

SCIENCE CENTERS IN SWEDEN – DEVELOPMENT AND NEW ROLES

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Abstract

The science center movement in Sweden dates back only about ten years. Before then, the science center concept was known only to a limited number of museum professionals, scientists and educators. Small projects were carried out and plans had been laid for several years by museum directors, university planners and educational entrepreneurs, but it was not until the second half of the eighties that the first science centers finally were opened to the public.

The start of the science center movement in Sweden was encouraged by government action and activities of government agencies. Those actively responsible for creating new science centers are found within the university world, with some of the already existing museums, but also with communities and county administration. Science centers in Sweden are still not numerous, but those existing show more diversity between them than is usually the case in other parts of the world. Different ways of approaching science and technology and differences in organization and responsibilities account for differences in size, scope and activities.

Government concern to strengthen the position of science and technology in the Swedish society as a whole will also strengthen and change the role of science centers. Developing science and technology centers as tools in the strategic planning of the future is once more and very strongly on the agenda of the Swedish government. During 1993, government action was taken to improve working conditions for science center activities within education in Sweden. This paper reports on the development of science centers in Sweden as institutions of informal education.

1. Introduction: The early stages

Science museums in Europe have a long and strong tradition but the science center concept, although based in museology, was new to Europe when it was first introduced here in the seventies. The Scandinavian countries, being in many respects strongly influenced by North American cultural development, were among the first in Europe to start working on the science center concept. Delegations from museums, universities and government agencies responsible for

science and technology research and education travelled to the United States and Canada, visiting first and foremost the two famous ground breakers: The Exploratorium in San Francisco and the Ontario Science Center in Toronto. As a result, the science center concept was introduced in Scandinavia, and several projects in the Scandinavian countries were started on a small scale by different interest groups, within museums, universities and city and county administrations.

In Sweden, the Swedish Council for Planning and Co-Ordination of Research (Forskningsrådsnämnden/FRN) assumed a supportive role for the development of science centers at this early stage. The actions of the Council were started in 1979, following a government plan to support and strengthen research generally in Sweden on a long-term basis. This plan also included measures to disseminate and popularize the results of research and the research process as such. Universities, museums and other organizers were requested to develop activities and the Council was given the responsibility of distributing grants for projects considered creative and innovative, thus contributing to the growth of ideas and action throughout the country. The Council especially took the task of looking after the needs of young children, forming a special working group to that purpose.

During the eighties, the Council supported various projects, originating in the universities, in museums, with organizations of different kinds and with the communities. Some of these projects grew into plans for science centers. This support from the Council was vital already then, and it has proved of great importance to the development of the whole of the science center movement in Sweden.

As a result of these actions, several small activities based on the science center concept and a hands-on philosophy grew into larger projects. The Council for Planning and Co-ordination of Research continued to support many of these projects over the following years, which in turn made them more visible locally and regionally.

2. Different initiators – different roles

As already mentioned, the initiators of the projects receiving support from the Swedish Council for Planning and Co-ordination of Research were to be found in

different institutions and organizations in Swedish society. Consequently, the reasons for starting the projects also differed, and as the projects grew into more permanent institutions, the different scope of their activities became more evident.

There is still no great number of science centers in Sweden, but, in a national perspective, those existing are more diverse than their counterparts in other parts of the world. This is no doubt due to the different character of the initiating bodies, and also to the fact that there were hardly any close models to follow. Science centers in Sweden developed out of the ideas of special people and out of local and regional needs rather than representing an international trend.

It is worth noting that among the growing projects only a few of those conceived in big cities and at big older universities and museums have been reasonably successful so far, whereas those started at new universities, or small museums, and in medium-sized cities have made more substantial progress since the middle of the eighties.

To picture the science center situation in Sweden, the activities of two main types of initiators will be described.

University activities: some examples

In the late seventies, the universities of technology saw their number of students gradually dwindling. Looking at the demographics of Sweden, it was easy enough to realize that if science and technology education did not succeed in attracting students at a lower level, to prepare them for higher education in science and technology, then all universities of technology were looking at a meager future. Obviously, the young universities, lacking in recruitment traditions and reputation would also be those to suffer the most. Supporting science and technology center projects as a part of popularizing science and technology thus appeared to be a matter of survival in the long run, as a means to ensure the basis for future university student recruitment.

The two new universities of technology at Luleå in the far north of Sweden and at Linköping in central Sweden very actively took part in creating and supporting

growing science/technology center projects within their own organizations. The main reason for the involvement was a matter of self-sustainment.

