Designing for
Small Screens:
Learning Objects for Educational Applications via Handheld Mobile Technologies

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Portable Digital Assistant Technologies

→ PDA is a hand-held device equipped with computer capabilities that often includes wireless connectivity, a mobile phone, a camera and a variety of add-on.

→ This tool potentially creates a spectrum of educational opportunities and a new type of student-technology partnership in learning.

Image Source:
http://electronics.howstuffworks.com/pda.htm

Image source: http://www.marcrettig.com/

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→ PDA for teachers and students to share files (Ray, 2002)

→ PDA for students to ask questions, answer polls and give teachers feedback (Ratto, Shapiro, Truong & Griswold, 2003);

→ PDA for delivery of courseware and quizzes and as an intelligent tutoring system (Kazi, 2005);

→ PDA for dissemination of information and collection of data during field trips (So, 2004);

→ PDA as a tool that supports students' inquiries (Sharples, Corlett & Westmancott, 2002; Clyde, 2004);

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→ PDA in computer-supported collaborative learning (Roschelle & Pea, 2002; Zurita & Nussbaum, 2004);

→ PDA as personal tool for lifelong learning (Sharples, 2000);

→ PDA for disadvantaged young adults to improve literacy and numeracy skills (Attewell, 2005);

→ PDA for access to resources, as connectivity tool, as capture tool, as representational tool and as special calculator (Churchill & Churchill, 2005).
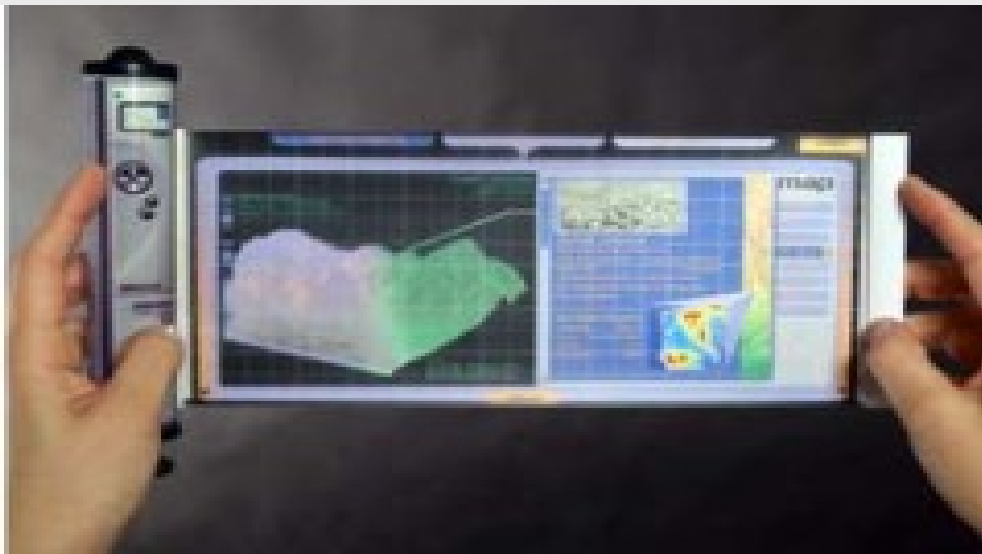
→ Many reports underline limitation of small screen

→ There are very limited guidelines in relation to the design of learning objects for PDA (Luchini, Quintana, and Soloway, 2004)

