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Augmenting the Performer–Audience Live Participation in Professional Event Productions

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ABSTRACT

Event productions, such as corporate workshops, night galas, or networking events, can reach higher levels of participant experience and productiveness if performer–audience interactions are augmented with possibilities for live participation from mobile terminals. However, it easily happens that polls, backchannels, chat screens and other methods remain as mere activation tricks that fall short from a successful integration to events' goals and content. Based on a 10-year process of developing live participation technologies, deploying them successfully in collaboration with event producers in over 100 professionally organised event productions ranging from 10 to 400 participants, we analyse techniques that increase events' value for the audience and the organisers. Building on our experiences and event studies literature, we describe how positive audience participation can be achieved by supporting cognitive (informational), affective (experiential) and conative (behavioural) elements of event participation, thus helping the audience members notice how the event supports their needs.

CCS CONCEPTS

• **Human-centered computing → Collaborative and social computing devices**.

KEYWORDS

Live participation, Co-located interaction, Audience–performer interaction, Events, Productions

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1 INTRODUCTION

Hundreds or thousands of events are organised each day in every large city in the world. For London and New York, for example, Eventbrite.com typically lists over thousand public events each week. Unlisted private and corporate events increase the count event higher. Every planned event needs *production:* planning, coordination and execution by dedicated people [19, 28]. The talks, performances, group work sessions, panel discussions, timings of the breaks etc. require planning to ensure a satisfying experience for the audience and intended outcomes for the organisers. Interactive technologies have been used to augment events for decades, starting from 1960s when the first clickers (i.e., handheld terminals where audience participates via button clicks) came to market and allowed the performers to gather responses from the audience via multiple-choice questions [17]. With the proliferation of mobile phones and laptops, the possibilities for computer-augmented performer–audience interactions—or *live participation* (LP; [25, 31, 33])—has become possible in almost any event. Live tweeting [26] and backchannel chats [49] are examples of rapidly proliferated technologies that have made use of this possibility.

Successful LP is non-trivial to achieve. Interactive technologies can be included in events in many ways, and without a careful orchestration (i.e., without "activities that are oriented towards the smooth running of the experience"; [40, 49]), LP may distract instead of augment the experience. Moreover, while human–computer interaction (HCI) research on collocated social interaction has been growing over the years [35], it has rarely studied how IT can be used to augment the interaction between performers and the audience in event productions particularly.

While HCI studies have been few, event studies (e.g., [19])—a research field that combines tourism research and marketing—has addressed the challenges of organising planned events. Two useful frameworks have been identified. The first one draws from a classic division of human mind [20] that identifies its *cognitive* (informational), *affective* (experiential) and *conative* (behavioural) elements [19]. These elements relate to, respectively, conscious mental work, such as knowledge creation and its transmission in the event; the emotions and feelings that the event elicits on the participant; and the actions that the events allow for the participants. The other framework, based on Pine and Gilmore's [37] work on experience economy, describes four levels of experience: passive

spectating, engagement in the event's activities, co-creation of its activity, and finally, liberation and emancipation that the event participation may elicit [19]. These frameworks have been applied in other event types (e.g., sports; [23]), but we are not aware of their use in professional event productions.

Our team has designed, built, and subsequently continuously improved an IT tool for event augmentation for over 10 years, and we have also participated in organising and producing over 100 events with this tool. In this paper we explicate the knowledge about technology-augmented event production that we have acquired. We investigate the following question: *What IT-based techniques for performer–audience interaction do professional event organizers apply in their work?* Our method has been practice-oriented and longitudinal. It has had elements of action research [45] in that our interventions have been aimed at improving participants' (such as organisers', performers' and audience members') event experiences through reflective participatory activities.

2 RELATED RESEARCH ON LIVE PARTICIPATION

While event productions have been rarely studied academically, HCI studies on other kinds of events offer insights on which to build further research on. The most topical knowledge can be found from Nelimarkka et al.'s [33] study on LP's three novel interaction possibilities that differ based on the control that performers vs. the audience have on the technology's use. "Performer-initiated & performer-controlled" systems include the already mentioned clickers that offer means for close-ended polls and their results' immediate summarisation on the screen [17, 22]. "Performer-initiated & audience-controlled" systems include question management systems where performers can initiate an interactive exercise and audience can freely post questions and comments to performers. The performer can review the comments and raise some of them into their presentation if they seem suitable for the performance's flow. The third category is "audience-controlled" systems. It consists of backchannels [14, 49] and chat screens [26] where the audience has the freedom to initiate interactions any time and the performer has little control on their unfolding.

The above-presented three-part classification helps pay attention to different technologies' affordances for the performers and the audience. However, the work has not, so far, been extended with analyses on techniques that performers can exploit to achieve desired audience experiences. This production-focused practical perspective is what we wish to contribute in this paper.

2.1 Events as Performances

Event productions share many aspects with performance settings. This has created a fertile ground for adaptation of theatrical concepts [48], especially because events and performances alike are based on an idea of a limited duration. The existence of an identifiable beginning and an end, as well as presence of intervening phases that can be planned to follow a script, help structure the event experience. In addition, the dramaturgical methods developed in theatre and script-writing may be, and are, used also in event productions [34, 37, 43].

