

Technology

Technology: Introduction

Human technology is as old as humanity. We know that early human species used materials such as stone to produce a wide range of artefacts and tools that extended their possibilities of changing their environment to meet their needs. The saying “humans have what animals are” makes it clear that what animals can do in their various specialisms, people can do using tools and techniques. The earliest tools and artefacts reveal human intelligence and awareness of the properties of materials in their environment. Human culture emerged hand in hand with technology and the hand tools we use today embody a long history of practical wisdom and knowledge of the world and its rhythms.

The basic gesture of technology is the transforming of materials to meet human needs and in the process, transforming human lives and societies. Complex technologies have grown out of simpler, older technologies. We can recognise the evidence of this not only in design and in the machines themselves, but in the language we use, for example terminology in computing that originated in hand-based technologies, such as printing. Therefore, it makes sense to understand the basic principles of navigating, steering a small boat, trimming sails, using wind and currents before one drives a motorized boat or indeed flies in a space shuttle. Making things by hand is the best preparation for designing robots, just as the fine motor skills involved in cutting, slicing, sewing are a good basis for surgery.

The Waldorf technological curriculum begins with handwork and handicrafts and crafting in nature (e.g. building fires, green woodwork etc.). Knowing where materials come from, how they are processed, knowledge of the properties of materials and the uses of tools, first manual and then electric, are preconditions for understanding digital technology as a tool to be used safely and appropriately. Technology is always explored with reference to real human need and the impact of the environment of sourcing and production. Each workshop is a site of craft traditions and learning communities which embody not only the know-how/ know-what, but also the values that accompany craft work and technology. Becoming a craftsman involves the development of ‘an ethic of excellence’ (Ron Berger, 2003). Pupils’ introduction to digital technologies and media builds on this approach, with pupils firstly learning in a practical context – using pcs and cameras, text and image software, search engines and research. The emphasis is on safe and meaningful use, but also understanding the cultural context of technology, including its use of raw materials and energy, its impact on the environment and approaches to sustainability. Later, in the upper school, pupils learn about hardware, programming and coding.

Technology: Purpose of Study

Steiner Waldorf education offers opportunities for pupils to learn how materials are transformed into tools and artefacts to meet human needs. A need is recognised, knowledge of tools and materials are applied to find practical solutions. Starting from a simple practical solution, products can be further developed and modified to meet other, changing or more complex needs, using feedback derived from evaluation of the products created. Technological education begins with the nature and origin of materials, and the nature and cultural origin of tools, and how tools extend human powers and multiply human effort. Knowledge of materials begins with traditional handcraft techniques (sewing, knitting, spinning, whittling) using natural, locally sourced resources. Pupils become familiar

with the safe use of simple and household machines in context, e.g. a corn mill, simple woodworking tools, an apple press etc. They learn to produce useful artefacts and products such as yarn, garments, wooden utensils, apple juice, bread etc. In doing so, they learn the historical and cultural origins of these crafts, the production of materials and the ecological impact of this. As pupils progress through the school they learn to use more complex tools accurately and safely in a workshop environment, embodying the values of being a crafts-person. Through the history curriculum, pupils learn about the history, cultural significance and impact of technology from early cultures to contemporary digital society. In media education children begin by becoming literate in analogue media, followed by learning how to use modern information technology equipment safely, appropriately and responsibly. Digital technology is integrated into the curriculum as an extension of the 'warm' analogue technology of the lower school. Pupils are introduced to the question of human responsibility in the ethical application of technology and the benefits and risks of technology use including Artificial Intelligence.

Technology: Aims

Pupils are

- knowledgeable skilful across a range of analogue technologies
- technologically literate across a range of everyday mechanical and digital applications
- responsible, competent, confident and creative users of information and communication technology
- users and creators of technology, rather than merely consumers of it

Long Term Curriculum Intent

Language and communication

- Accessing information through and about technology in different formats and media
- Understanding and using relevant technological and disciplinary terminology and vocabulary
- Articulate experiences, ideas and solutions in the field of technology

Health and well-being

- Use both analogue and digital tools safely, appropriately and effectively
- Understand how to keep oneself safe in the virtual world
- Understand the impact of technology and its uses on health and wellbeing

Senses

- Observe and understand processes
- Experience, understand and distinguish between real sensory experience and virtual realities

Imagination and play

- Play with tools and materials in exploratory ways: tinker, make rapid prototypes
- Be creative and resourceful in planning and making
- Imagine possible solutions to problems and needs, and improvements to current solutions

Empathy

- Understand the needs of others and the world and how these might be met with technological solutions
- Imagine the effects of technologies on others and the world

- Understand how technologies have evolved and the impact they have had on people's lives and the environment
- Imagine all possible consequences of actions using technology

Aesthetics

- Appreciate the aesthetic qualities of tools and materials including tools from different cultures and periods of history
- Understand and apply aesthetic possibilities of using tools and techniques
- Find solutions to problems which are aesthetically pleasing

Inquiry

- Investigating the needs of specific situations and possible ways of generating useful, effective and ecologically meaningful improvements or solutions
- Understanding the properties, potential, appropriate uses, risks and life cycles of different materials
- Planning, sourcing and making using appropriate technologies
- Constructing models as ways of finding solutions to questions and problems
- Understand the origins and development of key technologies and their effects on society
- Analyse situations and information and be able to understand complexity
- Recognise basic principles at work and use this knowledge to design workable systems within a given field of technology
- Identify key factors in a situation and address these in terms of effective solutions to problems
- Understand and use sequences and processes in complex operations
- Use maths effectively where needed in technological thinking and solutions
- Being able to de-bug: systematically analysing processes to find issues

Democratic participation and society

- Understand the uses and possible misuses of technology in enhancing, supporting and undermining democratic processes
- Recognize the need for democratic control of the uses of technology
- Recognize the need to ensure that all people have equal access to the benefits of technology

Lifelong learning

- Maintain an enquiring attitude and interest in technical matters and changes in technology
- Adapt to new technologies

Future thinking

- Anticipate future needs of people and the environment
- Anticipate the consequences of technologies for all, including nature
- Understand complex relationships between different needs and the effects of technology
- Recognize opportunities for self-development using technology
- Recognize the need for research and technologies that objectively address real human and ecological need rather than profit

Holistic thinking / Spirituality

- Understand technology from a holistic perspective: its processes and systems and its relationship to needs and outcomes
- Understand the purpose of technology in addressing human and ecological needs

- Make decisions about technology within the wider context
- Consider the spiritual meaning of technology and the realities it creates and enables

Judgement

- Make judgements based on knowledge, understanding and insight in relation to technology, its potential and its ethical use
- Use technology in ethical ways
- Reflect on and consider the uses and abuses of technology
- Take up founded positions in relation to technology
- Critically evaluate technological projects