These universities started their ambitious projects by investigating the possibilities of starting science and technology centers within the university organization. Exhibit building and testing, class teaching and teacher training, children's workshops and other activities were organized as part of the planning process. The lack of tradition and the openness towards new and informal education within these universities helped the science center projects grow. Also, the fact that these universities were situated in smaller communities made the projects more visible and vital to the general public and to the local decision-makers. The importance of industry to the economic structure of both cities accounts for the interest among politicians and industrial leaders to emphasize science and technology within education also by informal means such as a science center. The long-term aim of the science center projects at these universities was to attract the general public to science and to enhance and possibly change science and technology education for children. To do so, it would be necessary first to change the attitudes and to increase the knowledge of teachers, especially those of the lower grades of school.

The two projects of Linköping and Luleå, though similar at the start, turned out rather differently.

The Linköping project, Fenomenmagasinet (The Phenomena Warehouse), has remained small, and has until recently been kept essentially a university matter, although to some extent supported by the city and the regional council. It deals mainly with the phenomena of science and works by teaching science classes to students and to teachers. It is also open to the public on week-ends and in summer. Its power of influence on the educational situation in the region is limited by its size both in actual floor area and staff. Recent development towards independence of the university and more of community support may result in increasing activities in the future.

The Luleå project, Teknikens Hus (House of Technology), was taken out of the university to form an independent non-profit foundation, being funded before it started by donations from industry and private persons. It was planned and created to be larger and to deal with technology, especially with regard to modern

local and regional technology. It has become a community pride, attracting large numbers of visitors, including many tourists, and receiving a lot of support from the local and regional industry and society as a whole and from the whole region, both morally and economically. Since its start, it has been involved in teacher in-service training and has for some years had a government grant to develop training activities in technology especially for female teachers.

Other important action to be mentioned in the university context was taken by teachers and researchers at the Teachers' Training College in Stockholm. Here, an interest in the pedagogy of science was of course the reason for supporting new initiatives in the educational field evolving among the college staff. As a result, a science center, Tom Tits Experiment, was opened in a satellite city of Stockholm, as a separate foundation supported also by the local city council. It has a special character, using artistic impression as a key idea, and working to combine science and art in a creative manner. Throughout its existence it has also been active in teacher in-service training in science.

Museum development

Museums, and notably museums of technology, were trying to develop their museological tools to attract new audiences in the mid-eighties when the need for renewal to increase the interest in technology was clearly felt. Museums in the ethnological and historical field were planning additions in exhibits and activities including the history of technology.

These science center additions to museums have mostly remained small and have taken a limited part in teacher in-service training activities. Their connections to the school system have mostly focussed on teaching classes, specializing in different fields. One of these museums, Framtidsmuseet (The Future's Museum) in Borlänge in Central Sweden has a planetarium and thus specializes in astronomy. The Malmö Museum in the south has taken the life, activities and instruments of an 18th century Swedish scientist as a theme for the exhibits. The earliest initiator of a science center as part of a museum was the National Museum of Technology in Stockholm, cooperating with and using the experience of internationally known museum science centers, e.g. Launch Pad in London. On the island of Gotland in the Baltic, a new part of the well established historical and ethnological museum of

the region was organized along the same internationally successful lines and called Fenomenalen, indicating the focus on phenomena.

In some communities, the efforts of the initiators have been combined and led by the community, county or regional administration, with the clear aim of uniting the educational tools of science/technology centers with the school system to work towards a common goal of industrial and economic development. It is still too early to judge the outcome of most of these projects.

3. Science, technology and government concern

The situation of the early nineties in Sweden with regard to science and technology education shows much the same picture as did that of the late seventies, only even more pronounced than before. In the late eighties students were overcrowding the universities of technology and the future of Swedish science was promising. Now, in the nineties, these great expectations have changed to concern for the further development of Swedish technological industry and for scientific research in Sweden. Student numbers are again decreasing, and science and technology education at school does not seem to attract young children. The results of the campaigns of the seventies and early eighties do not seem to have lasted long.

This situation has caused concern not only in the universities, among politicians, with the Swedish Academy of Engineering and the Academy of Science but also with industrialists. There has been call for greater involvement in matters of science and technology education on the part of government and government agencies. This call for action was met in 1993 by several decisions on government action to address the needs for change in science and technology education. Special projects were initiated within the Agencies of Education and Higher Education and great importance was attached to measures to increase the educational interest in science and technology generally.

A wider role for science and technology centers

One of the measures taken by the Ministry of Education and Science was to once again use the science center concept, now to focus on the importance of changing science and technology education – the contents as well as the methods. This time,

the science centers were given a specific task, based on the experience of informal education within science centers . A working group was set up to look into the possibilities of making science centers play a greater part in the teacher in-service training in science and technology.