The contexts studied have included not only technological art installations and staged performances but also mundane settings such as public interactions [21] where participants may take one or more roles as performers, spectators or bystanders [10]. Reeves et al.'s [40] theatre-based framework considers performer-initiated & performer-controlled cases where the technology is fully in the use of the performer who may keep it "hidden" or openly use it to "amplify" audience interactions. Complemented with other forms of activities, such as bodily performance, performers can evoke various experiences—secretive, expressive, magical or suspenseful—in the audience. If there are several performers, some of them may contribute to the performance behind-the-scenes and carry out the more demanding tasks with technology [39]. If applied to LP contexts, Reeves's framework would, however, need to be extended to also account for audience-controlled uses.

Sheridan et al.'s [42] Performance Triad framework, emerging from an analysis of club culture, assigns a more participatory role for the audience by noting technology's role in the audience's self-expression. Spence et al. [44] additionally note that the audience members, when equipped with LP technologies, can obtain novel kinds of roles during performances, including ones resembling those of the performers.

Most closely related to participatory event productions that we address in this paper are the approaches looking at temporal trajectories [4–6]. In them, using dramaturgical methods and theories [36], performers can plan different kinds of trajectories for audience members' experiences, interactions with artifacts, and reflections. The trajectory-based approach for performances has been developed in a context of arts-based research, and to our knowledge has not been explored so far in professional event productions. Part of this paper's contribution is to initiate this exploration.

2.2 Educational Events

The most extensive research about the integration of technologies into performer–audience interactions has been carried out in computer-supported cooperative learning (CSCL) research. Interactive technologies can support pupils' and students' constructive knowledge creation [49]. Since lectures are also planned events and thus require some amount of event production, the findings from CSCL offer lessons for production of digitally augmented events.

Two interaction modes in particular have been studied: audience response systems (e.g., clickers; see above) and backchannels. The former offer the audience a possibility to respond to performer's questions using predefined alternatives that the performer has planned. Although limited in interaction, clickers are useful in several ways. They make feedback loops faster between teachers and students, direct attention, and increase the engagement, interactivity, and enjoyment [2, 7, 9, 17, 24]. Backchannel chats—the other frequently studied technology—increase engagement and learning through allowing for text-based discussions while the students also attend to teaching. Backchannels have increased peer learning, co-construction of knowledge [29, 49], participation opportunities for introverts [32], and audience engagement as active contributors rather than passive listeners [15].

The success in using these tools depends on suitable classroom "orchestration": task preparations to support learning [2, 3], identification of a suitable level of flexibility [38] and finding a role for technology in the activity [12]. These preparations need to coherently communicate the suitable learning-conducive norms of conduct [13]. While the best practices on orchestration are still in the making [41], a frequent observation has been that teaching can be "scripted" using generic patterns and that these patterns can be implemented in interactive technology (e.g., [11]). Such a narrativistic approach resonates with the earlier-mentioned trajectory-oriented approach to performances [4, 5] and also our experiences.

3 RESEARCH METHOD

We address our question—what IT-based techniques for performer–audience interaction do professional event organizers apply in their work—by reflecting our experiences from practice-led research [27] that has covered over ten years of work and over hundred events of different sizes, types and production arrangements. We base our analyses on an organic development process of a LP system—LPTool (the true name anonymised but closely resembling Screen.io/Presemo; https://screen.io)—which we have deployed both in educational and corporate contexts. LPTool is also available as a commercial product and it has been also licensed to dozens of companies.

This paper's authors include both LPTool's developers (who are or have been also academic researchers, and different ones than listed in the table) as well as HCI researchers who have been in a secondary, yet critical role (by being colleagues or thesis supervisors) in LPTool's development and deployment.

LPTool's deployment in different contexts has supplied us with experiences on both successes and failures of event production and audience engagement. In this paper, our goal is not to present an evaluation of LPTool as a system, but to consider it as an example of a class of other similar systems. Thereby our findings about challenges in LP-based event augmentation (and how they can be tackled) are intended as being generalisable to any digitally augmented event production.

In this paper, we complement this experiential knowledge with semi-structured interviews with two professional event production partners—one that specialises in networking-oriented events and the other that specialises on large companies' strategic planning workshops. We inquired about the types of events that they organise, the history about collaboration with the LPTool company, a story of a recent collaboratively organised event, and deeper discussions on what makes an event production successful. Finally, we asked the informant to tell another event organisation vignette.

We also interviewed three LPTool representatives beyond our author team, two of them twice. As is typical for start-up life, the representatives bore several responsibilities, one being the CEO of the company, and everyone participating both in LPTool's development as well as in event facilitation. These interviews touched the informant's career in the company, the general requirements for events' successful facilitation, what tools (technical and conceptual likewise) are used in facilitation, and a longer story from a recent event that the informant had facilitated. The two follow-up interviews with two members delved into the question on how upfront scripting should be balanced against the desire to let the event unfold naturally, as well as into the more general matters concerning the necessary real-time coordination between organisers in big events.

Table 1: Informant details.

Role	Gender	Research method
Event producer for corporate gala events	Female	Interview and participant observation*
Event producer for corporate strategic workshops	Male	Interview
LPTool team member	Male	Interview (2x)
LPTool team member	Male	Interview (2x) and participant observation*
LPTool CEO	Male	Interview and participant observation*

* All of these informants were observed in the same event production.

