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## Active construction of experience through mobile media: a field study with implications for recording and sharing

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**Abstract** To fully appreciate the opportunities provided by interactive and ubiquitous multimedia to record and share experiences, we report on an ethnographic investigation on the settings and nature of human memory and experience at a large-scale event. We studied two groups of spectators at a FIA World Rally Championship in Finland, both equipped with multimedia mobile phones. Our analysis of the organization of experience-related activities in the mass event focuses on the active role of technology-mediated memories in constructing experiences. Continuity, reflexivity with regard to the Self and the group, maintaining and re-creating group identity, protagonism and active spectatorship were important social aspects of the experience and were directly reflected in how multimedia was used. Particularly, we witnessed multimedia-mediated forms of expression, such as staging, competition, storytelling, joking, communicating presence, and portraying others; and the motivation for these stemmed from the engaging, processual, and shared nature of experience. Moreover, we observed how temporality and spatiality provided a platform for constructing experiences. The analysis advocates applications that not only store or capture human experience for sharing or later use but also actively participates in the very construction of experience. The approach conveys several valuable design implications.

**Keywords** Large-scale events · Ethnographic field study · Sharing experiences · Constructive memory · Mobile and ubiquitous multimedia · Active spectators

### 1 Introduction

The increasing availability of multimedia able devices, sensor technologies, and pervasive infrastructures raises the question of how these could be useful in recording and sharing experiences. In our recent work we have investigated computational support to record and re-experience *visits*. We have proposed a specific application setting (visiting practices in architectural design) and computational support to record and visualize multimedia files using traces of a walked GPS-based path as an important element of the experience of the visit [1]. In another line of research, we have studied how users utilize location context in sharing experiences of a place. We observed how location works as a discussion initiator that evolves into much richer communication that no more refers to the original place [2]. From these studies, we have learned the importance for design of carrying out ethnographic studies in specific settings to understand current practices and motivations for recording and sharing experiences. More importantly, we became aware of the necessity of a deeper conceptual understanding of how “experience” and “memory” can relate to ubiquitous computing [3, 4]. Along these lines, the work presented in this article proposes a novel application area, large-scale events and the experience of spectators, along with particular and grounded perspectives on experience and memory.

This kind of human-centred work poses several questions that are not explicitly or thoroughly addressed in works presenting prototype systems. One question to answer is what is meant by experience. This includes discussing what kinds of experiences there are, and how they are different in different settings and which are interesting to be considered for recording and sharing. Another important question is why in certain settings people would want to record and share experiences, and devote resources (cognitive, social, and physical) to it.

In this paper, we tackle these issues by first proposing an alternative view to memory and experience. It draws

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from recent psychology and anthropology, and emphasizes the active role of memory in creating experiences and supporting human agency. This creation is manifested and socially mediated through cultural artefacts and expressions. We look at one particular type of expressions, ubiquitous multimedia. Grounding on this notion of experience, we present observations from an empirical study of our application area, ubiquitous multimedia in a large-scale event. Finally, we conclude the paper by reflecting on the ramifications of the approach to how we think about the mobile multimedia.

### 1.1 Ubiquitous multimedia and the construction of human experience: a new perspective

Our perspective to the issue of technology support for recording and sharing experiences entails two important aspects of experience. The first aspect is best considered from the standpoint of an individual, evidencing how technology can support social agency operating through phenomenal and functional consciousness. The second aspect, inspired by anthropology, expands the approach from the individual and considers how technology can change the cultural relation between experience and expression. These two aspects are carried forward and illustrated in our analysis of the organization of activities in a large-scale event.

#### 1.1.1 Memory, experience, and the social-cognitive processes of human agency

The orthodox view that the role of memory is the re-living or re-use of past experiences has been challenged in many recent theoretical debates on the role, function, and purpose of human memory.

Firstly, phenomenologists, especially Husserl, have stressed how memory attaches itself immediately to the present and actively orients us to the present and the future, and not just the past (cf. [5]). They believe memory has a *projective character*, it enables *protention*, not just retention or preservation. Consequently, they have emphasized the role of memory in creating a “field” (e.g., to the present) or “horizon” (e.g., to the future) instead of just laying down traces of past experiences, as empiricists like Hume held. For phenomenologists, memory then caters to practical time (future-oriented action) in addition to experienced time.

Secondly, and somewhat similarly, in cognitive studies of action, two paradigms in relation to memory and experience can be distinguished [6]. The *sensorimotor* approach, originating from the work of Descartes, views action as mentally mediated responses to sensory stimuli. Here, in the process that ends in response-selection, memory traces are formed. These traces can be re-experienced (episodic memory), recalled (semantic memory), or re-performed (procedural memory) later on. The *ideomotor* approach, by contrast, emphasizes the internal locus of control of action. Goal structures,

motivations, emotions and the like trigger actions in a less reactive but in a more *latent* manner.

An important common denominator for the two is that in both memory is viewed as an active and proactive participant in the process of producing acts of volition, not as a passive storage for experiences and events in the past. From the perspective of ubiquitous multimedia, it poses a question of how to support not only recording of experiences but also providing them available to the active construction of experience and action.

Thirdly, and expanding on the above two, an *agentic perspective* to cognition and social systems has been put forward and elaborated by Bandura [7, 8]. According to Bandura, memory, as an integral part of human cognitive system, enables human agency by supporting intentionality and forethought, self-regulation, self-reactiveness, and self-reflectiveness. This self-actualizing agency operates within a network of sociostructural influences, in which the agent is both a product and an active producer of social systems. This occurs through three modes: direct personal agency, proxy agency (relying on others to act on one’s behest), and collective agency (socially coordinative, interdependent effort). As we will argue in the next subchapter, these modes are manifested in (cultural) *expressions*.

We believe that these views of memory provide an important alternative to the memory-as-a-storage-for-later-recall view. Specifically, from the point of view of ubiquitous multimedia, *multimedia is no more seen only as a mean to record and later re-live experiences but as a way to actively exercise agency and construct experiences with others*.

#### 1.1.2 A performance perspective to experience and the role of expression

The social-cognitive analysis, however, cannot address the *cultural sphere of experience and agency*, which, we believe, also bears relevance to the design of ubiquitous multimedia. To understand the relationship between experience and its *expression*, we refer to the anthropology of experience as proposed by Turner [9], who bases his approach on previous thinkers that addressed “experience”: John Dewey, who saw an intrinsic connection between experience and aesthetic qualities, and Wilhelm Dilthey who affirmed that experience urges toward expression and communication with others. These views and the work of Turner contributes to create a *performance perspective* (for a detailed discussion see [10]) which was found useful by anthropologists who investigated a variety of performative processes in social life leading to a better understanding of how people experience their culture and how events are received by consciousness [9]. The performance perspective contributes with the following distinctive propositions [10].

For Dilthey the concept of an experience, *Erlebnis*, is what has been lived through. Dilthey wrote that reality

only exists for us in the facts of consciousness given by inner experience [cf. 9]. According to this view experience is not only the diluted juice of reason but also feelings and expectations. While behaviour implies a routine that one goes through an experience is personal, as it refers to “an active self, to a human being who not only engages in but shapes an action” [9, p. 5]. Meaning is considered emergent and not predetermined in events; it “is generated by ‘feelingly’ thinking about interconnections between past and present events”<sup>1</sup>. According to Dewey [11] mere experience is passive endurance and acceptance of events, while an experience stands out “from the evenness of passing hours and years”. Turner applied these perspectives recognising how experiences “erupt from or disrupt routinized, repetitive behaviour”. The perspective of Dewey on experience explains the “standing out” of an experience with the particular relationship between doing and undergoing of the experiencer, and with the concept of perception. The structure and pattern of an experience is not given by arbitrary beginning and ending, but by an initiation and a consummation, and by “doing and undergoing” not merely in alternation but in simultaneous relationship. Dewey makes a distinction between perception and recognition of an object stressing the energy and consciousness needed in the act of perception. While recognition is when a thing is experienced and interpreted only as something we already know, perception occurs when we experience a thing that imposes certain qualities that create new insights for the participant.

