A journey to 2100

In 2100, automation of work will have a massive impact on our society. Labor will not be the primary occupation anymore in adulthood. Education has to adapt to prepare new generations for a life in a non-linear society that values creative and social skills above all. Moreover, education will develop to be an end goal in itself instead of a means to an end. It has become possible to learn your whole life. Education that combines the preparation for a non-linear society, and the ability to participate in lifelong learning requires a new type of school – the learning space of the 22nd century.
Education research

People interpret the role of education in different ways. Two of the most common paradigms are that education is useful for:

- Bildung, self-cultivation of the individual
- A means to help the whole society forward

Religious
Within public schools, there is room for parochial teaching, with freedom for specific, philosophical education. This has subdivided the public school into "algemeen bipsionder", "openbaar", "prot. christelijk", "katholiek", "reformaschol, confessioneel" and more specific types. (https://www.scholenopdekaart.nl, n.d.)

Vrije school
The concept of the Vrije school – Free school – relies on the school of thought of anthroposophy. The subject matter is for a minority of society. (Boersma et al., 1996, p. 23–24)

Freinet
The Freinet concept does not follow strict methodologies but is based on the experiences of the children. The teacher and student group work together to create a meaningful education. Freinet education goes out of the classroom to visit companies and nature to experience the world firsthand. (De Vereeniging voor Freinepedagoog – uitgezagen, n.d.)

Finland public
The Finnish Public school system stands out from other foreign school systems for its performance on the PISA report by OECD (NOS, 2016) Part of the success of the Finnish education is that the teacher must have a university degree and that the teacher has more autonomy and freedom to prepare classes to his vision. (NOS, 2016) Education is given according to the ideals of phenomenon-based learning. "Why Are Finland’s Schools Successful?", (2011)

Public
Different concepts and visions for education were always reserved for a minority of society. The public school has been and still is the default school within the Netherlands. The concept of the public school was to prepare all children in Dutch society for a meaningful existence in society. (Boersma, Vosseburg, & Bagtje, 1966, pp. 20–21)

Montessori
Self-development and auto-didactic education are the essence of the Montessori education concept. An essential aspect of the Montessori concept is the goal to make the child independent from adults. Education is aimed at individual work and individual interests. This individuality is countered by working in groups of switching consistency. (Dalton is no method, no system, it’s an influence - Helen Parkhurst, "Dichteronderwijs," n.d.)

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Jenaplan
The Jenaplan concept relies on the belief that the child is a product from the relation with his fellow humans. The education process is based in a community that shares the same norms and values. The school has to be part of the society it reflects or self-education is conducted in part through adults from the neighborhood. The space for learning has to be arranged in such a way that curiosity is triggered for a diversity of activities. (Boersma et al., 1996, p. 22)

Freedom of education act

<table>
<thead>
<tr>
<th>Kindergarten</th>
<th>Elementary school</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMBO</td>
<td>MBO</td>
</tr>
<tr>
<td>HAVO</td>
<td>Bachelor</td>
</tr>
<tr>
<td>WO</td>
<td>Bachelor</td>
</tr>
<tr>
<td>PhD</td>
<td></td>
</tr>
</tbody>
</table>

MBO = Master Bachelor Orlando
HBO = Bachelor Honours Bachelor

Education since 1800

1857 – Education law of 1857: dictates which courses are given
1868 – Introduction of general grammar by de Vries and te Winkel
1874 – "Kindergarten" by Van Houweling, forbade children under 12, to work in factories
1895 – Rise of the business education
1900 – First formal education law in the Netherlands
1914 – First Montessori school in the Netherlands
1914/1924 – First grammar by Van Houten
1920 – First free school to Rudolf Steiner in The Hague
1930 – First Dalton School in The Hague
1963 – First Jenaplanschool in the Netherlands
1976 – New law on higher education: More oriented on society; Dutch becomes main language in universities instead of Latin
1992 – First time that “Scholenbouwprijs” was rewarded, to stimulate innovation in the architecture of schools
1998 – Introduction Second Phase: the subject packages are repalced by profiles
2006 – Fresh schools campaign launched by VRACO: Increase sustainability and interior climate of elementary and secondary school
2014 – Openbaarjaar2032: Education 2032 research group with recommendations to improve Dutch education
2018 – Curriculum.nu, research group/think-tank to discuss the future of Dutch education.
Fluid education focuses on offering lifelong education. Therefore the school is open for adults that come in for respecialization. Adults that come for respecialization can learn everyone about their experiences so far and inspire.

