

Interaction, Experience, and Design

MIRACLE Workshop 2009, October 29-30
Mixed Reality Applications for City-based Leisure and Experience
Schloss Birlinghoven, Sankt Augustin, Germany
Barbara Grüter

we are always waiting for the big
event that will change our lives forever -
not to make our lives a paradise,
but to give us direction, to find out what
our mission is, what is worth struggling for.
we are a nation in search for a frontier,
and without one we are overwhelmed
by anxiety.

Doug Aitken

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Doug Aitken

*The american pioneer is only one format of experience
there are others*

Experience in HCI

- an umbrella term for interaction beyond the desk
- a property of a product
- the utterance of a user about his feelings in a certain situation
- an empirical observation/measurement/description of a user's expression of feelings in a certain situation
- a shift in understanding human-computer interaction?

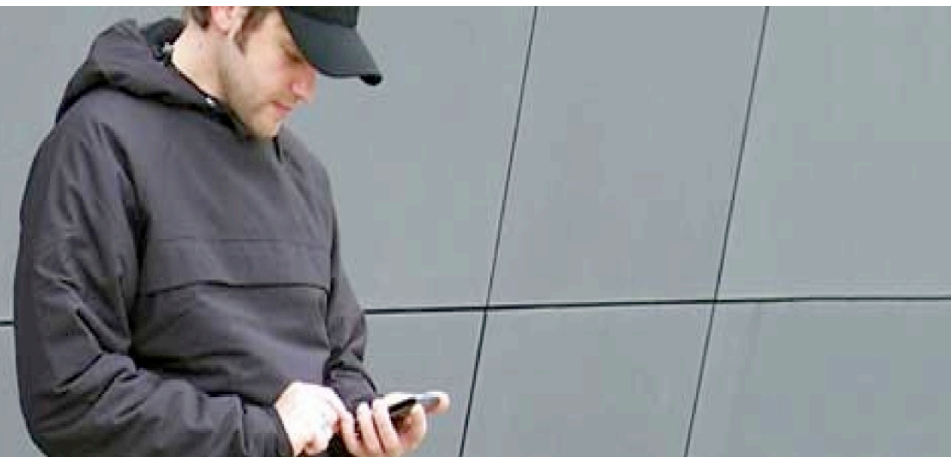
Outline

- Intro
- Mobile & AR Interaction
- Missing
- Experience & Design
- Playing

Intro

GANGS OF BREMEN

Mobile gaming experiences and human-computer interaction



Gangs of Bremen

- Start March 2003 – together with students aiming beyond the curriculum frame
- Situating games in the contexts of
 - our city Bremen
 - urban male and female youth
 - our research on human-computer interaction
- The name:
 - Bremen, The Free Hanseatic City,
 - Hanse, Hansa – „armored small group“, a gang in the early medieval times

Gangs of Bremen

Mobile gaming experiences
and human-computer interaction

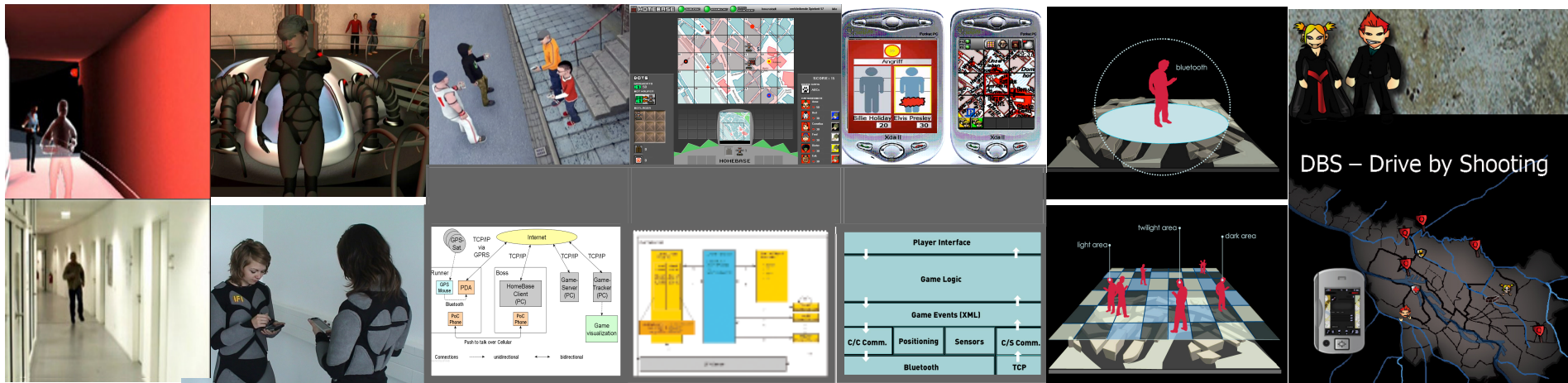
- their conceptual, aesthetical and technological foundations
- by means of exploring, developing, and playing mobile games

