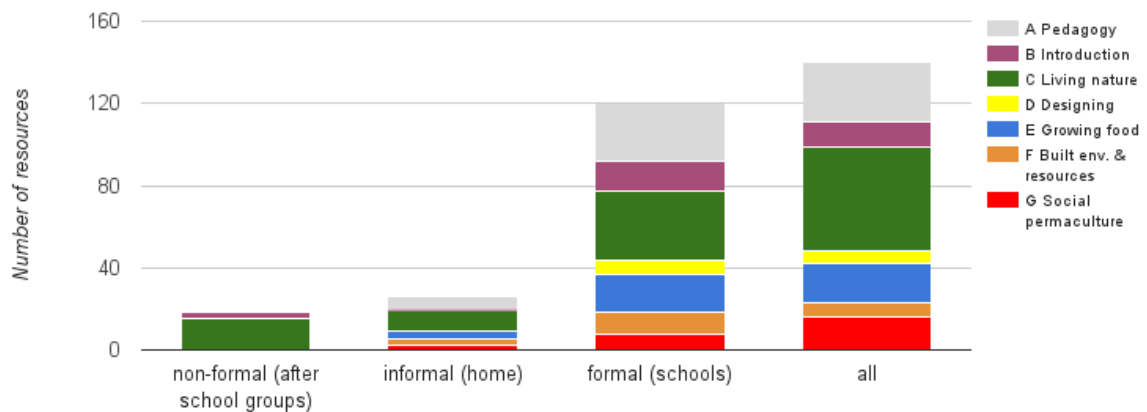


Figure 5 - Resources primarily relevant for each educational setting by curriculum theme.

2.1.5 Permaculture ethics and principles

Permaculture ethics and principles are the core of permaculture, it is how permaculture tutors decide whether a design is a permaculture design or not (e.g. Permaculture Association, 2013). 38% of resources do explain a permaculture ethic or principle of the resources, and 35% of resources explained them indirectly, see figure 6.

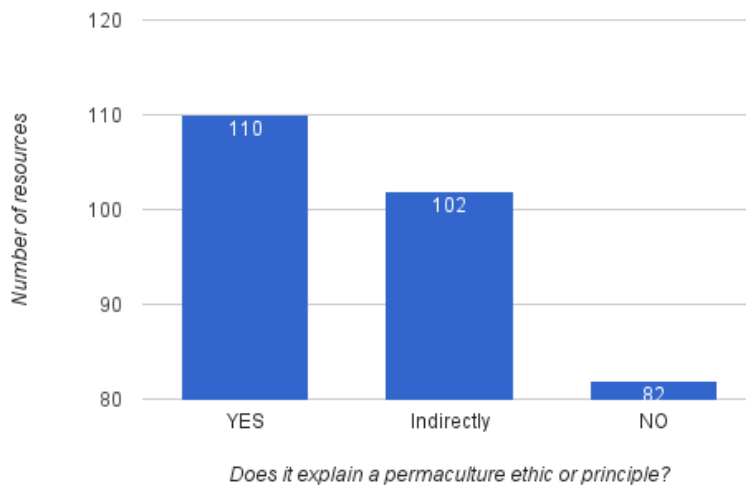


Figure 6 – Permaculture ethics and principles.

2.2 Permaculture pedagogy

Pedagogy is defined as “the method and practice of teaching, especially as an academic subject or theoretical concept” (Oxford dictionary, 2016). The term comes from the Greek *paidagōgos*, in which *paid* means child and *agogos* means to lead or guide; thus literally “to guide the child”. Thus pedagogy is about how we teach children, rather than what we teach them. It is important to discuss what permaculture pedagogy is in order to assess whether a resource is using that pedagogy and therefore whether we can recommend its use with children.

Figure 3, above, shows that 64 resources are mainly concerned with pedagogy, i.e. how we work with children. When asked “ Does this resource appear to be using or relate to a permaculture pedagogy?” 65% of the 64 resources mainly about pedagogy were rated “Good” or “Excellent”. This may be because the researchers only listed resources as most relevant to this theme, when they considered it a permaculture pedagogy (as the main topic addressed by this theme).

One point which stands out from the resources rated highly in our survey is the importance of child-led learning, especially with children aged 3-6 years. For example, White (2012), summarises research about play thus:

“In the short and long term, play benefits cognitive, social, emotional, and physical development... When play is fun and child-directed, children are motivated to engage in opportunities to learn. Moreover when given choices in play, children can find activities that are best suited to their individual needs” (p31).

Another point that stands out (e.g. White, 2012) is that teachers (whether they acknowledge it or not) are role-models. Children will do what their role-models do more than they will do what their teachers tell them to do.

The central question is “What does a permaculture pedagogy look like?” Mollison and Holmgren both used a didactic style of teaching, where the teacher stands at the front of the class and fills the “empty vessels” of the students’ minds in front of them as if they have no prior knowledge (e.g. Mollison, 1994). Freire (2007) encourages departing from didactic teaching, towards a ‘Problem-Posing Education’. This is done through a process of dialogue with students, enabling a praxis - a process of reflection and action. This leads to the emergence of consciousness and critical thinking, and to individuals who question what they see and strive to understand it and take action to change their world.

Bakx (2014) states that:

“Over the years many permaculture teachers developed their own pedagogy, introducing new ways of motivating learners and designing rich and diverse learning environments – often by intentionally applying permaculture design ethics and principles to the challenge of education.”

Examples in the resources given include Clayfield and Skye (1995), Morrow (2010), and Goldring (2000). The latter exemplifies different ways which permaculture is taught, including nearly 100 session plans. Trought (2015, p18) explains it thus “the concept of permaculture defies traditional educational pedagogy by insisting that nature is our true instructor and observation is the tool to discovery”.

All of the resources mentioned above are aimed at teaching adults. Many of the examples can be adapted for working with children, but none are aimed specifically at children. In fact, we found no resources specifically exploring a permaculture pedagogy for working with children. This is clearly an area for further research and development.

There are different pedagogies for working with children that have been influential, and which we have listed in our catalogue. It is useful to briefly introduce a few of the most relevant ones here: Montessori, Steiner, Reggio Emilia and Neohumanist education.

2.2.1 Montessori

Ten of the resources in our catalogue are either written by Montessori or are about Montessori kindergartens and schools. Maria Montessori developed a pioneering, holistic pedagogy from 1897 to 1952. This pedagogy is now world famous, and is used in thousands of kindergartens and schools (e.g. Montessori, 2016, lists 3877). In the Montessori pedagogy, preparation is key. Specially developed Montessori materials and furniture are designed to meet the child's physical and psychological needs and support the child's growth in the areas of practical life, sensory stimulation, mathematics, language, arts, music, science, history and geography. Whilst children explore the materials, they learn to concentrate, develop self-confidence, respect themselves and others, understand order, and to love learning.

Interestingly, most of the Montessori books in the catalogue have not been rated very highly by CiP researchers, with an average rating 3 out of 5 ("partly useful and relevant to CiP"). However, in response to the question "Does this appear to be using or relate to a permaculture pedagogy?" 9 out of 10 were rated Good or OK, which shows that there is some fit with a permaculture pedagogy, but it is not excellent.

2.2.2 Steiner

Another famous pioneering educator was Rudolf Steiner, who founded the Freie Waldorfschule (Free Waldorf School) in Stuttgart, Germany, in 1919. His work

developed into the Waldorf educational movement, which influences teaching in “over 1,200 Steiner schools worldwide and 2,000 Early Years settings in a total of 60 different countries” (Steiner Waldorf Schools Fellowship, 2016). Steiner's spiritual-scientific research is known as ‘anthroposophy’. This approach is based on a perception of the human being as threefold, comprising body, soul, and spirit. The focus for 3-6 year olds is imitation, not intellectualism. For 7-12 year olds the focus is on learning through imagination (story, myth, art, narrative, and biography) and doing. The time to exercise and challenge the intellectual intelligence comes later, primarily in adolescence (Steiner, 2012, and 2011).