The contribution to our discussion on ubiquitous multimedia is first of all to have concepts that help discern “an experience from mere experience” for example through the concept of perception. This bears implications to understand what we want technology to record. The emergence of meaning in events and the relationship of doing and undergoing raise the question of what the role of ubiquitous multimedia is in the construction and recording of experiences. On one end the technology could be seen as a recording device external to the situation not influencing in any way the experience by being invisible and imperceptible. On the other end *ubiquitous multimedia could have an explicitly participative role enhancing and thus shaping experiences by taking part in the emergence of meaning supporting shared interpretation, or assisting doing and undergoing.*

Following Dilthey, Turner explains how meaning, which is sealed up and inaccessible in daily life, is “squeezed out”<sup>2</sup> (from the German Ausdruck) through expressions such as, performances. In Turner’s words, “an experience is itself a process which “presses out” to an “expression” which completes it”.

Our discussion is about how we can record and share experiences using ubiquitous and multimedia technology. The difficulty is that we can experience only our

own life, what is received by our own consciousness and we can never know completely another’s experiences. We overcome the limitations of individual experience by interpreting expressions, where expressions are representations, performances, objectifications, and texts or in our case media texts. By automatically recording information, for example video, we can capture the “behavioural dimension” of events but we have little access on the meaning and experiential aspect. Conversely, *if ubiquitous multimedia is used for consciously creating expressions these could provide a powerful tool to record and share experiences.*

## 1.2 Related research

### 1.2.1 Visitors and spectators in large-scale events

There are not many ethnographically grounded studies on visitors’ behaviour in large-scale events such as festivals and big sports competitions. Instead, research has been focusing mostly on economic impacts of the events to the region, event management and statistics of the spectator segments (e.g., [12, 13]). The visitor perspective, with descriptions of visitors’ practices, social interaction with each other, orienting and planning in the event, etc. is by far an uncharted territory.

Studies on tourists provide some insight into the topic, however. Brown and Chalmers studied city tourists having a special attention on information needs as well as map and travel guidebooks usage [14]. Their finding was that personal experiences are often shared with other people, usually between travel companions but also with other people, such as other tourists. In the study, they observed that experiences could originate from practical issues, such as solving together problems in way finding. In a study on Swedish Rally, Roskilde rock festival and a sailing competition in Sweden, Nilsson et al. [15] noticed that the primary interest of the visitor is to experience the event in action, such as seeing cars drive by from a few meters’ distance. This goal was supported with socializing with other visitors by exchanging information, which supplemented the experience. Studies on mobile media usage in large-scale events have focused mostly on the question on what type of timely information should be provided to the visitor. For instance, the systems by Nilsson et al. [16] provided entry lists of competitors, announcements from the organizers, and maps of the area. At Roskilde rock festival, their system informed about the bands playing at different stages. That is, visitors were seen purely as consumers of mobile media, neglecting how they can create and share multimedia.

### 1.2.2 Pervasive computing for recording experiences

Current work in pervasive computing for memory and sharing of experiences lacks of clear conceptual approaches as no perspective, for example, is put forward

<sup>1</sup>Here meaning (Bedeutung) is considered along with value (Wert).

<sup>2</sup>Dewey arrives at the same consideration: “Etymologically, an act of expression is squeezed out, a pressing forth” [11, p. 64].

on the nature of experience. Moreover, works usually do not provide motivations of creating multimedia records of experiences as no scenarios or examples are discussed of why people would use such records.

For example, solutions for automatically recording experience-related data have been proposed (for example in a recent workshop [17] or in this special issue) but these lack sophisticated ideas on how and what for the recordings would be used. Usually, some aspect of perceptual reality is captured, clustered, organized, and re-represented for later access on a desktop computer. However, we hold that memory is always memory for something, and these purposes should not be forgotten. Recall and other functions of memory support psychosocial well-being, or social agency, and separating these functions from the analysis easily leads to the system not being used at all. The functions of ubiquitous memory have been considered in more detail by Niwa et al. [18], who proposed a system to package experiences and using them for others as mobile location-aware messages; Lin et al. [19] who considered making shareable stories out of wearable sensor data; Kono et al. [20], whose system enabled putting daily documents as projections in one's home; Mäntyjärvi et al. [21] who communicated user-created media via mobile terminals in a map-like UI; and van den Hoven [22], who proposed a semi-tangible photo-viewer application as autobiographical aid to enhance the experience of souvenirs. However, they have not looked in detail to the complete experiencing of these memories. We believe that this experiencing is a greatly situated, future-oriented, and interactive process. As the emergent practices for experiencing and co-experiencing through these technologies cannot be known in advance, empirical work on this issue is very important and topical. Our work contributes to this research by providing the first study of the experience of multimedia memories from the perspective of design.

### 1.2.3 Mobile sharing of multimedia

Studies of sharing multimedia have already been undertaken with mobile applications. These, however, do not explicitly tackle the problem of memory and sharing of experiences. The study by Koskinen et al. [23] points out that content in MMSs between friends is rarely independent from previous communication. People also started to create collections of pictures on the same topic, such as variations of a joke that had been circulated within the group. In both studies, communication of moods was one of the main purposes as well. Battarbee's study echoes these findings [24]. Mobile devices can also be used for recording digital media that is assembled into a coherent story at a later stage. Mäkelä et al. [25] found that pictures were taken not only about special situations but also often to create stories, illustrate everyday life in a funny way or to make art. Frohlich et al. [26] have found that if the people are

co-located as is often the case in events, storytelling aspect loses importance. In addition to the most popular commercial solutions for mobile group communication with multimedia, there has been academic research in the area. In their paper, Sarvas et al. [27] studied the sharing of mobile pictures from the perspective of the picture's lifecycle from capture to archival in a photo blogging type of system MobShare. The system provides a way to send pictures from a multimedia phone into web folders that can be viewed and commented by invited acquaintances. The user study showed that the web publishing activity familiar in photo blogging supports social discourse similar to discussions around paper pictures which happens clearly after the photographed event. The tangible digital photo album of Balanović et al. [28] tries to replicate the functionalities of traditional paper photo albums. With their device, users are manipulating digital images and can also share them. Flipper is a system [29] that supports "groupcentric sharing, automatic and persistent people-centric organization, and tightly integrated desktop and mobile sharing and viewing." The interface is simple and supports "buddy-lists" based groups. Its support for recording and sharing experiences is limited as only individual pictures can be shared which are organized according to the person that shared them making it difficult to organize many pictures according to particular events.

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## 2 The rally field study

The aim of the study was twofold: to carefully investigate the salient aspects of the spectator's experience in a large-scale event as a rally, to uncover opportunities for ubiquitous multimedia in enhancing this experience. A field study using available camera phones has been organized specifically to observe what spectators would record and how they would share multimedia items in a group.

### 2.1 The rally as a setting

The setting of the study is one of the 16 rallies that comprise the FIA World Rally Championship. There are 353 km of driving tracks, called Special Stages (hereafter *stages*) that cover approximately 4,500 km<sup>2</sup> in central Finland, having Jyväskylä city as the central point. The 3-day rally takes place in early August. The number of spectators in total reaches 300,000 in some estimates, the predominant visitor segment consisting of sports enthusiastic males under 40 years old. Nearly 88% of the spectators are from Finland. Visitors spend approximately 11 million euros during their stay in the area. There are some information services for the visitors, the most important being a radio, which conveys split times of the drivers. Supplementary information is presented in specials on the TV. The most important sources for static information are (1) the official



programme published by a Finnish car sport magazine and (2) the accompanying sheet having a map for special stages, timetables, and instructions for approaching the special stages by car.

