Ubimus contributions to digital creative practices (Editorial)

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EDITORIAL

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Recent advances in ubiquitous music (ubimus) research unveil the emergence of polarities that may foster ways of supporting diversified musical practices. These trends were already present in the transition from first-wave to second-wave ubimus initiatives and have been identified as poles of attraction. Currently, these intersections may have incorporated enough know-how to stand as emerging frameworks. This editorial attempts to identify emerging threads that connect the contents of this special volume to the ongoing initiatives of the ubimus community.

We can characterize the development of ubimus as a research concern in two waves. Its beginnings, the first wave, were focused on an expansion of the vision of ubiquitous computing to music, with special interest in the study of creativity as expressed within the field. Dominant were ideas related to mobile technologies, network interaction, the worldwide web, as well as their applications toward cooperative, participative and open musical activities. Built into the work were the concepts of computing technologies receding to the background and allowing users a more natural and intuitive handling of music-making. These views and ideas were expressed clearly in (Keller, Lazzarini, and Pimenta 2014), which features a good summary and survey of first-wave ubimus. As the group of researchers and projects began to diversify, we observe a second phase of development, which may be characterized as a constellation around the original themes of ubimus. In this second wave, we see an expansion of research into various areas such as psychology, acoustics, signal processing, music education, computational thinking, the internet of musical things, emphasizing the expansion of do-it-yourself and maker communities. A representative development of second-wave ubimus is the edited collection by Lazzarini et al. (2020). This body of emergent approaches leads to a continuous redefinition of what ubimus aims to study. Efforts such as this special edition contribute to expanding these frontiers.[1]

A persistent discussion among ubimus practitioners involves the difficulties to define a field that does not rely on a fixed set of resources and is not constrained by established musical idioms or styles. In fact, a key characteristic of second-wave ubimus trends is aesthetic pliability, encompassing frameworks based on computational and ecological thinking (Keller and Lazzarini 2017; Otero et al. 2020) and highlighting artistic and educational endeavours grounded in communities of practice (Lima et al. 2017). As attested by the frictions among approaches that attempt to tackle diverse musical knowledge, ubimus flexibility of means and ends defies adopting a fixed definition. Consequently, *ubimus may be understood as a creativity-led research practice or as a movement rather than as a delimited set of techniques.*[2]

To engage with higher-level descriptions of ubimus practice, second-wave ubimus initiatives may be grouped around three targets as components of creativity-oriented research: ways of thinking, ways of designing and ways of deploying. Defying classifications aligned

to musical genres while simultaneously providing support for extant artistic categories, ubimus infrastructures for artistic practice feature a push-and-pull dynamic motivated by the requirements of both legacy music-making – such as networked music performance (Mills 2019) and acoustic-instrumental formats – and proposals geared toward distributed creativity and interaction.

Ways of thinking and ways of designing: the push and pull of ubimus practice and infrastructure

Musicians have criticized the acoustic-instrumental perspective for many years, pointing to the distributed nature of musical creative processes (Keller 2000), to the increased disengagement from hierarchical musical thinking in improvisatory contexts (Lewis 2000) and to the heterogeneous nature of musical time management when music is freed from the fixed score (Bhagwati 2013). All these aspects are incompatible with musical interaction understood exclusively as 'instrument playing'.[3] Distributed interaction is a fairly recent concept in computer science (Bardram 2012; Buxton 2013) prompted by the current lack of a fixed relationship of 'one stakeholder, one activity, one device' adopted by device-centric thinking.

Thus, musical infrastructure and practice are not always aligned and are not driven by a uniform agenda. For this reason, and complementing the easy-going 'negotiations' proposed in the context of ubiquitous computing (Dourish and Bell 2011), ubimus researchers have paid special attention to emergent social frictions. Socially motivated design metaphors may unfold in layers, sometimes prompting adaptations from the stakeholders to explore the creative potential of fresh resources – a case in point are the musical activities linked to social-media platforms (Radovanović 2022). Other times, exploratory music-making pushes for changes in the design strategies, as illustrated in the development of distributed-

interaction techniques prompted by a decade-long lag between the spearheading applications of distributed creativity in music and a push for deployments of support infrastructure based on ecosystems, exemplified in mobile, web, DIY practices, embedded hardware, analogue computing and IoMusT (Lazzarini et al. 2020).

