Interacting with Technology

Lecture 4: Case Study: Children and Technology

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Overview

Introduction & Lecture 1: Children, schools and technology

Lecture 2: Mobile technologies and sensors

Lecture 3: Mobile and tangible technologies for children

Lecture 4: Case study: Children and technology

Lecture 5. Exploring spatial cognition with novel technologies

Lecture 6: Aiding spatial cognition in children

Lecture 7: Evaluating 'in the wild'

Overview

Case study: Children and technology

- My PhD
- A brief history
- Example data loggers
- Case Study One- River Field Trip
- Case Study Two- ‘Sound and Graphs’
- Problems to overcome
- Questions

My PhD:
‘Mobile Contextual Data for Hands on Learning’

- My PhD is sponsored by Great Western Research.
  - This means I am linked between two universities, Bath (Psychology) and Bristol (Computer Science) and I have an industrial sponsor, ScienceScope.
  - ScienceScope make data logging equipment for schools which can either be used inside or outside of the class room.

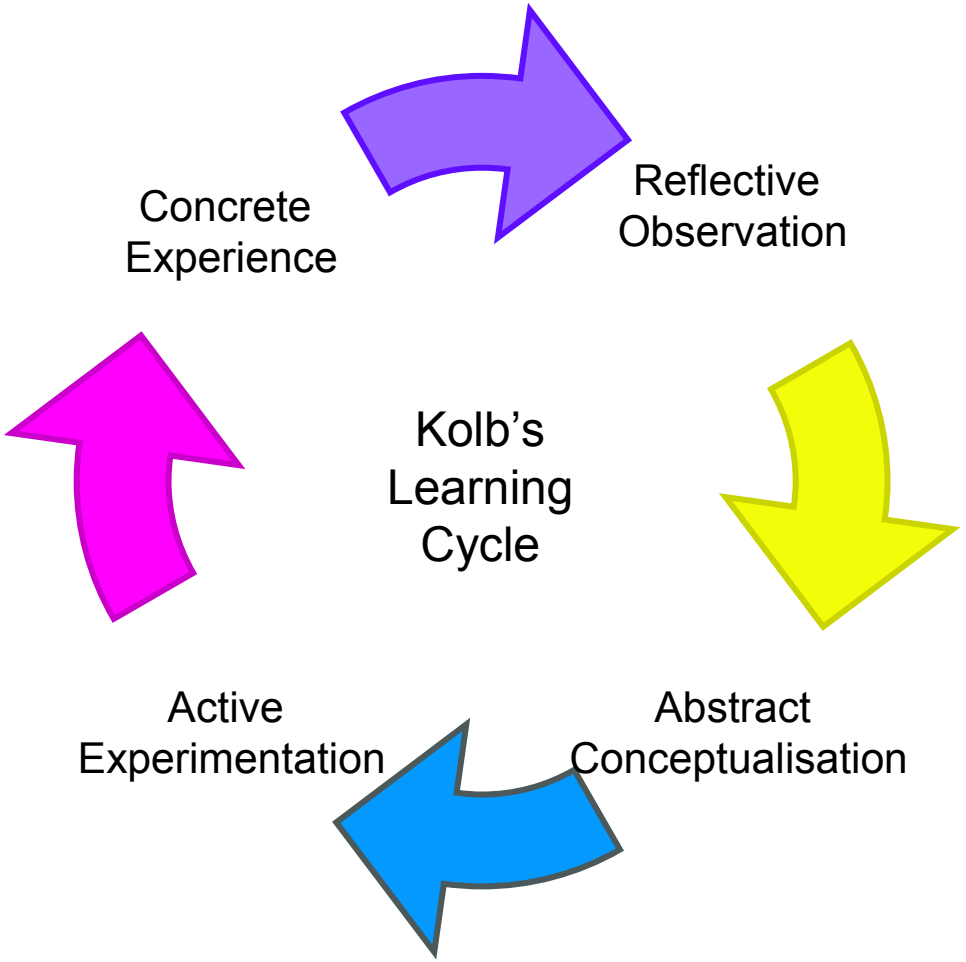
- My PhD sits within a multitude of fields;
  - education, science, computers, and outdoor learning

- The key theme running through out my research is to establish the role **context** can have on **learning** and **motivation** in school children.

- By understanding what kind of information helps children we can disseminate this information and work with educational software producers to improve learning tools.

A Brief History

- **Piaget** - Belief that learning should occur through play and interaction.
- **Vygotsky** – Thought learning should be within the learner's 'Zone of Proximal Development' this was the idea that learners should be provided with tasks slightly harder than what they can currently do, encouraging the learner to take control of their own learning.
- **Dewey-** There should be a balance between traditional teaching and personal enquiry
- **Kolb-** Developed a learning cycle of four stages which students would need to pass through for effective learning.