During the rally, activity is divided into two places in the area: along the stages where the cars are driving, and at Pavilion, a congress centre in Jyväskylä. Pavilion hosts an information centre, an expo, and a service park semi-open to visitors where the cars can be spotted between the stages. The 22 stages are driven in succession, and due to the number of spectators and traffic jams, it is not possible to visit every stage. Some roads are also closed from the public, to let competitors drive easily from one stage to another.

At the stage, safety personnel are spread throughout the stage, at about 100 m distance from each other, and spectators are guided behind red tapes that mark the safe zones. Cars are driving past with 2-min intervals, and the personnel signal their arrivals with high-pitched whistles.

## 2.2 Method and arrangement of the study

Two participant groups were recruited through a local travel agency 2 months before the rally. (1) The small town group consisted of 7 males more than 30 years old (group A) and (2) the capital area group (group B) consisted of 3 males and 1 female of about 25 years of age (and a dog). Both groups had visited the rally also in the past years. They volunteered to participate in the study for no monetary compensation. They were approached well in time before the rally and introduced to the researchers and the study.

Eight SonyEricsson K700i phones—4 for each group—were utilized. The K700i phones are capable of taking 640×480 pixel (VGA quality) pictures and 176×144 pixel video clips. The phones have 41 MB of storage on a memory card. The phone has also an FM radio that can be listened with earphones. Apart from configuring the MMS settings, no modifications to factory settings were made for the trial. Phone accounts were paid for the users. An introductory tutorial of the use of the phones was given to all participants to ensure necessary skills to operate the devices. They were asked not to delete the content that they had used during the rally, since it was to be analysed later on by researchers.

In the rally, each group was shadowed by a researcher, primarily using video camera for recording. The researchers integrated themselves in the group of spectators as participant observers. Out of the three rally days, the half of the first and the second day in full were observed. While group B travelled the whole rally as a group in the same car, group A split into two groups on the second day as three members woke up early to go to three stages while the remaining four woke up at lunch and passed the afternoon in town in the service area and at the expo. For this reason we were also able to observe in-group usage of MMS (more than 50 items). After the

rally, the phones were collected and all the pictures, video clips and MMS content were extracted for analysis.

Participant observation is an established method to gather ethnographic data in human–computer interaction research and related areas. It includes challenges connected to the fact that the fieldworker turns into a research instrument [30]. Besides training and experience this requires continuous reflection and introspection with epistemological, social, emotional, and ethical challenges that make the role of a participant observer difficult: “her primary attitude is that of a novice who tries to become a part of the life of the community; at the same time she needs to maintain enough distance to record her observations and reflect on her evolving understanding of the situations she encounters” [31]. The problem of changing the situation under study with the presence of a participant observer has to be put in term of managing the interventions in a fruitful way for the research. This means orchestrating interventions (as the introduction of camera phones) in a way that generate relevant research knowledge. Mostly the sensibility and experience of the participant observer can mitigate the problem of causing misleading results. To reduce some of these problems we approached the groups well in advance, had two face-to-face meetings with group B (the members in group A lived so far away that meeting in advance could not be arranged), explaining the research setting openly, and establishing weekly email conversations on the preparations for the upcoming rally. The assessment of the relevance of the ethnographic material we gathered relies on the quantity of episodes and multimedia recordings that were gathered and on their natural and “genuine” character.

## 2.3 Experiencing the rally

To report the salient aspects of the spectator experience we provide three distinct views: a temporal analysis of a day at the rally, an account of the spatiality of the experience, and finally an account of the social dimension with interactions between spectators, group identity, and protagonism. These are essential to understand, in light of the concepts introduced in Sect. 1.1.2, the spectator experience as emergent from simultaneous doing and undergoing, which in turn orient us to what we may call “active spectatorship”.

### 2.3.1 Temporal frame

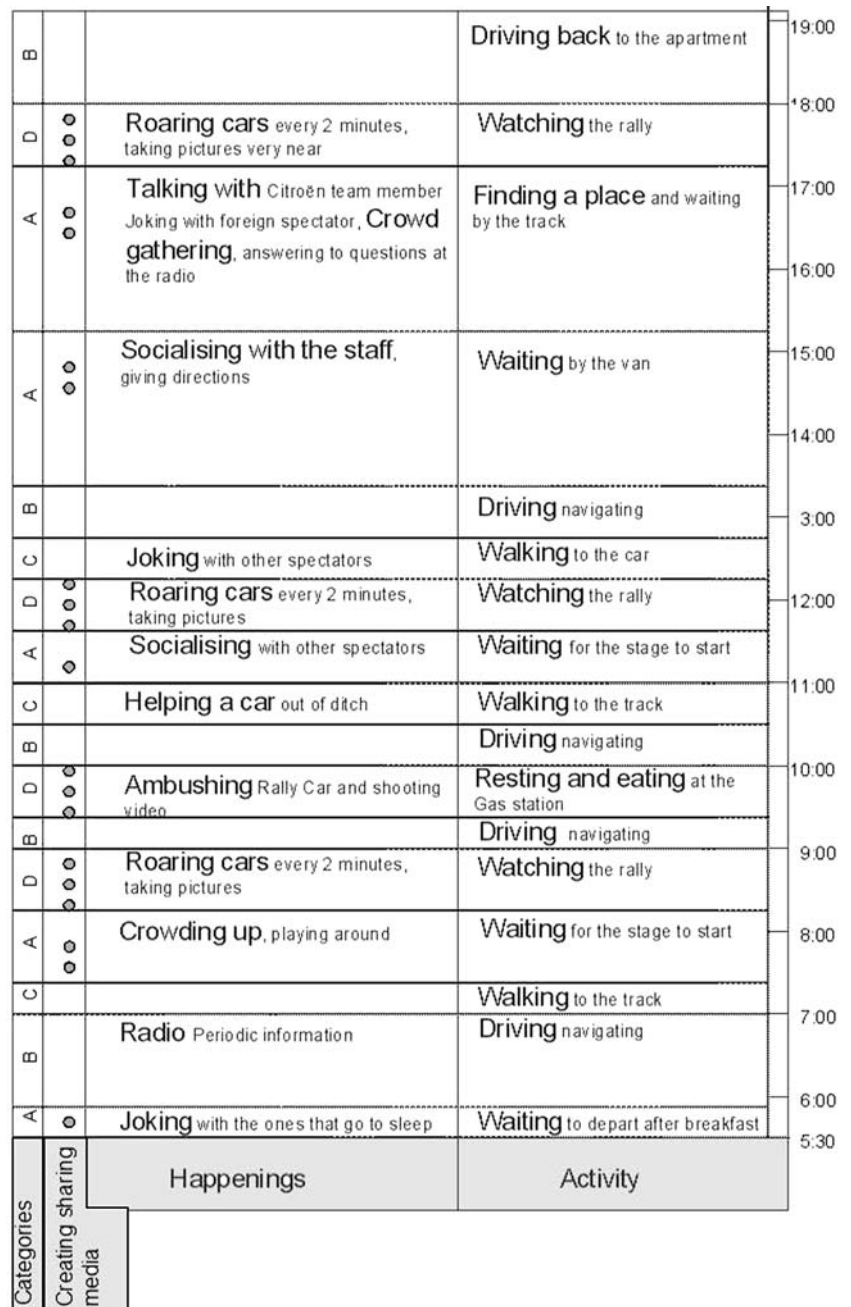
Through a temporal analysis it is possible to describe how the variety of “doings and undergoings” of spectators are distributed along a day forming different moments of varying intensity and of varying dispositions for different activities. A first important observation is that experiences of spectators in the rally are organized around a temporal frame given by the event. The rally event has a fixed temporal structure that is planned up to minutes that distributes events in a vast

area with a rapid succession. However, events may overlap in time at different places, also considering that there are background events as the RallyExpo, a fair connected to the rally. While the rally drivers and cars manage to go through all stages and servicing (also open to spectators), it is unthinkable for spectators to follow all stages and service times. Usually, the groups visited two to four stages per day. For example, for group A, this program occupied the whole Saturday (5:30–19:00). Figure 1 depicts the temporal structure of their day.