In line with distributed-interaction demands, recent proposals in technological design are starting to emphasize the dynamic relational properties of resources and stakeholders in an effort to develop resilient approaches despite the fast rate of replacement of devices and the heterogeneous tendencies of post-2020 computing (Lazzarini et al. 2020). Consequently, the technological ecosystems of ubimus are in continuous change. For example, a decade ago we saw the emergence of mobile computing as a means for the expression of music by non-experts, supporting non-trivial musical activities from an everyday creative perspective (i.e., little-c music). In the intervening years, these technologies have receded to the background, incorporated as another tool for music-making alongside others such as web-based technologies and DIY/Maker techniques. To achieve resilience, support for these practices need to be agile. Faced with the fast-moving changes in technological means, how resources are developed, implemented and delivered, whether they are adopted or not, we need to move toward forms of design that react and adapt to emergent social demands.

To summarize, ways of thinking and designing for ubimus practice are shaped by local factors – opportunities for action and limitations determined by material, cognitive and socially grounded resources – and are also influenced by extrinsic factors – motivations, goals and deterrents that include legacy infrastructure as well as socially motivated barriers. To circumvent these barriers, ubimus research strives to avoid the demands of genre-specific musical training or the use of resources that tend to foster a divide between an elite of musically able

stakeholders and a large population of passive consumers. Unveiling the impact of these factors may yield a more focused picture of the specific contributions of technology to creative digital practices. By furnishing critical tools to gauge the evidence gathered within community-oriented artistic endeavours, second-wave ubimus may help to avoid the myth of 'creativity exclusively driven by technology'[4].

Ways of deploying: expanded temporalities and semantics-based strategies

A challenging aspect of creative music-making is how to plan and evaluate the emerging ways of deploying musical experiences. Collaborative music-making by means of ubimus ecosystems tends to encourage meaningful aspects of engagement, while avoiding some of the negative byproducts of online social exchanges. Despite this positive outlook, more work is needed on this front. For instance, when deploying ubimus technology in spaces that were previously considered out of bounds for public interactions, such as domestic settings, unexpected problems may emerge. How to deal with boundaries in privacy and intimacy as opposed to designs that target public exposure is one of the challenges faced by the emerging initiatives in domestic ubimus.

Another promising research thread triggered by post-2020 creative practice points to issues arising from the non-verbal exchanges enabled through synchronous and asynchronous resource sharing, particularly when synchronous face-to-face interaction is not an option.[5] Acoustic-instrumental practices built around fixed scores enforce centralized decision-making and linear organization of time. Ubimus research fosters alternative techniques for knowledge-sharing, encompassing expanded temporalities and the usage of semantics-based strategies.

Ubimus ecosystems let the stakeholders deal with their sonic resources through the organization of temporalities rather than through the imposition of metre. Time tagging is a creative-action metaphor that uses local acoustic cues to enable decision-making (Radanovitsck et al. 2011). Graphic-procedural tagging employs selected visual features of found imagetic resources as triggers for musical actions (Keller, Miletto, and Otero 2015). The tool *Playsound.Space*[6] uses sonograms to complement the support of semantics-based selection processes (Stolfi, Milo, and Barthet 2019). The creative-action metaphor *sound sphere*[7] provides a combination of color-coding, tones of grey and airport-style abbreviations of semantic cues to furnish parametric handles for mixing activities on its virtual sphere (Bessa et al. 2020; Simurra et al. 2023).