In addition to interviews, the first author (not a LPTool team member) also carried out a participant observation visit into a production of a 200-person networking event that was facilitated by LPTool's CEO, another LPTool team member, and a professional event production company.

In these ways, by reflecting event facilitation among this paper's authors, interviewing two different kinds of informants, and observing an event production, we triangulated the insider and outsider views to increase the depth of our analysis. A summary of the informants and the research methods is provided in Table 1.

To summarise, we adopted a combination of first-person retrospective reflections and third-person interviews as our research method. These methodological choices reflect the practical limitations of this research. By being a start-up company prioritising growth and becoming profitable instead of being a research project, LPTool members had neither actively documented the events that they had facilitated nor conducted user studies about LPTool's uses in the events. Our solution to this challenge was to use the interviews in order to externalise the knowledge that had accumulated over the years within the LPTool. In Discussion, we discuss the limitations of our research methodology and its effects on the validity of our findings.

4 LPTOOL SYSTEM

LPTool's first versions were originally developed to meet the needs of academic workshops. However, a vast majority of event productions where LPTool has been employed over the years has been organised for business purposes. For event participants, LPTool is a system that can be used with any wirelessly connected device that has a web browser (e.g., a mobile phone). In addition to above-mentioned Screen.io/Presemo, LPTool resembles Socrative (https://www.socrative.com), Flinga (https://www.nordtouch.fi), Sli.do (https://www.sli.do), and Poll Everywhere (https://www.polleverywhere.com) in that it also allows performers create interactive tasks that can be used as part of presentations.

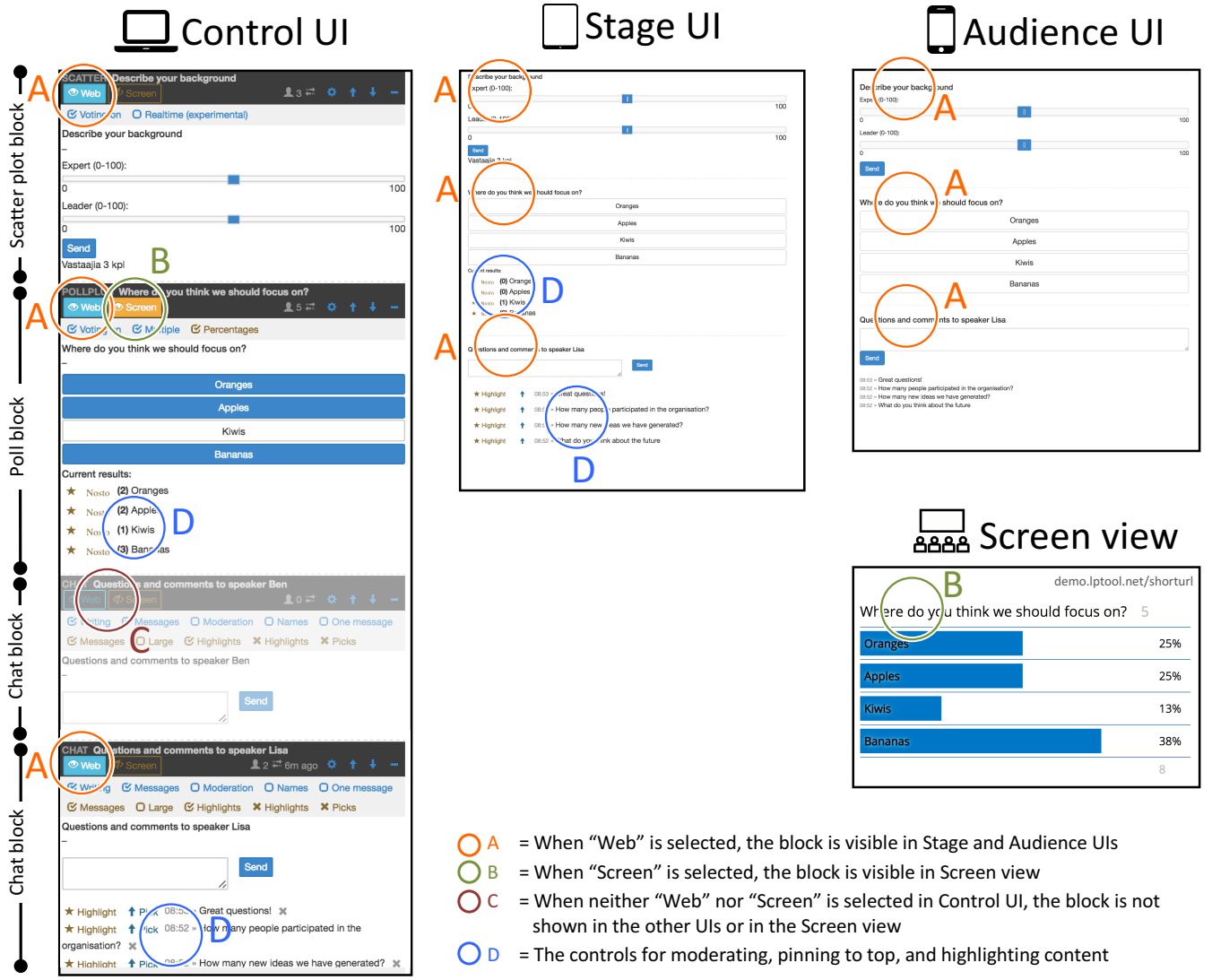


Figure 1: LPTool's two management UIs (Control and Stage), the Audience UI for participants and the Screen view that is shown on stage.