Seeing, thinking, learning and trying for yourself.

A Brief History

Krajcik (1998) and **Johnson (1997)** who note the importance of hands on experience and authentic work.

Stanton (2003, 2005): Participate Project - the role of context for learning and also noted the role of automation, with students seemingly gaining more from work that they had to put together themselves in comparison to having this automated by software.

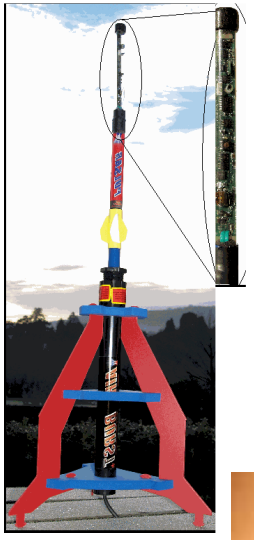
Zoldosova (2006) - Emphasized the importance of personal experience for natural learning.

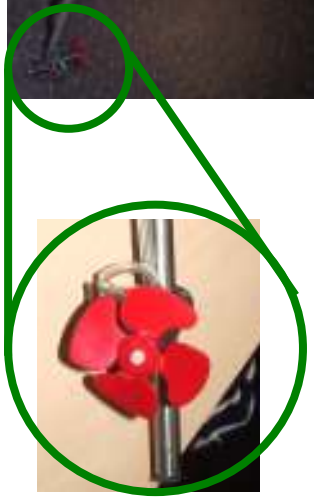
Glasersfeld- In order to direct your own learning you must be motivated to do so.

Rogers and Wild (1994) noted that data loggers can free students from mundane tasks of recording data and allows them to concentrate more on evaluating and interpreting the data.

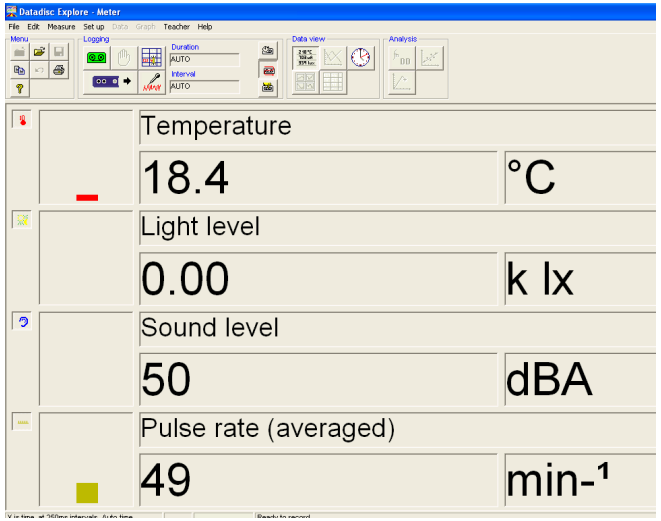
Whye Choo (2000) having the graph drawn immediately allows the pupils to gain context with the graph, drawing connections between the shape of the graph and their real time experience.