Mobile games

- based on the physical movement of players
- in a mixed game world, combining real world and virtual dimensions

compare AR def.: Azuma, 1997, pp. 355–385

Gangs of Bremen



Gangs of Bremen

Gangs of ZIMT & Intro 2003-2004		On the Streets & Intro & Play tests 2004-2009		Insomnia 2006-2007	Clandestine 2008-2009
Communication		OTS-Server	Insomina-Client		

Mobile games today

e.g.

Tourality	GPS Mission	MR. X Mobile	Mattel 09
			
fastfoot	Triangler	Swordfish	Invizimals Sony 09
			

... tomorrow?

we witness

- the emergence of mobile game communities
- a surge of AR and even mobile AR applications
- the emergence of dynamic map technologies

we envision

- the convergence of mobile, social, AR, and map technologies
- ecosystems connecting mobile gamers, producers, researchers and game technologies

... tomorrow?

all of that enabling and challenging again


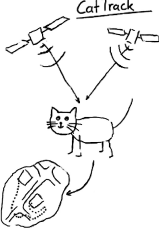





to deeper understand

- interaction models
- experience concepts

Mobile & AR Interaction

Mobile Interaction

Mobile Interaction

Small Screens & Display Technologies	Location & positioning	Context	Social interaction
		<ul style="list-style-type: none"> any information about the situation of an entity Dey & Abowd emerging context Heideger, Suchman, Dourish 	
Camera Interaction	Sensor based interaction, e.g.		
	Surface – pinch	Tilting	Head tracking, infrared reversedWii
			