Analysing the whole day of a group it is possible to divide the 14 h into periods characterized by five recurring dominant activities: driving, walking to or from the track, waiting for the stage to start, watching the rally, and

resting or preparing. This analysis is corroborated by observation of other days of the same group, and by the observations of the second group. These periods have been analysed looking at three different aspects: first, the social interaction within the group and with other spectators (sociability); second, the occurrences of intensive peaks that are characterized by requiring full attention from all spectators for a short time and that are considered to be “intense moments”; third, in what we call killing time, we observed the spectators actively looking for ways to avoid boredom. Intense moments, however, do not only occur while watching the rally cars in action. The group purposefully chose a gas station for resting and eating to ambush the leader of the competition between

**Fig. 1** Temporal and rhythm analysis of a day at the rally



two stages and shoot videos of his car, waving at him. Sociability, especially with strangers, seemed to increase during the day and usually increased while walking for kilometres from and to the tracks and waiting for the stage to start. Killing time was also present throughout the day especially while waiting for the stage to start, walking to and from the tracks. Finally, in Fig. 1, we also visualize the occurrences of media creation and sharing.

This analysis points to four different categories of temporality that show in which situation the creating and sharing of experiences through multimedia was most relevant:

**Type A.** Time as a horizon. In the situations where the members enjoyed the moment, the group was waiting or resting and there was time and resources to actively stage entertaining situations and to engage in interactions with other spectators. Here, multimedia was used in socially engaging ways. However, there were several tasks that occupied occasionally the members of the group, such as managing shared resources (drinks, cigarettes, batteries), carrying the radio and maintaining its audibility, choosing and conquering places to see the rally.

**Type B.** Time as a task. While driving, one member was absorbed in the task. Other members were taking the time to make calls and rest, there was the least number of recordings but passengers used part of the time to send MMS. The radio was periodically giving news about the rally. Most of the interaction inside the group occurred as part of the constant task of navigating.

**Type C.** Time as a mixture of task and horizon. The group spent two or more hours each day in walking to or from the stages. While fewer media items were created in this case, members were constantly looking for ways to create entertaining situations, joking with other spectators, commenting about them inside the group, dancing or singing.

**Type D.** Time as cyclic events. This last category includes situations where there were brief and intense moments that stood out significantly, e.g., ambushing a rally car between stages, and the periodic roaring of rally cars in action every 2 min. Here, a large portion of the media was created and shared immediately with the rest of the group. Tasks to be managed included waiting for the car and positioning the body in the right way to view or record the car, as well as keeping track of competition results and who would be the next driver.

### 2.3.2 Spatiality, places, and territories

The rally is a massively distributed event where spectators move around a vast area covering several hundreds of kilometres everyday. The area includes a variety of different places: the Pavilion (service area, Rally Expo, etc.), stages (gatherings at the beginning, end, and along the track, parking areas, refreshment stands, and accessories stands), and the apartment or cottage.

Movement in this space can be divided into three activities: way finding as deliberately planning and executing a route from A to B; exploring as finding and

evaluating new places and territories; camping as creating places and territories for the group, settling. Moving around is observable at different granularities creating *multiple levels of mobility*:

- *Cottage/apartment.* From the several stages, often located far from each other, the spectators must choose some for each day. The day before, a preliminary plot emerges in the group. It includes a route with generic sequence of stages to be visited and a very rough schedule.
- *Before or during travelling to the stage.* When travelling to a stage the group decides from which direction to approach the stage and which road to use.
- *Approaching the parking place.* The spectators chose a place to park.
- *At the parking place.* The right equipment is selected considering the distance to the track, the weather, and how long they will stay. Arrived at the track they ask members of the safety staff or other visitors for information deciding to walk up or down the track.
- *Along the track.* Once a location is found, the group settles or camps, creating a place and a territory considering the point of view to the track and rally cars.

However, this is not a step-by-step process, but a highly interactive one where decisions at forthcoming levels are anticipated and prepared for. Decisions on the overall plot are influenced by lower level mobility issues and the other way around. In other words, the levels penetrate each other in the cognitive reality, although they do not in the time-space reality. As the available information (in the official rally guide and maps) does not support decision-making in all the levels, experiences from previous years are employed in the lower levels of mobility (e.g., remembering where there were good places to settle close to a parking place). However, the decision is not only about optimising a route or convenience of the territory, but also about leaving opportunities open for exploration and new experiences. This kind of playful opportunism [32] occurs also at the level of execution. Our previous work called this sidestepping [33], but here it could be called *contingent navigation tactics* where the overall plan can be changed if the situation provides for unforeseen possibilities (e.g., Ambushing, see Sect. 2.4.2): stopping by to a gas station and thus missing the beginning of stage to see a top rally driver driving by). Here, in comparison to sidestepping in everyday mobility (such as getting from work to home), the overall navigation plan is much more flexible as the originally intended goal does not have to be reached. As we will argue later, this multiply determined nature of mobility yields new possibilities for using ubiquitous memory and experience applications.

### 2.3.3 Sociability, group identity, and “protagonism”

We use the term group as we observed four or more persons (four and seven persons, respectively) sharing



activities and goals for a prolonged time (at least three full days). According to statistics carried out about the rally in Finland, most spectators travel in groups and are not first-time visitors. We observed two different groups, which did not have any relation to one another. In our two cases, persons in a group lived in the same area and had to travel a large distance using a shared vehicle (300 km), and share the same accommodation for the 3 days. However, the group might split into “sub-groups” temporarily (also for a whole day) to accommodate different desires.

*Continuity* The rally for on-site spectators is an intense social experience, which is over and over again created and maintained through social acts. Social interaction happens throughout the day and involves, besides the other group members, also strangers as other visitors or members of the organising staff of the rally. The interaction with persons external to the group can last from few seconds to few hours. It includes many types of interactions that involve utilizing individual memory in a proactive or prospective way to support social agency:

- joking, socialising, exchanging directions and advices with other spectators while walking for kilometres from the parking places to the stages, or along the tracks (Fig. 2),
- arguing, discussing, and socialising with the members of the safety staff or teams competing in the rally (Fig. 3),
- less explicit interaction may include gazing passers by, as well as acting in ways to attract attention.

*Example episode* (Fig. 2): Group A joking and socialising with a foreign spectator. Irishman: “There are not many good Finnish drivers in this rally”. Eero (member of Group A): “Well that is your opinion....” Then they talk about the weather. The Irishman took with him a rain jacket and heavy clothing but it is a warm weekend. Eero answers that next time he should



Fig. 2 Example episode showing joking with stranger spectators

call him and ask if and when Eero has vacation, as when he has it the weather is always like this.

*Example episode* (Fig. 3): Socialising with the staff. While waiting 3 h for the stage to start, group A socialises with members of the safety staff, they check the safety staff’s van as one of the members of group A just bought one himself.

*Reflexivity and group identity* The spectators wore distinctive uniforms and were often taking pictures of other groups and themselves. Members of Group A wore a red cap (supporting a specific driver) and black shirts (Fig. 4 left). Group B manifested group identity by carrying a Finnish flag, (being a Finn), casually wearing a T-shirt as a hat, or all wearing white T-shirt or black caps (Fig. 4 right). By-passers were often evaluated and sometimes, purposefully, in a loud voice so that the evaluated people could hear).

There was continuous and reciprocal interest towards people passing by who often made comments aloud.