→ The only way of dealing with this limitation is to re-invent some strategies for more effective design of learning objects and for novel ways of interaction
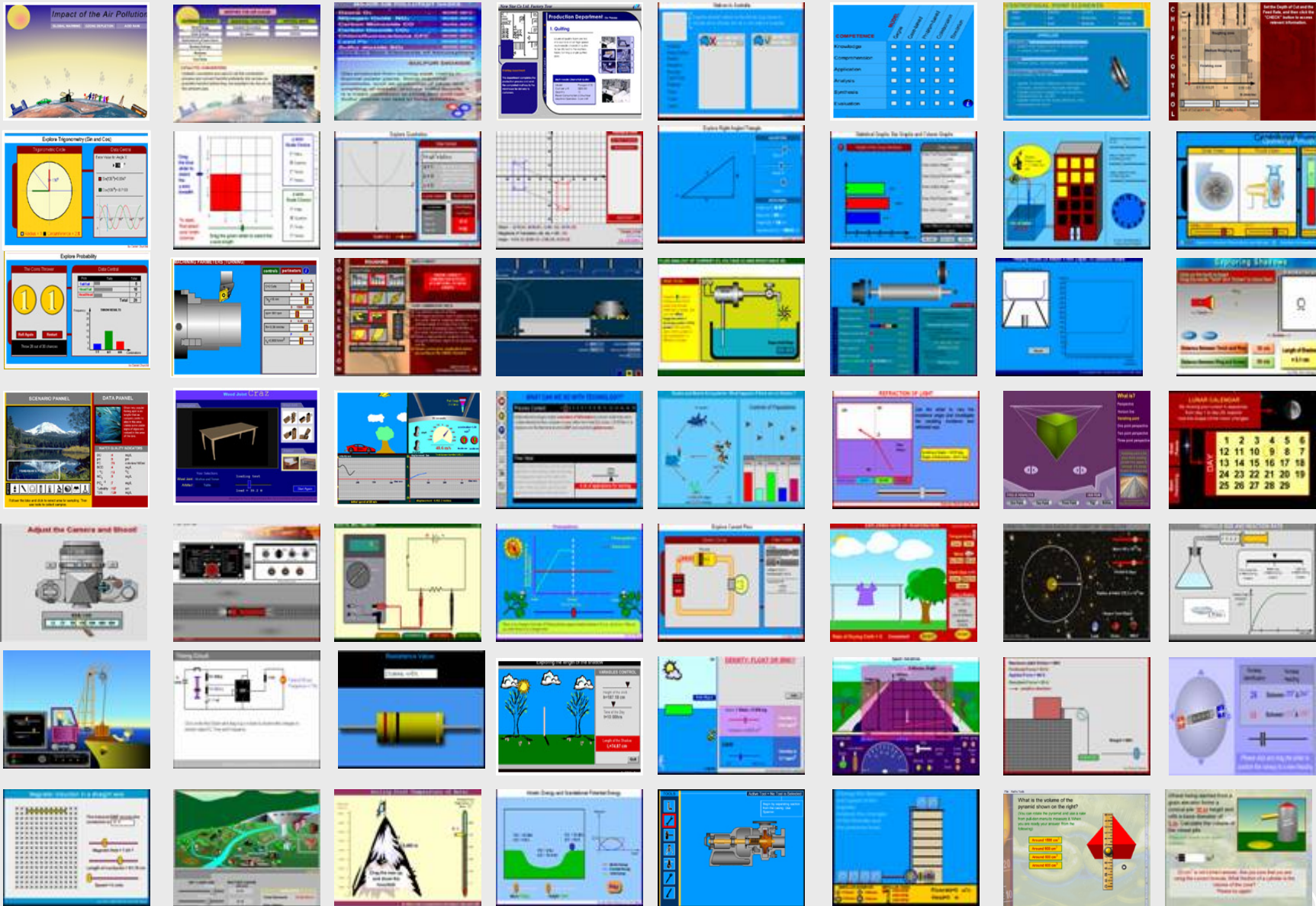
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→ The specific areas of inquiry in this study are:

★ What types of learning objects may be more effective for educational applications via PDA technology?

★ What may be a more effective context for their educational applications via PDA technology?

