



Dynamic-PDA-Use for Learning: An Undergraduate Student Experience

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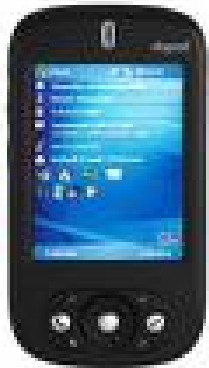
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What Is a PDA?



Personal Digital Assistant

Literature: PDA Educational Applications

- Improving collaborative learning (Zurita & Nussbaum, 2007),
- Enhancing interactivity both in/out of class via a messaging system (Markett et al. 2006)
- Supporting face-to-face group interactions through a communication system (Liu & Kao, 2007)

Problems

- Designing complicated learning environment to support prescribed tasks
- From researcher's perspective
“Technologies have traditionally been used to support teachers' goals but not those of learners” (Jonassen et al., 2008, p4)

The Research Focus

To investigate into undergraduate students' exploration and use of the PDA tools for learning in natural settings.

Theoretical framework

From social constructivism perspective
(Jonassen et al., 2008; Jonassen et al., 1999)

“Knowledge construction process is best understood as agents employing *a variety of tools* in the production of artifacts (p. 110)” in socio-cultural and socio-historical settings. (Jonassen et al., 2000).

“Knowledge construction results from *activity ...*” (Jonassen et al., 1999, p. 3).

Activity Theory as a Situative and Analytical Framework

Social constructivism is associated with a variety of theories such as activity theory, situated and distributed cognition. (Jonassen & Land, 2000).

Activity theory “combines explicit reference to individual agency, the use of technology, and the social context” (Roussou et al., 2008 p. 146)

Situtative Learning Environment



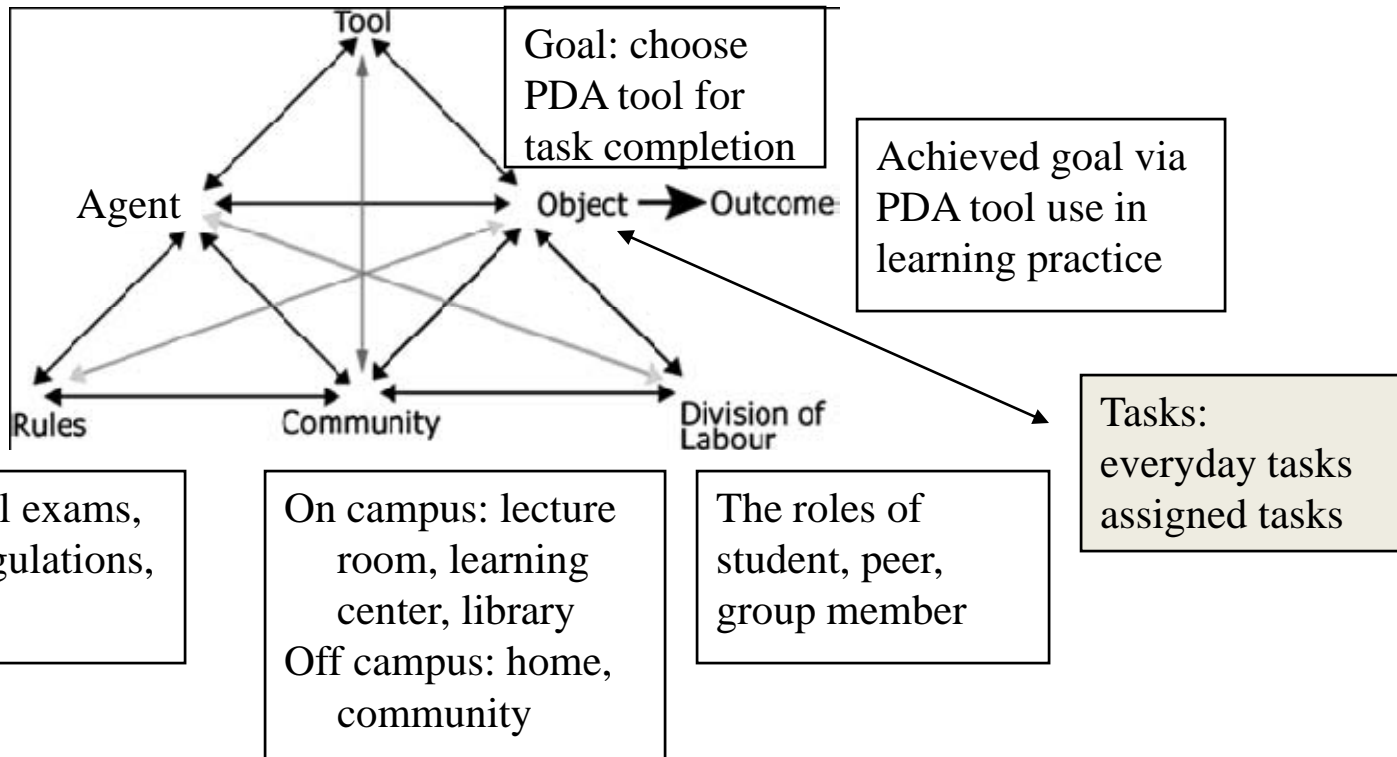
"Hang on you two, I've got a text message coming through."