*Protagonism and active spectatorship* The field study revealed the variety of ways in which spectatorship at the rally is an “active”—not passive—experience. As we have shown in this chapter, spectators are not merely observing rally cars but, for example, are engaged in navigating in a vast area, settling, and conquering positions. In maintaining an active role, or exercising agency, spectators also were exhibiting their memory, knowledge, and skills by:

- giving tips and directions to other spectators (Fig. 5),
- engaging in discussions with the safety staff or with members of the competing teams (Fig. 6).

*Example episode* (Fig. 5). A member of group A explains to another group of visitors how the rally cars will be passing on the race track, which is not visible as it is hidden behind the bushes.

*Example episode* (Fig. 6). Group A discusses with a member of a competing team (left) that is measuring the temperature on the track. The group tells him that at 1 km there is water on the road (they heard this from the safety staff). This *protagonism* and *active spectatorship* is even more evident in the way in which the groups created and shared multimedia as we shall see in the next section.

## 2.4 Creating and sharing experiences through multimedia

The previous section described the context and salient aspects of the spectator experience. This section reports in detail how the two groups of spectators used their camera phones in creating and sharing multimedia items. This ethnographic material is relevant in several ways to exemplify the perspective introduced in Sect. 1.1. First, it shows how the mobile multimedia can serve



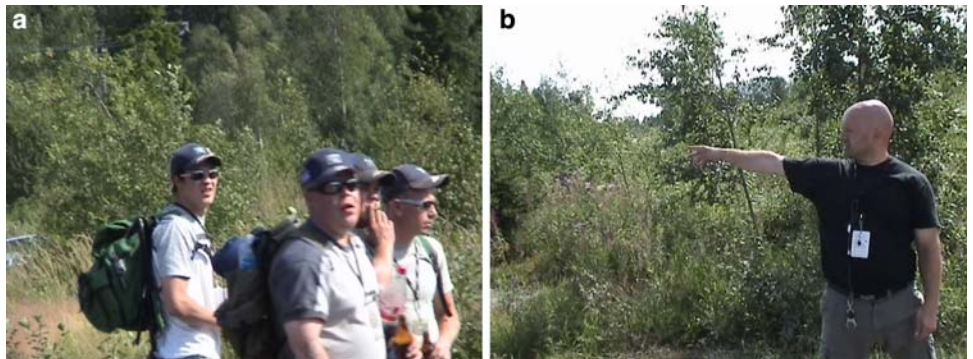
**Fig. 3** Example episode of discussing with the safety staff



**Fig. 4** *Left* Three members of group A. *Right* Three members of group B (photo taken by participants with the phone)



**Fig. 5** Example episode of giving tips and directions to other spectators



**Fig. 6** Example episode of discussing with a member of a competing team (left)



as a shared memory that supports spectator's (inter)actions. Second, it shows how the mobile multimedia can concur to construct and enhance the rally experience. Third, it is evidence of how the mobile multimedia collections can be expressions that give access to how spectators experience the rally.

#### 2.4.1 Recorded multimedia

For the analysis of the recorded media, our starting point was that they reflect spectator experience as lived with and through multimedia. The act of recording an event itself assumes a selective decision-making process where the participant has weighed the benefits of recording higher than its costs (e.g., social disruption to on-going activities, cognitive and physical effort). Thus, recorded media can be claimed to be selected, meaningful, relevant, and valuable pieces for the participants.

To collect the data, all media (pictures and videos) were extracted from the participants' mobile phones after the rally. As the participants had a possibility to delete contents from their phone, the corpus does not reflect all media recorded during the trial but those that were considered worth keeping by each individual. The deleted pictures consisted mostly of unsuccessful pictures and pictures that were regarded as too intimate to be disclosed to the researchers. The remaining media were classified according to the object or subject of the picture. The classification and related proportions are presented in Table 1.

From the table, some interesting preliminary observations to multimedia-mediated spectator experience can be made. First, more than half of the pictures were not related to the (sport) event but the *aspects of "being there"* was emphasized. These non-event pictures were mostly about group members, other people (mostly girls, Fig. 7g), and artefacts. This observation provides more evidence to our claim that spectatorship is not about sitting alone, experiencing events and recording and sharing them; the active and social co-construction of experience is important as well. The *staged pictures* category illustrates this aspect justly. Pictures in this category were not of real on-going situations or actions,

but were staged, posed or otherwise organized by the group (see Fig. 7e).

Second, a large proportion of the pictures clearly represent *emotionally loaded pictures* having their meaning in the social interaction triggered by the picture. In addition to the staged emotions (e.g., Fig. 7e), we observed pictures of gags (e.g., taking a close-up picture of a tobacco stump and asking others what it is) and of new friends made while attending the event that were evaluated and sent to the new friends via email. In addition, the corpus contains ownership pictures (a logo of one's car, Fig. 7f), and pictures related to jokes (e.g., a picture of a puking person deemed funny, Fig. 7h).

Third, the pictures represent a *large spectrum of social networks* involved in the spectator experience, ranging from the self (Fig. 7e) and group members (Fig. 7d) to strangers (Fig. 7h) and drivers (Fig. 7b). The sociality of spectator experience is well illustrated by the fact that 44% of pictures involved people as their object. As will be discussed later, this sociality bears implications for design because the relationship between the recorder and the recorded is different than with pictures that represent artefacts or scenery. Fourth, many of the pictures were organized as *collages and series of pictures*. These were related to funny events (e.g., group's dog wandering to a mud pond, see Fig. 7i), cool cars (from different angles and with technical information, as taken from a magazine), and "extreme shooting" (a series of car pictures taken from an extreme position dangerously close to the road, see Fig. 10).

#### 2.4.2 Situations of creating and sharing multimedia

The recording and sharing of multimedia happens in a variety of situations that can shed some light on why multimedia records are created and how they relate to experience. By analysing the ethnographic material along with the recorded material by the two groups, we have discovered these typologies of situations: staging, competing, documenting, portraying ad-hoc friends, storytelling, joking, hunting, and communicating presence. This rich articulation indicates a strong relation

**Table 1** Categories of recorded pictures and related proportions

Event (255 pictures in total, %)			Non-event (272 pictures in total, %)		
Cars	In action	75	Group members	Situations and acts	43
	Lining up	6		Staged situations	5
	Between stages	4		Skin faces	4
Drivers		9	Other people	Strangers	22
Helicopters		3		Ad hoc friends	1
Trucks		2	Artefacts	from magazines	10
Repairs		< 1		Signs	1
				Cars and details	4
				Other stuff and objects	4
			Scenery		5





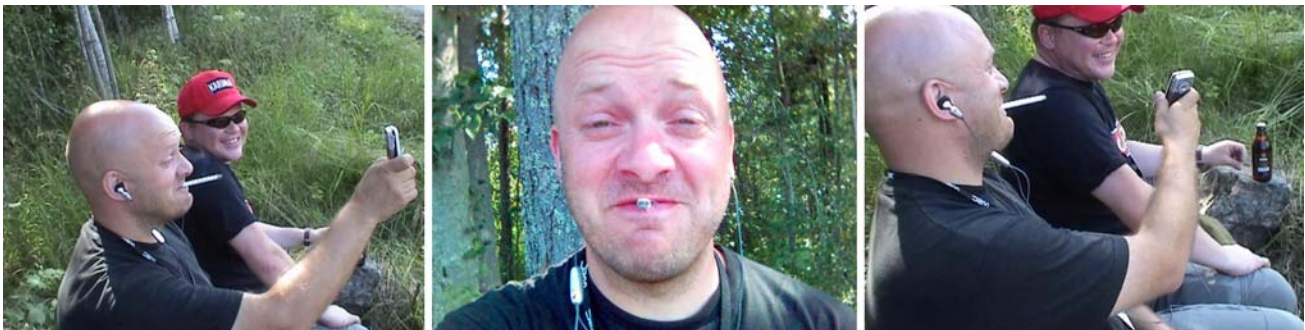
**Fig. 7** Example media. **a** The cottage where the group stayed, **b** cars lining up for the race, **c** a WRC car, **d** a group picture, **e** a staged facial expression, **f** car logo, **g** Pirelli girls, **h** a strange guy puking across the street, **i** a picture series of Danny getting into a muddy pond

between the practices of recording and sharing on one hand, and experiences of the group at the rally on the other. These situations have been considered relevant in our analysis, as they either occurred in both groups or occurred more than two times.