**Focus on social skills**
Alain du Button, the founder of the School of Life said that “Everyone has to take the role of the teacher and learn how you get an idea inside your head, in that of someone else.” (theschooloflife.com). Social skills will be one of the most important in the future, by making everyone a teacher, they will become more social in the process.

**Focus on creativity**
As creativity is one of the few skills that will be unaffected by automation, it will become one of the most important skills in the future. Problem-solving relies heavily on creativity. In an uncertain future, one of the only certainties is that there will be problems that need to be solved.

**Focus on vocational skills**
Some might say that “robotics can do it better”, but we still need to understand how the robotics clean, do maintenance on our homes and calculate rent. Vocational skills are an important part of the curriculum.

Fluid education is open to everyone. Fluid education takes the fact that Freinet experiences the world firsthand within Fluid education there is room for Self-development and auto-didactic education as thought by Montessori. Fluid education takes the focus on social, creative, technic and craftsmanship from the Vrije school. Fluid education takes the focus on conversation, work, play and celebration from Jenaplan.

Fluid education takes the focus on conversation, work, play and celebration from Jenaplan.

**Education for all ages**
Fluid education focuses on offering lifelong education. Therefore the school is open for adults that come in for respecialization. Adults that come for respecialization can learn everyone about their experiences so far and inspire.

**Schematic overview**
Fluid education uses the phenomenon-based learning method.

### Fluid education

**Public**
Fluid education is open to everyone.

**Montessori**
Within Fluid education there is room for Self-development and auto-didactic education as thought by Montessori.

**Dalton**
In Dalton the teacher is present to guide, in Fluid education this is also incorporated.

**Jensplan**
Fluid education takes the focus on conversation, work, play and celebration from Jensplan.

**Vrije school**
Fluid education takes the focus on social, creative, technic and craftsmanship from the Vrije school.

**Freinet**
Fluid education takes the fact that Freinet experiences the world firsthand.

**Active contextualized phenomenon-based education**

**Passive-decontextualized education**

**Fluid education uses the phenomenon-based learning method**

### Landscape phase
- **Age: 0-4**
  - Teach
  - Landscape phase

### Generic phase
- **Age: 4-6**
  - Teach
  - Generic phase

### Generic phase
- **Age: 6-9**
  - Teach
  - Generic phase

### Generic phase
- **Age: 9-12**
  - Teach
  - Generic phase

### Generic phase
- **Age: 12-15**
  - Teach
  - Generic phase

### Specific phase
- **Age: 15-18**
  - Teach
  - Specific phase

### Pre-specialization
- **Age: 18+**
  - Teach
  - Pre-specialization

### Specific or Applied science
- **Age: 18+**
  - Teach
  - Specific or Applied science

### Specific or University
- **Age: 18+**
  - Teach
  - Specific or University

### Specialization or Nothing
- **Age: 18+**
  - Teach
  - Specialization or Nothing

### Hobby or Nothing
- **Age: 18+**
  - Teach
  - Hobby or Nothing

### Online
- **Age: 18+**
  - Teach
  - Online

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Lifelong learning

- **Learn**
- **Work**
- **Hobby**
- **Online**
Learning space research

School buildings are built up from the same elements. These are the generic elements of a learning space:

- Sports
- Classroom
- Playground
- Facilities
- Storage
- Toilets

Fuji Kindergarten
H-Type school
Openluchtschool
Montessori school Delft

“Help me to do it myself! a real paradox which involves developing self-sufficiency and which assumes that the capacity for learning lies within the child.”
- Yui y Takaharu Tezuka
  (Y. Tezuka as cited in a+t, 2018, p. 17)

“Schools must constantly adapt to new demands, visions and demographic developments, a process to which the school building, in practice, is not well-suited.”
- Schoolparasites
  (Kempinga, Aarsman, & Bouvier, 2004, p. 163)

“Het is een sterke hygiënische kracht, die ons leven beïnvloedt en die tot een stil: een hygiënisch stilzal uitgroeien.”
- Johannes Duiker
  (Duiker J. as cited in Dam, Komossa, Swakman, & Schouten, 2011, P.41)

“Montessori education requires as many places for individual activities as possible. [...] a classroom with many corners and different zones”
- Herman Hertzberger
  (Space and Learning, Hertzberger H., (2009), P.162)

Conclusions from typological research

School buildings tend to grow in size alongside the growth of their students.

