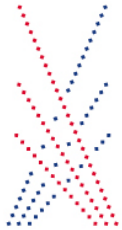

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The materiality of stagecraft and digital technology adoption

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Abstract

The relationship between material technologies and the organisation needed to use them has tantalised practitioners and fascinated theorists. This paper shows the craft-orientation of theatre performance production, analysing how a show is made through organisation, and how this craft sensibility affects the propensity to adopt new digital technologies amidst increasing pressures to do so from arts funding organisations. Using a novel process-mapping method not before applied to the cultural sector, the paper reveals how the many roles of theatre production including Directors, Set Design, Production Management, and specialist functions like sound, light and wardrobe integrate their work using traditional boundary objects and largely craft practices. The paper argues that this craft sensibility together with scepticism for mediated communication partially explains the apparent reticence of Performance Arts organisations to adopt digital technologies. Any initiative to encourage adoption needs to recognise these practices and values.

Introduction

The relationship between material technologies and the organisation needed to use them has tantalised practitioners and fascinated theorists. Using a novel process-mapping method not before applied to the cultural sector, the paper maps how the many roles of theatre making including Directors, Set Design, Production Management, and specialist functions like sound, light and wardrobe integrate their work using traditional boundary objects and principally craft practices. This paper reveals the craft-orientation of theatre performance production, analysing how a show is *made* through organisation, and how this craft sensibility affects the propensity to adopt new digital technologies amidst increasing pressures to do so from arts funding organisations. The paper argues that this craft sensibility together with scepticism for mediated communication, partially explains the apparent reticence of Performance Arts organisations to adopt digital technologies. Any initiative to encourage adoption needs to recognise these practices and values.

Theoretical Background

Sociomateriality: Ever intertwining

As intangible services have increased in importance so has organisation scholars' defiant (and contrarian!) attention to their tangible counterparts: objects, artefacts, things, stuff, scaffolding, often categorised collectively as materiality. Theorists have sought to understand 'how matter matters' (Carlile et al. 2013) to the extent that Boxenbaum et al. (2018) suggest this may represent a 'material turn' in organisation studies, yet they call for better understanding of how the use of artefacts affects our creativity or the reception of new ideas. This would be the case for better insights on the transition from analogue to digital tools, for example.

This organisational materiality literature draws on somewhat earlier work on sociomateriality where scholars have sought to explain relationships between technology and the social. Sociomaterialists have gravitated to an "intertwining" of the material and the social realms, rather than antagonism. As in many debates concerning the social and other factors, scholars

quickly crowd around the degree to which the social/organisational is 'determined' by the technological/material, or whether there is agency to counterpose this determination. Leonardi and Barley (2008) go beyond the apparent but glib resolution that there is some mutual influence and it may be contingent on the case, arguing that this dichotomy is a needless distraction, since the 'voluntarist' account of change has too often been conflated with the 'idealist'. This is a subtle distinction whereby 'voluntarism' represents the idea of human agency and choice in engaging with materiality and technology, while Leonardi and Barley's conception of 'idealism' is attached to values, beliefs and logics of technological domination over socially fulfilling autonomy. Voluntarism is presented as a lighter, healthier, option which is essentially instrumental and empowering through design. Our interest in this regard is what influences the choice to migrate from one material 'paradigm' or toolbox to another. In this case the movement from 'craft' based materials and practice to 'digital'. As Leonardi and Barley stress "Materiality matters for theories of technology and organizing because the material properties of artifacts are precisely those tangible resources that provide people with the ability to do old things in new ways and to do things they could not do before."(p. 161). A question here is why then do they choose not to do these new things, even given the affordances of said new things?

One issue here is whether digital technology may be considered materiality, since it is essentially software comprised of 0 and 1 codes. Much of the literature accepts that software should be considered of the material realm, since it is enabled and supported by hardware, electricity and an extensive infrastructure. Our interest is the relationship between these artefacts and the activities that are essential to fulfilling their purpose, the processes and practices that activate them, and the organisational dynamics of movement to a different material base (Jones, Lorenzen and Sapsed, 2015). One important transition of this type was of course the historical shift from handicrafts-based production to mass industrial production.

Craft Production

Craft practice is generally understood to be distinct from standardised industrial production, denoting small batch production organisation, often bespoke and unique and requiring human intervention. Craftworks cannot be left to automatized processes (McCullough, 1998). Craft typically depends on small-scale, localised trading and often personal relationships between buyer and producer, and face-to-face interaction between those collaborating on the work.

Craft workers are thought to be highly skilled and motivated, their knowledge is predominantly tacit and accumulated through practice, executed through the hands and body as much as the brain and tools (Cattani et al., 2013).

