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Aesthetic Approaches to Digital Pedagogy in Arts Education

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Abstract

This article examines the unique intersection of knowledge that occurs in the digital arts learning context. The knowledge shared has emerged from the author's practice as a teaching artist designing and delivering an immersive and interactive intermedial arts learning experience in the field of physical theatre entitled Creature Interactions: an interactive workshop. Building on Mishra and Koehler's TPACK model for technology integration in learning contexts, an adapted model for conceiving and understanding technology integration in arts learning is proposed, TPAACK. The revised model presented acknowledges the primacy of aesthetic knowing and affect in arts encounters and its intrinsic presence in arts learning across any domain; digital or analogue.

Introduction

Harnessing and integrating technology for learning is a critical issue across all areas of education. The hasty transitions to online and digitally driven learning during the COVID-19 pandemic revealed deficits in educators' knowledge and skills in digital pedagogy. Arts educators were not immune to this lack of preparedness. In spite of warnings from leading arts educators (Anderson, 2005; Booth and Taylor, 2016; WISE, 2015), many arts teachers resisted technology integration based on arguments related to the aesthetics of live, embodied, in-situ experience. Resistance by arts educators is in direct opposition to learners' desires, with learners seeking "more diversity in their learning experiences, and would like schooling to give more space to new technologies and creativity, curiosity or collaboration" (W.I.S.E., 2020). In the face of the changed post-pandemic educational landscape and the desires of students, it is timely to take a more considered approach to technology integration in arts education. A technology integration that is informed and meaningful is called for, as opposed to the rushed and experimental approaches seen during the COVID-19 pandemic. It is important to note that there is a distinction between a technology driven experience and a technology integrated experience. This article offers an adaptation of Mishra and Koehler's TPACK model (2006) for conceptualising and enacting technology integration in arts learning that has been generated through the experiences of designing and delivering an intermedial arts experience for children aged five to eight years. The understandings presented build upon the TPACK model, which is considered best practice for technology integration in learning contexts (Martin, 2015; Millen & Gable 2016; Nelson, et. al., 2009).

Context

The knowledge shared in this article has emerged from the author's practice as a teaching artist designing and delivering an immersive and interactive intermedial arts learning experience in the field of physical theatre entitled *Creature Interactions: an interactive workshop*. The experience, a co-production between Queensland Performing Arts Centre and Stalker Theatre, blended interactive digital media and arts learning into an immersive intermedial workshop experience for children. Central to the experience was the experiential and pedagogical design and facilitation of the workshop, which was conducted by the teaching artist-researcher. The understandings captured in this article are equally applicable to arts teachers and teaching artists facilitating digital arts learning experiences.

Creature Interactions entailed a workshop featuring an immersive 360-degree environment involving an 11-metre-high digital rendering of an Australian bush landscape created by researchers at University of Technology Sydney's *Creativity and Cognition Studios*. Infrared cameras captured the movement of participants and trigger points were coded into the interactive environment, allowing participants to move and change the environment, making

this technology a perfect vehicle for a physical theatre learning experience. *Creature Interactions* represents a significant undertaking in the integration of technology with arts learning by fusing the expertise and knowledge of teaching artists with the digital tools created by technology designers. Further, the interactive workshop has proven itself a successful technology integrated arts learning experience. With multiple successful seasons nationally and internationally as an immersive interactive arts experience for young audiences, the work aims to promote embodied artistic thinking while educating about Australia's environment.

Research Design

The research presented here was conducted across two seasons of *Creature Interactions*; Brisbane 2016 and Shanghai 2019. The premiere season in Brisbane consisted of 19 forty-minute workshop experiences over 11 days. The second research cycle occurred in Shanghai with eight workshops over four days. Data collection occurred through audio visual recordings of workshops, reflective journals and interviews with teaching artists delivering the workshop, technology designers and key production staff associated with the project, in addition to the tacit understandings generated in and through the creative practice. The insights and perspectives of the creatives working on the workshops (director, technicians, production staff and intern teaching artists) are communicated in this article and thickened by the observations and experiences of the researcher who also participated in the workshop as lead teaching artist across the two points of data collection.