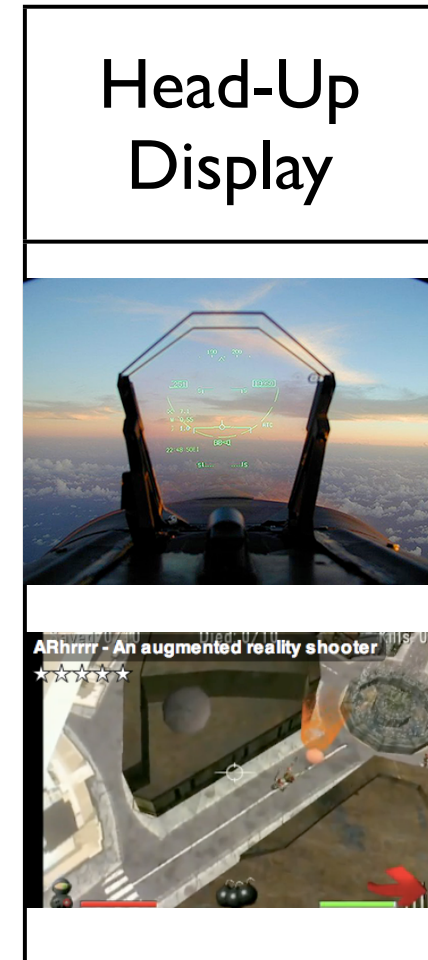
AR Interaction Pattern

LaMantia 2009a

AR Interaction I

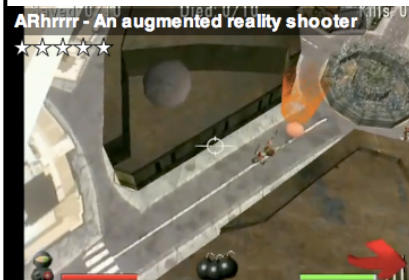
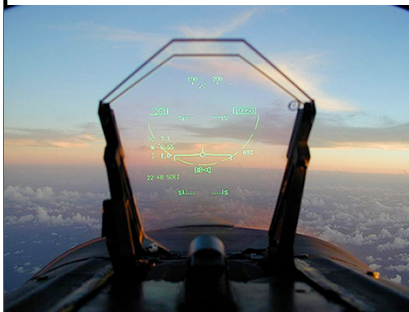
- add information about the real objects
- integration with a fixed point of view, usually the focus of the user's visual field
- The oldest of the AR interaction patterns

LaMantia 2009a



AR Interaction Pattern

Head-Up
Display

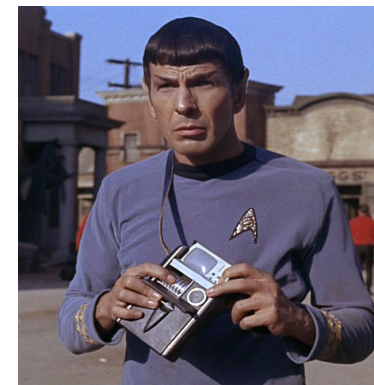


AR Interaction 2



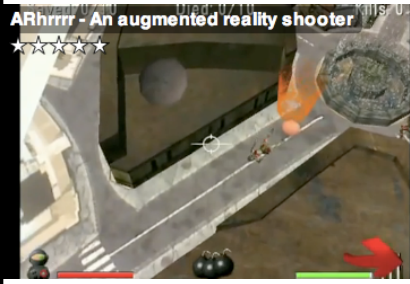
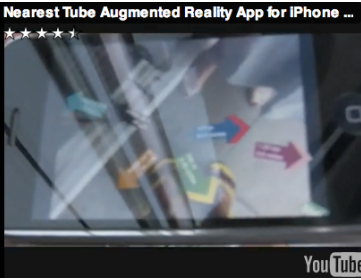
- scanning device to explore the local area
- adds pieces of information to an existing real-world object
- physical behavior:
 - waving the device around in the air in the general direction of interest,
 - while peering at the display screen

LaMantia 2009a

Tricorder



AR Interaction Pattern

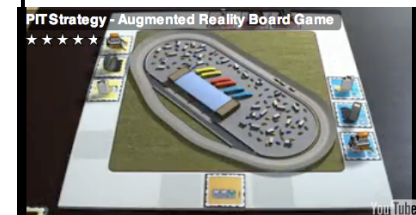
Head-Up Display	Tricorder
	
 <p>ARhrrr - An augmented reality shooter ★★★★★</p>	 <p>Nearest Tube Augmented Reality App for iPhone ... ★★★★★</p> <p>YouTube</p>

AR Interaction 3







- adds new and wholly virtual objects to the real world situation
- virtual items are sometimes interactive
 - often interact with one another
 - sometimes with the real elements