Two of Steiner’s resources were reviewed in the catalogue and both were rated 3 out of 5 (“partly useful and relevant to CiP”). The two Steiner resources were rated “good” in their relation to a permaculture pedagogy.

2.2.3 Reggio Emilia

The Reggio approach, developed by Loris Malaguzzi (1920-1994), is an educational philosophy operating in a network of state preschools (3-6 years) and infant-toddler schools (0-3 years) in the town of Reggio Emilia, Italy. Kantrowitz and Wingert (1991) found that the network of 33 infant/toddler schools and preschools in Reggio Emilia were among the ten best school systems in the world.

The Reggio approach values the child as strong, capable and resilient, rich with wonder, knowledge and innate curiosity which drives their interest to understand their world and their place within it. The teacher is considered a co-learner and collaborator with the child and not an instructor. Teachers plan activities and lessons based on the child's interests, asking questions to further the child’s understanding, and actively engaging in activities alongside the child. Hewett (2001) states that in this approach "as partner to the child, the teacher is inside the learning situation". There is a strong focus on social collaboration and working in groups, where each child is an equal participant, having their thoughts and questions valued. The adult is not the giver of knowledge, instead children search out knowledge through their own investigations (Casarini, Gambetti & Piazza, 1995). Young children are offered daily

opportunities to encounter many types of materials and to express themselves in many different ways (using art, drama, words, song and more). Children actively work with hands, minds, and emotions, in a context that values the expressiveness and creativity of every child (Edwards, Gandini, and Forman, 1998).

Two resources explicitly about the Reggio Emilia approach were reviewed in the catalogue. The average rating for usefulness and relevance to CiP is 4.5 and in response to the question 'Does it appear to be using or relate to a permaculture pedagogy?' the answer for both resources was 'good'.

2.2.4 Neohumanist education

Seven of the resources are about Neohumanist education and all seven have been rated 5 out of 5 for usefulness and relevance to CiP. The partner kindergarten in the CiP project uses a Neohumanist pedagogy.

The founder of Neohumanist Education was Prabhat Ranjan Sarkar (1921-1990), an Indian philosopher, social activist and spiritual visionary. Neohumanism extends the Humanist recognition of the rights of all human beings, to the entire natural world. It recognises the existential value and rights of all beings - including basic resources such as water, air, earth and light. It provides a rational framework in which to understand, value and cultivate the spiritual dimension of human existence. At its core, Neohumanism is “the practice of love for all creation including plants, animals and the inanimate world” (Sarkar, 1981, p12). Neohumanist Education thus aims to be an education of the heart, to help children preserve the natural sense of wonder, joy and connection they are born with. Sarkar believed that universal love leads to a deep appreciation for the ecology of our planet, sustainable living, and a just social and economic structure. This love is practically cultivated through the integration of specific Neohumanist techniques such as “Quiet Time”, special music, songs, wisdom stories and practical experiences in nature and the community that help children to cultivate empathy, respect and care towards a diversity of people and the natural world.

Sarkar (1981) stated that early childhood education is of critical importance, as our basic world view is formed during that period. Once internalized at about seven years old, it becomes part of a subconscious filter or lens through which the person views the world, which is quite resistant to change. When children are taught to listen to their own hearts and cultivate critical thinking about injustices and a commitment to fairness for all - not only for human beings, this expanded view of the world will be natural for them.

3. Resources by curriculum theme

In this section we go through each theme in the CiP curriculum and analyse the resources in the catalogue across the five languages of the CiP project. This will enable us to identify gaps in the knowledge-base.

3.1 Introducing permaculture

“Permaculture... [has] become a worldwide movement encompassing all aspects of how we as human beings can live harmoniously in relation to our Earth and it's finite resources... Permaculture is about creating sustainable human habitats by following nature's patterns.” Burnett (2012, p8).

The CiP theme “Introducing Permaculture” introduces children to the ethics and principles of permaculture, and explains why it is necessary.

Topics include:

“Our planet is ill”: providing a context on sustainable development (this is relevant to children aged 7-12 years, and not those aged 3-6 years):

- climate change,
- pollution (including litter),
- resource depletion (especially finite resources),
- human-centered, short-term thinking.

“Permaculture for Healing our Planet” introduces key permaculture concepts:

- permaculture ethics: Earth Care, People Care and Fair Share,
- permaculture principles: Mollison’s (2009) and/or Holmgren’s (2002),
- What is permaculture? and it’s history.

Of the 316 resources reviewed, 37 (12%) relate mostly to the theme of Introducing Permaculture.

Of the 37 resources about Introducing Permaculture, 33 are in English, 3 are in Romanian, 1 in Slovenian and 1 in Czech. Italian listed no resources that relate strongly to this theme. Of the English resources there are 12 websites, 12 books, 3 videos, 3 'other' (e-book, songs, and a fairytale), and 2 lesson plans.

Of the 37 resources about Introducing Permaculture 19 are most appropriate for 7-12 year olds, 11 resources are suitable for both age groups, and three are most suitable for 3-6 year olds. Four are for adults to learn more about permaculture.

The majority of resources for this theme are either focused on sustainable development or on explaining permaculture. Resources in this theme that relate only to teaching sustainable development very often poorly reflect a permaculture pedagogy and they do not explain permaculture principles.

There are a number of websites addressing environmental education, including climate change, providing ideas for educators as well as online games and activities for children. These websites often didn't receive high ranking from our researchers, normally rating just 2 or 3.

Of the resources which relate explicitly to permaculture, the ranking for "relating to a permaculture pedagogy" is "OK" or better for every resource, and all of these resources do explain a permaculture ethic or principle.

Whilst very young children may not be cognitively developed enough to consider the global environmental situation, it is important for their teachers to have this awareness, so that they can design practical applications, such as putting food scraps into a compost bin. A thorough analysis and holistic approach considering a permaculture pedagogy is essential for this area.

3.1.1 Resources about permaculture with children

Of the 316 resources reviewed, 20 of them are explicitly about permaculture with children. Of these 20 resources, two are not available in English. Table 1 below lists the resources available in English. These resources have been reviewed by three to

five researchers who have each given a rating for usefulness and relevance to the CiP project. The final column of table one shows the average rating. Please note that this rating does not necessarily rate the quality of the resource, but how relevant it is, for example if it mostly relates to children older than 12 years old it is less relevant than a resource about children within our target age group (3-12 years).

From table 1 it is noticeable that only one of the resources which the researchers found that is available in English, is explicitly about engaging children in permaculture, is from Europe (Alderslowe, 2012). The majority are from the USA (11), then Australia (4), New Zealand (1), Jordan (1) and South Africa (1). The most accessible resource listed which gives a thorough understanding of how permaculture can be implemented in a school is the Afristar 30 minute documentary from South Africa (Afristar Foundation and Fixerfilm, 2013).

Table 1 – Resources in English explicitly about engaging children in permaculture.

