Designing mobile inquiry-based learning activities

Learners' agency and technological affordances

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DESIGNING MOBILE INQUIRY-BASED LEARNING ACTIVITIES: LEARNERS' AGENCY AND TECHNOLOGICAL AFFORDANCES

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ABSTRACT

Recent discourse and research studies on mobile learning showed increasing awareness of the complexity of mobile learning in the digital age. Notwithstanding mobile devices, Web 2.0 and Web 3.0 technologies have greatly empowered learners and educators to overcome the constraints of conventional education, such as time, space, location and to learn on the move. However, balancing technological dependency and learner autonomy remains an area of contention in designing meaningful mobile learning activities. Hence, this interactive and participatory workshop aims to bring together researchers and practitioners working on this issue to share their experience and to engage in facilitated activities and discussions on designing mobile learning activities that effectively balance learners' agency with mobile technology. Additionally, this workshop also provides a platform for unsolved challenges and future research directions on smart technology and smart learning spaces in the context of mobile learning, laying the groundwork for joint research efforts.

Plenary session (45 min)

Part I: Discussion on the design challenges and issues pertaining to mobile learning in the era of digital mobility. This integrates perspectives on mobility of learners, smart technologies and learner agency, bridging formal and informal learning spaces, outdoor enclosed and open spaces.

Part II: Using the six-dimension analytical framework (Appendix 1), learners' agency and technology support in the following categories of mobile learning activities (Appendix 2) will be discussed:

- Direct instruction: location guidance, procedural guidance and metacognitive guidance
- Content: fixed and dynamic
- Data collection: cooperative and collaborative
- Peer-to-peer interactions: social asynchronous and social synchronous
- Contextual support: augmented, immersive and adaptive feedback

Hands-on session (1hr)

Participants will work in small groups on designing mobile inquiry-based learning scenarios in their respective education institutional contexts.

Following is a checklist to guide your mobile learning design:

1. Target group - for whom is the mobile inquiry-based learning scenario intended?
2. Learning objectives - what do you want the students to learn and experience?
3. Content - What type of content will the students be confronted with and the (technological) support required to facilitate learning and promote learner agency?

4. Context - where do students learn this? what are essential elements in the (formal and informal) contexts needed to achieve the learning objectives? What are relations to practices beyond the curriculum?
5. Learning activities and phasing - what do students do? How do the learning activities (in the different (formal and informal) contexts relate to each other? E.g., where do you start (or school or at ...), what follows?
6. Didactics: Starting points - what type of learning process (e.g, inquiry-based learning, self-regulation, feedback and reflection) do you want to support?
7. Didactics: Control - What is the responsibility for the learning process?
8. Didactics: Guidance - What (pedagogical) support do students receive? from what or from whom?
9. Peer-to-peer interactions: What forms of interaction (synchronous/ asynchronous) will engender learning in your activity design?
10. Contextual support (Tools and technological) - What is the role of technology in the learning and support process?
11. Evaluation and assessment - when is your design successful? what should the result be? how do you determine that?

Materials (will be provided)

- Analytical framework & tools
- Design template

Concluding session (45 min)

Gallery walk and presentation of mobile inquiry-based lesson designs, followed by a concluding discussion about issues arising and directions for future work in the mobile learning: smart technologies, smart data and smart learning spaces.

