TECHNISCHE UNIVERSITÄT DRESDEN

Business Oriented Design of Collaborative Applications

Mathias Müller, Ingmar S. Franke, Dietrich Kammer, Rainer Groh

Technische Universität Dresden, Department of Computer Science, Dresden, Germany

CogITo
Cognitive Interface Technologies

Europa fördert Sachsen. ESF Europäischer Sozialfonds SACHSEN

AVI 2012 / Designing Collaborative Interactive Spaces
May 25, 2012 / Capri, Italy

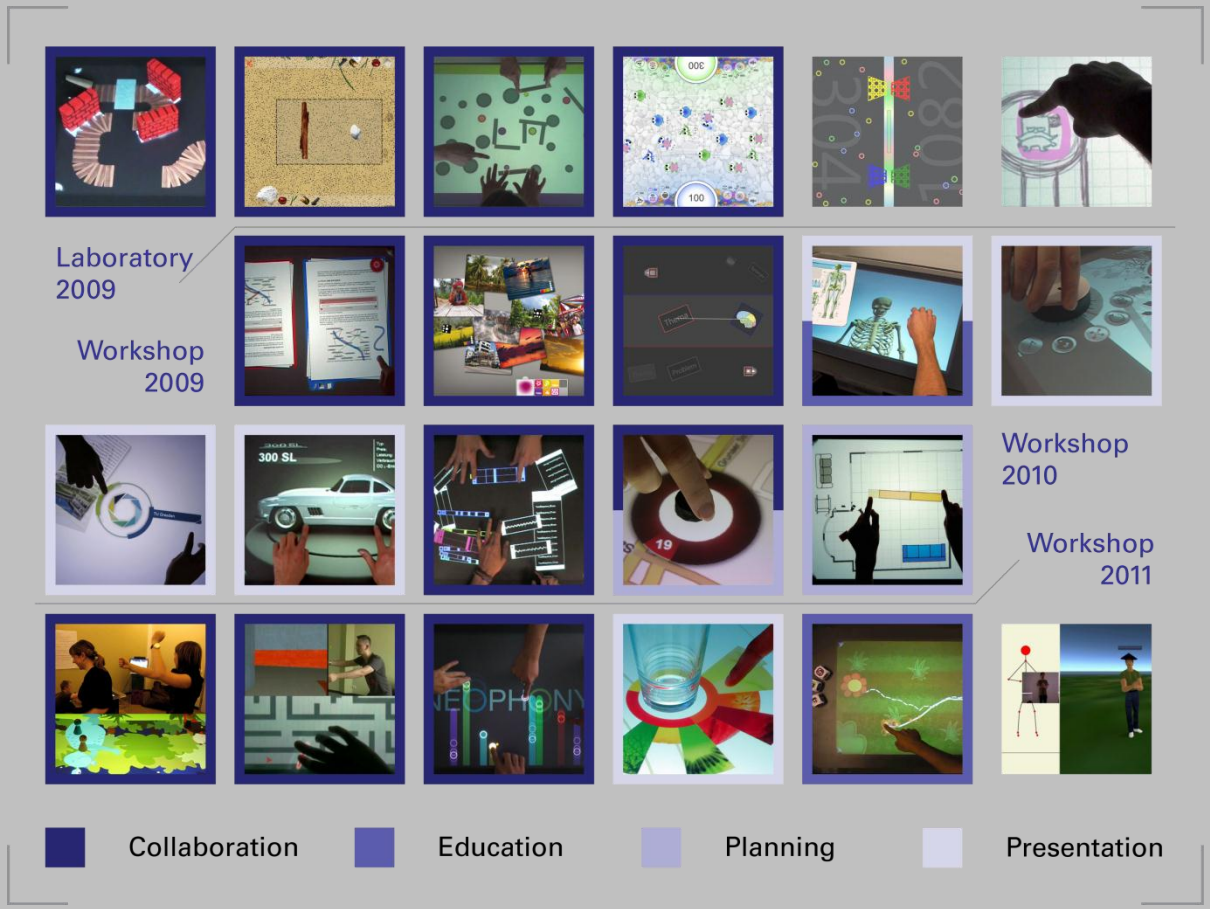
Outline

[1] Introduction

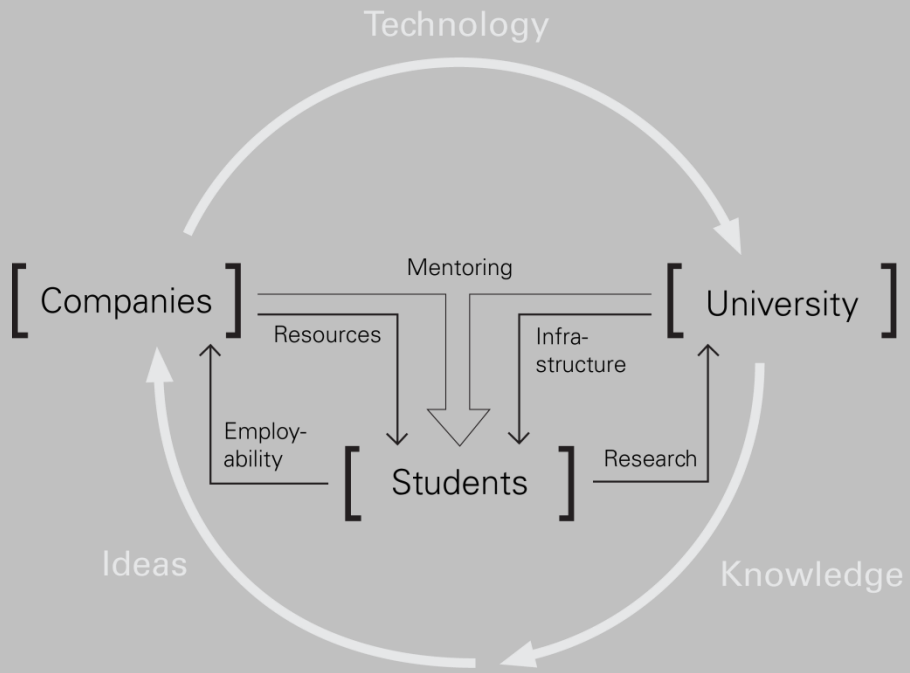
[2] Workshop vs. Laboratory

[3] Results

[4] Conclusion and Future Work



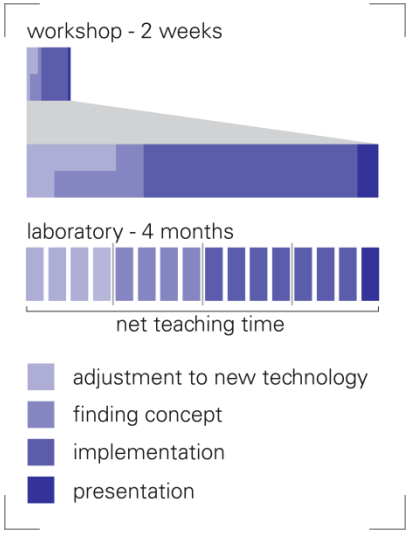
Introduction



- New interaction technologies:
  - Need for novel concepts
  - Experimenting with new technology
- Synergies between university and business partners
  - expensive technology, provided by business partners
  - infrastructure provided by university [1]
- Evaluation of benefits and disadvantages of different education models

Workshop vs. Laboratory

Conceptual Differences



Benefits of the workshop

- Condensed format: better guidance and interaction with students
- Direct mentoring by companies

Drawbacks

- Time pressure and conceptual weaknesses due to small amount of time
- Only small teams due to organizational overhead
- No experience with format, optimization during following iterations

Comparison to laboratory

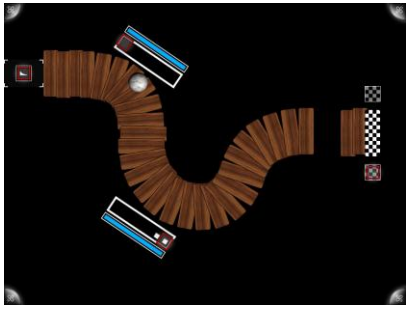
- More time for elaboration on concepts
- Breaks every week disturb workflow
- More time needed for adjustment to technology