LPTool offers several "interaction blocks": (1) *Chats* let the participants post messages, by default anonymously, that may then be shown in their devices and in a large screen; (2) *Polls* let them choose among a set of predetermined alternatives, either in single-choice or in a multiple-choice format; (3) *Voting* is like the poll but allows users to submit their own alternatives to the poll in real time; (4) *Scatter plots* are sliders suitable for gathering data along semantic differentials and Likert scales, after which the results can be displayed as two-dimensional scatter plots, and (5) *Delta polls* combine two Polls together to display differences in the participants' answers at two points of time.

In addition to the participant-facing UI and the Screen view for presenting the contents for everyone in a room or a lecture hall, LPTool has two UIs for organiser-performers. Figure 1 presents these UIs, the Screen view, and the connections between them. It also shows how the interaction blocks are visualised in these different UIs for performers and the audience.

To cater the needs of different event types, each interaction block in LPTool has a number of parameters that affect its behaviour. The most commonly needed ones are the visibility and anonymity options by which the organizers can control which activities are available for the audience at a given time, and to enable or disable anonymity in chat-based messaging. An important feature is also the need for zero configuration from the audience's part: it can access the LPTool by entering a short hyperlink into their handhelds' web browsers without logins or nickname creations.

LPTool operates in real time. Thus, if a performer hides or shows a block, that action takes immediately place both in the mobile

terminals (i.e., in the Audience UI) as well as in the Screen view. Participants need never refresh their mobile browsers' pages to see the most recent content, not even if their terminals have timed out and their screen locks need to be opened. For example, the bar chart shown in Figure 1's Screen view updates in real time as the votes accumulate.

4.1 Performer Roles

The need for two different management UIs (i.e., Control and Stage) arises from the number of different roles that event productions involve both before and during the events. Following the terminology developed by Nelimarkka et al. [33], event productions typically have the following performer roles.

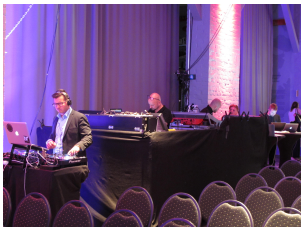
Event producers are the main organisers of the event, but are rarely visible for the audience. They prepare the script of the event, often as a part of an organising team. Before the event, at their desktop computers, they author the content for LPTool using the Control UI, so that it can be shown and hidden at desired times according to the event's script. During the event, event producers do not usually use LPTool directly anymore, but have another person managing it. This is because of the several parallel commitments that orchestration of an event entails, as well as the need to anticipate any problems that may arise and to mitigate them. The orchestration requires close cooperation with several other people in the event, such as video and audio mixers at the back of the room (i.e., at the so-called "front of house") as well the following people with other kinds of performer roles.

Hosts and chairpersons invite other performers onto the stage, introduce them, keep up a good spirit in the event, and keep an eye on the timetable. Their task is to face the audience (in case of hosts) or to facilitate on-stage discussion (chairpersons), and this limits their ability to attend to LPTool's activities (e.g., ongoing chat discussions). They can however raise questions from the audience to on-stage discussion if these questions have been pre-selected (i.e., "picked") by moderators (see below). LPTool's tablet-optimised Stage UI has been developed to cater for the hosts' and chairpersons' needs. One of its main uses is highlighting of participants' posts on the Screen view and reviewing audience's contributions, such as voting results.

Moderators and orchestrators, finally, work off-stage using the Control UI, with a full control of LPTool's features. Moderators are needed for screening the content that especially in chat screens may arrive at a quick pace. They also pick suitable contributions to the top of a list so that also hosts and chairpersons can notice them. In networking-oriented events, moderators often sit at the front row together with the event's customer. Orchestrators, in turn, work at the front of house next to the event producer as well as lights and sound mixers, where they show and hide entire LP activity blocks within LPTool according to the event's script.

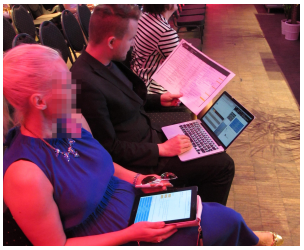
4.2 Event production types

Our experiences from LPTool's deployments have been predominantly of two types: networking-oriented events and workshops. *Networking-oriented events* are typically light-hearted in spirit and their program usually has entertaining elements. They may be



A) DJ, audio mixer, video mixer, and LPTool's orchestrator booth at a night gala event's "front of house".

C) A host, using a Stage UI, presents questions from the audience to a speaker in a big seminar. The questions, originally posted to a chat, are now highlighted in the screen.



B) A host and a moderator with Stage and Control UIs at a night gala event's front row.

D) Performer presents voting results from LPTool in a brainstorming workshop.