Title of the book or website	Author	Description	Average Rating
Food for thought-Schools permaculture	Afristar (2013)	An educational documentary which offers step-by-step instructions on how to establish a permaculture garden at a school. Incorporating testimonials and case studies from all over South Africa.	4.5
Nurture and Nature	Alderslowe (2012)	An article in the Permaculture Magazine about an outdoor parent and child group in Glasgow, Scotland.	5
Kurent: A journal of permaculture resources for children, parents and teachers	Children's permaculture guild (2016)	An excellent journal sharing permaculture resources for children. Includes book reviews, activities, stories, and more. USA based.	4.25
The Garden - The Permaculture Song	Griswold & Thomas (2011)	A permaculture song with the 3 permaculture ethics and 12 Holmgren principles (USA).	4.00
Teaching Children Permaculture	Hogan (2012)	Excellent interview - podcast. 1 hour. How to set up your own permaculture farm/kindergarten, a beautiful story including the core routines of art of mentoring.	4.67
The institute of permaculture for children	IPEC (2016)	A website with information about courses and events on children and permaculture in USA. Has a long list of resources on permaculture with children.	4.75
Growing Schools	McCurdy (2016)	'Growing Schools' is a 4-part documentary series which is about empowered children involved in transforming their school grounds into abundant food gardens and nature havens. It explores the proven benefits of gardening and nature connection for children's motivation, academic achievement, health and well-being. New Zealand based.	4.4
Permaculture: Rhymers manual	Formidable Vegetable Sound System (2013)	A music album with songs about each of the 12 permaculture principles. Australian. They are also developing work with children in schools.	4.25
Permiekids	Mendez (2016)	This is an educational resource network which provides resources and activities for people to come to their center, in East coast USA. Some useful articles and information.	3.75
Children's food forest	Nuttall (1996)	About creating a permaculture food forest in an Australian public school based on the principles of permaculture. Inspiring. <i>Out of print so only 1 researcher read it.</i>	5
Outdoor Classrooms: A handbook for school gardens	Nuttall and Millington (2008)	Fantastic book about applying permaculture in school gardens with children, with links to curriculum etc Australia based, 2nd edition includes adaptation for the temperate climate.	4.8
Permaculture goes to school	Pacific edge permaculture (1997)	A good resource about applying permaculture in schools, ideas and bibliography for educators (USA).	4

Kids learning permaculture	Permaculture Institute (2014)	A very short video with children of various ages learning about different plants and topics relating to permaculture. Shows a small part of their farmers market (USA).	3.17
Solving all the problems of the world in a garden	Permaculture Institute (2010)	A video on the Jawaseri School Garden Project, in Jordan. The garden in the video won a national competition held by the Jordanian Department of Education – for schools who incorporate environmental projects into their curriculum. Mostly older children (12+).	3.00
The permaculture student	Powers (2015)	The Permaculture student is a book and worksheets aimed at young people and home educators. He is also interested in setting up permaculture home education groups in USA.	4.00
Soil lesson plan	Shapla, (2015)	Part of the Children's permaculture design course - soil. USA based.	4.33
Children's Permaculture Guild	Shapla, (2016)	This website aims to share print material, online resources, history, and support to further expand the growing network of environmental education and permaculture. USA based.	4
Co-creating a fun, sensory and edible family garden	Webb (2014)	An article with tips on how to create a children friendly family garden with permaculture principles. Australian.	3.50
Farmer Phil's Permaculture: The Original Permaculture Children's Book	Williams, Williams & Guize (2014)	A children's picture story book suitable for ages 6-9. The rhyming scheme also appeals to younger children (USA).	4.33

3.2 Living Nature

“If we want people to flourish, to become truly empowered, then let us allow them to love the earth before we ask them to save it.” Sobel (1996, p39).

The Living Nature theme is about discovering nature, learning about natural laws, and being in nature with awareness and appreciation. One of Mollison's (2009) permaculture principles is to “Work with nature”. We must first learn about nature, to understand the processes of the numerous systems and how they interact, in order to know what would naturally occur, and thus how to work in alignment with nature rather than against it. This is a key theme of permaculture education with young children.

There is a great deal of information available about the need for humans, and especially children, to spend time in nature. A key resource is Louv (2008) which

outlines the basis of nature-deficit disorder, and the need for educators to ensure that children are spending time in nature.

Topics within Living Nature include:

- Soil: exploring soil and soil life (e.g. minibeasts, bacteria, mycelium), soil textures, soil tests; indicator species; rocks and geology; and landform (beaches, hills, valleys).
- Water: playing in water, creating dams, catching and saving water, water life (e.g. fish), the need for water for all life, the water cycle, tides.
- Plants and trees: exploring and naming plants and trees, foraging, and exploring their properties and uses; climbing trees, bushcraft.
- Patterns in nature: spotting recurrent patterns such as spiral, branching, and nets, and thinking about their uses.
- Animal, fungus and bacteria kingdoms: learning their names, signs, families, homes, food, lifestyles and other patterns.
- Air: wind, weather, sky, breath and air (e.g. what it is made of and how)
- The web of life: interactions between elements, habitats and how the whole is more than the sum of the parts.

Of the 316 resources researched, 110 (35%) of them relate primarily to the theme Living Nature (see Figure 3).

This high percentage of Living Nature is across all languages apart from Italian (which has the most resources in pedagogy). Table 2 - 'Number of resources about Living Nature' shows that the authors found the language with the most resources about Living Nature is English (56), which is 31% of the resources in English. Please note the higher total number in this table is because some (8) resources exist in more than one language.

Table 2 - Number of resources about Living Nature in each language

Language	No. of resources about Living Nature	% of resources about Living Nature
Czech	25	43%
English	56	31%
Italian	3	6%
Slovenian	18	39%
Romanian	14	64%

Type of resource

The vast majority, 67%, of resources across languages about Living Nature are books. 15% are websites, 8% are lesson plans.

3.3 Design

Permaculture is an ecological design process - we are learning from nature and applying it to our design. Design methods are used in conjunction with permaculture principles to create an overall pattern or plan of action. A good design helps us to make best use of the available resources and create a more productive system, that meets more of our needs and creates less pollution.

The standard entry for adults into permaculture is through a Permaculture *Design* Course, which demonstrates that permaculture is indeed a system of design, thus it is important for children who are learning about permaculture to explore and learn about design.

Topics within Design include:

- Observation: creating maps, discovering local history, identifying what's there, understanding the weather and microclimates, soil, water sources and storage, interviewing stakeholders.
- Analysis: working out what you want and what limits there may be to it, and how best to fit them together.
- Design: Through drawing, model-making, post-its etc.
- Implementation: How to plan out how we will make the design manifest, what who needs to do and related questions.

- Maintenance: how much work will who need to do to maintain it?
- Presenting a design.

In order to make these topics age-appropriate and fitting with a permaculture pedagogy, educators should consider the size, scale and complexity of projects. Younger children's cognitive development may be in a stage where they can do only certain analytical steps of the process - but age appropriate, open-ended questions can be used to stimulate them to reflect and think more deeply and holistically.

A total of 14 resources were reviewed which relate primarily to this theme. An additional 12 resources were identified as having Design as a secondary theme, these were primarily related to Living Nature (5) and Growing Food (5). Only 1 was considered to have an 'excellent' pedagogy, 5 good, and 5 OK.

None of the resources found refer directly to designing with children 3-6 years old. Seven out of 14 resources are for 7-12 year olds and six are for both age groups. The Reggio Emilia approach encourages children to make a hypothesis, create designs, test their designs and design their learning path from an early age (Hewett, 2001).

Five resources about Design are in English, seven in Czech, one in Italian, and one in Slovenian.

3.4 Growing Food

“Young people are increasingly isolated from the land and deprived of the joys and responsibilities it teaches.” Waters (1996).

Many children do not know where their food originates from, and there are increasing health and well-being problems related to a poor diet such as obesity, diabetes etc (Oliver, 2016).