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APPENDIX 1

The 12 types of mobile activities based on the six-dimension analytical framework (Suárez, Specht, Prinsen, Kalz, & Ternier (2018).
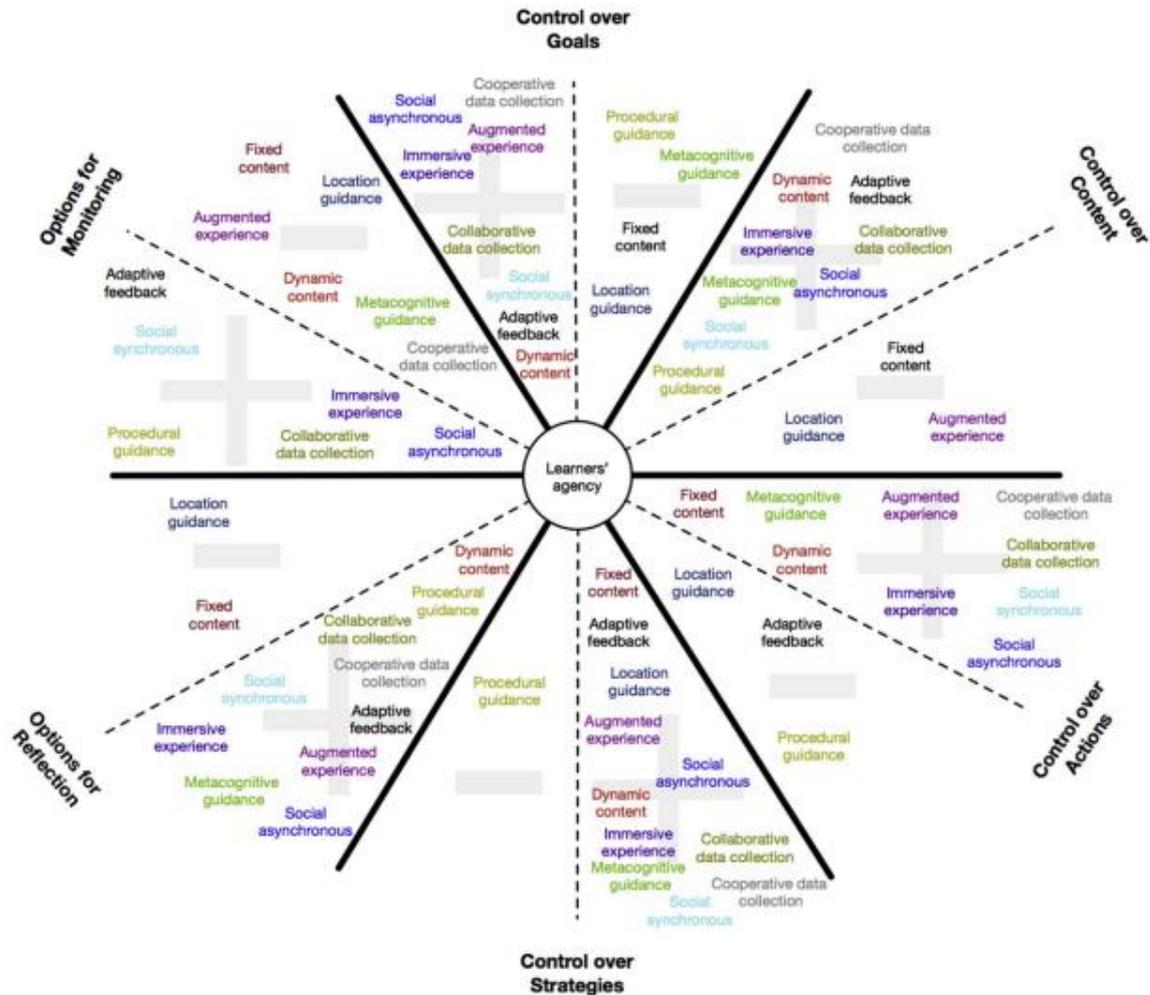
APPENDIX 2

Technological support for mobile inquiry-based learning and learner agency (Suárez, Specht, Prinsen, Kalz, & Ternier (2018).

Table 1. Contextualized Guidance and Instruction

Direct instruction	Technological affordances
Location guidance	GPS, Radio Frequency Identification (RFID), Quick Response Codes (QR codes), Personal Digital Assistants (PDAs) & Geocaches
Procedural guidance	Task/process execution, question-guided tours, process or collaboration scripts
Metacognitive support	Mental model construction, carry out interpretations, scaffolding to understand scientific concepts, reducing cognitive load in data collection & interpretation processes.

Table 2. Access to Content

Access to content	Technological affordances
Fixed content	Local repositories, preloaded e-libraries, preloaded mobile apps, RFID tags, QR codes, Geocaches and digital artifacts triggered with GPS and AR
Dynamic content	Browsing, filtering, interpreting information found on the web, remote databases, concept maps, discussion forums, KWL (What do I know/ wonder/ learn) tables, online blogging, wikis and social networks.

Table 3. Data Collection

Data collection	Technological affordances
Cooperative	Capturing multimedia data, taking notes, drawing schemas, multiple choice questions to guide data collection and collect information for KWL tables.
Collaborative	Collaborative concept maps and graphical data visualization of data jointly collected.

Table 4. Peer-to-peer interaction

Peer-to-peer interaction	Technological affordances
Synchronous	Instant messaging, chats with notifications.
Asynchronous	Forums, online discussion panels, online platforms without notifications and social boards.

Table 5. Contextualized support

Direct instruction	Technological affordances
Augmented experience	GPS, timer or accelerometer
Immersive experience	GPS, big display for immersive simulation, stargazing simulation, 3D weather simulation.
Adaptive feedback	intelligent systems that give hint for making further observations