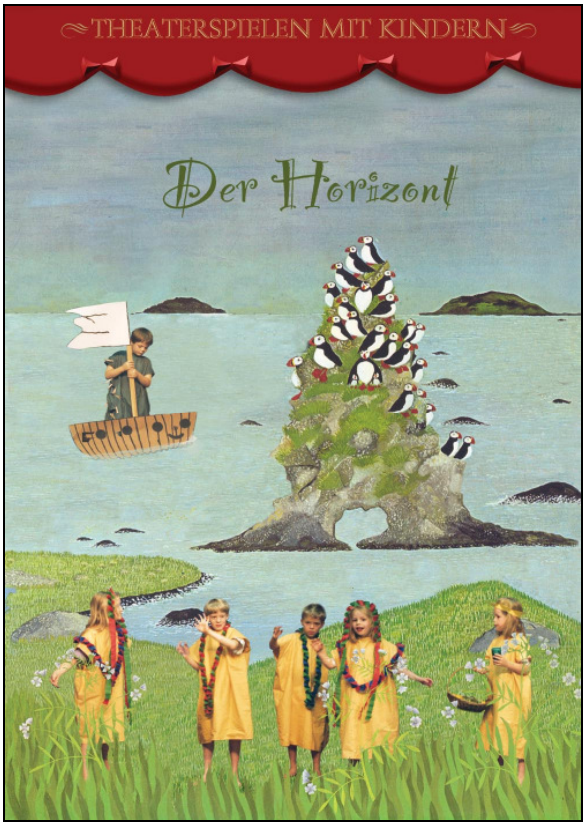



Cover sheet: The Horizon


Cover sheet: The first Railway in Germany

# Gender-oriented Technology Teaching and Learning by Theatre-Playing

**by Wolfgang Haupt, Thomas Langkau and Juergen Wehling**

This contribution reports on a project, which succeeded in motivating Primary-School teacher students to subscribe in practically oriented Technology teaching courses.
This project has been carried out at the University of Duisburg-Essen over a period of about 20 years. The students could participate in these courses as part of their advanced studies in practical teaching. The aims of the project were:
-Supporting action-centered cross-curricular Science and Technology teaching.
-Supporting intercultural learning and awareness of the plurality of the heritage of mankind (see UNESCO-Charter).

**Children learn by playing**
Since children experience the world about them through play, theater playing with children was chosen as the method to achieve the above mentioned aims. In this way complex subject-matter can be treated with especially written dramas for children. Respect for the environment, tolerance and understanding of other cultures: these and other subjects can be negotiated playfully with suitable drama processes and drama texts. While taking part in theater children are able to approach other cultures and languages through play and through action. Children become involved with the content of plays, so that e.g. scientific, technical,

historical subject-matter can be studied. Beyond this, the child`s self-confidence, team spirit and understanding of the importance of being considerate are strengthened. In this way drama contributes to the development of the child`s personality.

**Gender-oriented Teaching**

This kind of theatre project work fulfils the demands of gender oriented teaching and learning.

It enables, by a variety of different fields of activities executed step by step, e.g. individual specialization in teaching and learning. The objective of theater playing is to perform a play.

At the same time the overall perception is required. Therefore during this process different gender-specific forms of communication and behavior come into focus.

**Practice for students**

In the absence of suitable scripts, the plays were especially developed for this project.

This took place with the aid of criteria provided by the teachers involved, as regards e.g.

language use, structure, inclusion of music and dance etc.

The contents of the plays for teaching and learning technology naturally had to be suitable to bring technical problems into the focus of the children.

**Journey to the Horizon**

The central section of the scenery shows fish, jellyfish and starfish swimming in a sparkling sea. The scenery on the right stage shows a wooded island. The scenery to stage left shows an iceberg. Four narrators sit to stage right.

| | |
|---|---|
| Narrator 1: | Once upon a time there was a little hedgehog. His name was Hector. |
| Narrator 2: | One day he went for a walk along the seashore. |
| Hector Hedgehog comes on stage, walks up and down and looks out to sea. | |
| Narrator 3: | The sea was twinkling and glittering in the sun, as if it were covered with millions of precious jewels. |
| Narrator 4: | Vast green waves thundered onto the beach and, on breaking, threw up a spray of sparkling water and shivering rainbows. |
| Narrator 1: | When Hector Hedgehog shaded his eyes he could make out the fine line of the horizon beyond the gleaming water and trembling rainbow light. And he said |
| Hector Hedgehog: | How beautiful the sea is. I would really like to know what is hidden beyond the horizon. |
| Narrator 2: | So Hector Hedgehog climbed into a boat and set sail. He headed out to sea on a journey to the horizon. |
| Music plays. Hector Hedgehog gets into his boat. | |
| Narrator 3: | The sun was shining, the ship was rocked gently by the waves and Hector Hedgehog was very happy. |
| Narrator 4: | When the wind became stronger and the waves became bigger, the boat was rocked rather more and Hector Hedgehog felt a little seasick. But only a little. |
| Narrator 1: | And so Hector Hedgehog sailed across the sea for many days. But whenever he reached the spot where the horizon should have been, it had already retreated into the distance again. |
| Narrator 2: | At last, after a long time, an island emerged on the horizon. |

Excerpt from The Horizon

The teacher students were prepared for the practical work with the theater plays in the schools in supporting courses at the university ( see below ).

