Does using new technology improve children’s learning?

Learning with hand-held mobile technologies

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What is learning?

- Learning is defined as “the process of acquiring knowledge, attitudes or skills from study, instruction or experience” (Miller & Findlay, 1996, p167).
- Behaviours, skills, knowledge, understanding and values are acquired during learning.
- The three aspects to learning are gaining skills, gaining knowledge, and social bonding.
- There are three learning styles used, often at the same time. These are visual learning, auditory learning and kinaesthetic learning.
How can learning gains be measured?

- The behaviours, skills, knowledge, and understanding of the pupils involved can be observed or assessed.
- The learners can be asked for their opinions.
- To give a comparative measure of the level of improvement, a method of assessment needs to be carried out to compare one method of learning with another.
- Test the knowledge of the learners before and after the event that it is hoped will bring about learning.
When is learning achieved most effectively?

- Learning skills and ideas in the relevant context.
- Learning and recall also improve when the learner is performing motor activities.
- Learning is most effective when it engages, motivates and inspires students.
- Challenging but achievable tasks, with a sense of discovery, and opportunity for bonding are fun.
- Challenge, curiosity, fantasy, and tasks with a goal are motivations for learning.
Why use mobile devices?

- Portable, hand held devices have been found to be engaging and motivating for learners in many studies (e.g. O'Hara, Kindberg, Glancy, Baptista, Sukumaran, Kahana, & Rowbotham, 2007; Facer, Joiner, Stanton, Reid, Hull, & Kirk, 2004; Loveless, Denning, Fisher, & Higgins, 2007).
- They allow learners to feel in control of their own device and learning.
- Learners often have tasks to accomplish with goals.
- The portable nature of the devices allows them to be taken into different contexts, such as on field trips, allowing students to learn about a topic in context.
- Mobile devices allow, and in some cases, encourage motor activity.
Research

- This would suggest that such technology would lend itself to improving the standard of learning achieved by pupils in a variety of tasks.
- Is this theory supported by research showing improvement in learning with mobile devices?
Learning achieved with handheld devices in a range of educational settings.

55% participants were under 19 years old; 45% were 20 years old or older.

Learners used hybrid PDA/phone devices to access m-learning materials via a microportal.

This was a collection of mini web pages where learners could find learning materials, communication services, web links, collaborative tools, and help with the system.
Findings

- Learning was measured by formal assessments, ongoing assessment by instructors, responses to questionnaires from learners and instructors.
- The PDAs improved the literacy, reading and numeracy skills of learners, particularly the least able.
- Being involved in this type of learning also helped students by:
  - Raising confidence.
  - Improving independent working.
  - Helping students identify own support needs.
  - Improving motivation and focus.
  - Improving engagement and interest in tasks.
  - Raising self esteem.
  - Improving skills in operating the PDAs.
Faux, McFarlane, Roche and Facer (2006)

- All pupils and teachers in a primary school in Shropshire were given PDAs to use as their own at school and at home.
- Activities planned in all subject areas using the PDAs, but a focus on literacy.
- Analysis was ‘informal’. Comparison with SATs scores of previous cohorts, described by the headteacher.
- A guideline for comparison, not experimental data.
Results

- Literacy skills generally improved.
- Particular improvement for boys in non-fiction literacy in years 3 and 4.
- Reading abilities improved.
- Fiction scores were lower. **
- Increased motivation.
- Increased self esteem.
- Improved ICT skills.
- Special needs pupils could use the PDAs to aid their communication.
Compared learning about butterflies on a butterfly farm using PDAs with using a guidebook.

The learning gains between the two groups were compared by giving both groups pre-tests and post-tests.

9 and 10 year old children took part in the study as a field trip.

The PDA group took photos of the butterflies, sent them to the server (teacher’s laptop).

Photos automatically compared to the database stored on laptop, and three most likely are returned to PDA.
Butterfly experiment

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Results

- The same group did 4 tasks using these methods, over a period of time (Post-test data for fourth task was not included in their results).
- PDA group made more progress between the pre- and post-tests.
- This progress was consistent over three activities.
- The level of knowledge of knowledge was maintained between activities.
Graph to show results

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What does this research tell us?

- There is very little research measuring the benefits of mobile technology on learning.
- Only one of these papers compares mobile devices with another form of learning.
- Only one of these papers is under ‘experimental’ conditions.
- The research *does*, indicate that for many activities there is an improvement in learning, and that this could be a greater improvement than is made by other teaching methods.
- All of the research has indicated that the mobile devices have improved learners’ motivation, enjoyment and independent learning, which would all suggest that learning gains would be made.
- It would certainly be worth further research in the area to see if these results can be generalised...
Conclusions

- Mobile devices are widely available in society.
- Students are motivated by using them to learn.
- The self motivation, enjoyment and engagement observed indicate learning benefits that could be measured more directly by future research.
- The benefits of capitalising on the advantages mobile devices offer will become more necessary as mobile devices become more a part of everyday life.


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