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Holochess



AR Interaction Pattern

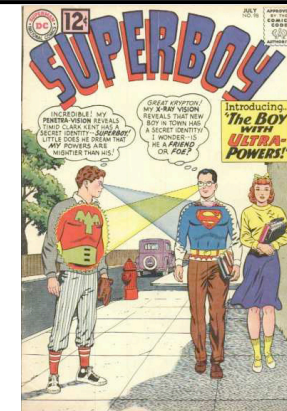
Head-Up Display	Tricorder	Holochess
		
<p data-bbox="309 1070 707 1098">ARhrrr - An augmented reality shooter</p> <p data-bbox="309 1098 414 1125">★★★★★</p>  <p data-bbox="1032 1362 1093 1385">YouTube</p>	<p data-bbox="734 1114 1093 1141">Nearest Tube Augmented Reality App for iPhone ...</p> <p data-bbox="734 1141 817 1168">★★★★★</p>  <p data-bbox="1032 1362 1093 1385">YouTube</p>	<p data-bbox="1120 1070 1516 1098">PIT Strategy - Augmented Reality Board Game</p> <p data-bbox="1120 1098 1225 1125">★★★★★</p>  <p data-bbox="1473 1267 1516 1289">YouTube</p>

AR Interaction 4

- simulates seeing beneath the surface of objects, people, or places, showing their internal structure or contents



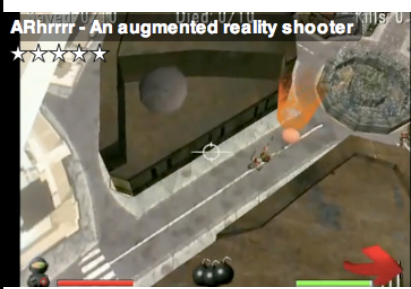

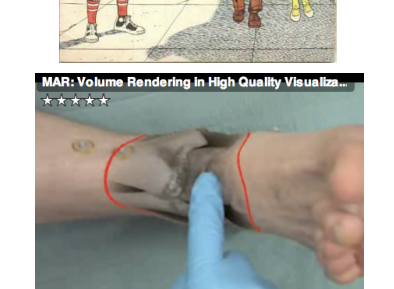
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X-Ray Vision



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AR Interaction Pattern

Head-Up Display	Tricorder	Holochess	X-Ray Vision
			
<p>ARhrrrr - An augmented reality shooter</p> 	<p>Nearest Tube Augmented Reality App for iPhone ...</p> 	<p>PIT Strategy - Augmented Reality Board Game</p> 	<p>MAR: Volume Rendering in High Quality Visualiza...</p> 

Missing

Missing AR Pattern

Loner	Second Hand Smoke	Pay no attention to the man behind the curtain	The Invisible Man	Tunnel Vision	AR for AR's sake
<ul style="list-style-type: none"> ◦ reliance on single-person, ◦ socially disconnected ▸ micro/pico projectors for small groups 	<ul style="list-style-type: none"> ◦ the indirect experience of AR by people around you ◦ disruption, resp. complication of social forms like attention, awareness, presence, and conversation 	<ul style="list-style-type: none"> ◦ privacy management: AR apps broadcast your identity, when you want to remain incognito? 	<ul style="list-style-type: none"> ◦ vice versa AR apps may make you unrecognizable to people around you 	<ul style="list-style-type: none"> ◦ Monocular reduced view ◦ difficult to react to phenomena beyond the narrow view ◦ difficult to mesh with the human perspective 	<p>patterns addressing everyday activities</p> <ul style="list-style-type: none"> ◦ Reading, ◦ writing, ◦ editing, ◦ selecting items, ◦ navigating info spaces, ◦ filtering

Missing – AR UCC

UCC-AR Barriers: the gap between experts and novices

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AR UCC – Recent developments

- ARML Introduction Augmented Reality (AR) Specification
Based on KML with Extensions (Rice, mobilizy, neogence, AR Consortium)

Problem: the explicit geographic frame of reference in KML

- AR creators, buildAR from Layar
- Google Wave
direct vs. indirect content creation pathways to mapping out potential augmented content

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AR interaction review

Vedrashko

- The wow factor
- Novelty factor: from „neat“ to „meh“
- Usability mostly horrendous
- Seldom interactivity beyond rotation
- Why?

Vedrashko 2009

AR interaction review

AR „experiences remain skin-deep at best, offering little, if any, sort of reason to pay attention beyond the initial moment of interest“

LaMantia 2009a, on Vedrashko's assessment

Skin-deep experiences!
That's all?