Consequently, genre-specific variables such as latency and jitter tend to lose relevance when considered in the context of ubimus expanded temporalities. A flexible approach to sonic organization may help in tackling issues that have gained salience in post-2020 creative practice. Reduced physical mobility, lack of face-to-face physical interaction and avoidance of crowds are all detrimental factors for the acoustic-instrumental ways of music-making. As an alternative to the legacy approaches to musical interaction, ubimus frameworks enhance the designers' ability to deal with time-based information without constraining the application within specific musical-genre features.

The four strategies just discussed – the metaphors time tagging, graphic-procedural tagging and sound sphere, and the tool Playsound.Space are compatible with various creative resources while remaining open to varied musical materials. For instance, Stolfi, Milo, and Barthet (2019) support the usage of any sound class available on the audio repository Freesound. Both time tagging and sound sphere let the participants use their own sonic materials. Graphic-procedural tagging relies

on the extraction of visual features from found images.

It may be argued that an aesthetically pliable perspective on musical interaction does not necessarily foster refined developments in creative music-making. We tend to agree that the European 19th-century ideals of individualistic self-expression, instrumental virtuosity and the notion of art-making as an activity tailored exclusively for an elite of geniuses are not priorities of ubimus endeavours. These notions are perfectly compatible with designs based on digital musical instruments, networked music performance or other chamber-music formats. Hence, these legacy practices are well served and will continue to inform the commercial music industry. The ubimus emphasis on aesthetic pliability envisions supporting design initiatives that explore emergent forms of social interaction which lie beyond the standard division of labour between composers, performers and audience enforced by the acoustic-instrumental legacy.[8]

Ubimus approaches to information sharing

Despite an increased flexibility to tackle musical time, some ubimus projects require the usage of domain-specific information. For instance, scoring is an instrumentally oriented strategy that has been expanded to deal with various forms of representation. Scores can be rendered on-the-fly and do not need to be restricted to standard common-practice notation. As exemplified in graphic-procedural tagging, some scores may repurpose found images (Keller, Miletto, and Otero 2015). This usage points to the potential integration of any material resource as a target for scoring, including food (Rosales 2022).[9]

A caveat of score-based strategies for collective decision-making is the requirement of domain-specific knowledge from untrained participants. Subtle musical information, e.g. parametric timbral characteristics, may be delivered by means of semantics-based strategies such as ASC (*creative semantic anchoring* – Simurra et al. 2023). ASC proposes the deployment of verbal or textual resources as a strategy to share musical knowledge.[10] Hence, it may be understood as a computationally expanded usage of natural language within the context of creative activities. Another strategy often adopted by ubimus practitioners involves the visual rendering of sonic information, as exemplified in Playsound.Space (Stolfi, Milo, and Barthet 2019).

Given a persistent tendency to employ scoring as a musical information-sharing mechanism, the applicability of visual scores may show restrictions across two dimensions: openness and scalability. The former refers to the qualities of sonic resources that are supported by the ubimus ecosystems. The latter points to the ability of the infrastructure to expand the quantity of resources. Several ubimus projects have addressed aspects of openness by supporting various types of materials (all the examples discussed above give liberty to the stakeholders regarding the amount, size and type of sonic resources) and by expanding the available strategies for collective decision-making. Scalability remains as a potential barrier both for geographically distant stakeholders and for handling massive quantities of resources.

Functional fixedness – or the tendency to repeat choices or procedures during a creative activity – has been observed when casual participants are faced with the task of choosing among a large collection of items. A similar problem, compounded by the difficulty of predicting sonic outcomes, is often triggered by systems that offer flexible parametric layouts. A standard approach to handle these issues is the adoption of presets, or prepackaged choices of configurations. Presets are useful shortcuts that may furnish ready-made solutions to untrained participants, providing fast access to choices that are well-suited for stringent casual-interaction contexts. Though, blackbox

solutions are hardly effective when the aim is to share know-how. More research is needed to address these caveats. Good starting points are provided in this volume by the concepts of *musical stuff* and *media multiplicities*. We will address these contributions below.