Creature Interactions offers a site for investigating the affordances of technology and arts learning, a growing field of practice. Specifically, the research sought to answer two research questions: 1. What occurs at the intersections of teaching artist and digital technology? and 2. How do the practices of the teaching artist contribute to arts learning experiences in the digital context? Integral to a fulsome examination of these questions was the researcher's understanding of the TPACK model.

What is TPACK?

TPACK is an acronym for technological, pedagogical, and content knowledge, which posits a conceptual model for the use of technology in general education contexts. TPACK offers insights into how "the relationship between technology and teaching transform[s] the conceptualization and the practice of [teachers]" (Mishra & Koehler, 2006, p. 1019). Mishra and Koehler, the creators of TPACK, assert that content knowledge, pedagogical knowledge, and technological knowledge must no longer be treated as "separate bodies of knowledge". Instead, they promote the necessity of the "complex interplay of [the] three bodies of knowledge" (2006 p. 1025) depicted in the model below (Figure 1). Each of the requisite

fields of knowledge are over-lapping and interconnected with TPACK sited in the central field, representing the intersection, synthesis and ultimate transformation of three knowledge fields: technological, pedagogical and content knowledge—into an elevated mode of learning. The model “emphasizes the connections, interactions, affordances, and constraints between and among content, pedagogy and technology” (Mishra & Koehler, 2006, p. 1025). TPACK is a unique body of knowledge that goes beyond mere integration or accumulation of the constituent knowledge bases, toward transformation of these contributing knowledge bases into something new (Angeli, et. al. in Herring, et. al., 2016, p. 26).

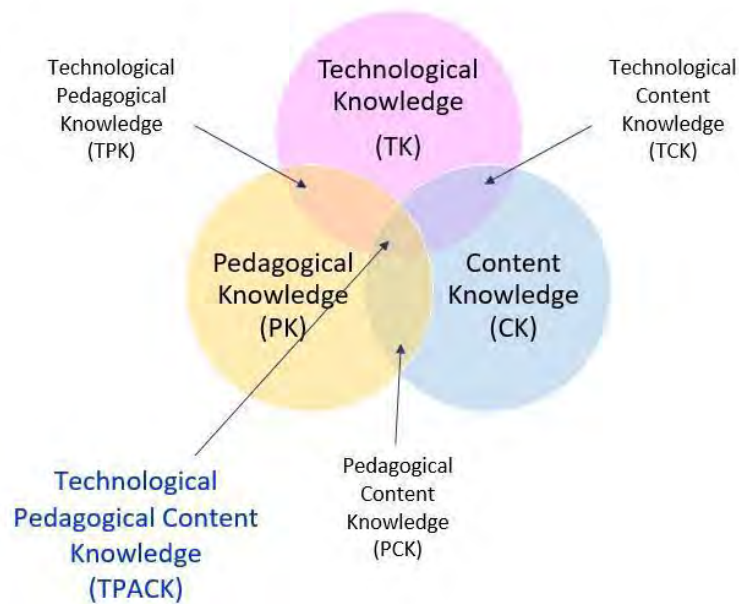


Figure 1. TPACK Model (Mishra & Koehler 2006).

Significant to this article is the notion that TPACK has aspects that are “domain-generic and others domain-specific” (Herring, et. al., 2016, p.25). Specifically, there is acknowledgement that the model needs to be applied contextually. That is, the model needs to reflect discipline specific subject matter, valued ways of working and pedagogies. In short, educators working in different disciplines will need to develop different TPACK bodies of knowledge and flexibly navigate the space defined by the three elements of content, pedagogy, and technology and the complex interactions among these elements in specific contexts (Mishra & Koehler in Herring et. al., 2008). Recognising the domain specificity of TPACK’s operation led Mishra and Koehler to raise questions about the application of the model to specific domains of practice (such as music, drama and dance). Suggesting,

[I]t would be very informative and valuable to consider the specificity of TP[A]CK

within domains, where affect plays an important role in teaching and learning, such as, for example, the fine arts (i.e., music, drama, and dance), an area of research that has not yet been systematically pursued. (Mishra & Koehler in Herring, et. al., 2016, p. 25)

It should be acknowledged that researchers such as Macrides and Angeli (2018a; 2018b; 2020) have examined the application of TPACK in music education, but other artforms have largely been left unaddressed in academic literature. The research presented in this paper offers a response to the question raised by Mishra and Koehler regarding the TPACK's operation in arts learning experiences sited in the field of drama education. *Creature Interactions* provides a site where greater understanding about the operation of TPACK in an arts learning 'domain' can be generated.