★ **How can these types of learning objects be designed to manage the challenge of the small display area of PDA technology?**
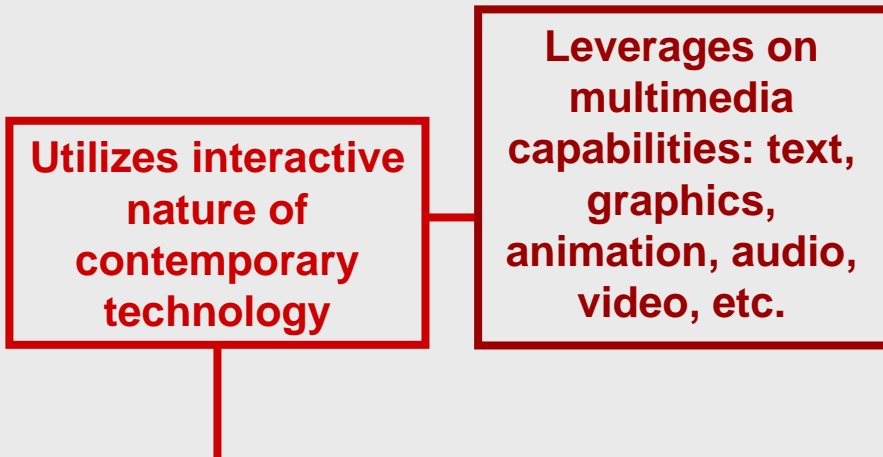
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LO Design for PDA

Utilizes interactive nature of contemporary technology

Leverages on multimedia capabilities: text, graphics, animation, audio, video, etc.

Representation designed to afford uses in different educational contexts

It originated with pedagogical intentions and for educational purpose

It can be reused in different educational contexts (including those unforeseen by the designer)

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→ **<u>Information Objects</u>**

★ Display of information organized and represented with modalities

→ **<u>Conceptual Models</u>**

★ Representation of a key concept or related concepts of subject matter

→ **<u>Contextual Representations</u>**

★ Data displayed as it emerges from represented authentic scenario

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➔ **Simulation Objects**
  - ★ Representation of some real-life system or process

➔ **Practice Objects**
  - ★ Drill and practice with feedback, educational game or representation that allows practice and learning of certain procedures

➔ **Presentation Object**
  - ★ Direct instruction and presentation resources designed with the intention to transmit specific subject matter

→ In the first stage, interaction with a number of education professional who are exemplary PDA technology users.

→ The second stage of the study used the results of the first stage as the basis for the design of a few learning objects for implementation with a small group of students in a school.

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→ Effective LO for PDA should be designed to supports student-centered learning activities.

→ These learning activities should often be conducted out of the class environment, as PDA technology enables portability.

→ Such learning objects should not require students to spend a lot of time with it.

→ LO should be a highly visual and often interactive display.

