Introduction
With current debates about what a 21st century education should look like and £45 billion earmarked by the UK’s previous government for England's Building Schools for the Future program, how might children and teachers influence the reconfiguration of their buildings and outdoor spaces and find new child-led and competency-based ways to work together? The Fountaineers project aimed to explore the possibilities, with teachers and children working across classroom boundaries to co-design an interactive, programmable fountain for their school playground.

Location
England

Aims
The overall aim of the project was to use the design and construction of an interactive, programmable, ‘intelligent’ water fountain as a vehicle to explore issues around participation, learner voice and alternative approaches to teaching and learning, and to develop a powerful, flexible, and unique learning resource that will become a valuable and integral part of everyday school life and learning.

Description
Fountaineers was a collaborative project between Futurelab, Stakeholder Design, and Luckwell Primary School. The project’s aim was to design and build a fountain for the school and to engage the whole school in the project. Work on the project began in October 2006, and ended with the fountain launch in July 2008. All of the pupils and teachers in the school were involved in the design of the fountain. They acted as researchers, co-designers, advisors, and engineers, and worked alongside external design and fountain experts. The design process encouraged experimentation with methods in decision-making and in communicating across the whole school community, and with different mechanisms for consultation and ways of working across age groups.

The final programmable fountain has a variety of inputs and outputs that allow it to be programmed in many different ways, and the capacity for a range of uses. With the fountain completed, children are encouraged to work together to determine how to manipulate it. Use of the fountain is related to subjects in the curriculum including science, dance, Information and Communication Technology (ICT), drama, and citizenship.

Management of the fountain’s use is supported by teachers, but is ultimately owned and led by the pupils.

A number of initiatives by the previous government brought changes to England’s education system including curriculum design and pedagogy. At policy level these included, for example, the government’s Every Child Matters framework, the Children’s Plan and the Qualification and Curriculum Authority’s Futures.

These policy documents encouraged school leaders and teachers to innovate in order to provide a more meaningful, experiential, and ‘local’ curriculum for learners. The direction of change was for learning to become more personal, holistic, and learner-led.

Initiatives and debates around the redesign of learning environments in England were driven by a government planned investment of approximately £45 billion more than 15 years in the Building Schools for the Future program. (See www.bsf.gov.uk)
For teachers and learners to have a real say in the redesign of their schools, mechanisms for them to envision new educational futures and the pedagogies and approaches to teaching and learning were required. These included considering how traditional 'non classroom' space can be used to support learning, the possibilities that new and emerging digital technologies may bring, and the reorganization of time and people. School redesign is an opportunity to see how learners can take part in the redesign process and how this in itself might be viewed as a valuable and authentic learning experience with significant outcomes.

Scale
- Luckwell Primary School
  - The scale of the initial project involved the staff and children in one primary school
  - 14 staff (teachers, administrative, and learning support assistants)
  - Approximately 200 children ages up to six years

Staffing
Five staff at 2-6 days/month.
Three other staff to a lesser extent.

Cost
Total project cost (co-design project & fountain): £217,000.

Leading Practice
This whole-school, co-design project resulted in the production of a programmable playground fountain. It encouraged teachers to adopt a different perspective about children and their capabilities and their relationships with them. It provided an opportunity for the whole school community to rethink the use of space for learning, including the use of what might be traditionally considered as space that was not for learning.

Lessons Learned
The project succeeded in part because of the shared culture of innovation held in the school. That culture of innovation was evident when, during the project, there was a change in school leadership. The project continued to a successful conclusion.

Often, technology in learning brings to mind pictures of learners using traditional computers and following computer-aided learning programs. The Fountaineers project provided a broader view of the way in which technology can assist learning, both through development of design and construction of the fountain, and in its continuing use a programmable machine.

While there are advantages of developing and building something real, there are challenges that result from the pace of design, reaching agreements, and construction that may create a challenge for continuing engagement of children's interest. However, it may also help to develop a breadth of understanding and learning among participating children.

Good design principles that engage end-users in the development and implementation of designs and construction provide shared ownership in the success, or indeed failure of projects. That co-ownership by teachers, pupils, and the wider community can be a powerful force for cohesion and mutual support. A higher profile for design in learning and its use could be transferable and helpful in schools.