E) Participants in a chat-based breakout session using the Audience UI.

Figure 2: LPTool in different types of use.

organised, for example, to establish contacts, increase brand awareness, celebrate important occasions, advertise products, or serve as recreational events for a company's personnel. In the events where LPTool has been in use, networking-oriented events have usually involved 100–400 participants.

The easy-going atmosphere is however hard to attain. It requires careful scripting that in entertainment industry is often codified into "cue lists". These lists contain detailed timelines and triggers for lights, sound, video, and order of outputs in separate columns of a matrix-like sheet. Networking-oriented events have usually involved all the types of performer roles (see above) because they have been complex orchestrations. Pictures A–C in Figure 2 are from these kinds of events. Typically, customers have planned the event together with an event production company and delegated the responsibility of the event's execution to the event producer. The production company, in turn, has hired the LPTool team to orchestrate LP of the event. There are also many occasions where the developers of LPTool have taken the responsibility for event production on their own, without an external event producer.

Workshops, in contrast, are smaller in comparison and may have been open for only exclusive audiences. They have been organised, for example, to analyse a company's strategy, communicate it to managers, brainstorm new innovations, or to bring experts together to discuss a topical question. Pictures D and E in Figure 2 are from such events. Workshops have usually reached appr. 100 participants at most. They have often included breakout sessions

in smaller groups (see Figure 2E) and involved at least a moderate amount of improvisation. Thus the level of scripting has been lighter compared to networking-oriented events. This has been because the event's unfolding may have been strongly affected by the audience's contributions. Workshops have often had a simpler set of different performer roles. Moderation has not been as necessary as in networking-oriented events, and the event producer has usually been able to act also as the chairperson and the host. However, since workshop participants' chat messages may be rich and deep in their content, they may require a lot of attention and real-time analysis both on-stage and off-stage. This has been important because responsiveness to participants' ideas—such as insights in brainstorming—must have been attended, and an LP system's role as a conducting channel for these ideas has been critical.

LPTool has been used also in other types of events. It is in active use in lecture-based teaching in two big universities in our home city. These uses have not been included in the analysis of this paper because lectures rarely match the characteristics of corporate event productions. LPTool has also been used in several arts productions, such as as an interactive channel between a rock band and its audience in an experimental concert arrangement, and as players' communication channel in a science fiction pervasive game experiment. Finally, LPTool has been used in numerous academic settings of different sizes, to gather questions from the audience in meetings, conference panels, or paper presentations's Q&A sessions. It has also been used to drive brainstorming in small gatherings. Some of these uses meet the characteristics of event productions. Because the LPTool team members have been facilitators also in these kinds of meetings, they have informed also this paper's analysis.

5 HOW LIVE PARTICIPATION CAN FACILITATE EVENTS

As we stated in the Introduction, the event studies literature [19] suggests that all the three elements of human mind—cognitive, affective and conative—are important in event productions. Our discussions and interviews both with the LPTool team members as well as with the two event producers have confirmed the validity of this three-partite division. On one hand, events are rich with information and content (i.e., the cognitive element), but on the other hand, they are episodes of heightened experience that should also leave a feeling of lasting significance in the participants (i.e., the affective element). LP can fulfil both of these goals, but it needs orchestration that promotes suitable kinds of actions (i.e., the conative element). Without attempting this, LP's role may degenerate to mere activation or (in the words of one LPTool team member) "a gimmick"—thus reaching only a passive or at best an engaging level of participation in Pine and Gilmore's [37] four-level classification. In the following sub-sections, we will address how tools such as LPTool can support the cognitive, affective and conative elements of event experience and how event producers tackle them.

5.1 Conation: Getting Participation in Motion

We will present our findings starting from the conative—action-oriented—aspect of participation. This is because LP depends on participants' active interactions. If the encouragement to act is successful, also the cognitive—information-oriented—as well as affective—emotion-oriented—aspects of participation will have a chance to succeed.

Because LP has become a widely accessible type of event participation only after the ubiquitous proliferation of smart phones, there are not yet established, culturally shared action scripts for how to orchestrate LP or how to participate in it. That is, not even the performers have always a clear model on what to expect from LP or how to engage in LP:

> "We can give them [our corporate customers] some alternatives and tell them that they would benefit from using this kind of technology. That it will give you alternatives, you get answers, you can follow up on them [...] go deeper [...]. But I often notice that the level of use remains terribly kind of...like now we have the results, OK, these were our results [...] They don't look at them, those on the stage, the management, they are not ready to start like, 'audience had these ideas. Number three is interesting. It did not get much votes. Why? [...] Let's start opening that'." (Event producer)

> "What's difficult in event productions is that [...] I think it is this that we all have a lot of pre-existing conceptions on what events are like. There is the audience sitting in chairs, then there are presentations. That is easy to communicate, you don't usually even need to communicate such things like we have a seminar and it has these speakers. Everyone knows that there is a screen somewhere and so on. But immediately when there is something more participatory, then you have many possible forms of participation. Then communicating it, what is this now in practice, what is this situation going to be like, is harder." (LPTool team member)

Similarly, also the participants need to be helped to see the variety of available interaction possibilities beyond such well-known uses as questions-and-answers sessions after presentations:

> "These are so new tools, and people learn only by seeing them in action and by trying them." (LPTool team member)

> "These preconceptions on what participation can be may come from those moments when someone has seen a Twitter wall and now thinks 'yes this is the same thing'." (Another LPTool team member)

The problem of communicating productive interaction patterns applies therefore to both organisers and the participants. In our own practice, we have found that the communication is easiest if the participants can draw from interaction models that they already know, such as the ones described in the following.