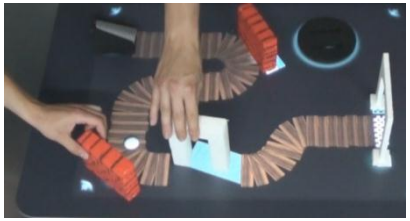
Results
Overview

Conceptual domains

	W1	Lab	W2	W3
Collaboration	SurfaceReader MySpace TagIt	MarbleRun Under The Surface MT Tower Defense Scoop	SampleSurface *Time-Table*	Punchinello SurKiLab neophony
Presentation	NavigaTable TangibleDesignHelper		DRESDENconcept Shroom	MyFruit
Education	*NavigaTable*			Vismo
Planning			FurPLe Time-Table	
	2009	2009	2010	2011

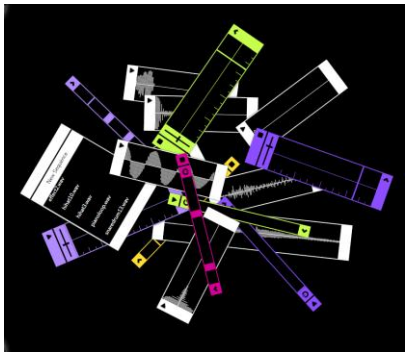
Results
Marble Run

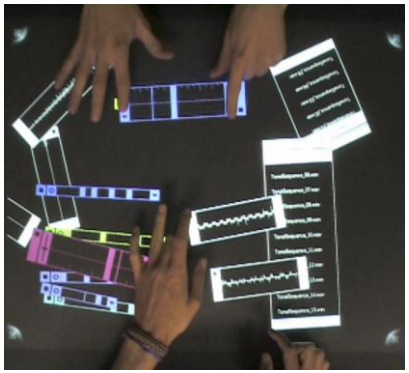




- Collaborative game focusing on tangible interaction
- Tangible User Interfaces contribute to collaboration [2]
- Users have to guide a marble ball from start to exit and overcome obstacles
- Physical tangibles such as walls, planks, magnets
- Pausing enables placing tools and looking for solution
- Use of multiple tangibles at once improves collaborative character

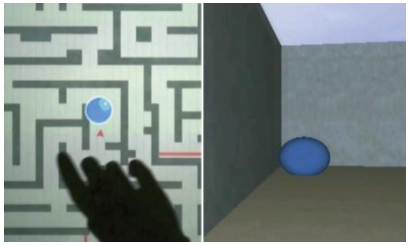
Results
SampleSurface

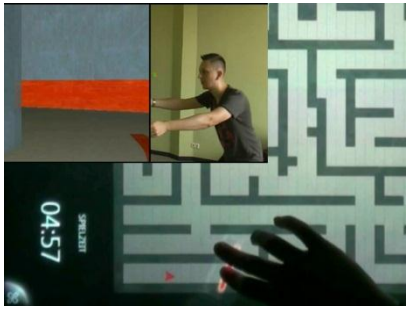




- Multi-touch application for collaborative music arrangements [3]
- Inspired by MTSeq [4] and reacTable [5]
- Arranging and cutting of audio samples
- Use of easily discriminable gestures
- Reduced UI should entice users to experiment with sounds

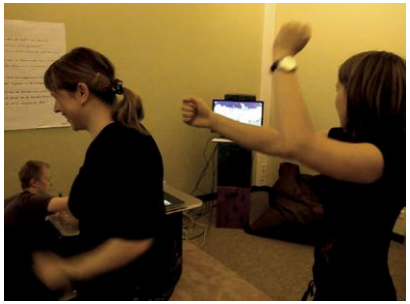
Results
SurKiLab





- Collaborative maze-game using Microsoft® Kinect™ and Microsoft® Surface®
- Concepts of immersive and emersive interaction [6]
- *Escapist:*
  - Avoid obstacles and reach exit within given duration
  - Tracked by the Kinect™
  - Immersive view of maze (1st Person)
- *Commander:*
  - Prevent opponent from escaping the maze
  - Can place obstacles by interacting with the tabletop
  - Emersive view (map)