Is there anything we can learn from game design?

Is there anything we can learn from game design?

I am not sure?

Experience & Design

How does pleasure emerge and evolve over time in a game?

Salen & Zimmerman, 2004. p. 305

All of the possible states and experiences of a game are contained within the theoretical construct called *the space of possibility*.

A game player begins his or her journey through the space of possibility at the same place every time: the start of the game. But the experiential path that a player takes through the space will vary each time the game is played.

Every play of the game will be unique, even though the rules of the game, its formal structure, remain fixed.

This quality of games, that a game provides the same consistent structure each time but a different experience and outcome every time it is played, is a powerful engine that sustains and encourages play. We refer to this concept by the shorthand term *same-but-different*.

Salen & Zimmerman, 2004. p. 305

The *magic circle* of games
that delineates what is inside from what is
outside the game,
is in this perspective not just a visible
spatial boundary,
but can be seen as *dividing every single
object, action, and player* into
a component that is part of the game,
and a component that is not a part of the
game.

Juul, 2007, p. 514

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Elements of experience

we have the same elements in all three quotes

- the space of possibilities - what is inside the system
- the beyond the frontier - what is outside of the system

the decisive question for players as well as for researchers

- the way we deal with the known and the unknown aspects of our work,
- the way we conceptualize the relation of system and context
- not everybody is an american pioneer, at least not all the time

Elements of experience

Possible answers are

- paradigms their implied approaches
- cultural or personal styles of dealing with the known and the unknown aspects of the own situation

Needed

- concepts able to deal with dynamic change
- and interdisciplinary issues

Defining experience

A definition I

Experience is

a particular unit of both,

predefined interaction mechanics - the known aspects

emerging context of play - the unknown aspects

as such a moment of an activity, be at

a single sensation,

the experience of an event,

a complex evolving story

A definition 2

Experience is

the core of emergent game play

a source of value creation and innovation

... most abstract

Experience is

a particular unit of

formal identity between the involved instances

substantial difference between the involved instances

The methodological meaning

formal identity—basis of computation and quantitative analysis

substantial difference—basis of events and qualitative analysis

An example

On the Streets

- developed 2004-2007
- 2006 - 2007 Play tests
- Played by meanwhile more than 500 players
- September 2007: Chinese and German play tests

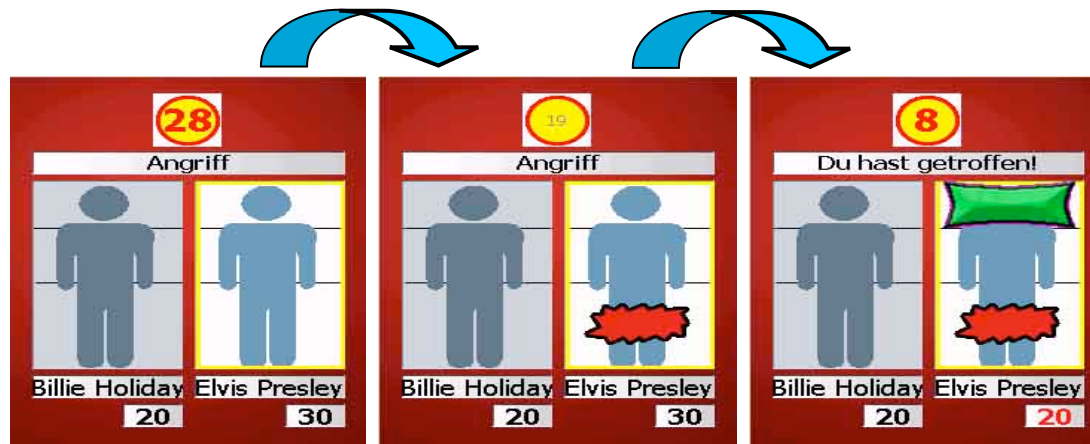
Salen & Zimmerman, 2004. p. 305

Fight experiences

Binder & Wang 2008

The fight mechanics

- Enter the field physically
- Identify the enemy physically
- Attack and defend virtually