Growing food enables children to reconnect with the Earth and the true source of our food. It helps to improve children's understanding of nutrition and can change eating habits. Gardening provides a perfect opportunity for integrated, holistic learning - as different subjects, such as maths, science, art, health and physical education can be easily and naturally woven into the experience. Working together in the garden also improves social skills, such as teamwork and self-awareness.

The "Growing Food" theme includes the following topics:

- children growing their own food potentially including planning the harvests,
- building raised beds,
- sowing seeds, planting, weeding, watering, mulching, caring for plants,
- dynamic accumulators, companion planting,
- treating sick plants, problem solving,
- harvesting and discovering different yields,
- seed saving,
- aquaculture, livestock keeping,
- composting,
- rainwater catching,
- food forests,
- preparing, cooking and eating food from the garden.

The researchers found a total of 44 resources related primarily to this theme. 29 resources were in English, 8 in Czech, 6 in Italian, 3 in Slovenian and none in Romanian. 3 of the resources found are aimed at 3-6 year olds, 12 are for 7-12 year olds and 27 are for both age groups. 19 resources were found primarily relevant for formal education and 19 for all learning environments.

Seven out of 44 resources about Growing food were described as having an "excellent" permaculture pedagogy and 14 were described as having a "good" pedagogy.

3.5 Built Environment and Resource Use

“We do not inherit the Earth from our ancestors we borrow it from our children” Berry (1971, p26).

This theme will support children to investigate what the built environment is made of, how it is built and how we use resources within it. Topics include:

- den building and fairy homes,
- our homes, our neighbourhood,
- building with natural materials (e.g. pizza oven),
- biomimicry (copying nature in our designs),
- draught-proofing and insulation (e.g. wearing clothes, insulating a den etc),
- resources' (including electricity, oil and water) sources, the effects of use, and ways to use less,
- refuse, reduce, repair, reuse and recycle,
- ecological footprints,
- transport (e.g. Walk to School week),
- consumer goods (e.g. repairing and reusing clothes or electronic devices),
- upcycling (e.g. making puppets from old socks).

20 resources were identified as primarily relevant to this theme, half of which were also about a different CiP theme. The majority of resources primarily relevant to Built Environment and Resource Use are in English (9), then Czech (7) and Slovenian (4).

Interestingly, at 3.04 this theme has the lowest average rating for usefulness and relevance to CiP. Two thirds of the resources are most relevant to children aged 7-12 years, with only 1 most relevant to 3-6 year olds and 6 relevant to both age groups. The most prevalent resource types are books (9) and websites (7). 9 out of 20 of these resources appear to be using or relate to a good or excellent permaculture pedagogy.

3.6 Social Permaculture

“The next Buddha will not take the form of an individual. The next Buddha may take the form of a community; a community practising understanding and loving kindness, a community practising mindful living. This may be the most important thing we can do for the survival of the earth.”

Thich Nhat Hanh (cited in Brown, 2015, p164).

The theme of social permaculture is about exploring how permaculture principles can be applied to designing healthy human culture - from an individual to a global scale. For children is it about Me and My Community - supporting children to find peace within themselves, understand others and work well together.

The “Social Permaculture” theme includes the following topics:

- World view:
 - learning from and connecting to nature,
 - peace building,
 - creativity and art,
 - spirituality and rituals,
 - diversity,
 - finding quiet time.
- Me and my community:
 - health and well being,
 - group decision making (e.g. using voting, consensus),
 - family,
 - who is in my neighbourhood (including animal and plant families) being good neighbours,
 - conflict resolution & compassionate communication,
 - money and its alternatives,
 - personal empowerment,
 - the power of communities to improve life in cities, and how they are the element of transition towards sustainability.

- World of work: How you can learn more about permaculture, the world of work in permaculture.
- Feedback: Ways to get/receive feedback from children, as well as children learning how to express what they think about things. Children learning to give and receive feedback constructively.

27 resources were identified as primarily relevant to this theme. Out of those 18 resources are available in English, 9 in Italian, 6 in Slovenian, 4 in Czech (some books are available in more than one language). 24 resources gathered were books. 19 resources are available for both age groups, 5 for 7-12 year olds.

The average rating of usefulness and relevance to CiP of these 27 resources was 3.85, which makes it the theme with the highest ranking.

4. Areas for further research and resource development

From the explorations about pedagogy above it is clear that further research is required to define a permaculture pedagogy for working with children aged 3-6 years and aged 7-12 years. This definition will enable educators to develop activities, lesson plans, videos and other resources which are pedagogically relevant and age appropriate.

Table 3 lists the topics which should be focussed on to create resources which support educators to lead children in learning about the different aspects of permaculture. Whilst some resources were found which relate to these topics, they were either not of an appropriate pedagogy, not giving the permaculture view of the topics, or not sufficiently detailed. In particular there were very few lesson plans in our survey and this is an opportunity for permaculture educators. Whilst the list below may seem quite adult, we are looking for how we can explore these topics age-appropriately.

Table 3 - Topics for further resource development

Theme	Topics
Introducing Permaculture	What is permaculture? The permaculture ethics. Permaculture principles.
Living Nature	Soil: what is soil made of, soil life, soil types and tests, indicator species, rock types. Patterns in nature: spotting recurrent patterns and thinking about their use. Plants and Trees: they way they work, their importance, ecosystem services, and ways to identify them through stories and songs. Fungus and bacteria kingdoms: identifying and exploring their properties and uses. Air: wind, weather, sky, breath. The web of life: interactions between elements, habitats and how the whole is more than the sum of the parts.
Design	Learning from natural systems to apply to your design. Guiding children through a complete permaculture design process.
Growing Food	Food Forests. Connecting systems in a garden.
Built Environment and Resource Use	Investigating what our buildings are made of and how that affects resource use. Building with natural materials (e.g. cob ovens). Biomimicry (copying nature). Insulation and draught-proofing. Resources' (including electricity, oil and water) sources, effects of use, and ways to use less.
Social Permaculture	Money and its alternatives. Group decision making. Practising mindfulness. Spirituality and rituals. Learning to give and receive feedback. Living in community.

5. Recommended resources

The resources listed below are ones which at least one of the authors are familiar with and think are very relevant and useful for educators working in the field of children in permaculture. First are listed resources which relate most closely to pedagogy, after this the resources are listed by theme of the CiP curriculum.

5.1 Pedagogy

Teaching Children Permaculture with Kelly Hogan (2012) is a podcast which describes experiences of a permaculture kindergarten in the USA. Also relevant to *Introducing Permaculture*.

The Hundred Languages of Children by George Forman, Lella Gandini, and Carolyn Edwards (1998) is an inspiring book about the Reggio Emilia approach. It is a comprehensive introduction to the Reggio Emilia Approach, history and philosophy, parent's perspective, teaching methods, school and system organisation, use of space and environments.

The Last Child in the Woods by Richard Louv (2008) brings together a growing body of research showing that direct exposure to nature is essential for healthy childhood development and for the physical and emotional health of children and adults.

5.2 Introducing permaculture

Farmer Phil's permaculture by Williams et al (2014) is a children's storybook which exemplifies the difference between conventional farming and a permaculture approach. The book has very vivid picture and poetic language, although hand-drawn drawings (rather than computer-animated) could potentially improve it. The book is available for free online.

The children's permaculture guild (2015) is a website that shares printed and online resources, to support and expand the growing permaculture kids' network. It

has a selection of books, lesson plans and online curriculum for children, parents, and educators. They have recently started an online Children's Permaculture Design Course, which is an excellent resource, although at the time of writing it doesn't cover all of the themes in the CiP curriculum.