Given the variety of factors affecting the processes of decision-making in musical activities, such as the changes in local conditions (Aliel et al. 2023; Koszolko 2022; Roddy 2023; Thomasi 2023), or the introduction of uncertainty through computational means (Aliel et al. 2023; Thomasi 2023), or the shared agency among human and non-human stakeholders (Barros, Freire, and Costalonga 2023; Roddy 2023), the visual weight of scoring practices may force the exclusion of some ways of deploying that are gaining importance in second-wave ubimus artistic endeavours. Consequently, in parallel with the expanded notions of temporality we may be heading toward more relaxed strategies of information-sharing that target other layers of meaning beyond just mapping musical activities through visual representations. These strategies also need to tackle contingencies caused by the changes in local conditions, as exemplified by the creative-action time tagging and by the practice of outdoor live sampling.

Summing up, ubimus frameworks support two key enablers for musical information sharing and production: expanded temporalities and semantics-oriented interaction. The use of flexible temporalities releases the stakeholders from the grip of metric-based systems, reducing the design's reliance on common-practice notation and encouraging the exploration of both digitally generated and tangible resources in the context of collective creative activities. Complementarily, semantics-oriented strategies incorporate both sonic and contextual information that can be readily shared among stakeholders bypassing instrumentally oriented codification.

Despite its potential to facilitate group musical endeavours, semantics-based interaction also presents some caveats. The participants need to speak the same language. This requirement is not limited to semantics-based frameworks, it also applies to all creative-coding languages that demand knowledge of English (cf. Messina et al. 2021 for a critical perspective on this issue). Taking into account that native English is less common than Mandarin, Spanish, Hindi or Arabic, it is difficult to argue for its adoption as a metalanguage for music-making across all cultures. Choosing spoken languages as conduits for collective aesthetic decision-making may enable alignments on broad aspects of design. But this strategy may fall short when trying to address culturally specific traits. This is an intriguing area of investigation that will certainly be expanded by future contributions from Asian and African ubimus practitioners.

Ubimus and the Internet of Musical Things

A recent development in ubimus research is the emergence of the Internet of Musical Things (Turchet, Essl, and Fischione 2020). This area of investigation overlaps with other work in the Internet of Things (Borgia 2014), networked music performance (Rottondi et al. 2016) and human-computer interaction (Rowland et al. 2015), to cite but a few.

Turchet and co-authors (2018) define the IoMusT as a set of protocols, networks, ecosystems, and musical things supporting the production of services, content, and activities of musical nature within physical and digital environments (or a combination of these). Central to this is the concept of the *musical thing*, a device capable of acquiring, receiving, and processing data to serve a musical purpose. Examples of these are smart instruments, mobile devices and wearables. In the context of IoMusT, musical things are significant in that they enable ubiquitous music activities.

An important line of research in ubiquitous music has to do with communication

technologies. Various techniques furnish support for networked resources (Pimenta et al. 2014), which may take place between multiple human actors, in combination with partially autonomous systems. While basic IoMusT technology can be considered to be already in place, for example, by means of wireless sensor networks (WSNs) (Dargie and Poellabauer 2010) and associated IoT technologies (Borgia 2014), specialized aspects of the synchronous dimension of musical activities still pose a challenge to networked interactions. The challenge involves the provision of ultra-low latency and a high level of reliability in the communication channels, which is still missing in commonly available IoT wireless communication protocols. The ideas developed under the so-called tactile internet (Aijaz et al. 2017; Maier et al. 2016) offer a possible way forward, but these still need substantial breakthroughs to satisfy the realtime and high audio-quality requirements of typical IoMusT usage. These aspects are discussed by Visi, Basso, Greinke, Wood, Gschwendtner, Hope and Östersjö in this issue – *Networking concert halls, musicians, and interactive textiles: Interwoven Sound Spaces.*

Further developments also need to take into account the mounting social pressures for more resilient, secure, sustainable and pliable infrastructure. IoT resources are increasingly incorporated in activities and settings that are potentially disruptive. Consider, for instance, domestic ubimus. Private homes constitute ideal scenarios for deploying IoMusT-based tools. As suggested by recent approaches to human-computer interaction, multiple potential problems may arise: Should researchers encourage these deployments without extensive studies on their impact on the privacy and well-being of the stakeholders? Should the expansion of computational means take precedence over concerns on health, communality and the preservation of local cultural values? The next section provides a glimpse of emerging aspects of home-oriented ubimus

practice that could eventually be enhanced or discouraged depending on the preliminary evaluations of the support infrastructure with particular emphasis on their cultural impact.