While seen as a pre-industrial form, craft persists as a segment in most industries, experiencing cycles of prosperity and disfavour, as well as legitimacy (Suddaby et al., 2017). There is a normative stance whereby craft is perceived to be superior to industrial processes (Miller, 2017; Ocejo, 2017) yet craft has an ambiguous relationship with technology and innovation (McCullough, 1998; Blundel and Smith, 2013). If craft is understood as a practice where the hand is largely directing and applying tools directly onto a bespoke artefact then the added mediation of information technology can be seen as categorically different, especially since the product can be easily replicated at mass scale with a single mouse click. However many would argue like McCullough that digital work can be seen as craft work, guided as much by the hand and body as other craft processes, especially since technology producers increasingly try to simulate the tactility and accuracy of digital tools, for example, the advances in styli for drawing in recent years. We now turn to the practice in performing arts, first explaining our method.

Methodology

Context and Method

The research study was designed to discover and document practice in a theatrical production within a large company in the North of England as a case study of opportunities and barriers to digital technology adoption. The company produces and tours and is one of Arts Council England's National Portfolio Organizations (NPOs) with multiple stages and a significant year-long programme in its base. This case study was part of a technology upgrading project whereby one of the authors was employed to work at the organisation for 18 months, enabling participative observational research (Savage, 2000).

The wider context is a policy environment that is increasingly urging arts and cultural organisations to use digital technologies more in their processes and their productions, following reports showing the sector lags others in technology adoption. The latest of these was 'Culture is Digital' (DCMS, 2018), which proposed new metrics and targets, including a 'Digital Culture Code', which would comprise *"a set of guidelines and principles which*

*cultural organisations **should sign up to** in order to demonstrate a commitment to developing their own digital maturity and the maturity of the wider cultural sector." (p. 15).*

This would be accompanied with a 'Digital Maturity Index' for arts organisations to aid their development, but also their ranking and benchmarking against others in the sector. The implication of not engaging with the digital agenda for these largely subsidised organisations are not explicit, but general sentiments are that taking a position not engaging with digital would be unsustainable.

In order to shed light on the creative process of theatre production and identify the innovation opportunities within those procedures, we developed a process map, a step-by-step account of the actions taken in an organisation to produce a specific output. Process mapping has been identified as a useful tool to visually represent work processes and identify problem areas as well as opportunities for improvement (Marrelli, 2005). Parallel work has documented the process of production making, but was only within a small production (Vasiliou and Schofield, 2019). Our work will expands this research by focusing on the interconnections and interdependencies between the different departments.

Data Collection

To develop the process map we followed a qualitative approach, combining ethnographic observations, one-to-one interviews with the lead practitioners for each function in the production, and a company workshop to present and validate the final process map. More particularly, through the ethnographic observations, including 'fit-up', 'Tech Week', and meetings, we identified teams and individuals central to a specific production: 'Alice in Wonderland', and outlined their roles. We then proceeded with interviews of nine members of staff, both permanent and contractual for the specific performance (including director, stage and costume designer, producer, stage manager etc.). The interviews were audio recorded and transcribed, covering information regarding the overall production process and the role of each participant and their department, with particular attention on the flow of information within the production central to team-working systems (Militello et al., 2007; Vasiliou et al., 2015). After developing the initial process map, we conducted a company workshop, with 13 different staff members from the company to review and revise the process map.

Data Analysis

To develop the process map we went through the interviews starting from individuals with the more central roles such as the director and production manager. Initially putting major procedures on a timeline to visualize the overall production process, and gradually enriching the timeline with more information and parallel tracks. This was validated with a workshop with the practitioners who were presented with the process map. Following the process mapping, we also performed a meta-analysis to identify major themes among the interviews in relation to technology usage and potential that are discussed in the following sections.

Findings

Process Map

The first stage of the theatrical production is the "Play Choice" that may start 8-10 months before the performance, after which, the Admin phase - of putting the team together - and the Designing phase begin. Towards the end of the Designing phase the artistic team and the cast start the process of Devising, meaning testing the show with the cast. At the same time, as the cast start rehearsals, the design team finishes the design and starts the Making phase, where they build the set and gradually move the cast in to finish the production. A detailed process map is visually demonstrated below (Fig.1). The marketing track of the process map although not initially included in the first draft of the process map extracted through the interviews, emerged as a need through the workshop, where their role was highlighted through the staff conversations.