→ Two types of learning object are favored for delivery via PDA technology: an information object and a conceptual model.
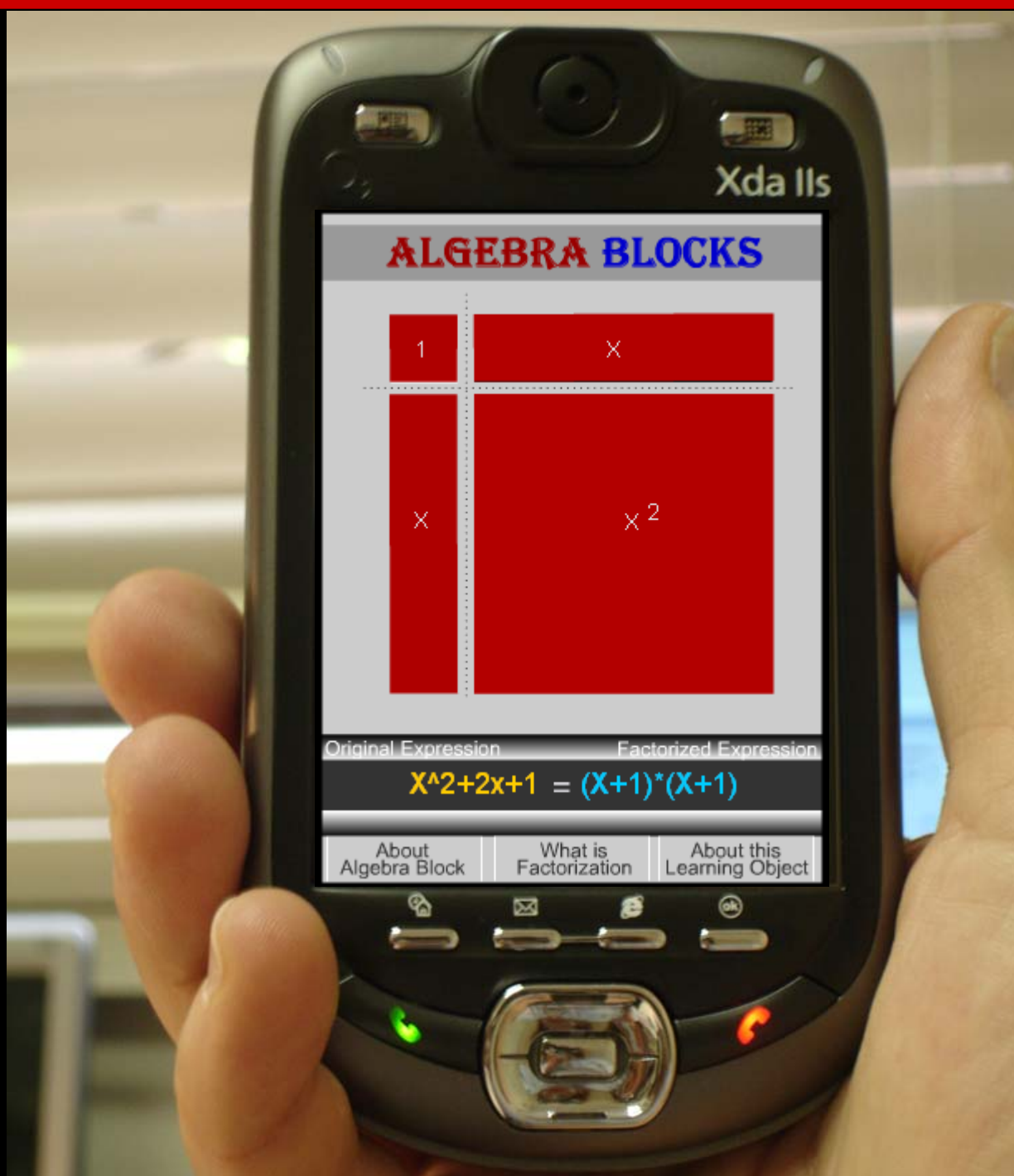
→ The key limitation of PDA technology for the delivery of learning objects is the small display

→ The small screen is a factor that affects the effectiveness of presentations of LO

→ It might negatively impact acceptance of this type of technology in education communities.

→ The small display area is, in fact, a reality of this type of technology, and PDA are going to change further in the future as consumer demands for less bulky devices increases

→ Some interesting design ideas surfaced through engagement with the respondents

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Visualization

Visuals can communicate complex ideas with clarity, precision, efficiency and convey the most knowledge in the shortest time in the small space.

~ Tufte (1983)