Results
Punchinello



- Collaborative interactive theatre
- Tabletop as interactive display for stage director
  - Spatial movement of characters
  - Creation of sounds
- Tangibles underline the role-play character
- Up to 2 players in front of Kinect as actors
- Spontaneous play includes interaction via screen and tabletop but also “analogue” interaction between users

Conclusion and Future Work

- Workshop as business-friendly format
- Laboratory with focus on research questions
- Students should participate in courses of both formats

- Further development of concepts
- Switching focus new technologies
- Detailed evaluation in EmplIT-Project (Employability for IT) [7]

Conclusion and Future Work

CogITo
Cognitive Interface Technologies

- Interdisciplinary project of Computer Science, Technical Design and Engineering Psychology

Main apects

- Interaction with avatars
- Interaction in Virtual Environments
- Attention-Centered User Interfaces [8]

Thank you for your attention.

Contact
mathias.mueller@tu-dresden.de
ingmar.franke@tu-dresden.de
dietrich.kammer@tu-dresden.de
rainer.groh@tu-dresden.de

This publication is supported by the European Union and the Free State of Saxony, funded by the European Social Fund (ESF).

References

[1] Groh, R., Kammer, D., Franke, I. S. (2010): **Students as Catalyst of the Knowledge Economy: Evolution of Synergies between Companies and Universities**, In: *Proceedings of the 6th Annual European Computer Science Summit* ,ECSS 2010 , Prague, 2010.

[2] Subramanian, S., Pinelle, D., Korst, J., Buil, V. (2007): **Tabletop Collaboration Through Tangible Interactions**. In: *Proceedings of the 16th IEEE International Workshops on Enabling Technologies: Infrastructure for Collaborative Enterprises*, Paris, France, 2007.

[3] Bahr, J., Peschke, J., Kammer, D., Franke, I. S., Steinhauf, J., Kirchner, M., Schönefeld, F., Groh, R., (2011): **SampleSurface: Kollaboratives Musizieren mit Multitouch-Unterstützung**. In: Eibl, M. & Ritter, M. (Hrsg.), *Workshop-Proceedings der Tagung Mensch & Computer 2011*. überMEDIEN l ÜBERmorgen. Universitätsverlag Chemnitz, Chemnitz, Germany.

[4] Geiselhart, F., Raiser, F., Sneyers, J., Frühwirth, T. (2010): **MTSeq - Multi-Touch-Enabled Music Generation and Manipulation Based on CHR**. In: *Proceedings of the 7th Workshop on Constraint Handling Rules*, Edinburgh, 2010.

[5] Jordà, S., Geiger, G., Alonso, M., Kaltenbrunner, M. (2007): **The reacTable: Exploring the Synergy between Live Music Performance and Tabletop Tangible Interfaces**. In: *Proceedings of the 1st International Conference on Tangible and Embedded Interaction*, Baton Rouge, Louisiana, ACM Press, New York, NY.

[6] Groh, R. (2005): **Das Interaktions-Bild: Theorie und Methodik der Interfacegestaltung**,TUDpress - Verlag der Wissenschaften GmbH, Dresden.

[7] Project EmplIT, Available at: http://mg.inf.tu-dresden.de/forschung/projekte/emplit-employability-it, Retrieved 05/16/2012.

[8] Franke, I. S., Pannasch, S., Helmert, J. R., Rieger, R., Groh, R., Velichkovsky, B. M. (2008): **Towards attention-centered interfaces: An aesthetic evaluation of perspective with eye tracking**, ACM Trans. Multimedia Comput. Commun. Appl. Vol.: 4 Nr.: 3.