Afristar is an organisation that uses permaculture as a guiding methodology to engage in sustainable development initiatives in South Africa and beyond. They have specialised in developing posters, educational documentaries and informational booklets to illustrate techniques and principles of sustainability. The video entitled "Food for Thought- School Permaculture" (Afristar Foundation & Fixerfilm, 2013) is useful and educational.

The garden - The permaculture song by David Griswold and Oz J Thomas (2011) introduces the 3 permaculture ethics and 12 principles in a funky 3 minute song with animation.

The Formidable Vegetable Sound System (2013) are an Australian band who have written one song for each permaculture principle, with some great videos. They have started working with schools and aim to write lesson plans to go with them.

Permaculture goes to school by Pacific Edge Permaculture (1997) is a useful resource about applying permaculture in schools, with ideas and bibliography for educators.

Permaculture: A beginner's guide by Graham Burnett (2012) is a brilliant introduction to permaculture. He uses simple hand-drawn pictures to explain concepts which are hard to grasp in other texts. This resource is highly recommended to any adult or older child who needs a good introduction to permaculture.

Earth user's guide to permaculture by Rosemary Morrow (2010), as a manual for teaching permaculture and a good introduction to practical permaculture with clear illustrations. It can be adapted for work with children.

The manual for teaching permaculture creatively by Robin Clayfield and Skye (1995) is a book on Creative Facilitation and Interactive Learning Methods and Process written especially for Permaculture Teachers and Educators. Available as a book or pdf.

5.3 Living nature

Nature storybook series published by Walker books, such as Think of an Eel (Wallace, 1995), Emperor's Eggs (Jenkins, 1999), White Owl, Barn Owl (Davies, 2008). These are each written by authors who are specialists in their scientific field, each have children's story and a interesting facts related to it, with large beautiful illustrations.

The story of the little mole who knew it was none of his business by Wener Holzwarth and Wolf Erlbruch (1989). A fun storybook for young children (3-9 years). A poo lands on the mole's head so he goes around all the animals investigating who dunnit. Great way to introduce tracking to young children.

The giving tree by Shel Silverstein (1964), memorable children's book about how every part of a tree is useful for human being life, and how generous trees are with us humans. It has been translated to over 30 languages (but not Romanian).

Sharing nature with children by Joseph Cornell (1979) is a classical text which describes numerous activities to connect children with their natural environment. Symbols on each page show the age the activity is appropriate for, and group energy. Other relevant books by the same author include Sharing the Joy of Nature and Journey to the Heart of Nature.

The tale of Tommy Nobody: A bird story by Ruth Thomson (1985) illustrated by Charlotte Voake. This lovely little book tells of a fledgling who falls out of his nest and doesn't know who he is. He asks each of the other birds "Am I a bird like you?". Each bird replies describing their main feature, such as the robin's red breast. This story teaches very young children to identify common garden birds.

Nature's playground by Fiona Danks and Jo Schofield. A year-around treasure of helpful ideas for educators to all parents and teachers to do outside, supporting children to explore nature. In the same series (by the same authors) are Go Wild!, Run Wild, the Stick book and the Wild Weather Book. Translations in German, Spanish, French, Slovenian, Dutch, Polish.

The coyote's guide to connecting with nature by Jon Young, Ellen Haas and Evan McGowan (2010) is an all time classic book with lots of information about Living Nature, including an original section on Indicators of Awareness, as a different standard or benchmark for nature education (e.g. Quiet Mind, Common Sense). They describe Core Routines and many other activities and games, and even outline programmes of different lengths which you can lead with children.

5.4 Design

The living Earth card games by Lizet Frijters (2013) are highly recommended as a way to connect children (age 7+) to the art of designing through play.

The fountains - let's make an amusement park for the birds is a book and video based on the Reggio Emilia approach by Teresa Casarini, Amelia Gambetti and Giovanni Piazza (1995). It is available in English, French, Italian, German, Albanian, Chinese, Korean, Spanish and Catalan. It gives a behind the scenes look at a long term project in which children designed and built an outdoor amusement park for birds in their playground.

5.5 Growing food

Outdoor classrooms: A handbook for school gardens by Carolyn Nuttall and Janet Millington (2008) is amongst the highest ranking resources. This book is aimed at teachers and home educators who want to incorporate outdoor education at all levels of the school curriculum.

Kurent by Children's Permaculture Guild (2015), is a newsletter which is disseminating permaculture with children in the USA.

Garden organic (2016) have a website which provides games, planning and planting advice, wildlife projects, growing activities, construction projects, posters, information sheets and more. As it is about organic gardening there are some differences from some permaculture gardening tools and techniques.

Growing schools with Robina McCurdy (2016) and team are excellent videos on growing food in schools and kindergartens in New Zealand. One video showcases how kindergarten children can be included in the creation of a garden and what they learn along the way. Food forests are also documented in their "Localising food project".

Children's food forest (1996) by Carolyn Nuttall (currently out of print), is the story of the author's experience creating a permaculture food forest in an Australian school.

5.6 Built environment and resource use

"You can save the planet: 50 ways you can make a difference" by Jacqui Wines (2007), which has been translated into various languages including Czech and Italian. It's a great small book (144 pages) full of practical advice and instructions, how to save nature in the daily life of every child. On every page you find one idea which you can try - about eco-friendly behaviour, shopping, saving, reusing, recycling, not polluting, protecting living creatures, sharing ideas with others etc.

The International Association of Eco Schools (2016) has many schools engaged in environmental protection in each of the partner countries, and many others (total 59 countries worldwide). This is a fantastic resource for all working in formal education, including a 7 step methodology, 10 themes, many videos, and links to other schools and other organisations throughout each country and the world.

5.7 Social permaculture

The joy of caring for children in the circle way by Manitonquat (2015) through which the author encourages all of us to make children our priority, put them at the centre of our thoughts, feelings, and actions, return childhood to children. The joys of play and connection and of nature, the wonder and delight of learning, and the marvels in every moment of awareness.

The Neohumanist education curriculum for early childhood education by Didi Deshaies (2010) contains sections about nurturing children's inner development, using conflict as a teachable moment, as well as socio-emotional intelligence.

Fly eagle fly: An African tale by Christopher Gregorowski (2000) is a short story for 4-8 year olds. This is a story about an eagle with a beautiful meaning about how you must be what you are meant to be in the world.

6. Conclusion

The purpose of the Survey of resources was:

- For the project partners (the authors of this survey) to become familiar with what resources there are about Children in Permaculture.
- To create a list of recommended resources which project partners agree are the key resources.
- To identify gaps in the collective knowledge-base. This will enable the project partners to create resources in areas of most need.
- To disseminate this information to other educators working in the field of children in permaculture - project partners, members of the network and educators worldwide who work in formal, non-formal or informal settings.

The main conclusions are:

- There are many interesting resources concerning pedagogy, but none about a permaculture pedagogy with children.
- Within the Introducing Permaculture theme, there are many resources offering a general introduction to environmental education, but there are few resources available for introducing children to permaculture ethics or principles.
- The theme of Living Nature is well covered, with resources available for most of the topics.
- There are a number of resources aimed at teaching adults to create a permaculture design, but very few resources which demonstrate sharing design skills with children. There is therefore great potential for permaculture to contribute to the CiP theme of Designing.
- There are a good number of resources relating to Growing Food, although few of them are specifically using permaculture techniques with children.
- Within social permaculture there are many resources available, although some areas require further research. A question to be explored is, how to integrate and connect social permaculture with the other themes.
- No single resource was identified which can be used to guide children through all of the CiP curriculum themes comprehensively.

The next steps are:

- To further explore what is a permaculture pedagogy for working with children, and how this varies with age group and educational setting. This will dictate the form that future resources should take.
- To present detailed case studies which offer examples of permaculture practice with children, to illuminate areas outlined by the quantitative analysis presented within this paper.
- The catalogue should be adapted to become an on-line database, which will allow it to continue to grow as more resources become available, more people

become involved representing more languages, cultures, philosophies and countries.