5.1.1 Participation Models that Audiences Are Already Familiar with. The following two models for LP-based interaction have in particular been easy to communicate.

Input elicitation: LPTool's suitability for gathering real-time feedback and comments that can be used to adapt the presentation is well-understood by practically everyone. Performers can turn this preconceptual idea into more action in different ways. They can

ask the audience to post comments on a screen, comment on the contents of an earlier presentation, such as to point out issues that have been forgotten, or invite the audience into a brainstorming-like ideation where a lot of ideas are gathered and then discussed and possibly rated together.

Reflection: Another easily understandable use for LP is to help the participants process what they have spectated. For example, after a provocative talk, the participants can be asked to reflect its meaning from their own perspective. In the simplest case this may be a close-ended poll asking how a participant will start acting on the new information from then on. This helps the participants consider the talk's content one more time. A deeper version is to have 5-min discussions with neighbours and then share the outcomes with others through LP. One of the event producers told that in one in-house workshop the task had been, for example, after hearing about the most recent customer satisfaction study, to think what the most important "must-win battles" for the company would be from then on. After the brief discussions the suggestions had been posted to a chat, discussed together, and finally voted about.

5.1.2 Onboarding: How to Warm Up the Audience. Although generally well-understood interaction patterns exist, audience often requires help in the initiation of interaction. Thus, we have developed a number of "onboarding" techniques to communicate some of the desired forms of participation and make them attractive to the participants. First, we have discovered that it is a good practice to start every event with warm-up questions. In a large event, where the participants do not know each other in advance, a warm-up task may involve an exercise of finding out who the people present are like. Participants may be shown a list of options (e.g., organisational roles) from which they can choose from, and a bar chart will change in real time as the answers start coming in. The real-time accumulation of votes in the screen serves as a good incentive to take up one's mobile phone and participate. This breaks the slight hesitation.

Second, once the participants have their phones ready at hand and they have a positive experience on the easiness of participation, the next LP activity, such as chatting, may be seeded with a performer-contributed message that implicitly communicates the desired kind of participation:

> "It is very important to seed it somehow, that participation. And preferably using the language that is familiar in the organisation [...] And with properly formulated sentences that start with a capital letter and end with a period, for example. Versus with those like "helloooo" and other short shout-outs. A good example defines the norm for what is expected from this [LP]. But seeding is difficult because you are usually not a domain expert." (LPTool team member)

> "You introduce the product, tell how you can participate, and then there is the warm-up question, so that people get started using it. And its good if it [the question] is suitably simple but they nevertheless see how it works." (LPTool CEO)

In seeding, the transparency is essential. It must be absolutely clear to the participants that the seeded content has been created by event organisers, producers, or orchestrators, instead of pretending that it is authentic audience-contributed content. The transparency can be ensured with an additional indicative remark of the message's origin. If transparency is not adhered to, it risks destroying the event's atmosphere of trust. In an event full of professionals and experts, a doubt about secretly staged comments would be detrimental to the event's success.

Third, the participants need a quick assurance that their participation, such as messaging to an on-screen chat, is *acted on* in the unfolding of the performance. For example, high quality comments to a performer should be highlighted in the Screen view for everyone, and then asked from the performer at a suitable moment. This assures the audience that their participation indeed has an influence.

Finally, although inappropriate (e.g., hostile) contributions are usually only occasional, the producers need to be ready also to *moderate* them if there is a risk of escalation. When done appropriately, moderation preserves the integrity of the event's spirit, strengthens the mental model, and also shows to the participants that their contributions are also attended to. The LPTool team members also emphasised to us in the interviews that moderation should not however be overused since a feeling of being unjustly censored easily kills participants' willingness to participate.

5.2 Affect: Empowering and Intensifying the Participation

As we already described in relation to conation, LP provides event producers with new tools to activate the audience. It turns the participants into co-creators of the event and its content:

> "The audience is not only passively listening to that, the expert on the stage, but it instead participates, you see? And in fact, is also co-creating the event, what it becomes, those results." (Event producer)

With novel participation possibilities comes the experiential challenge stemming from the system's obtrusiveness. If a participant feels that LP is stealing attention away from the direct performance, the engagement with LP-augmentation decreases. This happens, for example, if the participation does not seem to matter in the larger event context. Based on our experience, striving for the following two goals can help in avoiding this competition between participation channels.