Gastrosonics

Mesz, Sakdavong, Silén, Hopia (this issue) – *Aesthetic Emotions in a Mixed Reality Multi-sensory Experience with Food Crossmodally Matched to Music and Visuals*– provide a short overview of gastrosonics, pointing to various ubimus projects that have explored the creative possibilities of handling music and food through technological means. The authors underline the differences between gastrosonics and sonic seasoning, stating that 'the latter refers specifically to perceptual [and] cognitive aspects of eating or drinking in the presence of sound'. One thread of this emerging field is closely related to the area of human-food interaction. Human-food interaction focuses on the techniques developed to support gastronomic activities through computational means. Aligned with second-wave approaches to human-computer interaction, the emphasis of this area has been utilitarian. But given the diverse and widespread cultural traditions of food handling as an artistic practice, a natural development could involve a fusion between creative music-making and creative food preparation and consumption. This is what ubimus authors envision as gastrosonic research, pointing to the unexplored combinations of various modalities of gastronomic and musical experiences and to undocumented aspects of cultural heritage tied to the synergies of activities involving food and sound.

The gastrosonic experiences documented in the present volume – reported by Mesz et al. in *Aesthetic Emotions in a Mixed Reality Multisensory Experience with Food Crossmodally Matched to Music and Visuals* – involve the exploration of a combination of extended

reality with material resources. Participants were invited to eat cheese and drink wine while interacting with a realistic virtual-reality display (condition 1), or they were given warm jalapeño cheese or cold menthol-chocolate samples (condition 2). Cheese consumption was matched to sounds that tried to elicit pleasantness, creaminess and softness, through sonic parameters corresponding to consonant, soft and legato events. The chocolate tasting was synchronized to breaking ice and crunchy-textured sounds. The visuals featured imaginary landscapes.

Mesz et al. apply a procedure of evaluation of aesthetic effect by assigning semantic labels to emotions. Most of the evaluations yielded positive outcomes, ranging from delight or interest to intellectual stimulation. Contrastingly, negative emotions were almost absent. The results of the first condition (realistic display) and of the second condition (imaginary landscapes) were very similar. The only aesthetic dimension that yielded a significant difference was surprise. This contrast was attributed by the authors to the unfamiliar characteristics of the imaginary landscapes. Given these initial positive results, more work is needed to untangle the aspects related to crossmodality. In particular, the lack of negative emotional outcomes places a question mark on the method. If the data obtained tends to be only positive, it may be the case that other semantic dimensions are needed to assess the complete range of multimodal aesthetic experiences.

Designing ubimus frameworks for post-2020 digital creative practice

As discussed in the first section of this editorial, ubimus research involves at least three areas of interest, encompassing ways of thinking, designing and deploying creative resources. These three targets are not necessarily aligned and may demand specific frameworks to address, on the one hand, the material requirements of multimodal musical experiences and, on the other hand, the cognitive and social factors that shape our understanding of music-making.