Change Diameter

Diameter = **30** cm

Radius = **15** cm

Circumference= **0** cm

Area of Circle = **706** cm^2
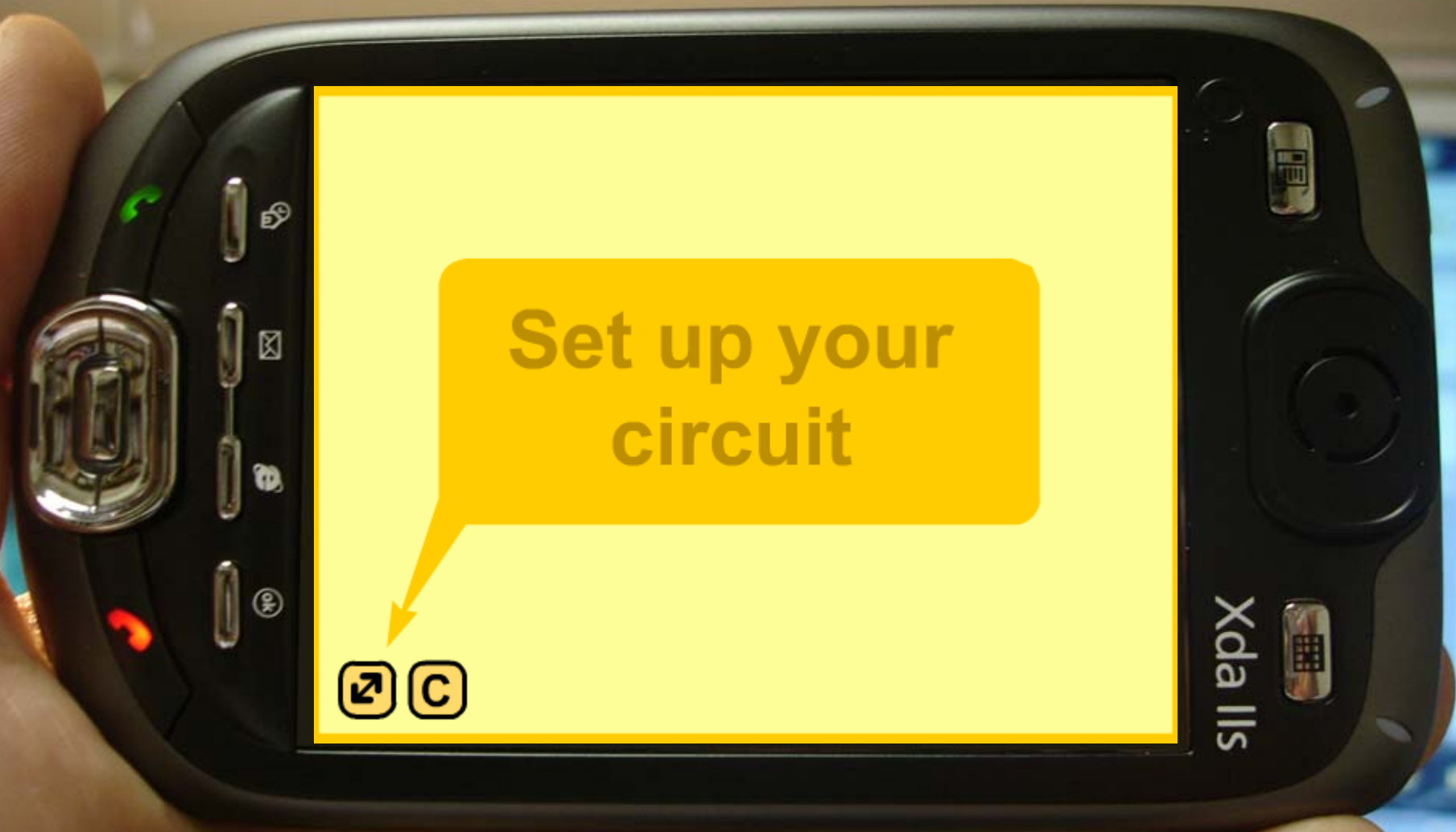
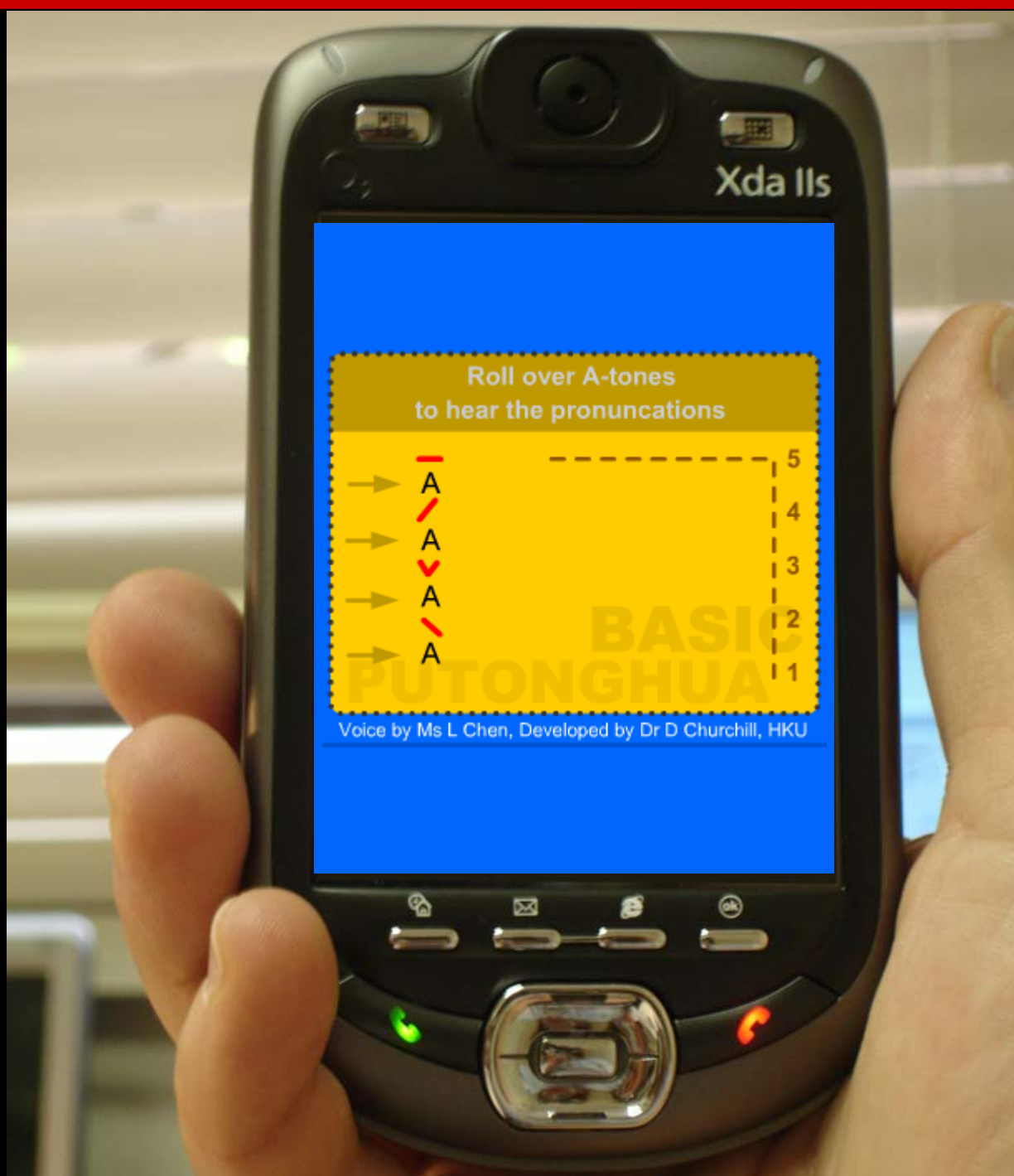*Explore Circle*

Essential Interaction

Thumbnail Preview

Collapsible, Movable, Semitransparent

Learning

Key concepts form any discipline can be represented in visual and interactive formats to permit development of deeper understanding. Portable technologies allow these concepts to supplied form outside anytime and anywhere.

Class 1

Class 2

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Psychological Functions
(Biological and Cultural)

Plane of Consciousness

Perception

World
(Nature, Others and Artifacts)

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→ The study leads to a set of recommendations for the design and use of learning objects for PDA delivery.

→ This might further provide some ideas for new strategies for interaction with PDA resources.

→ These might be useful to designers of LOs for PDA delivery and to those involved in planning the actual use of these resources by students in learning activities.

→ Possibly, some understanding might derive from the study regarding more effective designs of information for small screens, and might inform the design of resources for PDA delivery in fields other than education, such as - for example - journalism.

→ Q&A

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