5.2.1 Empowering the Audience. According to the classic Greek study of rhetoric, a successful speech should empower its audience [47]. However, empowering does not happen by itself. This is how a LPTool team member reflected the company's very early experiences from attempting to make events more participatory:

> "[When we started facilitating events,] we had to quite quickly shed all the illusions that you could do some generic LP [...] If those events are such that the right people [in the customer's organisation] don't have a grasp and control on their content, and you can't get to talk to them, then the LP will not work [...] Then also the event's content is easily such that it does not deliver any personal meaning [to the audience]. And when it does not, then also the audience will

> sense that with some weird spider senses that it does not matter what you post to the chat… that 'I don't bother, I can [equally well] pick my nose'." (LPTool team member)

In these situations, the events fail to empower their participants. Contrariwise, when one's contribution is acknowledged, it can have a strong emotional effect on everyone in the room, including the event producer:

> "[Let's think] you are some middle level or upper middle level manager [in a corporate workshop] and you anonymously suggest that 'I think our communication strategy is OK but there are these kinds of problems, such as X.' You get your comment visible to others, and on the stage there is the CEO and the chair of the board, they look at it, and say 'hmm by the way we have not thought about that, great that we learned about it.' Then one realises that, both as a producer of that participation and as a facilitator, that LP indeed helps people […] And then the participants see that 'now my comment was accepted to that discussion. I have a possibility to have an effect on our firm's development'." (LPTool team member)

> "On one hand from that technology, but also from that content on the other, results a kind of wow effect among the participants, in the best occasions. Such as, 'cool, we are doing this together.' That you don't just need to sit quiet and watch PowerPoints." (LPTool team member)

A critical prerequisite for success is what one event producer labelled as "social security." If participants do not dare to air their opinions freely it will be harder to make them feel empowered. LP's support for anonymous participation is a crucial asset in this feeling: you can present your opinions safely and freely without being negatively singled out.

5.2.2 Intensifying the Experience. The second affect-related goal for LP, suitable for tackling the challenge of empowerment, is the intensification of event experience. LPTool team members told us that they sometimes use dramaturgical techniques to intensify the event experience. In this they are helped by two of the team members' experience on movie production and scriptwriting:

> "I think that those [studies on movies] provide some understanding on what works and how some problematic points can be approached […] Such as how these episodes should be built so that they proceed logically. Such as when do we reveal the results [of a poll], what feeling they will get after seeing this result." (LPTool team member)

> "In this live action we have always had a starting point in the rhythm and visibility […] That is the basic structure in its design. You can script the show so that you can plan when each element will become visible. So that it does not happen that the audience would see too early what kinds of questions will be coming up next. Or what kinds of interaction blocks will be coming if you want to create an element of surprise, which you usually do. Also, if you want at a particular moment that now we put this on the screen, and now happens a special thing in that participation. Then it will happen in that very second [by press of an icon]. That creates a particular energetic feeling of doing." (Another LPTool team member)

Again referring to classical rhetoric, event experiences also need an experiential closure: that the event has reached a conclusion, a joint achievement and that positive outcomes have been reached. This can be achieved sometimes with something as simple as a collective vote among the participants. The vote will not be as challenging as the reflection-oriented questions described above, because the purpose is not to problematise anymore. Instead they help the participations to summarise the results of the event in their mind. A question may, for instance, ask a person to choose between predefined alternatives that detail possible take-home messages, or future actions that anyone can start following from that point on, based on the event's contents.

5.3 Cognition: Reaching Meaningful Outcomes

Finally, the importance of event's content, and the importance of aligning LP with it, have been already mentioned several times above. For example, the participants must have a possibility to participate in the event in ways that they can understand (the conative challenge) and they need to have a chance to contribute to the event's unfolding with their content in order to feel being part of it (the affective challenge). It is therefore clear that also high-quality content is an essential characteristic of a successful event, and has been a recurrent topic in rhetoric [47], education [1], communication and media studies [18] and marketing [16, 30], among others.

Often the customer organisation—because LP can be a new concept to them—will need help in thinking about the possible forms of interaction that would augment the event's cognitive goals. In addressing this challenge, pre-event meetings with the customer are essential, although they sometimes involve a problem: especially in many networking-oriented events, preparatory discussions are often held with representatives from a customer's human resources department. This arrangement may compromise the possibility to have LP on topics that have high content relevance. In contrast, when planning takes place with managers (e.g., when the event will be a strategic workshop), challenges related to linking actions with the event's content have been less likely.

When an event's goals and content are well-considered, the following two opportunities, offered by LP, can be benefited to augment the cognitive element further.

5.3.1 Enabling Multi-Way Communication. LP technologies support three kinds of communication—from performers to audience, from audience to performers, and between audience members. With LP, participants get more possibilities to use these communications. They can exchange opinions with people who are not in their social circles and who do not sit next to them in the event. Because of parallel interactions whereby audience members do not need to compete for attention, the communication is also more equal for everyone. This way more viewpoints can be brought to bear on the event's outcomes.

Some bottlenecks need to be taken into consideration, however. On one hand, on-stage performers cannot attend simultaneously to direct and LP-based interactions. It is therefore advisable to have multiple performers in every event, especially those who work off-stage and attend to the LP-mediated interactions by analysing and filtering audience's contributions to the view of on-stage performers.

Similarly, also the participants in the audience have an attentional challenge: chats and backchannels in particular may capture participants' attention, leading to situations where they fail to attend to the direct performance [29]. This bottleneck can be solved with appropriate planning of the event's activities. The event producers can reserve slots from the program for mediated communications only or for breakout sessions. Alternatively, there may be separate chat sessions where the direct and the mediated interactions do not compete with each other.

