ABSTRACT
• Ubiquitous and pervasive computing devices, namely interactive tabletops, whiteboards, tablets and phones, have the potential to promote the design, management and awareness of learning activities in multiple forms.
• They can provide students with natural and alternative ways to interact with collaborators.
• They can help teachers create and manage learning tasks that are carried out both in the classroom and at a distance.
• How should these emerging technologies be successfully integrated in current teaching practice?

APPROACH
• From a technological perspective, to integrate collaborative learning activities using these kind of devices for classroom and distance learning.
• Based on the concept of orchestration, which portrays the teacher as the main actor for designing, regulating and monitoring student’s learning activities.
• Authentic learning settings revealed design elements for future ubiquitous and pervasive learning environments.

DESIGN ELEMENTS
Regulation Mechanisms
• Orchestration server is the main tool for the teacher to design, manage and regular learning activities.

Interconnection Mechanisms
• Orchestration server to keep central control.
• Requires a unified way to manage tools, inside and outside of the classroom.

Awareness Mechanisms
• Students: Self-regulation.
• Teachers: Coaching and evaluation.
• Researchers: post-hoc analysis, design-based interventions.
• Visualizations of key indicators of collaboration or task progress.

MOVING TOWARDS THE MODEL
Single-tabletop learning environments
• Face to face collaboration.
• Ideal for small groups.
• Can differentiate users activity and speech.
• Can discover patterns and group strategies.

Tablets and Tabletops
• Support Informal learning, such as semi-guided museum tours.
• Tablets for individual activities, tabletops for shared and collaborative activities.

Teacher Dashboards
• Provide teachers with timely information about “who did what or said what”.
• Support for control over the technology.
• Real time visualisations to enable teachers to make better decisions.

Virtual Learning Environments
• Use with phones and existing web services.

CONCLUSION
• Moving towards the integration of orchestration tools in web-based and ubiquitous learning environments, in conjunction with learning analytics tools.
• Providing teachers with control, management and awareness in and outside of the classroom.

REFERENCES