Technology and Arts Learning

Technology is an integral part of the arts landscape and 'newer arts' driven by technology have a direct impact on young people's lives (McLean, 2009, p. 113). Through arts experiences involving technology, "young people explore identities and forge reconfigurable alliances and cooperatives in real and virtual spaces to produce creative works" (Cameron, et. al., 2017, p. 25). The digital arts learning experience, *Creature Interactions*, which produced the knowledge shared in this article could certainly be considered a 'newer arts' experience, centered around artistic exploration and learning in an immersive digital environment. A critical learning that emerged through the development and delivery of *Creature Interactions* was the importance of understanding the difference between a technology driven experience and a technology integrated experience as proposed by the TPACK model (Mishra & Koehler, 2006). The TPACK model is widely acknowledged as a best-practice model for learning with and through technology (Martin, 2015; Millen & Gable 2016; Nelson, et. al., 2009). Achieving an arts learning experience that integrates technology and realizes TPACK was challenging, but ultimately provided the most fulsome experience for participants, which will be discussed further during this article.

Many theorists posit views about technology's role in the arts generally, and these have informed the understandings shared here. Wiggins views technology's role in art as creating a "doorway in" (2015, p. 70). Digital arts encounters frequently feature "input and interaction from the computational tools and platforms [requiring participants to] 'work' together to produce the creative experience" (Cameron, et. al., 2017, p. 12), which provide opportunities for rich and varied learning in and through the arts. Jones, et. al. (2015, p. 6) suggest technology transforms the material base of creative products, altering processes of production and consumption, which challenges existing arts practices and opens up the possibility of new forms such as the intermedial workshop featured in this article. New forms that emerge

through enacting and building upon models of technology integration such as TPACK.

Affect, Aesthetics, and Technology Integration

Art is a broad category under which a spectrum of distinct activity occurs, often with little in common at a surface level. Yet the categorisation of art is one which humans can readily recognise. This may be in part because there are recognisable qualities embedded in art and arts practice. Dewey (2005) highlighted the role of affect and aesthetic experience as integral components of art, a view supported by other theorists (DeCoursey, 2018; O'Sullivan, 2001; Schubert et. al., 2016). Affect is linked to feeling “moments of intensity, a reaction in/on the body” (O'Sullivan, 2001), and in the case of art, feeling generated through an arts encounter. Affect is central to art-making, according to Gilles Deleuze, who suggests “artists are presenters of affects” (1994, p. 175). Building on this, Iseminger (2018) asserts that art's function is based in aesthetic communication and the fundamental criteria for a work of art is its aesthetic quality. Abbs describes aesthetic experience as “simultaneously perceptive, affective and cognitive” (1987, p. 55), drawing affect and aesthetic operations together. A consensus exists to suggest that affect and aesthetic experience are viewed as integral to art making, and intimately connected in arts experience. As a result of the inextricability of affect and aesthetic engagement from art, Mishra and Koehler's speculation and suggestion for investigation about their impact on the operation of TPACK in technology integrated arts learning experiences would appear to have merit. To understand the impact of affect and aesthetic experience, *Creature Interactions* with its blend of arts learning and interactive, immersive technology provides a site to explore the operation of TPACK in the arts learning domain.

Creature Interactions: A Case Study in Technology Integration

Creature Interactions offers a unique site where the teaching artist (pedagogical knowledge), art form (content knowledge) and technology (technological knowledge) intersect. This intermedial physical theatre workshop afforded an understanding of the unique capacities of each actor in the TPACK model. The workshop is conducted in an immersive environment where digitally interactive projections surround the participants and soar to heights of 11 metres. It is important to understand that the teaching artist facilitating the workshop controls the projections. They are in control of when projections appear, how they appear, the order of the scenes and interactive objects, and the sensitivity of the trigger points. In short, the workshop moves through a series of digitally interactive scenes that are dramaturgically delivered by a teaching artist. Throughout the workshop, the teaching artist is making moment by moment pedagogical decisions (pedagogical knowledge) relating to the delivery of the workshop, its form and the integration of the technology. Neither the teaching artist or children are passively experiencing the technology; they are working with it and exploring its

capacities through the artistic skills of physical theatre (content knowledge). Due to the interactive nature of the work, no two workshops can be identical. Participants and the technology will offer new ways of engaging and interacting with each other that the teaching artist must manage and catalyse into a fulsome arts learning experience that sits in the central field of the TPACK model; a balanced synthesis of art, pedagogy and technology.