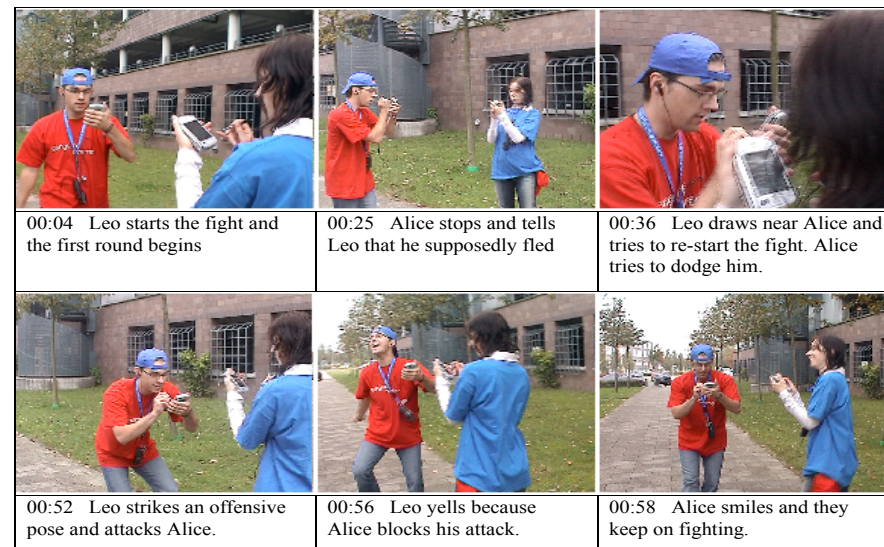


Two fights

Chinese players fighting

German players fighting

Binder. & Wang 2008



Two fights

	Fight mechanics	Fight mode
Chinese	<ul style="list-style-type: none">◦ Enter the field physically◦ Identify the enemy physically	<ul style="list-style-type: none">◦ chary◦ keep physical distance◦ Focus: virtual level
Germans	<ul style="list-style-type: none">◦ Attack and defend virtually	<ul style="list-style-type: none">◦ offensive, expressive◦ pestered each other◦ Focus: virtual & physical level

Binder. & Wang 2008

The identical fight mechanics
worked with different cause-effect relations
established within and by
the emerging context of play

Emergent game play

Emergent game play

emergent game play repeated over time results in operative rules,
by means of which the players adapt the game logic to their context

Ok, 8 means you
lose one round

Yes! As we play
it all the time or?

Uh? I
thought the Jack
means losing a round?
How do you play
that?



Emergent game play

Those rules will become explicit if someone behaving differently interrupts the flow

Emergent game play

- Emergent game play - a first step of transforming the game logic
 - Emerging rules - a second step of transforming the game logic
 - Enhanced game logic by novel rules implemented either socially and/or technically - a third step of transforming the game logic
- => redefinition of the game

Emergent game play

=> Playing is designing

=> Playing is developing novel play possibilities

Design

Design

- Iterative design
- Formal and non-formal dimensions
- What kind of reality
- Indexicality
- Playing

Iterative design

Game Design	I Idea to first prototype			II Concept & Development			III Culture		
Idea	Idea								
Core Mechanics		Core Mechanics							
Paper Prototype			Paper prototype						
Play-test			play-test						
Concept				Concept					
Mechanics					Mechanics				
Dynamics					Dynamics				
Aesthetics					Aesthetics				
					Aesthetics				
Play							Playing: emergent game play		

Formal and non-formal

	ludus	paidea
Format	rule structured games	open play
Scholars	Salen & Zimmerman, Juul	Montola et al

Formal and non-formal

We, Gangs of Bremen, strive for combining and even integrating both dimensions,

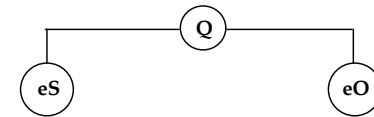
- system and context,
 - ludus and paidea
- and to exploit and to work with the tensions between them.