Learning activities are embedded in social contexts (Lave, 1988; Wersch, 2002).

An Activity System

Lecturers' resources, peers/friends' resources
other semiotic resources (language, signs, numeracy, concepts)
Technological resources: PDAs, computers



Research Questions

- What PDA uses did students make for their learning?
- How did these PDA uses support their learning?

Research Design

- Qualitative research through a multiple-case study approach
- one-year (from April 2006 to March 2007)
- Five participants

Participant Bio-data and Research Context



George (pseudonym)

Data Collection Methods

Student e-journals	Retrospective
Student artifacts	interviews Throughout one year
In-depth interviews	3 times: 1, 6, 12 months
Observations	One week

Data collection techniques

Data analysis

Categorizing and contextualizing strategies were adopted to analyze the data collected (Maxwell, 1996)

Results 1: PDA as a package of tools for varied learning activities

- Multimedia access tool
- Multimedia collection tool
- Communication tool
- Connectivity tool
- Representation
- Idea constructing
- Scheduling tool

For

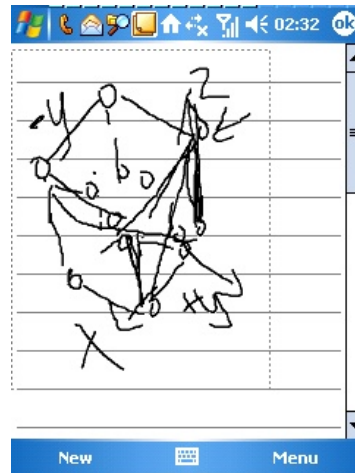
- Learning by exploring
- Learning by visualizing
- Learning by conversing
- Learning by reflecting
- Learning by constructing
- Learning by organizing

Results 2: Constraints of PDA Uses

- Physical: e.g. *small screen, slow processing speed, poor recording quality*
- Semantic: recording function – not shown in programs
- Logical: *screen freeze, unstable system*
- Cultural: tasks, other technology, other people, institution, community, home, agency