Thematic Analysis

Making

The study showed that the production of a show is fundamentally about *making*, in a very physical sense. The process begins with the consideration of the physical structure of the theatre. A fixed space, it is infinitely configurable for the needs of the individual show. Concerning the organisation, this is a company decision, since it may impact on the spaces of the company's other stages and shows it is running concurrently [Company Manager]. A dividing wall between two theatrical spaces is a physical choice, an abstract design choice as well as a business choice with multiple implications for a theatre company as a Project-Based

Organisation (Bakker et al., 2016; Sydow et al, 2004). In this case, the leads opted for the "epic space", combining two theatre rooms into a 4-sided stage and audience seating area.

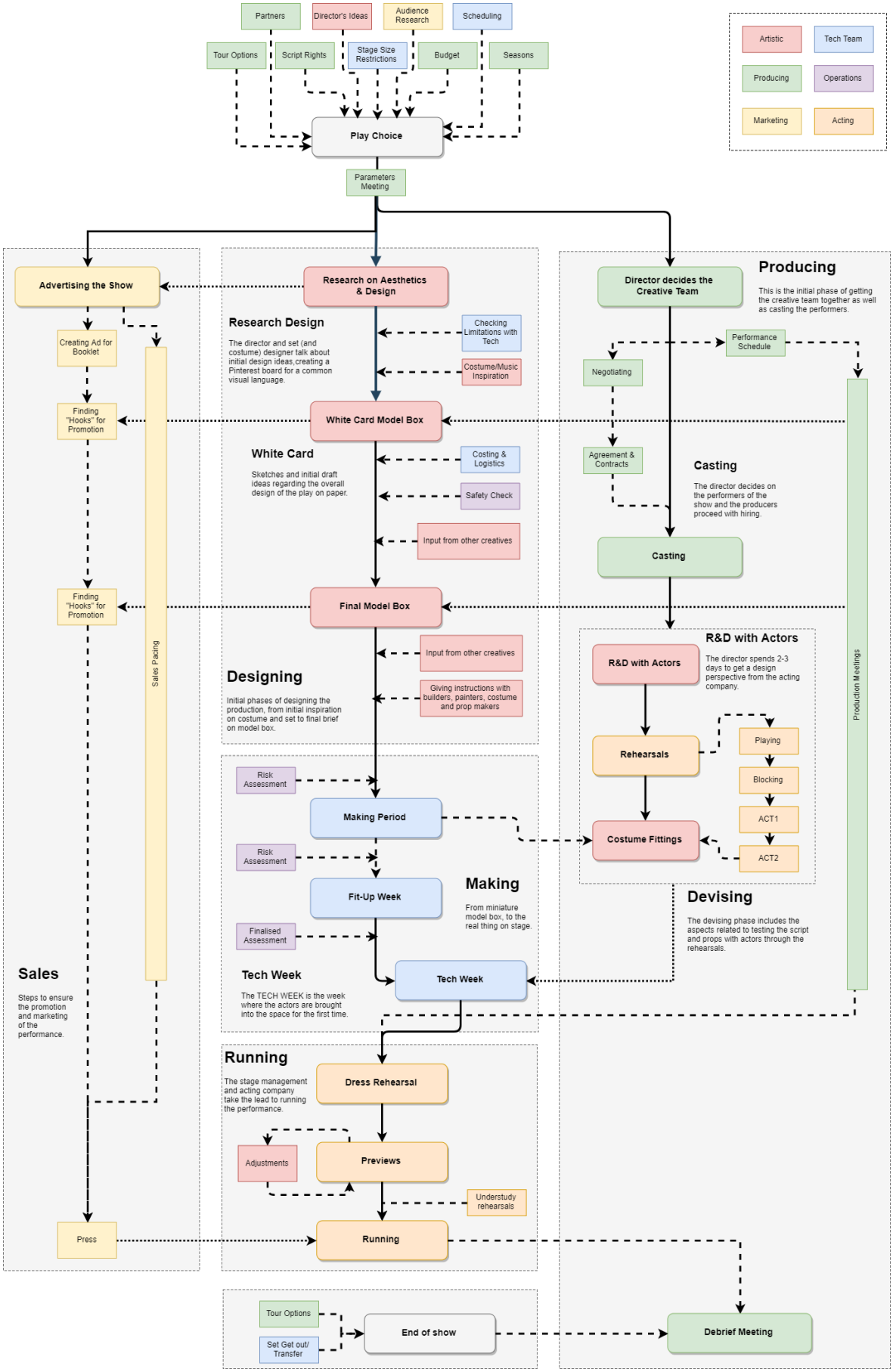

Figure 1. Process Map of a theatrical production

Once these boundaries are decided the Set Designer will apply the ideas worked up with the Director, yet his continued role also involved making: “As well as designing the set and the costume, there’s also a lot of collaborating and making and the practical side of it as well as the conceptual side.” [Set Designer]. For the stage manager, her role is “continually making things”, or “searching online for props to buy in”. When asked about the accomplishment of the show for which she was most proud, she replied: “I made the flags”, referring to the stage being decorated with bunting on which the Stage Manager had spent days of personal time measuring, cutting, folding and sewing. Reflecting on the show the satisfaction she recalled was this contribution, to the audience perhaps a detail, yet greatly fulfilling to her and her relationship with the final integrated production.