An area investigated in this volume is the convergence of score-based distributed music-making as related to the ubimus approaches to flexible musical time-management (Visi, Basso, Greinke, Wood, Gschwendtner, Hope and Östersjö, in this issue – *Networking concert halls, musicians, and interactive textiles: Interwoven Sound Spaces*). A potential dialogue between these two threads is boosted by scoring techniques that relax the restrictions inherited from common-practice music notation (Bhagwati 2013). Decentralized scores open the door for ubimus applications of distributed interaction. As crystallized in the notion of temporalities, ubimus designs may incorporate scoring by deploying musical information through pliable material resources (exemplified in the usage of e-textiles in this project). Textiles, printed artifacts, recycled images, or solid and liquid food may potentially be converted into creative surrogates for multimodal information sharing (Keller, Miletto, and Otero 2015). These resources require strategies tailored to establish consistent systems of reference across modalities. This area demands field studies to understand how organized sonic information is impacted when the stakeholders' access to shared information is limited by deficiencies in infrastructure, by lack of a shared cultural background or by misalignments in social expectations regarding either the settings or the resources. These issues become particularly salient when the targeted communities are located in peripheral territories and when the settings include private locations (cf. discussion on domestic ubimus above and Visi and coauthors' proposal).

As previously stated, the Internet of Musical Things provides a viable platform to incorporate IoT resources in ubimus activities. A complementary concept to the musical thing was introduced by Fraietta, Bown, and Ferguson (2020), i.e. *media multiplicitie*s. The authors

describe their strategy as 'data points and variable parameters [that] can be strategically mapped or bound using aliases, data types and scoping as an alternative to flat address-structured mapping.' They argue that the ability to send and access complex data types as complete entities rather than as lists of parameters promotes data abstraction and encapsulation. Furthermore, data structures can change during the life cycle of a computer-based musical activity. Hence, a goal of the media-multiplicities construct is to foster greater flexibility and resilience through the adoption of modular architectures.

An example of the deployment of this entity is the multimodal installation documented by Mikolajczyk, Ferguson, Candy, Pereira Dos Santos and Bown in this volume – *Space Shaping in the Design Process for Creative Coding: A Case Study in Media Multiplicities*. The complex requirements of a full-blown artistic project are explicit in their description of the methods. An interesting feature of their design process is the need to adjust the artistic decisions to the material constraints encountered during the construction and deployment of the installation's technological components. This is exemplified by the need to change the shape of the planned sculpture from a sphere to a cylinder. In this case, the motivations were practical: Providing access to the sculptural elements to enable both their construction and technical adjustments. Also, emerging artistic demands may trigger structural changes, impacting both the material and the digital components of the projected designs.

Working units, such as media multiplicities, that support abstraction and encapsulation make sense for ubimus goals. The ability to adjust the properties of the digital resources to the evolving artistic demands of a creative project seems to be a basic requirement of ubimus infrastructure. Interestingly, when situated in the context of the history of digital music-making, this idea stands out as unintuitive or exotic. As musicians, we have become used to handling fixed entities such as instruments, orchestras, notes or scales that eventually deliver yet more fixed objects, i.e. musical artworks.[11] These fixed entities were eventually formalized through hierarchical ontologies, such as those constructed around sound objects (Kane 2007). Hence, proposing a working unit that changes properties depending on its history of interactions with the creative stakeholders is, to put it mildly, weird.

Oddly enough, this is exactly the line of reasoning followed by Messina and coauthors in their contribution to the ways of conceiving ubiquitous music featured in this issue – *Disruptions, Technologically Convergent Factors and Creative Activities: Defining and Delineating Musical Stuff*. Their goal, shared by other ubimus endeavours, is to avoid excluding any genre or any potentially useful creative resource. Electronic music practices provide several examples of strategies that were not adopted in central countries but that remain important as historically unique design contributions.[12] There are also applications of techniques that despite their widespread adoption have yielded consistently trite results (autotuning and looping are examples that immediately come to mind). Thus, a proposal such as media multiplicities is aligned with the type of entities envisioned by Messina et al., with properties that are flexible and untokenizable,[13] hence resilient to attempts to turn them into commercial objects. They call them *musical stuff* and define them as 'a phenomenology of pliable entities that enable distributed creative activities, deployable on the musical internet.' The authors discuss a set of intrinsic dimensions of musical stuff, including territoriality, viscosity-fluidity, rivalry and persistence-volatility. These dimensions provide design handles for sonic-information resources that can be employed during creative activities. Thus, for instance, rivalry is a characteristic of resources that lose value when shared. Contrastingly, nonrivalrous resources can be freely

shared without impacting their creative value. The authors also tackle the usage of semantics-based strategies, such as ASC, in creative processes that involve volatile resources.