A selection of two of these plays is presented in the following.

Photo The Horizon

**From theater playing to technical construction**

The play "The Horizon" (for children of age 7 to 10) is part of the series "Tales of the little hedgehogs". In these tales Hector and Holy hedgehog experience exciting adventures.
In "The Horizon" Hector Hedgehog tries to reach the horizon (on the sea) with a boat

(see excerpt "The Horizon" and photo). Thus the children are highly motivated to construct their own small model boats which must really swim for their little hedgehog figures. In the supporting course at the university, the teacher students learn how to do this in a way suitable for children of this age and at the same time treating the subject "construction of a ship" in a technically correct manner. For this purpose they have to develop suitable media and experiments with these media, which can show that an object can be called a "ship" only when meeting four criteria.
It must:
1. have **buoyancy**
2. have **stability**
3. have a **drive**
4. be **steerable**

A model boat (see photo), built of the following material, will enable the children to make experiences (by experimenting) related to the criteria 2 and 4.
**-hulk**: Balsa wood, 14x5x2 cm.
-**mast**: metal pole (3 mm diameter)
-**sail**: thick paper or card board
**-rudder**: thin metal sheet

Model boat

When testing these boats (in the water) most of them will capsize immediately because the mast has been cut out to long. Of course the children want to solve the problem (e.g. by shortening the mast). Thus they gain the experience that ships do not swim stable automatically, but must be specifically constructed to do so (criterion no. 2).

| | |
|---|---|
| King: | What have you got to report, Minister? Are you still receiving many letters from the people? |
| Montgelas: | Yes, Your Majesty. Still. And above all I receive letters from people who are against the project. |
| King: | What do these people have against the railway? |
| Montgelas: | The horse and cart companies write that they are fearing large losses, and so do the horse-dealers. The hotel owners are expecting fewer overnight stays from the mail-coach travelers and also beer sales are expected to go down. |
| King: | Well, railways aren't going to appear all over Germany overnight |
| Montgelas: | Doctors write to me that at the fairly high speed of 20 kilometers per hour, which the trains will certainly reach, people may get a brain disease, indeed, that even looking at such a fast vehicle could cause such diseases. One would therefore need to build high wooden fences along the rails. |
| King: | In England such consequences have not been observed, or have they? |
| Montgelas: | No, Your Majesty, they haven't. Again other people write to me that the awful stench and loud noise of these moving machines will cause damage to nature: birds would fall from the sky, trees would wither, and much more. |
| King: | This has also so far not been observed in England. Are there further objections? |
| Montgelas: | Yes, Your Majesty, some fear that the new means of traffic will spread the idea of democracy everywhere. |
| King: | There could be some truth in this. But first have another sip *(they do so)*. And now you, Mr Denis, what's the news from the engineering division? |
| Denis: | Up until now, we have not yet found a factory in Germany that can produce four and a half metres of rolled rails for us. Without such rails, however, the project will fail. |
| King: | You will certainly solve that problem. |

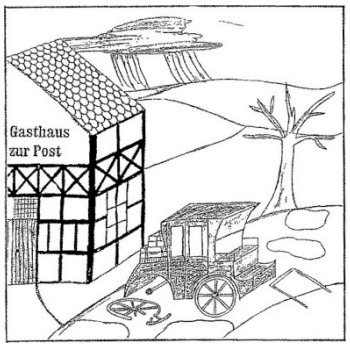
Excerpt from The first Railway in Germany

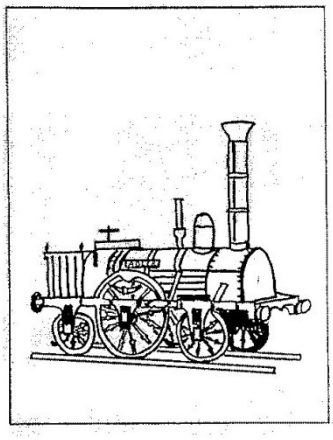
When the children try to move their boats by blowing into the sail, they will see that the boat does not always move exactly straight forward. They must construct a "steering device" (e.g. a rudder) to make the boat go where it is supposed to go (criterion no. 4).
The tools and their handling, necessary for the construction of the boat, are not discussed here.

**Technology and Society**

In many of the theater plays developed for teaching and learning technology a major topic is the interaction between technology and society: technology changes society and vice versa. The knowledge about this interaction is an important aspect of the understanding of technology. In the play: "The first Railway in Germany" this interaction is dealt with very explicitly. It shows the situation before the introduction of the railway in Germany and also the opposition of society against it and the problems which had to be overcome (see excerpt and photo).
In the supporting university courses students learn e.g. how to make use of the experimental potential of toy steam engines. Concerning the interaction of technology and society the students were e.g. given the task to research the traffic situation at that time and to prepare "Tips for teachers" on

the basis of the collected information. In addition the students could be given the task to design the scenery (see scenery) for the play (as an aid to teachers too).



Sceneries for The first Railway in Germany

For more information on the theater plays developed in the project “Kinder spielen Theater” see www.kinderspielentheater.de Some of the plays will be available also in English soon

Scene photo from: The first Railway in Germany