For roles like Stage Management and Wardrobe, the craft and physical making aspects of the show are clear, yet the interviews revealed that many roles were pulled into collaboration on making and physical work, such as the Assistant Director and the Stage Designer helping out with sourcing and building props and even applying make-up to the actors. What’s more, those owners of roles that are less physical and mediated also think of their work as craft. For example the Sound Designer described his activity regarding the layout of the theatre and creating a “palette” of sound effects, which is the “clay that I massage into shape”. The differing functions all to a degree see their role as *making* the show, contributing decomposable material parts that relate to physical space, and the physiological reactions of the audience in proximity to the performance. The show is not only designed, co-ordinated and performed; it is *made and crafted* over several months with efforts of the hands, eyes, and ears as well as the brains and voices of a collective.

Integrating work

The interviews and observations showed a need for the practitioners to work separately at times, individually or in their functional departments, and then bring the work together with others. Individuals expressed these competing needs in different ways, sometimes in an idealised normative way “So there’s not a sense of different departments, or there shouldn’t be. Because you all have this one goal: that you’re trying to tell the story. So you’re involved in all of the different departments. Because they’re all making this one thing which is your

vision and the director's vision essentially." [Stage Designer]. However, this prescription disguises a concern that this is a complicated challenge.

The Assistant Director explained, "So the rehearsals would be very fragmented in that you'd be working with a group of people sometimes, another group of people other times and then everyone sometimes." The process of theatrical show production, therefore, has all the challenges of integration familiar to other complex project work, whether software or construction. A key difficulty is the concurrent craft work going on with the artistic work, because of the need for differing space, conditions and tools. In this case "the hardest bit of the rehearsal, the communication that is lacking the most is between the rehearsal room and the building and the making of everything." [Set Designer]. There are also potential frictions between the Set Designer's vision and the reality of the build; the Production Manager will be responsible for taking the concept, estimating its costs and coordinating the team to build it, which will include the Designer but now only as a collaborator in the execution of his concept. This will often lead to cutbacks, adaptations and compromises.

There is a pattern in this collaborative process where the lead designers and managers who were most implicated in the early stages where work was mostly immaterial, are later drawn in to work on its physical realisation. For example the Assistant Director and Set Designer working on make-up and props: "I was mainly in the auditorium watching because that's where I need to be. Because I have a very clear overarching view of the production and what it should look like. Which the director does as well. But I think that the rigour that I bring to the visual stuff is important. … as well as being in the room I'm also off adjusting costumes, making props, painting things."[Set Designer]. This shows how this collaborative process is not a Taylorist separation of conception and execution with a corresponding division of labour, but a traditional collective craft work organisation, where designers are involved in the physical realisation of their ideas.

Boundary Objects

As in many other Project-Based Organisations theatre workers resort to boundary objects (Star and Grisemer, 1989) to help manage the collaboration task. There is a sequence of these artefacts that serve to concentrate the collective minds at key integrative stages. The first of these is the original script on which the Director, Assistant Director and Set Designer first

used to structure the play and to which they brought their ideas. This was a script intended for ‘devised theatre’, a form of performance that invites and relies on improvisation and the ongoing contribution of the actors, directors and choreographers involved, such that each becomes a unique performance. Devised theatre is therefore aligned with the practice of using boundary objects, since “Boundary Objects may provide informational support but denote no intrinsic meaning. They are in this sense, empty vessels to be filled with whatever is the preferred local beverage.” (Sapsed and Salter, 2004: 1519).

Following the script stage, the next significant milestone is marked with another key boundary object: the white card model. This is the Designer’s first prototype model of the set, which he shares with all the company staff and contractors working on the show. All the interviews referred to the importance of this pivotal moment. For the designer it is “a really important stage to sell the idea and get everybody excited”. For the Sound Designer it is an opportunity to meet the technical team and talk through how the sound would be projected greatly facilitated by the card model with its structures and parameters clear in a 3D physical form. This seemed to be a transition point from the Set Designer’s mind to the boundary object, which could then be internalised in the mind of the other practitioners, “And all I wanted to do was just have it in my brain, have the set so I could just think.” [Sound Designer]. Similarly, for the Producer, the white card model is “not a surprise” but an opportunity to “get a real sense” of the set.