- Translating resources into national languages, particularly Romanian (which has the fewest resources), will enable a much wider sharing of permaculture with educators in different parts of Europe.
- Resources should be created which can be used as stand-alone activities or lessons. It is also important to identify ways in which the activities can be put together into a whole programme which can broaden children's knowledge, skills and understanding of permaculture practice, leading towards a sustainable future.

In summary, this has been a useful exploration of the field of children in permaculture. The researchers have collated a considerable number of resources in a short period of time. However, it is likely that many more resources could be identified over a more extended period. Therefore contributions will be invited from educators around the world to further enrich the knowledge base.

The European CiP Partnership aims to produce a manual of activities, lesson plans and other resources which use a CiP defined pedagogy applied in every area of the CiP Curriculum. Exciting times are ahead, with skills, knowledge and understanding to deepen, horizons to broaden, and resources to be created and shared widely.

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Appendices

Appendix 1: Children in Permaculture Curriculum

	Theme	Topic	Sub-topics 3-6 years include:	Sub-topics 7-12 years include all those for 3-6 years plus:
A	Introducing Permaculture	1 Permaculture for children	The permaculture ethics: Earth care, People care, Fair share.	What is permaculture? The permaculture principles. Permaculture for healing our planet.
		2 The environment	Seeing forests and the environment as our home and keeping it clean.	"Our planet is ill". Peak oil, climate change, pollution, litter, resource depletion etc.
B	Living nature	3 Soil	Exploring soil and soil life, rocks, experiencing different landscapes (beaches, hills, forests, fields)	Soil types and tests, indicator species, geology.
		4 Water	Playing in water, creating dams, catching and saving water.	Water life, need for water for all life, the water cycle.
		5 Plants and trees	Exploring and naming plants and trees, bushcraft, climbing trees, noticing patterns, creating arts and crafts from natural materials.	Discovering plant properties and uses, exploring patterns in nature.
		6 The animal, fungus and bacteria kingdoms	Animal (including insects, birds, mammals & aquatic life) families, jobs, homes, names, footprints and signs. Mushrooms (exploring different shapes, colours, sizes etc).	The animal, bacteria, and fungus kingdoms' signs, feeding habits, lifestyles and other patterns. Interactions between elements, habitats and how the whole is more than the sum of the parts (web of life).
		7 Air	Wind, weather, clouds, sky, breath.	Microclimates
C	Design	8 Designing	Once the ability to make symbolic representation has emerged, children can make designs for example in sandboxes, with assembling objects, drawings. Facilitation through open ended questioning etc of the child's exploration process. Random assembly.	Observation: creating maps, discovering local history, identifying what's there, interviewing stakeholders. Analysis: working out what you want, what limits there may be, and how best to fit things together. Design: Through drawing, model-making, post-its... Implementation: Planning how, who will do what Maintenance: how much work will who need to do to maintain it?
		9 Presenting a	The teacher provides materials and questions	

		design	that stimulate children to think and express. Children present their designs if they wish by drawing, model-making talking or another a form of their choice.	
D	Growing food	10 Growing and preparing your own food	Children growing their own food (bed creation, sowing seeds, seed collecting), wormeries, composting, catching rainwater, and livestock keeping. Preparing food, cooking and eating together.	Building raised beds, planting out, mulching, aquaculture, dynamic accumulators, food forests, companion planting and planning and using harvests.
E	Built environment and resource use	11 Built environment	Den building, our homes, our neighborhood, natural homes, fairy homes, exploring and building with natural building materials (e.g. pizza oven).	Biomimicry, insulation, draught-proofing, insulation.
		12 Resource use	Re-using, reducing, repairing, recycling, and upcycling.	Resources' (including electricity, oil and water) sources, effects of use, and ways to use less. Eco-footprints. Transport (e.g. walk to school week).
F	Social permaculture	13 Worldview	Learning from and connecting to nature, peace, creativity and diversity.	Peace building, art, mindfulness, diversity, finding quiet time.
		14 Me and my community	Health and spiritual well-being, families, who is in my neighbourhood (including animals and plants), group decision-making.	Money (and alternatives), conflict resolution, non-violent communication, dragon-dreaming, personal empowerment, the power of communities to improve life in cities, and transition towards sustainability.
		15 World of work	n/ a	How you can learn more about permaculture; World of work in permaculture.
		16 Feedback	Children learn how to express what they think about things. Ways to receive feedback from children (including ideas and inspirations for new topics and activities).	Children learning to give and receive feedback constructively, and adults receiving feedback and acting on it.

Appendix 2: Overview of the resources in Czech

Summary of Resources

Our review of available materials in Czech includes 47 resources of the most informative value. In the Czech Republic there are many centers for ecological education that focus on civic environmental awareness and outdoor education for children. The centers develop and collate sizeable libraries of teaching materials and apply them in teaching a variety of school classes, putting the emphasis on living nature, environmental issues, wise resource use, and sustainable development. For example the eco-center Cassiopeia shares its educational programs with circa 400 schools and kindergartens in the southern part of the country. To date, no resources in Czech were developed specifically with the intention to teach children permaculture, however there are many resources tailored to ecological and environmental education, teaching children about nature through being in contact with nature (in natural settings or gardens). These materials have important information and qualities for the CiP project, bringing essential messages across and indirectly presenting permaculture ethics and principles.

In addition to the centers for ecological education, children in the Czech Republic are exposed to principles of permaculture via their practical demonstration in natural gardens that often include permaculture elements. There are hundreds of kindergartens and schools which have built their own natural gardens with the assistance of governmental subsidies. A system of guidelines and certification of natural gardens was developed for the Czech Republic by participating schools and the organization Prirodní zahrada o.s. <http://www.prirodnizahrada.com/>.

Most of the resources we recommend herein are books, worksheets, and lesson plans. We also included some websites about school garden design. The website links are available on the Children in Permaculture website, the other materials can be borrowed from centers for ecological education and public libraries.

Half of the Czech resources can be used for both target age groups. Nearly one quarter of resources are better fitted to working with children aged 7–12 years. Resources in Czech were gathered mainly from Czech authors. There are no known resources in Czech designed explicitly to teach permaculture to children. Regarding pedagogy - many resources are available in Czech which describe how to teach in an empowering, creative and engaging way with active learning methods, however none of them are explicitly about a permaculture pedagogy.

Areas for further research

The main areas requiring further research or translation from other languages are:

- Explicitly about engaging children in permaculture,
- Introducing permaculture ethics and principles to children,
- Exploring and defining a permaculture pedagogy with children,

- A translation of the book by Millington and Nuttall (2008) into Czech,
- Social Permaculture needs further research and inspiration from other languages.

Recommended Reading

PEDAGOGY

Metody aktivního vyučování (Methods of active learning) by Dagmar Sitná (2013) is book which includes general principles and examples of types of methods of active learning.

Líný rodič (The idle parent) by Tom Hodgkinson (2010) is an inspiring book, genuinely subversive, embracing childhood in its simplicity and true value in the modern and commercial world.

Bibinky a bláto (Mud and Nonsense) is book which Andreas Weber (2015) along with his children Max (13) and Emma (10), has created like a slightly different nature book. They gathered many suggestions for playing outside. Many of these ideas are especially suited to an urban environment, although they extend as well to wilderness camps that you can organise yourself.

Projektové vyučování (Project teaching) (Erudis, o.p.s. & Job, o.s., 2009) is a website with list of methods of active teaching and examples of activities.

