Kids' Club Reborn: Evolution of Activities

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Abstract

The observation of Kids' Club process indicates the development in methods, activities and tools from the beginning of Kids' Club in 2001 to the present activities. The key elements of Kids' Club that were presented at the first stage are still valid, but the activities have received novel forms, emphases and working tools as a result of action research. Kids' Club concept has diversified from the original Kids' Club technology club and research laboratory to encompass schools, companies and international cooperation.

1. Introduction

Kids' Club [3] is a technology club for children and young people and also serves as the research laboratory of the Educational Technology research group at the University of Joensuu, Department of Computer Science. Kids' Club was launched for the needs of educational technology research and the needs of children's technology education with a pilot group in October 2001. The second group of participants was chosen in February 2002 and new members into this group were chosen in September 2004. Participants in the Kids' Club are children and young people between 10 to 17 years. At the moment altogether 19 children participate in Kids' Club activities divided into two groups: the Mine and Learning Door projects. Both Kids' Club groups come together regularly twice a month a two-hour's worth. These two Kids' Club groups indicated that the Kids' Club is a workable concept and it can be applied to various target groups.

Kids' Club is seen as a Piazza where ideas are shared between people from diverse backgrounds. Kids' Club is now encompassing cooperation with teachers, elementary school students and teachers, companies, families and international cooperation in research and Kids' Club activities.

The main aims and motivations of Kids' Club are outlined:

1. to foster kids to creative design and problem solving for novel ICT-flavored artifacts;
2. to develop fresh tools and approaches for understanding technology and learning science;
3. to attract children, particularly girls, to think of their future careers in ICT.

From the *children's point of view*, Kids' Club is a technology club where they have an opportunity to study their interests in a playful environment. The environment is un-school-like and supporting students in the development of innovative ideas and alternative approaches to problem solving.

From the *learning theory point of view*, Kids' Club is based on the concretization of socio-cultural and constructionist [6] views on learning. Robots serve as *concretizing tools* with which children are able to make their internal thoughts and mental models explicit and easy to manipulate in physical world. The concretizing tools make also *inventive learning* possible which, in turn, emphasizes creative problem solving and the creation of new artifacts through the evaluation and comparison of different solutions. The learning as a process is based on the problem based learning process, where the creation of physical artifacts as possible solutions is stressed.

From the *research point of view* Kids' Club provides a platform for developing novel methods and applications of information and communication technology (ICT) for education, especially for learners with particular challenges or barriers in learning in the field of special education. The methodology is mainly based on action research. Separate studies are realized according to their own research plans.

2. Tools

The technical environment of Kids' Club contains several software and hardware tools for all phases of club activities. Some of the tools are commercial or ready-made freely available pieces of software or hardware and the research group has developed some. Technological environment can be divided into four categories according to the life cycle of club activities. Computers are used in all phases, and the computer environment is based on laptops and wireless network.

2.1. Tools for Planning and MindStorming

The first phase of Kids' Club project is planning. Several creative problem solving methods and different software, like MindManager, have been used. MindManager allows the user to construct mind maps quickly and maps can be converted to several formats for presentations and documentation. In addition, other similar software tools, white board, Promethean active board and such have been used for planning purposes.

2.2. Tools for Concretization and Modeling

LEGO® Mindstorms Robotics Invention System™ is a construction kit, which allows children to design and build their artifacts in a flexible way. The LEGO system can be programmed with several programming languages. By participating RoboCupJunior activities, children have become familiar also with ELEKIT-robots, Soccer Robo® 915, which are produced by EK Japan Co., Ltd. Children are encouraged to combine these kits with other materials in order to get a personal flavor for their robots and models.

In addition to LEGO and ELEKIT, door automatics with a 100cm x 100cm model door, a fingerprint and movement recognizers, a touch screen have been used in developing projects.