	ludus	paidea
Format	rule structured games	open play
Scholars	Salen & Zimmerman, Juul	Montola et al
same-but-different: games as systems & play as motion		

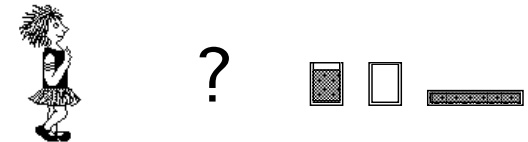
Formal and non-formal

Thinking and acting

Structure
◦ processing



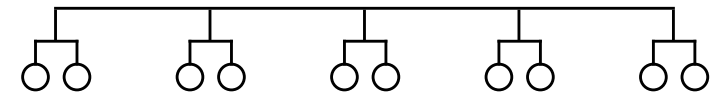
Context
unique conditions
acting together



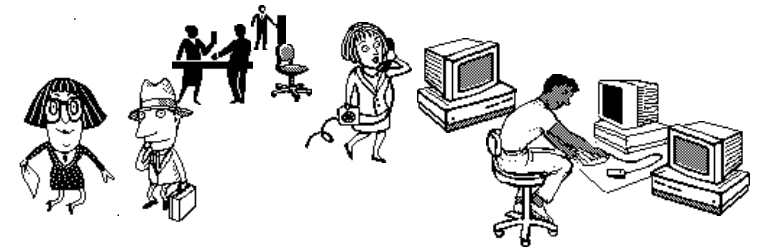
other examples

The company process

Structure
◦ value chain
◦ job division & time
order



Context
unique conditions
acting together



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Formal and non-formal

Sources and roots of our game design process

- Salen & Zimmerman 2004
- The formal approach from Marc LeBlanc MDA, Mechanics, Dynamics, Aesthetics allows a strong integration of game design and development with software design and development, Hunicke et a. 2004
- Our own work & game play

What kind of reality?

The mobile game world is *not a container* for game play
at least not only!

The reality of the mobile game world is primarily an
implication of what the players experiences, a generalized,
objectified experience.

The reality, that the player does not experience, does not
exist for him

at least not now!

What kind of reality?

We design the game world reality from the beginning with reference to the players.

The formal dimension of our approach

- Games as systems are elements and relations

The non-formal dimension of our approach

- play & design

What kind of reality?

The primary approach to design the game world is the organization of the player's activity.

We do this by reducing the game idea to the core mechanics and playing and replaying it again and again for understanding, shaping, varying and developing the game.

Indexicality

Indices represent play possibilities for the player

The indexicality of a design is decisive for a tangible, embodied form of interaction and experience

The problem: the indices are a result of both

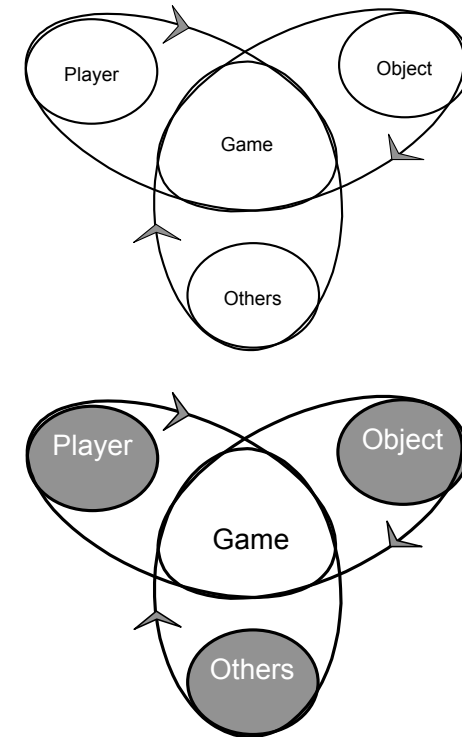
- predefined via design
- a unique aspect of the emerging relation of the player to the phenomena

On index, icon, and symbol compare
Peirce 1984

Indexicality

- The event at the border of the system
- The moment at the border of the space of possibilities ...
- The first-contact-scene: one aspect of this experience becomes an index, a novel connection between game and play
- Thinking and acting starts flowing again

Böhme 2000



Playing

Players playing develop
play possibilities

e.g.