5.3.2 Getting to Know Others. The content presented by performers and the content co-created with the audience are not the only types of content that may result from event participation. They also aid extending one's transactive knowledge: knowledge about other people's knowledge and expertise [46]. This is because events are also opportune occasions for getting to know experts and other important people in one's topic area. However, meeting the desired people in a large event—or even becoming aware of them—is a challenge.

LP can help in establishing contacts between people. For example, chat messages whose content signal about their senders' deep understanding about a certain matter will make other participants aware of each other's interests and expertise areas. This happens naturally if anonymous participation is not necessary and people can see each other's names. If anonymity must be ensured (as is often the case), one of the event producers recounted how LPTool's extended version had been prototyped and experimented in one event:

> "When you arrived, you got your own PIN with which you logged in. Then you could immediately see all the participants in the event, who was present, who had not registered yet, their faces, job titles, some other info. What they do, what their special expertise areas are. Also something about hobbies. So, there was a good amount of data about everyone and it helped you understand what the other persons do. And then some icebreakers like those hobbies, do we have anything in common. This was the clue [...] The goal was to [make you] talk with colleagues during that event as much as you could." (Event producer)

These profiles were also accessible after the event. Although this implementation was not integrated into LPTool's basic functionality, it provided starting points for using LP also for other means, such as to extending it temporally to post-event activities and to participants' social networks. We believe that a more comprehensive support requires development of as of yet untried collaborative tasks during an event—ones that do not compromise anonymity but help people nonetheless find each other. For example, exercises using self-organised group formation could offer one solution to this event design problem.

6 DISCUSSION

In this paper, we have analysed how event productions—especially networking-oriented events and workshops—can be augmented with LP. We found out that LP can improve event participation in all three—cognitive, affective and conative—elements of human mind.

These findings were based on research where we had to overcome particular methodological challenges. As we explained in the Methods section, our problem was the shortage of recorded data about the events that had been facilitated over the years. However, we interviewed event producers and LPTool team members—some of them several times (Table 1)—and two of this paper's authors also had participated in LPTool's development, which alleviated some of the problems of missing data.

However problems remain with the validity of findings. The dual role as a researcher who reflects their own work, and an author who wishes to publish the findings, poses validity problems such as self-censorship and difficulties to reflect on the research topic neutrally. More research should be conducted on computer-facilitated event facilitation, to verify the findings of this paper. Comparative studies between LP-facilitated and more traditional events without participatory technologies could also be useful, in order to assess the true novelty of these technologies and their contribution to production of event experiences.

Such studies still pending, we believe that LP offers a powerful and versatile way by which events can be transformed from passive to more active experiences. The orchestrations described in this paper offer several ways by which audience experiences can reach levels of co-creation and liberation, which in Pine and Gilmore's four-level classification [37] represent the highest levels of experience. On one hand, concerning the highest level—liberation—we repeatedly found out that this level may be easiest to attain if event participants had a chance of affecting an event's unfolding through LP-mediated contributions. On the other hand, balancing and interleaving the two modes of interaction—direct and LP—needs careful planning or else they start competing with each other for audience's attention and creating a disorganised event experience. These issues are related to the question of suitable scripting of event's participatory activities in relation to its cognitive and experiential goals. In other words, the conative (action-oriented) elements of LP have to be aligned with the cognitive and affective elements.

Several mutually complementary reasons encourage researchers to start exploring the possibility of LP scripting for events using LP interaction models. First, two of the LPTool team members that we interviewed attested for the benefits of a dramaturgical approach and scriptwriting in their event planning expertise. Second, similar concepts have already been developed in Benford's research on performance trajectories [4–6]. Benford suggests, for example, that when designing interactive performances, designers should consider beginnings and endings, role transitions, traversals between physical and virtual worlds, and temporal traversals between episodes, among others. In our interviews, as an example of such transitions, one LPTool team member told that small discontinuities in events' trajectories are often beneficial, because clear transitions help to construct a mental image about the event's different parts. In the similar way as it is a good idea to have a separate warm-up

chat which can be closed before the actual performances start, other transitions from direct interactions to LP and back may be useful to signal clearly. Continuously open backchannels or chat screens, in this respect, are problematic and should be carefully considered if used, because they do not offer opportunities for clear transitions between participation modes.

The LPTool members told that their system's future development may indeed involve design of additional support for performers and organisers to create suitable transitions, e.g., through narrativistic pre-event scripting and developing an authoring interface for it. In this future direction they may investigate scripting-oriented approaches similar to ones that have been developed in meeting support technologies in information systems research [8] and in the planning of teaching sessions in CSCL [11].

We conclude this paper with the following thoughts. Considering the volume of event productions organised each day around the world, we find that it is a high time that HCI researchers start looking at events as a context of collaborative computing. Computer-mediated communication has pervaded the everyday life and has made people skilful in expressing their thoughts in a written from in addition to the oral form. Sometimes, such as in large events, the mediated communication may even be the most convenient means of communication.

As we have explained, bringing mediated communication into events makes them more engaging, leads to better outcomes, and empowers the participants. By starting to develop means for participating in events, HCI research can bring the performers and the audience closer together, increase their mutual trust and contribute to more rewarding social experiences.

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