The need for increasing the emphasis on teacher in-service training was obvious. Ever-increasing numbers of students opt out of science when choosing study programs for their high school years. Science teaching in the lower grades of school is in many cases impeded by lack of science education on the part of the teachers already in service. The teachers' training colleges do not attract enough students to science teacher education to fill the needs of to-day and even less the needs of the future.

The working group set up by the Ministry was commissioned to survey the science center situation in Sweden, looking into the scope and activities of the existing science and technology centers. The working group then was to examine the possibilities of an educational role of the science centers in the intensified teacher training activities needed to achieve a change in the educational situation generally. It was considered vital to take advantage of the methodological contribution of science and technology centers to science and technology education as an inspiration to teachers and students and supplementing the formal education of school. Needless to say, this focus on the educational role and mission of science centers was also favourable to science center activities generally.

Working group, activities and proposals

Working group members represented the pedagogy of science generally, adult teaching methodology and science center experience. The Swedish Council for Planning and Co-ordination of Research, which as mentioned earlier had been active in supporting science center growth, was also represented. The author of this paper was appointed chairperson of the group and an experienced information officer in charge of project activities within the Agency for Higher Education was appointed secretary. Government officials representing the Ministry of Education and Science were co-opted as members of the group¹.

A survey of all existing science centers and equivalent activities and projects in the country was made as a start of the working group activities. The survey included information on organization, funding, annual income and costs, size, mission and current activities of all institutions, organizations, projects, etc. A total of about 30 science and technology centers or projects throughout the country were found to be active or in a planning stage.

From among these science and technology centers, a number of projects and/or institutions were selected which were considered more advanced or likely to develop further. The following criteria were applied for selection: the existing experience in teacher training, a pronounced aim to put science and technology in a social context, the degree of stability of the existing organization and its economic situation. Also, the experience of working with schools and universities was considered important. Those selected were invited as a further step to elaborate consistent plans to develop new teacher in-service training activities.

The aim of the working group was not to establish new training projects in science centers exclusively but to make the informal science center methods of teaching spread to a much wider circle. The working group thus examined the specific plans, the intentions and the methodological basis for further activities among those invited to take part in the development scheme. It also considered also the possibility of transferring the experience gained within the selected programs to other organizers.

As a final result of its activities, the working group submitted a proposal to the Ministry of Education and Science to support seven science and technology centers in the country by giving substantial grants over the next three years, so as to enable these institutions to plan and carry out teacher in-service training activities in accordance with their own intentions earlier laid forward. It was also proposed for six other promising smaller projects to receive small grants to stimulate further development. The Ministry of Education and Science took a decision based on these proposals in December 1993.

Evaluation of science center activities

In the decision taken by government, it was also stated that the Agencies of Education and Higher Education be responsible for following-up the science center activities. The agencies mentioned were already engaged in a joint assignment to “promote and initiate measures within the school and higher education sector which are designed to increase the interest of young people in, and their prerequisites for, studies with a technical and scientific profile”². The proposal submitted by the Working Group for Science/Technology Centers now widened the scope of this assignment.

This meant first of all that further contact and exchange of experience between the science centers in Sweden was to be arranged jointly by the agencies and in this way encouraged and facilitated. It also meant that the agencies took the responsibility of following and evaluating the activities of science centers supported by government over the next years.

The formal evaluation will be carried out by internationally acknowledged educators and researchers of methodology. The results will no doubt be of interest to a wider international audience. The first report from the evaluation process will hopefully be available in March 1995.

4. Conclusions

Even though Swedish government activities over the last 20 years often have focussed on science and technology education, the government actions decided on during 1993 have a wider scope than before, comprising both renewal of higher education, teacher training and in-service training and methodological development. The new and wider role of the science and technology centers in the overall promotion of science and technology education in Sweden will certainly help develop the science centers into strong and active institutions of informal education. It will also give these new and so far rather small institutions greater possibilities of playing an important role in Swedish science and technology generally. Furthering this development is indeed a national matter of great importance.

References

1. *Working Group for Science and Technology Centers*: Björn Andersson, Assistant Professor, Department of Subject Matter Teaching/Science, Göteborg University; Annagreta Dyring, Director, Swedish Council for Planning and Coordination of Research, Stockholm; Thomas Ginner, Assistant Professor, Department of In-Service Education of School Staff, Linköping University; AnnMarie Israelsson, Director, Teknikens Hus, Luleå, Chair; Gunilla Jacobsson, National Agency for Higher Education, Stockholm, Secretary; Co-opted Members: Dan Andersson, Head of Section, Christina Hasselberg, Head of Section, Peter Karlberg, Head of Section, Ministry of Education and Science.
2. Report on the Science and Technology Project Plan, Memorandum 5 October 1993, National Agency for Higher Education, Stockholm.