

# Enculturation and Value Encoding in the Design of Vocal DMIs

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**Abstract—** This paper considers enculturation in vocal DMI design. Two points of inquiry propose further examination of how values and assumptions from HCI and musical practices are encoded in the design of DMIs.

**Index Terms—** voice tech, design, culture, value, bias

## I. INTRODUCTION

External assumptions, sociocultural norms, bias, and misconceptions influence digital musical instrument (DMI) design and, consequently, musical practice itself [1]. Technology design, Human Computer Interaction (HCI), music pedagogy, and general social practices have their own embedded cultural norms. Whether intentionally or unintentionally, such norms and assumptions are incorporated in design. This enculturation—the way in which norms are adopted according to the views, values, and priorities of a particular group—and its manifestation is seen in vocal DMIs. For instance, assumptions about tactile control and valuation of particular musical pedagogies are encoded in novel interaction design.

These cases suggest future work to: (1) negotiate different value sets from converging cultures, and (2) challenge norms and bias in music technology design. This provides a point of inquiry for designers and artists to identify, exploit, and subvert assumptions in the development and use of DMIs.

## II. ENCULTURATION IN VOCAL DMIs

1) *The Role of Gesture in Vocal Interaction:* Enculturation arising from deep-seated HCI practices influences vocal DMIs. The history of vocal DMIs demonstrates a strong emphasis on tactile and hand-based gestural control for vocal synthesis [2]. Although other physiological and gestural inputs are available [2], there exists a pervasive belief that tactility and the ability to “touch” the voice provides more expressive control. This arises from existing digital development practices in broader HCI, which can (over)emphasise tactility as a dominant design input method for “refined control” [3].

Vocalisation itself is largely unlinked with movement of the upper limbs. Yet, vocalists are able to execute precise expression utilising somatic awareness [2]. Although tangible interaction is important, other modalities also comprise vocal and other experiences in music interaction. This includes auditory feedback, proprioceptive and interoceptive attention to the body’s positioning and internal movements [2, 3], and imaginative processes [3]. These can often be overlooked as a result of tactile-dominant design practices [3, 2].

2) *Encoding Ideals from Vocal Pedagogy:* Enculturation also occurs via traditional practices and pedagogical methods. Pre-

vious work explored how designers’ lived experience and conceptualisation of their voice—derived from existing standards in a particular musical culture they have been trained in—become encoded in a DMI [2]. This can cause tension when another user does not share this understanding [2], and can position particular vocal practices as more desirable.

This value encoding, left unacknowledged, can also reinforce sociocultural and colonial biases, such as the perceived superiority of Western classical music over other traditions [1]. Similarly, the design of vocal DMIs can further enmesh social power dynamics already imported to performance cultures [1]; for instance, developing breath-based vocal wearables brings into question the influence of social norms and expectations about women’s bodies in DMI design practices [4].

## III. QUERYING ASSUMPTIONS AND FUTURE WORK

These cases of enculturation in vocal DMIs show how cultural norms (e.g., from HCI and music pedagogy) can influence technology design and use. Two further questions and areas of exploration arise for DMI design and use:

1) *How can we negotiate between different cultures and their respective value sets?:* Tensions arise between pedagogical conceptualisations and novel interaction methods. Likewise, performance practices might adhere to cultural ideals, while contemporary approaches favour subversion of norms and innovation. This requires addressing existing practices, such as favouring hand-based gestural interaction, and their origins to be clear about the values we encode in technology.

2) *How can we acknowledge and challenge inherent bias?:* Social norms pervade anything humans do and we must be vigilant of how this plays out in our work. Challenging norms can provide valuable artistic query and novel approaches. As well, undermining harmful sociocultural bias, such as expectations about bodies and power dynamics present in artistic cultures, requires new approaches to interaction and design goals, providing a new line of research for DMI designers.

## IV. REFERENCES

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