*Staging* In these situations a picture or video is created staging people and or artefacts deliberately. Examples include participants portraying themselves acting in peculiar ways (Fig. 8), or staging artefacts as for example when a member of group B inserted a cigarette in a hole

in a tree, and took a picture of it. He then asked the others what the picture was portraying (Fig. 9).

*Competing* After the recording of a picture or a video the spectators often immediately showed it to the other members of the group (Fig. 10). Pictures and videos were often compared and the members discussed about their shooting techniques. “*Extreme shooting*” is a term coined by group B, which means taking pictures from “illegal” or “dangerous” spots behind the fence, hidden from the safety officials (Fig. 11). It must be close to the



**Fig. 8** Example episode of staging pictures (in the *middle* the picture taken with the phone)





**Fig. 9** Example episode of staging artefacts: a cigarette inserted in a tree

road and it is done in order to get excellent pictures of the cars. Sometimes there's real danger (like when the year before one person was hanging from a tree above the road).

*Documenting* In these situations the spectators create documents of activities or objects consisting of a collection of pictures. The activity of creating documents or collections, where the spectators select or frames

features creating an interpretation of the environment. To the extent that this activity is collective it contributes to a shared interpretation of events. Thus, documenting as an activity is different from what one could achieve by automatic logs of events. Examples are:

- documenting artefacts, like details of the group's car, cigarettes, and beer bag, or funny signs (Fig. 12),
- collections of photographs created from printed pictures on magazines (Fig. 13),
- documents of the dog wandering to a mud pond (Fig. 7i) or getting into the car,
- pictures documenting particular situations as being at the cottage or a group of noisy Estonians (Fig. 14).

*Portraying ad hoc friends* Pictures portrayed also acquaintances made at the stages. Pictures were also sent to the emails of these "ad-hoc friends". Group B made friends with two spectators from Lapland (Fig. 15). The father had a radio that reported results that started the discussion. The daughter had courage to ask if the dog could be petted. Maria (member of group B) took a picture of the daughter with the camera phone, asked for the father's email address and sent the picture straight-away from the phone. Similar situations were observed in group A, for example, when nearby spectator wanted to see what one of the member recorded on the phone (a

**Fig. 10** Just after having ambushed and recorded a videoclip of Marcus Grönholm between stages, three spectators show each other the video clips



**Fig. 11** Example of *extreme shooting*: a member of group B goes beyond the red and white signs, very close to the track (left and centre, behind a tree) to take a picture (right)





Fig. 12 Documenting artefacts or details: a detail of the group's car (left), cigarettes and beer bag (centre), a funny sign (right)



Fig. 13 A part of a collection of six photographs created photographing material in a magazine

Fig. 14 Documenting situations



clip of a rally car passing, Fig. 16 on the right). Then the member of group A took a picture of the spectator, who asked if the picture could be sent to his email. These portraits, as conscious and social acts, are eventful happenings in their own rights with a digital record. Here the camera phone is both concurring to trigger the event and is also recording it.

*Storytelling* A storytelling situation includes arranging a collection of pictures to be viewed as a specific sequence. An example is when a member of group B appeared back from an “extreme shooting” position and showed the results to others. He arranged the pictures in a series that started with four pictures of himself in the bush making funny faces and continued with six

successful pictures of rally cars (Fig. 17, first two pictures). He gave then the phone to others and instructed them on how to begin the show. He himself watched from the behind how the others reacted and commented on the pictures, turning the show in a dialogue (Fig. 17, last two pictures). This case of storytelling is a perfect example of how “agentic transactions” are manifested in expressions. Narratives have many social and psychological qualities that tie them closely to human agency but also make ubiquitous multimedia propitious for them. Here, narratives generate understanding of actions of others by communicating, through multimedia, the process by which understanding of an individually experienced event was achieved [34]. Therefore, they are often accomplished through



Fig. 15 Example of a portrait of ad-hoc friends in group B

“replayings” of personal experiences (e.g., Fig. 17). Moreover, they are replete with explicit and implicit messages about the narrator-protagonist [35]. Taken together, they are used both as a privileged site for the social construction of the self but also as a socializing tool that maintain and instil community values to others [36].

*Joking* The recording of a picture may also be a part of a joke or a game, in the way that it is purposefully created to be part of a playful exchange or interaction. One member of group A sent to part of the group that was not at the track an MMS with the picture (Fig. 18) asking in the text “What is this?” The picture portrays

the equipment used by one of the competition teams to measure the temperature of the track. Another example is group A amusing themselves taking a picture of a strange insect on a shoe of one of the member (Fig. 18, right). These cases further articulate how multimedia records can be arranged and used to enhance and construct experiences. On the one hand jokes interpret and on the other they create events.

*Hunting* Sometimes the recording of pictures or video-clips was part of a “hunting” like activity; for example, when group A ambushed the leader of the Rally between the stages and recorded the passing of the car in a video clip (Fig. 19). Group B engaged in a hunt for rally car trucks and photographed several trucks including a toy truck in a gas station (Fig. 20). The camera phone has a primary role in these cases, as the activity of hunting is centred on the act of being able to take a “good shot” with the camera phone. Again there is a dual role of the recording device as participating in the event and recording it. However, much more of the event could be recorded with current sensor technologies.

*Communicating presence* Group A split into two sub-groups the second day as three members travelled together to three stages (6:00–19:00), while the remaining four slept until late and spent the afternoon in town. During this day MMS were exchanged between members of the two sub-groups. Message replies communicated presence, both explicitly and implicitly, of the remote sub-group, as in the following example of a message portraying one member still at the cottage,



Fig. 16 Another example of portraying an ad-hoc friend in group A

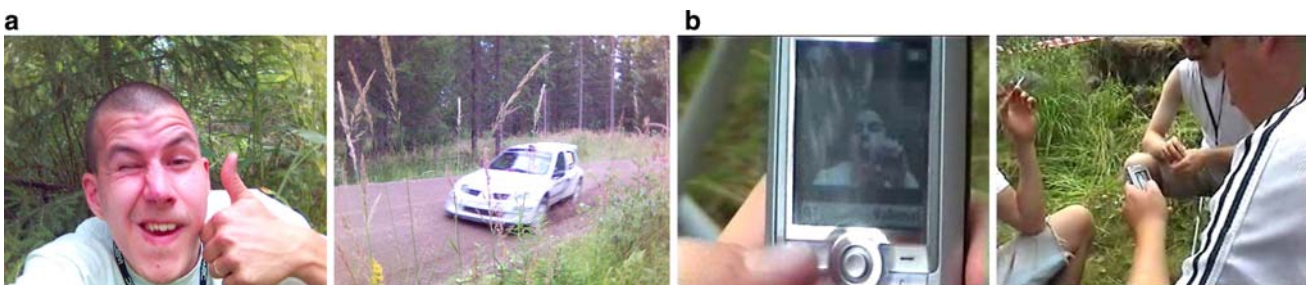


Fig. 17 Example episode of storytelling. The first two pictures are taken from the picture series that was recounted to others as a story (the two last pictures)



**Fig. 18** *Left* A picture of an MMS “What is this?” *Right* taking a picture of a strange insect



**Fig. 19** Group A ambushing the leader of the rally between two stages



**Fig. 20** Group B hunting for trucks carrying rally cars

which was sent to the sub-group at the stages (Fig. 21 left). The member who received it sent back a picture showing the crowd by the track (Fig. 21 right). Similar exchanges also created jokes as in the MMS exchange in Fig. 22. Here, a member of the sub-group at the Rally-Expo sends a picture (left) with the text “advertisement girl”, the member receiving the MMS at the track replies with a picture (right) with the text “our advertisement girl”.