Missing AR Pattern

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Problem: the explicit geographic frame of reference in KML instead of a meaningful frame of reference

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Meaningful structures

- players invent operative rules
- operative rules are meaningful structures
- player communities invent rituals and rely on them
- they are and provide meaningful frames of reference
- potentially useful for mobile and AR apps

A paradigm shift?

A paradigm shift?

Yes and No

A paradigm shift?

Yes

The definition draws the attention to different topics
implying different concepts, methods, design strategies

A paradigm shift?

Starting and reference point for understanding and designing digital media is the concrete bodily-sensual play activity of the player, the physical movement,

- which opens and defines the game world and
- changes the game in space and time because of unforeseeable events.

A paradigm shift?

No

Each definition is possible - the only question is to pay attention to the difference between the definition and the context of its application.

The difference a *play* makes ...

Thank you for your attention

References

- Aitken, D. In Adaweb. Retrieved 12:07, January 11, 2009, from <http://adaweb.com/project/aitken/>
- Azuma, R. (1997). A survey of augmented reality, *Presence: Teleoperators and Virtual Environments*, 1997, pp. 355–385
- Binder, D. & L. Wang. Chinese and German players playing On the Streets. Collaborative Master theses: Binder, D. Cultural diversity and its impact on media design. Hochschule Bremen, 2008; Wang. L. Mobile Games: Interfaces and the cultural context of their use. Universität Bremen, 2008
- Böhme, H. (2000) Der Wettstreit der Medien im Andenken der Toten. In: Belting, Hans / Kamper, Dietmar (Hg.): *Der zweite Blick. Bildgeschichte und Bildreflexion*; München 2000, S. 23–43.
- Hunicke, R., LeBlanc, M., & R. Zubek (2004). "MDA: A Formal Approach to Game Design and Game Research." [algorithmancy.8kindsoffun.com/MDA.pdf]
- Juul, J. (2007) A Certain Level of Abstraction. In *Situated Play: DiGRA 2007 Conference Proceedings*, edited by Akira Baba, 510-515. Tokyo: DiGRA Japan, 2007. <http://www.jesperjuul.net/text/acertainlevel/> p. 514
- LaMantia, J. (2009a). Inside Out: Interaction Design for Augmented Reality. Retrieved 13:25, October 25, 2009 from <http://www.uxmatters.com/mt/archives/2009/08/inside-out-interaction-design-for-augmented-reality.php>
- LaMantia, J. (2009b). ARrested Development: The Content Creation Barrier For Augmented Reality. Retrieved 13:25, October 26, 2009 from <http://www.joelamantia.com/user-experience-ux/arrested-development-the-content-creation-barrier-for-augmented-reality>
- Lee. Cat-track. In Mr. Lee Projects for cats and pets. Retrieved from <http://www.mr-lee-catcam.de/index.htm>
- Nova, N. Japanese kids playing gameboy. In Fotostream von nicolasnova. Retrieved 12:07, October 25, 2009, from <http://www.flickr.com/photos/nnova/69985091/>
- Peirce, C. S. (1894) What Is a Sign? Published in part in CP 2.281, 285, and 297-302, see also <http://www.iupui.edu/~peirce/ep/ep2/ep2book/ch02/ch02.htm>
- Vedrashko, I. (2009). Augmented Reality Microsites: First Impressions. Retrieved 15:10 October 26, 2009 from <http://adverlab.blogspot.com/2009/05/augmented-reality-microsites-first.html>
- Salen, K. & E. Zimmerman, (2004). *Rules of Play. Game Design Fundamentals*. The MIT Press, Cambridge, MA