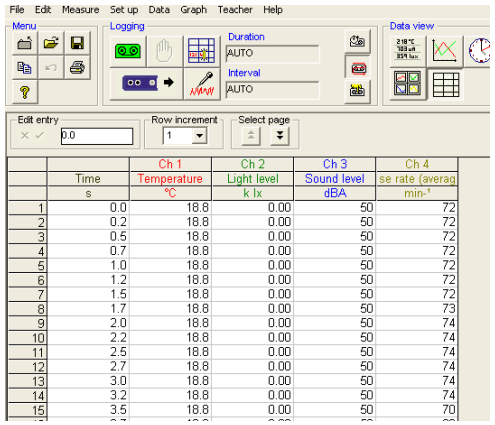
Data Loggers

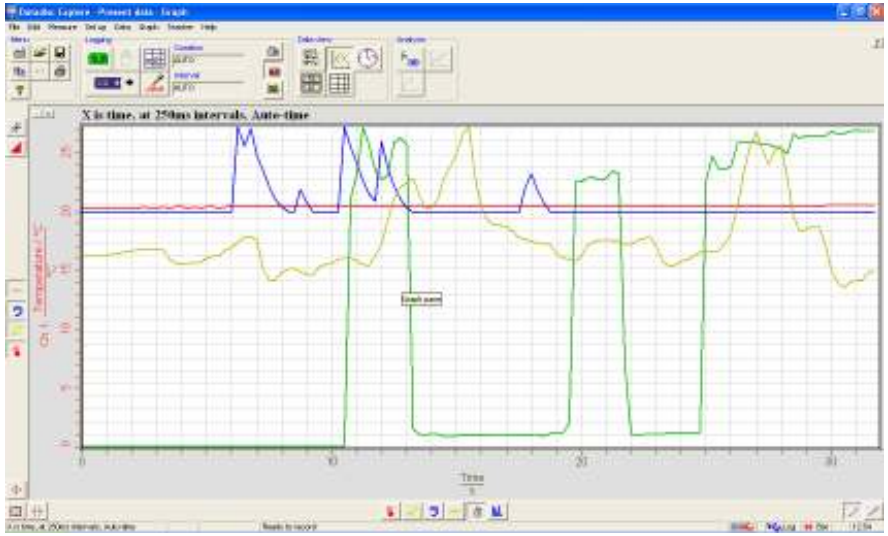


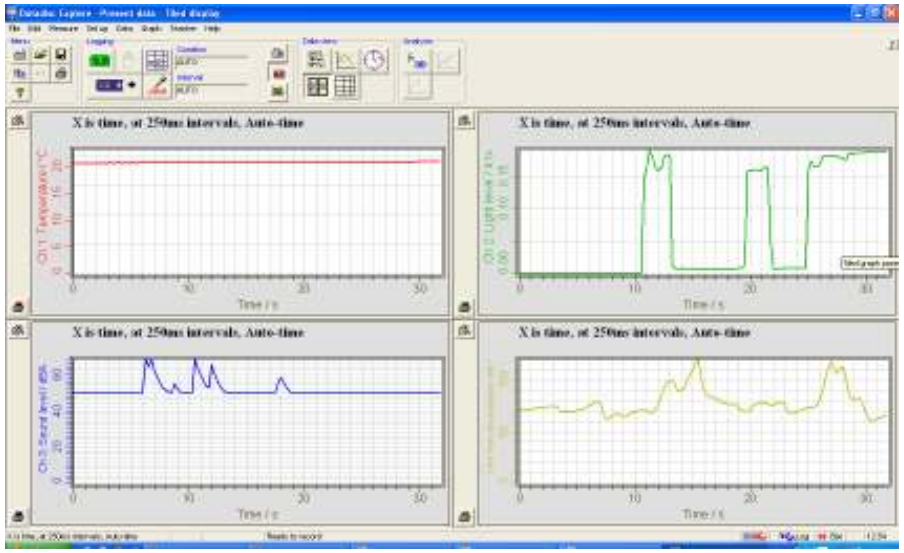


Data Logging Software









Case Study One-River Field Trip

- In order to understand how hand held devices are currently used I undertook two observational studies.
  - Firstly I observed, over a number of weeks, a group of year 10 Environmental Science students as they used data loggers on a river studies project.
  - Secondly I observed a group of year 12 Environmental Science students conduct a river study, some of the class used data loggers while others used ‘traditional’ apparatus.
- Both of these studies indicated to me how the students really enjoyed the context given to the project by actively collecting the data.
- I am currently completing the qualitative analysis of the data.

Case Study Two- ‘Sound and Graphs’

- This was a **Mixed Method** experiment designed so that I could establish which experimental condition was most effective (quantitative) while not losing the depth of information and insight provided by qualitative data.

- The experiment centred around students collecting sound level data and then using that data to produce graphs and answer questions on them.

- The students produced two graphs, one based on their own/their partner’s data and one based on pre-collected data.

- When producing the graphs the students either used computer software, drew graphs by hand or annotated pre-produced graphs.

- I am currently in the process of writing up this data for a journal article

Case Study Two- ‘Sound and Graphs’

- How did we measure it?
  - By developing a pre and post test we were able to gain quantitative data to show changes in how students responded to questions based on graphs.
  - Students were also asked a range of qualitative questions to provide more in depth data.
  - This was supplemented by video taping the whole experiment.

- What did we find?
  - We found that our intervention showed more effect on motivation than learning.
  - Students who collected their own data more often indicated that they felt more comfortable working with their own data than with data collected by a researcher.
  - Students who collected their own data also felt they could explain their own data better than data from the researcher.

Problems to overcome

- Students who were asked to draw their own graphs performed significantly worse on the graph drawing aspects of the post test.
  - The students found the day tiring and did not enjoy the quantity of worksheets required to provide us with data.
  - An ‘end of day’ factor was apparent which may have skewed the results.

- A large quantity of data was collected which was hard to analyse (see work books)
  - This highlighted to me the importance of planning exactly how you are going to analyse data.

- Video Data-
  - In the wild it is hard to capture the data you want,
    - during the river study I often ended up taking part in the experiment
    - It can also be hard to multitask-make notes, video, talk to students, not fall in the water…
  - In the classroom it can be hard to know where to put the camera
    - Some students dislike having the camera near them
    - Students often talk less when the camera is near them

Any Questions?

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