2.3. Programming Environments

An important part of the Kids' Club activities is programming. Children program their robots or other kinds of physical models to achieve the functionality of their liking. The programming environment is selected based on the needs of the current project. For example, LEGO RIS and IPPE [4] programming environments for LEGO robotics and TileDesigner environment for ELEKIT robots have been used. After the children have learnt the basic skills of programming, they can shift also to more advanced environments.

2.4. Tools for Evaluating Learning and the Process

Documentation and evaluation of the project are an essential part in Kids' Club projects. For documentation, children use typically digital cameras, PowerPoint presentations, posters or web sites. In this way, the participants can share their new knowledge and experiences with each other.

Several tools have been used for evaluating the projects and one's learning. Web and paper forms were used as questionnaires for reflection, but these methods did not give expected information to researchers from the children. Neither was the depth of the reflection process among the children meaningful for learning. Thus, a virtual reflection environment Virre [2] was developed for the needs of Kids' Club at first as a computer application and later implemented inside the Bruno teddy bear.

3. Kids' Club Activities

In Kids' Club, children are designers who work in pairs in a goal-oriented way within a certain subject area and without a tight schedule. Kids' Club lacks strictly defined curricula and examinations. Instead, evaluation of learning is done mainly through student reflection and self-evaluation, which takes place throughout the whole working process.

3.1. Technology Projects in Kids' Club

Kids' Club activities are based on various technology projects [5], where an essential part is to explore, experiment, develop, and to find solutions to technological problems.

Learning the basics about mechanics, electronics, programming and problem solving is an important part in the first building and programming projects. In these projects the aim is for example to build physically strong robots that can operate in different environments performing given tasks.

In modeling projects building and programming of models of real life devices, such as mine and devices of a supermarket, is the key element. Exploring the structure and functions of the device begins by familiarizing with a real life object or phenomena and their structure and functions.

Game programming projects emphasize learning of programming, designing and project-based learning. These projects helped the children to appreciate the importance of planning and choosing a suitable tool for implementing.

The common nominator for the projects in Kids' Club is that the projects are not always necessary successful in traditional terms, that is expected product, but they can prove to be very successful in educational terms.

3.2. Collaboration with Schools

Experiences of Kids' Club activities are used as a part of local schools' technology education. Student groups from three local schools have had their technology-oriented lessons at the laboratory of educational technology. These student groups have come both from general and special education. The lessons are based on topics and methods developed for the Kids' Club. During the lessons Kids' Club tutors' share their expertise with teachers.

The Kids' Club has also served as a springboard to The Development Project for Technology Education [7], which supports school cooperation by offering supplementary education for teachers. The training is implemented as an 80-hour course, which contains contact meetings and a teacher's technology project with their students.

3.3. Collaboration with Companies

Kids' Club and company, Abloy Oy, began cooperation in 2003 by creating an intelligent door system in the collaborative innovation creation project [1]. The common goals of the Intelligent Door Project were to create an intelligent door system and to seek novel ways of collaboration between the company and the school students. At the moment cooperation continues as the Learning Door Project.

3.4. International Collaboration

Kids' Club Piazza has widened from the pilot group of the early stage to extended Piazza. Thus, Kids' Club can be seen as a hub for Kids' Club piazzas all around the world. Many international contacts have given possibility to get children in touch with other children across the world. International - especially intercultural - collaboration is a *sine qua non* for developing the Kids' Club concept into the stage where it can serve as a learners' community, which welcomes members from backgrounds all around the world.

4. Conclusions

Creative use of educational technology can serve as a tool for problem solving and encourage students to find novel learning paths. It seems that a technology environment, such as Kids' Club, creates a natural environment for interaction and thereby develops cooperation skills. Development of social skills is based on learning other skills, such as programming, that was noticed during the lessons of the special education students [8]. The concept of the Kids' Club has proved successful also among the students from the regular education. It has not only increased their technical skills, but also helped them to collaborate and apply creative problem solving strategies. Kids' Club activities have an effect on developing of tools and applications of educational technology. Likewise developed tools make possible various club activities.

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