The white card model as boundary object needs to be flexible enough to allow the input of the other practitioners, but fundamentally to retain core ideas of the Set Designer and the Director. Importantly “trying to keep technical who have to build things” [Designer] is an imperative as there is a clear cost estimate function in the white card model meeting for the Production Manager and Company Manager perspective. The model gives them the information they need to cost-up the design for sound, lighting, costumes, props, scenery, transport and staffing. The design and the budget are both typically adapted. In this show, for example, the Company Manager insisted on cutting an effect of Alice simulating flying in the performance from the tech gallery across the stage, which would add an estimated £15,000 onto the budget. The Designer later produces a colour model box, a second iteration taking into account the suggestions and revisions from the white card model.

These boundary objects help to communicate the parameters and needs of the various departments. The designer described his greatest challenge as an inability to communicate ideas in his mind, and so he needs to *make* them, to reach beyond the limits of language. Once the models are made, the ideas can be absorbed and processed internally and through the organisation so that the production can be made by the collective: "We make the show together in the room" [Stage Designer].

Use of analogue versus digital technologies

It becomes clear that theatre practice is complex and interdependent project work, preferring face to face meetings, making material bespoke artefacts, and deploying boundary objects of a more material nature to stimulate personal interaction. What are the implications of this craft-orientated, heavily-localised work organisation for the adoption of digital technologies? For example, one could ask why not use a 3D Computer Aided Design model rather than the white card model? This would save time in that the physical models need to be built, which can take a week, while a digital model could be shared instantly, rather than requiring travel to attend a co-located meeting. A digital model could be commented on at distance, instantly revised and restored in real time. Despite the disadvantages, the interviews revealed a deep belief in face-to-face communication and that while digital models can be useful "ultimately it has to exist in the real world" [Production Manager], and a physical prototype that the team can walk around and touch is a more satisfactory indicator of its feasibility.

Following this detailed, on-the-ground study, we learn more about the challenges facing policy-makers and those seeking to promote digital technology use in performance arts. In terms of the materiality literature the case shows how organisational processes match the material base, and the difficulty is executing a shift from a handicrafts-orientated material base, with organisational practice that relies on physical work and presence, to a digital-orientated material base, with as yet unestablished work and communications practices. An example here is the attempted introduction of 'Go-Pro' cameras to be harnessed on actors during rehearsals, so as to generate digital content from the actors' viewpoints to be used for innovative digital promotion of the show. The wardrobe department found the harnesses to be cumbersome and an added aggravation to their already time-pressured task of changing actors' costumes in seconds. This is not resistance to the marketing opportunity, but rooted in physical processes, of fabric and bodies and personal interchange, all focused on timings and

presentation of storytelling to an audience. The company resolved to drop the idea for the current show and consider in future productions how to plan-in technologies at a sufficiently early stage in the sequencing of stage management.

The matrix below illustrates how there will be challenges in moving from one material base to another, not only for the necessary technical learning and updating but also the organisational processes and sequencing that are associated with them. Many organisations find themselves in the top-right quadrant, trying to implement new digital technology, without reviewing the organisational processes to match. Little wonder that organisations may fall back to the top-left quadrant in order to deliver on their core objectives. The entwining between the technical and the social as observed by sociomaterial theorists has a practical reality. The implication for the digital agenda lies in the bottom-right quadrant, and the need to review process with technology concurrently, not as easy as business as usual, but achievable and better to unlock the affordances of new technologies.

	Material base continuity	**Material base innovation**
Organizational process continuity	Easy	Highly challenging
Organizational process innovation	Challenging	Challenging but achievable

As regards the apparent digital laggards label, theatre practitioners are not Luddites and recognise there are weaknesses to some traditional work practices. It could be suggested that it is the craft sensibility itself that we have set out that opposes digital technology adoption, in spite of McCullough's arguments that digital tools may enhance craft sensibility. This may be a partial explanation yet we would also refer to the fundamental reliance on direct communication of theatre from its earliest times: between the players and the audience. We suggest that this extends to Performance Arts organization, and this partly explains the reticence from theatre workers to adopt these tools because of a scepticism over mediated communication. There is recognition of the power and affordances of new technologies but

these must fit with theatrical sensibilities, not reduce the amplitude of communication and never be applied for their own sake. Any policy initiative or management practice should recognise these sensibilities, or may do damage to stagecraft, and more likely would be avoided.

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