School buildings are everywhere.

The school could be envisioned as a micro version of the real city.

Students attending the kindergarten are out of the control of their parents and are in large quantities compared to their adolescent teachers.

The cleanliness of the structure and the lack of ornamentation reflect the ideals of the school.

Montessori education teaches us that it is possible to create qualitative spaces that are of temporary nature.
Learning space of the 22nd century

All the school buildings have been adapted to the specific type of education given. We can conclude that the ideals of education influence the design of the school.

"Fluid education employs phenomenon-based learning. It is required to actively experience these phenomena during the learning process. A diverse range of specific spaces is required to experience all phenomena during education."

Ideals of education → Design of school

There is a continuous interchanging of specific elements between different schools where fluid education is given implemented. The sharing of spaces makes it possible for all locations to experience the phenomena that are present in the curriculum.
If we take all elements, materials, and activities that take place at the school, we can categorize everything according to temporariness — creating a matrix of materials, spaces, and events. This matrix shows in which way the building elements have to be materialized and constructed. 

The building should be perceived as a building-sized shelving rack. Instead of stuff, spaces are placed in-between the racks. These spaces are the specific elements that offer students the opportunity to experience different phenomena.
Implementation

The building uses a modular 4500mm x 4500mm x 4500mm grid. All elements are adapted to be placed within the grid. Listed below are all the elements in the building, at this particular moment in the year 2100.

This open isometric shows the first two levels of the building.
Learning space of the 22nd century, Amsterdam

Ingmar Klappe
Facades

West

East

Ingmar Klappe

Learning space of the 22nd century, Amsterdam

1:200
Section

Section AA

Learning space of the 22nd century, Amsterdam

Ingmar Klappe
Details
Rack facade fragment with materialization

Learning space of the 22nd century, Amsterdam

Ingmar Klappe
Details - Material list

**STRUCTURE**

A. Cast in-situ concrete with steel reinforcement for the floors, with prefabricated concrete columns

B. Exterior timber beam, Douglas fir, impregnated

C. Interior timber beam, spruce wood, impregnated

D. Prefabricated timber rib floor with inner insulation

E. Prefabricated wooden facade element with inner insulation

F. Steel rectangle hollow section framework

G. Steel bracket as reinforcement of the timber beam and to connect it to main construction of (A)

H. Facade fastener, steel anchor in concrete

I. Facade fastener, steel anchors, connected to cast-in dowels and grooves of (1)

J. 4x4 bolt connection, possible to be individually dismantled for future alterations

K. Adjustable ceiling hanger

L. Adjustable frame to correct vertical elevation of boxes

M. Waterproof membrane

N. Regular insulation

O. High-density insulation

**INSTALLATIONS**

100. Demountable climate flooring with waterproof PVC floor panel finish

101. Demountable climate ceiling with wooden finish (for cooling, light fixtures and fresh air, with acoustic capacity), 500mm edge along ceiling with upward light fixtures

102. Green roof

103. Outlet of HVAC installation

104. Drainage gutter connected to the water collection basin for reuse

105. Integrated rainwater pipe connected to water collection basin for reuse

106. Integrated automatic window opener

107. Reserved space for installations

**FINISH**

1. Off-white, white clay panels, structurally strengthened by carbon fiber, matt and visible aggregate, porous material to enable algae growth

2. Glass panel

3. Timber window frame

4. Outer facade padding panel 50mm thickness of CLT wood

5. Curtain wall system with matt black finish, 50mm width

6. Wall finish to preference

7. Timber paneling finish

8. Steel mesh grate cover for (20)

9. Beechwood panels, impregnated with child-safe fire retardant, matt finish

10. Brass cap

11. Stair railing

12. Demountable wall panels

13. OSB placed on timber beams - reserved space for future alterations

14. Coarse aggregate concrete (visible gravel) floor finish

15. Gravel

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5. https://www.montis.nl/metaal/