A) INTRODUCING PERMACULTURE

Permakultura a školkové zahrady (Permaculture and kindergarten gardens) by Jana Nováková (2010) is an article for teachers on website with instruction about permaculture in kindergarten garden, processes and features in it and tips for creating it. It includes other website resources.

B) LIVING NATURE

Učíme se v zahradě (We learn in the garden) by Květoslava Burešová et al. (2007) is the manual with a lot of practical advice on how to establish, maintain and use a school garden for education and training with children. More than eighty practical activities which teachers can incorporate into their lessons, to share the joy of being outside with children.

Hrajeme si na přírodu (Playing at nature) (Lipka - školské zařízení pro environmentální vzdělávání, 2008) is a book full of simple games in nature.

Škola hrou v přírodě (School play in nature) by Tomáš Smrž (2012) from ecocentre Cassiopeia is also a book full of games to play in nature.

Krajina a voda (Landscape and water) by Vladimír Zatloukal & CEGV Cassiopeia (2012) is book which describes a methodology for Environmental education for the elementary school.

Vodní čarování (Water witchcraft) by Blanka Ponižilová (2008) is book of worksheets and lesson plans.

C) DESIGNING

Projekt Přírodní zahrada (Project natural garden) by Jana Neumajerová (2012) is a case study presented on the website which is a well-documented resource on the inclusion of children in the process of planning, designing and implementing a garden at a Montessori school.

Abych si moh cachtat nohy (For I could splash my legs) by Zoop Koniklec (2015) is a video created by the same school as previous case study. It is documentary about construction of a pond in the school garden.

Dětská hřiště v přírodním stylu (Playgrounds in natural style) by Elisabeth C. Gründler and Norbert Schäfer (2010) is the book, available also in German, good for adults to learn how to create a nature garden in a school or kindergarten.

Jak na školní zahrady – metodický materiál (About school gardens – methodical material) (Prunerová L., 2010) is the website for teachers that shares methodical instruction on how to create and use an ecological school garden.

Školní zahrada jako přírodní učebna (The school garden as an outdoor classroom) by Dana Křivánková (2012) is the book for adults which includes practical instructions for creating usable structures and features for education in a school's natural classroom.

D) GROWING FOOD

Hrajeme si s dětmi v zahradě (We play with kids in the garden) by Monika Pýchová and Tomáš Smrž (2012) is a practical guide book for planning garden arrangement and implementation of activities (games, recipes, gardening) with children not only in kindergartens and schools.

Dobrou chuť (Enjoy your meal) by Klára Smolíková (2009) is book of worksheets and lesson plans about food.

Pěstování s dětmi (Growing vegetable with children) by Katka Horáčková (2014) is a great presentation on website about how to create a nature garden in a kindergarten and how to use it with children.

Jůlinka z jedlé zahrádky (Julia from edible garden) by Tereza Václavíková (2013) is children's story book which inspires children to edible and herbal gardening with practical 'recipes' about how to make their own remedies by themselves from the garden and wild plants.

E) BUILT ENVIRONMENT AND RESOURCE USE

I ty můžeš zachránit planetu or 50 nápadů pro děti, jak přispět k záchraně planety (two editions of one book *You Can Save the Planet: 50 Ways You Can Make a Difference*) by Jacquie Wines (2008) is book full of practical advice and instructions, how to save nature in the daily life of every child.

Sedm barev duhy (Seven Colours of the Rainbow) by CEA Sluňákov (2008) is a book containing methodical material focused on the integration of environmental education into school curricula.

Ekoškola (Eco school) (2014) is the website of the Czech partner of an international association of Eco Schools, where is possible to find information about this program

(participating schools can get full versions with a lot of useful materials) including a 7 step methodology, various themes, videos, and links to other schools and other organizations throughout our country, but it also offers ideas in the section “An inspiration - Examples of good practice” about what to do with pupils or with whole school.

F) SOCIAL PERMACULTURE

NaZemi (On the planet earth) is the website concerning with global education, Fair Trade, dignified working conditions, responsibility of public institutions. NaZemi (2016) offers Global storylines, education for lecturers, teaching manuals and educational programs.

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Appendix 3: Overview of the resources in English

Summary of resources in English

There were 181 resources in English that were studied and reviewed. In addition we listed 9 magazines or additional publications on permaculture and children. Vast quantities of work are also available in other relevant areas such as: accelerated learning, 4 stages of competence, learning styles, multiple intelligences, contextual learning, schemas; psychology, intelligences, signs of well being, play types, emotional literacy, praise, and criticism. There exists evidence of the need and benefits of playing outdoors and a vast number of story books about nature. This demonstrates the vast availability of resources about a broad range of permaculture related subjects.

The average rating for all resources in English in response to the question “Star rating for usefulness and relevance to CiP” was 3.50, where 3 is partly and 4 is very much, demonstrating that there is a lot of useful and relevant information available.

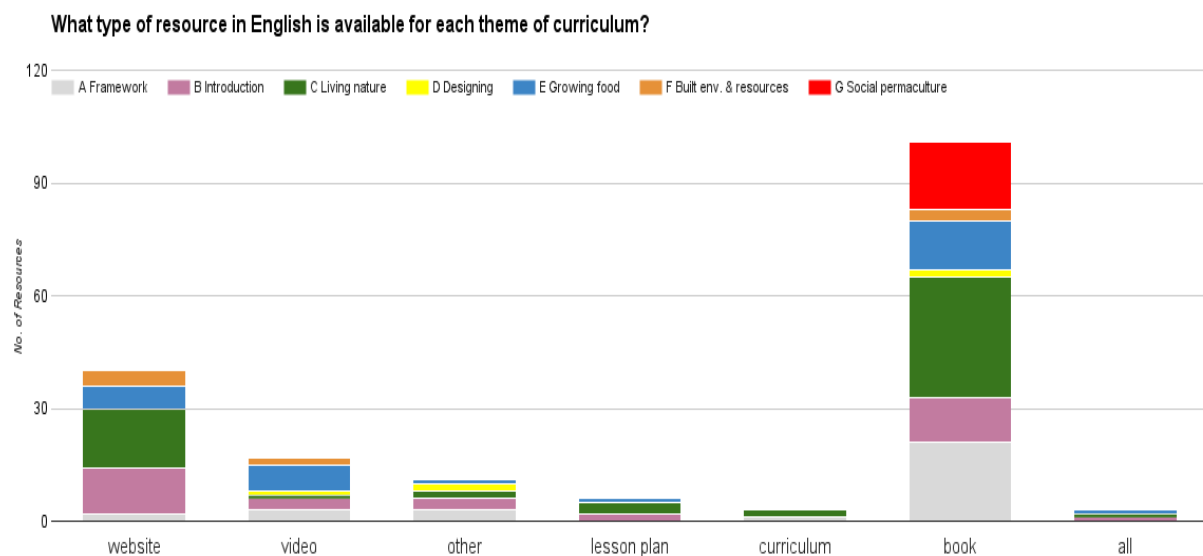


Figure 7 - Number of each type of resource in English by theme in the curriculum.

The most common type of resource in English are books (101) and then websites (40), see figure 7. The colours show that social permaculture (red) is only covered in books, and most of the resources about designing are in video or other formats.

The recommended resources and areas for further research in English have been described in the main body of the document above.

Appendix 4: Overview of the resources in Italian

Summary of resources

The total number of resources studied in Italian is 47. The vast majority of the resources are for adults to use the information to work with children, rather than for children to use themselves (e.g. storybooks). Most of the resources are dedicated to both age categories.

The majority of the resources had primary relevance for pedagogy. Regarding the themes of the curriculum, the theme with the most resources was Social Permaculture, then Designing, Living nature, and Growing Food. No resources were found for the themes Introducing Permaculture and Built Environment and Resource Use.