This rich articulation of situations points to how agency and expression can be integral parts of the spectator’s experience. Moreover, mobile media supported a shared memory in the group as the use of the phone as a recording device was part of different collective practices in which shared interpretation of the events occurred:

- in *competing* and *hunting*, providing rewarding activities leveraging on protagonism and engagement;
- in *staging*, *storytelling*, and *documenting*, providing a powerful expressive tool to make interpretations of the environment, create and share expressions;
- in *joking*, *portraying ad-hoc friends*, and *communicating presence*, providing opportunities for social interaction.

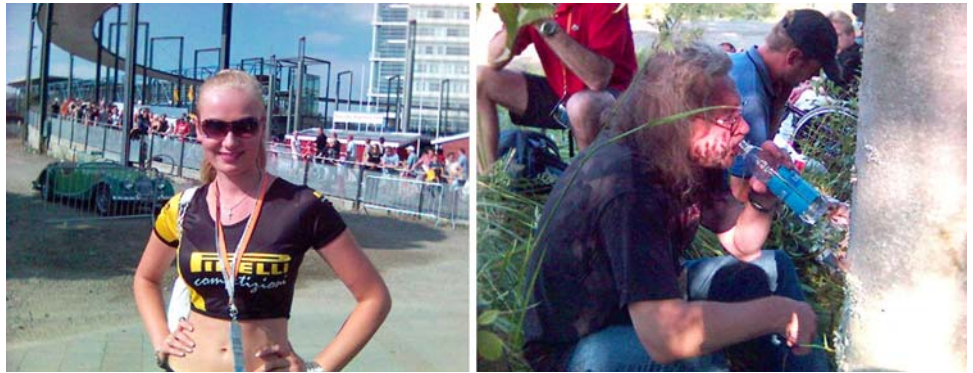
### 3 Foregrounding technology for active spectators

At this point we have completed three undertakings. First, we have introduced particular perspectives to experience and memory (Sect. 1.1). Second, we have proposed large-scale events and spectator experiences

**Fig. 21** Communicating presence through pictures in MMS and replies



**Fig. 22** Jokes and presence: MMS exchange by two members far apart



as an attractive setting for recording and sharing applications. In doing this, we have described in detail how the experience of the rally is constructed by spectators. The spectator's experience is massively distributed in space, is intensely social, and provides a relevant temporal articulation of activities with a diversity of rhythms (Sect. 2.3). Third, we have reported on a field study of camera phones in two groups of spectators that evidenced how the recording and sharing of multimedia can relate to their experience of the rally (Sect. 2.4). In the following, we return to discuss design implications for ubiquitous multimedia applications. The perspective on memory and experience that we introduced in Sect. 1.1 in the light of the material of the field study suggests considering recording technology as supporting the active co-construction of experience. Many works on memory and sharing of experiences design a role for technology as an invisible recorder that produces information artefacts to be used in later situations. We suggest instead to intertwine technology with the “doing and undergoing” of spectators, thus elegantly *foregrounding* recording and sharing to the user instead of backgrounding them, an approach that has been dominated thinking since the seminal works of Weiser [3, 4] (e.g., think about attentive, context-aware, ambient, invisible, or proactive computing, all of which aspire to non-disruptiveness; see [37] for a brief review). In the

following section, we derive implications of this strategy moving from a temporal analysis and from considering the spatiality of events. We conclude by highlighting two ways in which this strategy changes the nature of records: from individual records to shared memory for interaction, from records to expressions.

### 3.1 Conciliating doing and undergoing

Although many of the findings in this work are applicable to other settings in everyday life, they are specifically targeted to large-scale events and spectatorship. Because of the intensity of the happenings and occurrences at the rally, or at almost any modern large-scale event, these provide a unique opportunity for gathering an abundance of data on “experiences and memories” in a short period of time. Interesting characteristics of large-scale events are the spatial distribution, the duration that extends over days, and the fact that such events are set apart from daily life. Spectators and visitors gather in groups investing resources (time, energy, money) to co-experience something “extraordinary”. Large crowds of spectators are generally thought of passively and individually enduring the event and as consumers of an increasing quantity of accessories and gadgets. Moreover, while current development target exclusively individual spectators, statistics show that



spectators visit events in groups. Our research points to how the experience of the event is socially constructed and any application or service should take it into consideration. Novel applications can be specifically used to support different aspects of the experience of the spectatorship, such as maintaining relations to a social network (group's co-experiencing of the event), or maintaining awareness and engagement to the event (enhancing event presence).

Designing for active spectatorship means considering how the variety of doings of spectators can be combined with event and social situations to contribute to an enhanced experience. We have shown in the ethnographic field study how creating and sharing mobile media in groups of spectators provided possibilities for such a combination. To detail the implications of foregrounding technology for active spectatorship we consider two aspects: (1) temporality and the problem of interruptions, (2) opportunities deriving from considering spatiality and mobility of spectators.

### 3.1.1 *Temporality as a resource*

In their essay on the role of ethnomethodology in informing design, Martin and Sommerville [38] notice that the sequentiality and temporality of action have not been adequately considered in HCI/CSCW, although these provide crucial context for making sense of the unfolding situation. Temporal aspects of experience, e.g., 'rhythms', are important providing individuals with the means to coordinate information and practices [39]. Our work has made the first attempts in unearthing the temporal aspects of experience relevant to ubiquitous multimedia support for experiences and memory. Another aspect of the temporality is how it creates resources and restrictions for interacting with ubiquitous devices. As we see from Fig. 1, particular temporal zone as type A (time-as-a-horizon) typically provided for time-killing activities, some of which were related to more elaborate uses (e.g., skinning faces, looking at series of pictures) of multimedia. In temporal zones as type D, cyclical time created peak experiences where the time between the passing of two cars were used to articulate own experience and contribute to others' in a constructive manner. As the frequency of events (cars passing by) was tense, applications that required long interaction chains were not used; instead the time was spent on the co-reflection of immediate experiences.

Here, we then put forward a novel aspect to interruptions at the interface: whereas previously interruptions have been looked from the perspective of how computer-initiated notifications create interruptions to social activities and decrease performance on task, we on the contrary emphasize how the use of ubiquitous devices, because they create an interruption or disruption to social activities, can be left unused when they are supposed to be used. In addition, clumsy and slow interactions easily create pressures to adapt social

strategies to suit goals. This has been noticed in previous studies. For example, it has noticed how people have to actively "make place" for IT [40]. In other words, interaction with technology competes for the same temporal resources that the social activities need, and breakdown of the delicate balancing between the two easily leads to social costs in addition to cognitive costs [41]. This "temporal tension" [33] affects users' experience and conception of time, and they are effectively manifested as resources (or the lack of them) for social interaction with and through technology. We argue that unless designers put serious effort to understand the temporal resources for using technology, and design elegant foregrounding, they will be left unused or used only partially in regard to what was intended by the designers. There are some indications that similar thoughts are spreading. For example, Tim Brown (CHI'04 closing plenary speech) told that in mobile application design IDEO adheres to a principle of 20-s interaction, during which all logical steps from the beginning of a task to its end should be able to perform. Similarly, Sarvas et al. [42] observed that when the process of recording and annotating multimedia took over 1 min, users were very reluctant to use the system because of the disruption to on-going social activities. Our analysis of the immediate and impulsive nature of sharing of multimedia in peak experiences shows that in some cases even only 20 s would have been too much and rendered the service useless.