Creative digital activities of the post-2020 era present increasing challenges to the extant music-research frameworks. Thinking, designing and deploying resources for music-making entail the incorporation of multiple approaches and an intense dialogue across disciplinary boundaries. The four proposals showcased in this volume unveil a complex profile of concerns that come into play when we consider second-wave ubimus tendencies. These tendencies indicate, on the one hand, the persistence of established musical genres – such as networked music performance – and of legacy practices – such as scoring and the application of IoMusT resources within instrumental genres. On the other hand, they also point to boundary-breaking developments involving the incorporation of everyday settings and everyday activities in creative music-making, as exemplified in the domestic-ubimus initiatives featuring gastrosonics. The artistic output documented by these projects defies the established ways of musical thinking, unveiling fluid, dynamic and culturally situated concepts that suggest the emergence of cracks in our understanding of post-2020 creativity.

Notes

1. We are aware of the difficulties of tackling research without the adoption of a treatise, of closed boundaries or of an explicit alignment to an aesthetic trend. Our suggestion for artists that need such grounding to develop their work is to pick up any 20th-century music theory or any well-defined music genre.
2. See the proceedings of a recent ubimus event for multiple examples (https://www.ulster.ac.uk/conference/ubimus).
3. Multiple examples of interaction design built within the constraints of acoustic-instrumental thinking can be found in events such as New Instruments for Musical Expression (later modified to "interfaces").
4. An interesting outlook on digitally oriented creative performance is proposed by Webb and Layton (2023:, 16): "1.'Try again. Fail again. Fail better'(Samuel Beckett). Ignore instruction manuals and how-to guides. Learning through playing, experimenting, and failing is far more productive and rewarding. 2. Embrace the glitches and ghosts in the machine. Like 'real' performance, digital liveness is full of potential mistakes and mishaps. 3. Collaborate with others. Working digitally means you can connect with anyone, any-where (sic) and for free. 4. Do not wait! Work with what you have. Construct your own studio. Make your own green screen. Experiment with positioning desk lamps, webcams, and smartphones to create new effects. Creativity is more important than the 'best' technology. 5. Take your time - create slowly with reflection. Making digitally does not have to mean creating quickly. Take hold of technology and use it at your own pace; do not let technology take hold of you."
5. A subtle change in emphasis from *knowledge transfer* to *knowledge sharing* is an ongoing experimental question of recent ubimus projects. This change is prompted by a wider adoption of dialogically oriented practices (Lima et al. 2017) in ubimus design. Some musical genres, such as networked music performance, are well served by centralized decision making. This is not the case in practices such as ubimus comprovisation (Aliel et al. 2023).
6. http://playsound.space.
7. http:soundsphere.com.br.
8. Emerging ubimus frameworks carry various political implications regarding the adopted principles on sharing, agency and the flow of know-how. This discussion falls outside of the scope of the key topics of this volume.
9. *Taste this score* (Rosales 2022) employs a video score that features visual textures of food, proposing the use of textures that capture the micro-qualities of each dish as material to be mapped onto musical parameters to enrich the eating experience.
10. In computing parlance this type of interaction is usually labelled as *natural language processing*.
11. A point to be stressed that falls beyond the scope of this editorial is the emergence of

creative practices within ubimus that do not rely on the artwork as a required musical byproduct. One example is everyday musical creativity (Keller 2020).

12. Take, for instance, Fernando Von Reinchenbach's *Catalina*, a graphics-based analogue synthesis controller developed in 1966. https://proyectoidis.org/fernando-von-reichenbach/

13. *Untokenizable* is applied to entities that cannot be turned into tokens, thus they cannot be assigned monetary value.

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