The act of synthesising knowledge fields creates transformed knowledge (TPACK), but in doing this, the knowledge fields must cohere in a balanced fashion. The constituent fields of knowledge must be combined in the correct ratios to achieve a fulsome arts learning experience. The over or under-representation of a constituent field can weaken the end product. To achieve balance, the teaching artist must exercise epistemic fluency. Being epistemically fluent “requires the combination of different kinds of specialised and context-dependent knowledge, as well as different ways of knowing” and respect for different ways of knowing about the world (Markauskaite, 2017, p. 1). In line with this view, epistemic fluency also requires recognition, on the behalf of the teaching artist, of their own epistemic biases and frames of reference that may prevent this synthesis. The teaching artist must identify the epistemologies at play, then seek and resolve gaps in knowledge. From here, the teaching artist can move between and synthesise fields of knowledge. Through exercising epistemic fluency, the teaching artist bridges gaps in knowledge and engages a unified language, accommodates multiple perspectives and ultimately draws the epistemic fields together into a new transformed knowledge.

Balancing and Other Acts of Epistemic Fluency

Creature Interactions was a work that experienced discernible creative development to reach its final form. The initial attempts at delivering a ‘balanced’ workshop were unsuccessful, but interventions during the mid to latter part of the first season in conjunction with continued development prior to the second season produced more successful and predictable workshop outcomes. Early in the workshop development, technology dominated and the teaching artist felt hampered by a lack of agency. Specifically, the scale and spectacle of the digital projections coupled with what could be described as too much choice and self-direction, overwhelmed the young participants (aged 5-8 years). In terms of TPACK, there was a clear failure in its development, the emergent TPACK field where the interactive projections (technological knowledge), arts pedagogy (pedagogical knowledge) and physical theatre skills (content knowledge) synthesise and transform into new knowledge (TPACK) did not eventuate. To achieve balance in the workshop, the teaching artist put in place enabling constraints. The notion of a constraint that enables may appear paradoxical, but the reverse is true. Enabling constraints serve to promote increased creativity (Haught-Tromp, 2017; Manning & Massumi, 2014; Medeiros, et. al., 2018; Torrents Martin et al. 2015) and engagement with the workshop by reducing the solution set for a task, but still allowing scope

for individual responses and agency (Bix and Witt, 2020).

Enabling constraints in *Creature Interactions* were pedagogic scaffolds injected into the workshop. The initial enabling constraints were added during the Brisbane season with additional scaffolds included for the Shanghai season to further strengthen the workshop form. Specifically, a series of inquiry cycles and a process drama form were used as enabling constraints in the workshop. Both of these pedagogic interventions are compatible with the art form knowledge being explored in the workshop.

The enactment of enabling constraints in the workshop produced a discernible change. Where the technology had dominated, a space was created where arts skills (movement skills and artistic inquiry) could be brought into focus. Further, as the arts skills were promoted in the workshop a significant observation was made by the creative team, “Empathy seems to have arrived in the room”. Where the children had previously clumped and moved in packs marking territory and excluding other children from their play, there was a shift. They listened to each other, they were keen to share ideas with other children, and they respected each other’s space and took turns. The creative team termed this empathy, but it could also be termed affect and indicates a turn toward what Dewey would term the essential quality of art experience, aesthetic engagement. A shift in the affective domain occurred with the addition of scaffolding in the form of enabling constraints. The changes allowed participants to simultaneously engage cognitively, through the senses (perceptively) and affectively which are essential conditions of an aesthetic experience (Abbs, 1987). The teaching artist drew upon knowledge of technology, art form and pedagogy as suggested by the TPACK model (Thompson & Mishra, 2007), but another type of knowledge seemed to be at play and influencing the affective domain; aesthetic knowledge (McLean 1995).