There are many resources available in Italian about different alternative pedagogical approaches notably from Maria Montessori, Rudolf Steiner, Gianfranco Zavalloni, Loris Malaguzzi and outdoor education, which can support and complement the development of a specific permaculture pedagogy.

There are also various valuable resources for practical activities to support teachers, educators, parents and children for gardening and caring for nature. Within the theme Social Permaculture there are many resources which describe the importance of the mental, emotional and spiritual development of children.

Areas for Further Research

Analysing the resources available in Italian by curriculum themes the following areas need to be further researched:

B) Introducing Permaculture: This theme includes two sub-topics one is about awareness of the global environmental situation and the other is about introducing permaculture and its principles and ethics. Both of the sub-topics of this theme require further research and resource development.

F) Built environment and resource use: Although we have not found any specific resources about this theme, we know about numerous lesson plans and activities developed by educators active in environmental education who take inspiration mostly from resources available in English.

Recommended Reading

The following resources divided by the curriculum topics are those ones, which received the highest rate by the educators who normally use them in their activities with children.

A) PEDAGOGY

Come educare il potenziale umano (How to educate the human potential) by Maria Montessori (1984) describes the Cosmic Education which represents an inspiring overview of her methodology.

C) LIVING NATURE

Ecoalfabeto (Eco alphabet) by Fritjof Capra (2005) offers in a few pages the broad spectrum of the environmental education merging quantum physics, biology, science, education and ecology.

Giocare tra gli alberi (Playing among trees) by Alexandra Schwarzer (2013) offers a comprehensive summary of outdoor education focusing in detail on outdoor activities with ropes and nodes.

D) DESIGNING

Le piazze dei giochi e dei diritti naturali di bimbi e bimbe (Public spaces for playing and rights for children) by Gianfranco Zavalloni (2011) offers a useful perspective on how to design and build play areas for children in cities.

Appendix 5: Overview of the resources in Romanian

Summary of resources

There are few resources related to permaculture in Romanian, so the majority of what was gathered relates to the topics of the CiP Curriculum but not to permaculture directly. Resources explicitly about permaculture have been developed by people in the partner organizations.

Most resources in Romanian are books, but there are also videos, song collections, lesson plans, curricula, and essays. There are two main types of books: stories, and encyclopedia-style. The stories tend to be about getting children closer to nature. The type of stories varies, some come from folklore while others are contemporary. Storytelling is a very important means to convey information, allowing children to empathize with certain characters in certain situations.

Another area is encyclopedia style books where plant species are listed and their properties described. Some of the plants are portrayed in fun ways, so that children can relate and be captivated by nature more easily.

Of the resources with illustrations, some have drawings of personified plants, giving a child-friendly style; others have really detailed drawings that convey a lot of information to the children when observed attentively.

The curriculum is a Neohumanist early childhood curriculum developed by AEN with a team of Romanian Neohumanist teachers, including three with 20 or more years of experience in the field. It is implemented in the Romanian Neohumanist kindergarten "Gradinita Rasarit".

Some of the resources are for children to read and understand themselves, whilst others are for adults that can use the information to work with children. We have resources addressing both age categories that our project is covering, separately and simultaneously.

Regarding the themes of the permaculture curriculum, the majority of the resources have primary relevance for the theme Living Nature, followed by Introducing Permaculture, Built Environment, Resource Use and Framework.

The average rating of our resources with regard to relevance and usefulness to the field of Children in Permaculture, is 3 on the scale from 1 to 5 (5 being the highest relevance). This points out that the resources available in Romanian are not only few but not highly relevant for working with children in permaculture.

Areas for Further Research

Even in the Romanian kindergarten, Gradinita Rasarit, which incorporates ecological themes on a regular, ongoing basis into its curriculum, mostly the teachers rely on either English materials that they adapt or translate (and which have been shared in the English section of this research) or they invent their own resources which have not yet been formally recorded. AEN has developed a particular approach of storytelling on ecological themes based on the personal experiences of teachers with animals, plants and nature, which uses the power of personal examples in awakening love and respect for nature. The CiP project will provide an opportunity for this approach to be better documented as well as to collect the translated adaptations of stories that the teachers commonly use in their Neohumanist classrooms.

There are many areas for further research, especially since a lot of the information available is only generically about the benefits of plants and nature, but not specifically about permaculture. The information can be linked to permaculture but that is not explicit in the resources. Topics such as building with natural materials, the healing power of the body and nature, living in communities, and many others, have not yet been covered.

Recommended Reading

Fairy tales of the forest (Basmele Padurii, translated into Romanian) - Singh and Cann (2010) - teaches children to understand nature through trees that are the stars of stories placed in different cultural settings around the world.

Live better (Trăie te Mai Bine) - a guide to human ecology (îndrumar de ecologie umană) by Gheorghică (2015) - a guide about the changes that we can make in the lives we lead in cities in order to live more sustainably.

Plants in service of life (Flora în slujba vie ii) Dr. Vasile (2010) - a book about flowers that grow in Romania in the wild, what are they good for, as medicinal use, and also references to the healing powers of plants as described in the bible.

Appendix 6: Overview of the resources in Slovenian

Summary of resources

We have identified and reviewed 46 resources in Slovenian that are relevant to sharing permaculture with children based on the CiP curriculum. The majority of the resources were books, then websites. There are also some other resources such as reports and a graduation thesis. About half of the resources are aimed at both age groups, one quarter are aimed at 7-12 year olds and a few are aimed at 3-6 year olds. The vast majority of the resources are for adults to use the information to work with children, not to be used directly with children.

Regarding the themes of the CiP curriculum, there are 18 books that relate to Living nature (spending time outdoors and introducing nature to children), 13 that relate to Pedagogy (about how we teach, rather than what we teach) and then 6 to Social Permaculture (developing social skills and emotional intelligence). The other themes have even fewer resources. Although Social Permaculture has a number of resources available, the average rating on "Appropriateness and relevance to the CiP project" was amongst the lowest.

Areas for further research

The existing collection of resources is not complete and the resources itself are not meant to be used by children but educators. Therefore it would be very valuable if more stories and other resources that could really be used by children were identified. It was a surprise that not more websites were found and therefore we see a potential in further developing the website www.otrocivpermakulturi.si that the Permaculture Association of Slovenia started developing to meet the needs of the national CiP network in Slovenia.

We have identified some books that fit into our curriculum as Social Permaculture but the overall rating of those resources was low, which suggests further research is required to produce high quality resources that can support the educators in that area. In Slovenian (as in other languages) there is a general lack of resources about Introducing Permaculture, Design and the Built Environment and Resource Use. Only one resource was identified for teaching Growing Food. The "School Garden project" is well known throughout Slovenia and we need to look deeper at the materials they use as we expect that they are likely to have resources relevant to engaging Children in Permaculture.

It would also be valuable to explore which resources are available in Slovenian for adults to learn more about permaculture and if those could be used for work with children.

Recommended reading

Otroci potrebujemo gozd (Children we need forest) by the Slovenian Network of Forest kindergartens and Schools (2014) is a book which provides an overview for outdoor pedagogy and activities that can be done in forests, with a focus primary on kindergartens.

Joseph Cornell is an American author with several books translated into Slovenian, e.g. **Približajmo naravo otrokom (Sharing nature with children)**. He writes about re-establishing connection to the natural world through outdoor activities.

For those who would like to get in touch with permaculture as such, the recommended reading is **Uvod v permakulturo (Introduction to permaculture)** by Mollison and Holmgren (published in Slovenian in 1994 and 2012).

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