Impact
Through conversations with teachers and pupils, the internal team undertook early stage research to better understand the impact of the project. These initial findings are summarized below, along with some of the team's comments.

Cohesion
The project generated shared goals, a strong sense of cohesion and a changed relationship between teachers and learners and resulted in staff and children working successfully together.
- "When we talk about the fountain everyone listens" (6th grader).
- "I really loved the designing and working with lots of different people... I learned a lot" (7th grader).
- "I love opportunities for mixed aged work–I love it, it’s brilliant" (teacher).
Efficient and Effective Learning

Tentative findings suggest that the Fountaineers project promoted deeper learning and greater motivation among teachers and learners.

- "We're doing more in free situations—learning from play" (teacher).
- "Fountaineers is more fun because it is fascinating. The fountain is the best!" (4th grader).
- "The Fountaineering has been great because you learn different things" (5th grader).
- "It was great and I've never done anything like it since" (7th grader).

Emerging Shared Curricula and Pedagogical Vision

Fountaineers prompted fundamental questions about pedagogy and curriculum. Alongside the big debates and reviews within the system it has been a major catalyst in the commitment to develop more children-led, holistic, integrated, skills, and competency-based experiences. ‘Doing stuff’ is a phrase often heard—a reaction against the passivity and docility often found with current curricular approaches. The Fountaineers project was found to be a good ‘space’ in which to begin to modify the teacher role.

- "I'd love to see more learning with the children following their own interests" (teacher).
- "I'm winning through the use of participatory approaches" (teacher).
- "I'm positive and will go with the changes... I think children are on their way to voice, choice, and responsibility." (teacher).
- "Children are given challenge and responsibility. Working with special needs means we naturally deviate, nip and tuck, and explore what works. Like the Fountain project this often means following the children and letting them take the lead.” (teaching assistant).

Changing Behaviors and Roles

Promoting more learner voice, participation, and control amongst learners requires staff to adopt a different perspective about children, their capabilities, and their own relationships with them. ‘Traditional’ relationships and transmission models of teaching are replaced with more co-created, facilitator, and supportive modes. This represents a challenging and difficult transition period in professional practice, with staff having to develop a secure, shared, and realistic vision of pedagogy and curriculum. Members of staff have already started to explore and transform their wider practice and the project has been a significant catalyst in this process.

- "Children teaching... it's the best way to learn, I do this when I can" (teacher).
- "Fountaineers has been great. Children have responded to responsibility... it’s kept them engaged and it has been about authenticity” (teacher).
- "They have had to learn lots of new and different ways so they can teach us" (5th grader).
- "[The teacher] was learning as well as helping us all” (4th grader).
- "With Fountaineers it’s better, because they [teachers] participate more” (6th grader).
- "In Fountaineers you have more of a say” (6th grader).

Technology

- Hardware
  - Fountain pumps, spouts, lights, sensors, speakers, customized Fountain control system, customized Fountain control interface block (to translate data from Lego before sending to fountain, and vice versa), PCs
- Software/Applications
  - Fountain simulator program (Flash), customized software to control lights, spouts, sensors, Lego Mindstorms, Fountaineering wiki
- Media
  - NA

Conclusion

The project highlights the benefits of:

- Not being bounded by age-related learning
- Classroom-centered learning
- Co-design and co-construction
- Changed relationships between teachers and children
- Project-based learning and its impact across the curriculum
- The benefits of engagement and motivation
- A broad view of technology’s potential contribution to teaching and learning

Similar and Related Projects

MIT's Fablab: http://fab.cba.mit.edu/about/faq/

The Nuffield Foundation’s Young Foreign Project: www.youngforesight.org/default.asp?section=About&chapter=Aboutyf
Case Study

Read the Education Best Practices Whitepaper and other case studies at:

Sources

Humphreys, P, Jan 2009, Fountaineers: Exploring the impact of a whole-school co-design project, Emerging issues and implications for pedagogy, curriculum, and learning space design, Futurelab: www.futurelab.org.uk/resources/documents/project_reports/Fountaineers_case_study2.pdf


Teachersnet, 2009, Building Schools for the Future Programme, Teachersnet website