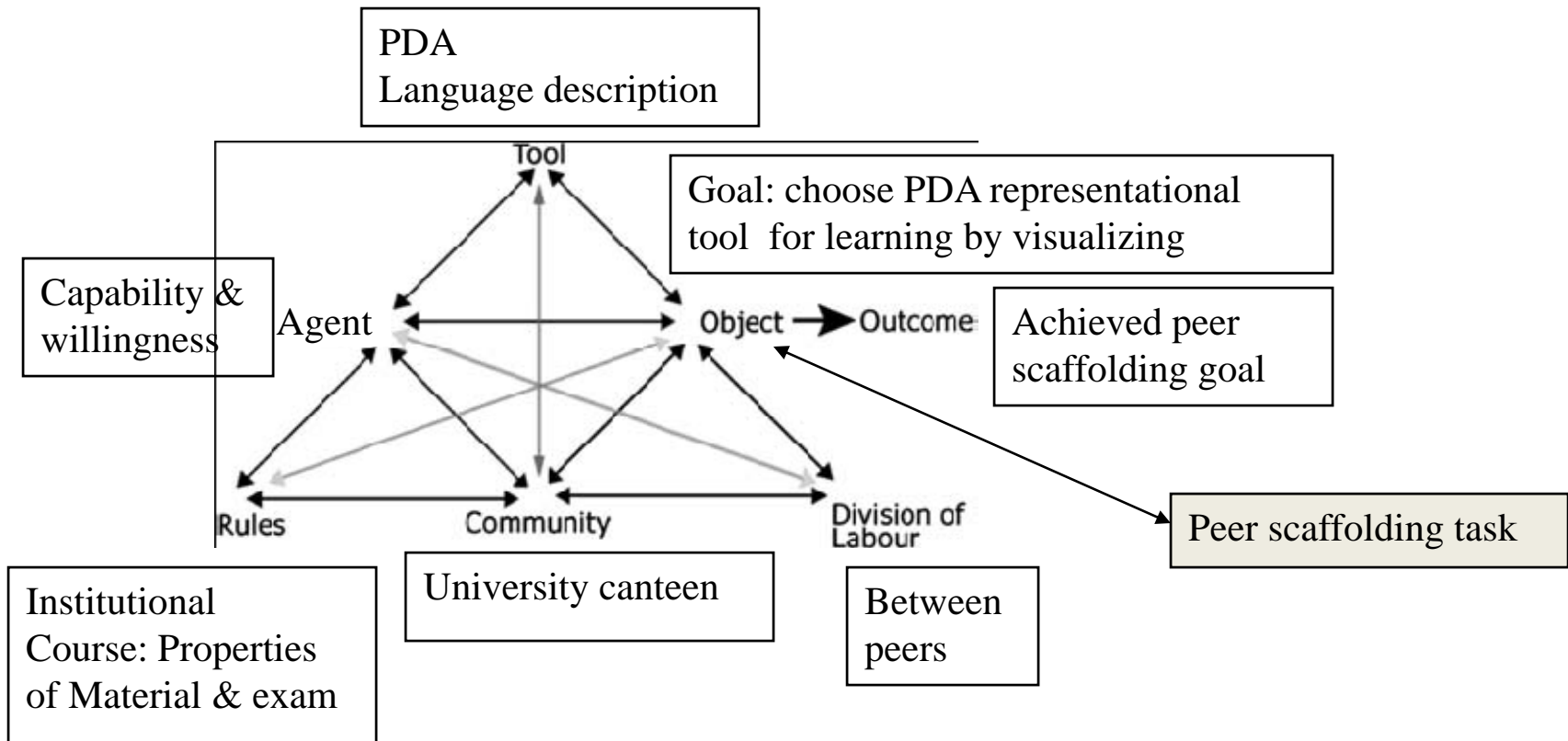
Episode 1: Representational Tool for Learning by visualizing in Peer Scaffolding Practice

“I had no paper on hand at that time. It was hard for me to elaborate on the complicated theory of the structure without a visual diagram... I drew a microstructure of steel for my classmate in Notes on the PDA. Though the picture was not well drawn on the small screen, it helped him visualize and better understand the microstructure when I explained the theory to him” (9 May 2006, e-journal).



Screenshot of Drawing of the Microstructure of Steel

Learning by visualizing



Episode 2: Connectivity and Multimedia Access Tools for Idea Construction in Model Making Practice

“Though the internet browsing via GPRS was not as fast as that via WiFi, it did help us to find out useful images” (19 July 2006, e-journal).



Picture of the designed 3-D model of 'A Bathing Ape'

Episode 3: Multimedia Collection, Connectivity and Multimedia Access Tools for Reflection in Constructing Lab Reports Collaboratively

“Using the PDA capturing function, I could record our lab results accurately. Though the quality was not as good as a digital camera, it helped us to visualize, reflect, and draft a well-presented report collaboratively after class. Without it, it was hard for us to draw pictures in such detail, and the research results might be distorted in the lab report without accurate drawings” (20 May 2007, retrospective interview).



Screenshots of the lab results captured from three dimensions

Discussions

- The PDA could be used as a package of tools for different learning tasks. These tools include: *multimedia access, multimedia collection, communication, connectivity, representation* and *scheduling*.
- The use of these tools also constrained and shape learning activities and vice versa.
- These tools were used individually, or used together with one or more other PDA tools for varied learning activities.
- The same tools could be used differently for different learning activities depending on the context in which they were used.

Conclusions

- Dynamic PDA uses for learning were closely related to the dynamic learner (agent), dynamic tools and dynamic context.
- The concept of *dynamic-PDA-use* for learning

Implications & Limitations

- Help improve handheld educational practices;
- Allow dynamic and flexible PDA uses for varied learning activities.

- Not for generalization
- A series of studies

Thank You