### 3.1.2 *Spatiality as a stage for (inter)action*

The often unexpected and improvisational ways of navigating point to the creative use of resources as available information and previous memories. Decision-making in mobility happened at multiple levels (e.g., different spatial granularities) taking into consideration social configurations (spatial distribution of group members and other spectators).

For location aware systems, particularly route guides and spectator information support, this points to how the access to records and visualisation need to be articulated accounting for multiple levels of mobility and the importance of considering records of experiences along with information of current happenings. This approach then comes close to Social Navigation [43], which refers to the use of social cues in navigation in an interface. These cues are typically formed by history, memory, or presence information, and such cues could be utilized in the ubiquitous applications for mass events. This far, however, human experience "in the wild" has not been analysed thoroughly to understand the relevance to ubiquitous applications of social navigation. Our work points out some possible directions for this work. For example, social navigation cues could help in the management of time, navigation (e.g., planning fast routes according to congestion), settling and conquering territories

(e.g., cues that help in avoiding crowded territories or territories occupied by competing groups). We can see the rich articulation of spatiality in meaningful constructs for the spectator: location (where am I, where are the others), place (where do we do this or what does one do here), territories (where are our places and their boundaries). The design implications for sensor technology in particular, interest the ways in which spatiality, in its articulations and corresponding ways to be tracked, can provide opportunities for richer records of experiences. More importantly, spatiality can provide new opportunities to create records as an additional dimension to be recorded and as possible trigger for (inter)actions.

### 3.2 Shared versus individual memory

The perspective to memory introduced in Sect. 1.1 is exemplified in the results of the ethnographic field study where two characterisations of multimedia records as memory can be interpreted as design implications. On the one hand records are not created by individuals but they can emerge within participative frameworks or practices. Their use is not just for an individual as but as they constitute a special kind of extension to shared memory for the group. They are an extension to memory as they make it possible to recall and make vivid aspects of past and present happenings. On the other hand, this contributes to constructing a shared memory on which participants can act. Implications include the opportunity for mechanisms that make available the records in real time as the event unfolds. Records are relevant here and now, to support agency by providing an external and shared memory. The study highlighted how the recording and the sharing can be temporally tied, emphasizing the importance to consider the recording/sharing/ accessing as a cycle rather than privileging one phase. Moreover, the empirical material showed how multimedia records can form collections and stories out of assemblage and interpretations of recorded items. These expressions do not always reflect the chronology and time of occurred facts as order and sources of pictures might be mixed. The reason is that they constitute an interpretation of past and present events pointing other spectators to currently relevant aspects. To the extent that these are shared in the group, we have shown in the study how these media collections contribute to a shared memory and understanding upon which members of a spectator group can interact and build a variety of discourses: joking in different topical threads, document, create stories or documents relevant to the group.

Implications for sensor technology include providing sensor-derived cues that provide awareness of others activities [44] and mutual context awareness to enhance the construction of shared memory. Moreover, context

information as explained earlier can be useful in enriching the records by contextualising the content.

### 3.3 Expressions versus records

Spectators in the two groups were provided with a powerful tool to create and share expressions. According to the anthropology of experience of Turner [9], expression shapes experience and experience shapes expression in a coherent system of interaction and interpretation of cognition (thought), affect (feeling), and will (volition). This perspective explains two features of multimedia records as expressions. First, multimedia records as expressions provide an exceptional access to the spectator's experience of the rally. Examples are situations in Sect. 2.4 as *staging*, *storytelling*, and *documenting* that provide personal interpretations of the environment. On the other hand, analysing other situations as *competing*, *hunting*, *joking*, *portraying ad-hoc friends*, and *communicating presence*, it becomes evident how creating the expression enhances the experience of the rally. An important aspect of the relationship of multimedia records as expressions with experience is that social mechanisms provided a clear motivation for creating multimedia records. Records are personal in the way people want to retain credits for them and are group sensitive in the way they contribute to a common experience. This draws attention to a more active role of technology in enhancing experiences and a more conscious role of people in creating the recording, but also to respect the authorship of the content.

Our study highlights the expressive role of multimedia in its relation to social experience. One aspect of this is in the almost competitive activity of taking pictures of rally cars where the picture is shown to each other from the mobile phone. Here, the multimedia provides a "short-term memory" of the immediate past that can be reflected on together with peers. After this social activity of sharing, the picture is stored to the device among other pictures of cars, and by that loses its significance in constructing experience. Later on, because by time these pictures detach themselves from the meaningful context and the experience, they provide much less value for the spectators. Disconnected from the original meaning created upon recording the media, they lose their value as reminders for experience and thus become confused with other similar media. Similarly, the MMS exchanges could be used to make jokes with pictures because they could convey the here and the now of the two remote parties, providing awareness and a context over a distance (Fig. 22). The MMS exchange in this case functions as an expression and as a platform for co-experience [24, 45]. The shared memory and record as expression views, if considered in the ethnographic material we reported, further reveal the importance of targeting with the design the

relations between participants and their roles in the recording acts. Whether more relevant as shared memory or as expressions, records were the product of participative practices, in which group members had different roles. Finally, considering new technology as sensors the main implications to be drawn is to consider it in potentially two roles, not only as recording devices but also as new means of expression.

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#### 4 Summary

In this paper, we have put forward and carefully investigated a complementary view to memory and experience in ubicomp HCI. It differs quite radically from the prevailing conception that embraces the two notions: (1) memory-as-storage and (2) experience-as-relived-memories. While we grant that the two cater for a whole panoply of interesting applications, personal lifelogs, memory prostheses, storytelling of life, etc. (as seen in the workshop wherefrom this Special Issue originated [17]), researchers adhering to them easily miss another promising set of potential uses. Therefore, we advocate a view grounded on ideas taken from phenomenology, psychology, and anthropology. Here, memory is seen as an active projection of the present and the past into the future. Through social interaction, memory participates in the creation of human experience and agency and is manifested in a variety of social customs and artefacts around expression. This, we believe, is the essence of “sharing of experiences”. Hence, instead of doing “experience surveys” or recording “experience logs” for an individual, we look at the active co-construction of experience in a group. Our empirical study looked at this in a selected application domain: ubiquitous multimedia for large-scale events. Continuity, reflexivity in regard to the Self and the group, maintaining and re-creating group identity, protagonism and active spectatorship were important social aspects of the experience and were directly reflected in how the multimedia was used. Particularly, we witnessed how the multimedia mediated expression forms, such as staging, competition, storytelling, joking, communicating presence, and portraying others; and the motivation for these stemmed from the processual, shared nature of multimedia-mediated experience. The resulting, recorded multimedia were related not only to recording the event for later recall, but also to complex aspects of co-constructing the “being there”, emotions, and sociability. Often, the unit of memory was not a single picture or text but a collage or series that communicated a story. In addition to these, we also noted how spatiality and temporality play an important role in experience and its sharing. The four temporal zones we proposed (time as a horizon, platform, task, and cycle) not only provide resources and restrictions for using technology, but also motivate and constitute some forms of sharing while inhibiting others.

Finally, we proposed as a general design tactic foregrounding technology instead of hiding or backgrounding

it. This approach calls for looking at the context not only as a restrictive boundary condition for interaction that has to be known in design but as a source for inspiration of how new alignments of mobile services and context informations may support users. For example, the multiple levels of mobility, their mutual cognitive intermeshing in what we called “contingent mobility tactics”, as we argued, might cater new application ideas, and Social Navigation could provide a good conceptual framework for innovating them. Moreover, we learned that viewing memory as shared instead of as individual is one important aspect in the endeavour of foregrounding. And we argued that from this perspective the mobile multimedia can be designed to create expressions rather than automatic recordings, as expressions constitute a unique access to how experiences are received by consciousness and how they are communicated to others. To conclude, we want to once again highlight the value of ethnographic studies for informing the design of ubiquitous computing for recording and sharing of experiences.

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