Aesthetic Knowledge

Aesthetic knowledge is intimately connected with artistry and understanding how to promote aesthetic experiences where participants undergo a sense of immersion and consummatory quality of experience (Dewey, 2005). The aesthetic domain is concerned with art form and its affective function rather than just propositional knowledge. Observations from a creative working on *Creature Interactions* highlighted two important conditions that came about after the addition of the enabling constraints; 1.) artistry was present and 2.) it was about the artist in the space. These two observations highlight the centrality of artistic experience, but also signal the ephemerality of the encounter and the unique treatment required to ensure the actions are catalysed into an aesthetic experience for participants. The teaching artist had to rely on their artistic instincts and hunches, also described as performative competence (Ulvund, 2016) or intuitive index (McLaren, 1988), to unify the affective, cognitive and sensory aspects of the experience into a coherent whole. The addition of aesthetic knowledge

to the workshop allowed the artistic aspects of the work to develop. Aesthetic knowledge relies on “a personalised and complex understanding of “the nature of the aesthetic experience” used to “facilitate what it means to engage with the aesthetic” and tap into participants’ “felt experiences” (McLean, 1996, p. 60). A producer who observed the workshop made an insightful observation, the added constraints “quietened people” and allowed “them to be able to actually surrender and connect to the immersion”. These words directly link to Dewey’s (2005) descriptions of aesthetic experience, which entails a movement through phases; inception (immersion), surrender and perception. By ensuring a balance of the knowledge fields involved in TPACK, the teaching artist was simultaneously creating a space for empathy and a potential aesthetic experience. Aesthetic theorist Peter Abbs (1994) suggests that “the first concern in arts teaching is to establish a frame in which genuine aesthetic engagement can be released; the second is with the rooting of aesthetic response into the field of the relevant artform” (p.63). The enactment of enabling constraints allowed space for the aesthetic instincts of the teaching artist to function, reframing technology from driving the workshop to an integrated state within an arts learning experience.

An intern teaching artist working on the workshop reflected that the rebalanced workshop repositioned her “relationship to the technology” synthesising the once overwhelming interactive digital projections with the other aspects of the workshop, “the technology is almost just a pre-text, a backdrop for our artistic and social learning together... A context for learning”. This was also echoed by another intern teaching artist who suggested that technology is integral to the emergent meaning of the workshop, “You have one meaning without technology, but with technology there’s new meaning for that thing”. The suggestion here is that when technology synthesises with the other fields of knowledge, it creates “new meaning”. The field in which this new meaning is generated suggests the presence of TPACK—or perhaps something more when we take aesthetic knowledge into account.

A central feature of this transformed workshop was the presence of empathy, which suggests the presence of the affective domain and aesthetic knowledge on behalf of the teaching artist. An intern teaching artist observed that technology was used as a tool to deepen the aesthetic encounter, giving participants “an aesthetic thing to go off but then their imagination allows them to go deeper”. Technology here is being used as an aesthetic tool, repositioning it from a place where it dominated, to one that coheres with the totality of the workshop to develop an aesthetic experience. With the addition of enabling constraints and attendance to the aesthetic domain, the technology, pedagogy and artform synthesised into a coherent package where the participants were seeing the technology as more than a game or a gimmick, but engaging emotionally, cognitively and kinaesthetically with the technology, committing to the simulated environment and using artistic skills to manipulate the projections. This aesthetic

transformation was seen in the ‘nightscape’ scene of the workshop.

The nightscape scene locates participants high in the tree canopy and features an over-sized moon. In the early workshops of *Creature Interactions* when technology dominated and the teaching artist struggled to balance the knowledge fields, the presence of the moon distracted the children and immediately triggered unfocused behaviour. This shifted when the teaching artist produced a more balanced workshop through the use of enabling constraints. The teaching artist transformed the scene by drawing on aesthetic instincts, by controlling the reveal of the scene further and seeding the artistic inquiry for children carefully before the transition to the nightscape. The teaching artist cued a scenic transition by saying “At night different animals come out”. This cued the projections to pan upwards through the foliage to the tree tops and an over-sized moon rose on the horizon. The more balanced and controlled transition now elicited a different response from the children; they immediately, without prompting started to mime climbing trees while other children would soar like fruit bats or scurry as possums. Despite the distracting spectacle of the moon, the children were able to connect their artistry to the stimulus provided by the technology. Here the aesthetic shaping of the learning experience allowed for a more balanced synthesis of the knowledge fields and arts learning could flourish inside the TPACK field.

It is evident that it is possible to successfully apply the TPACK model (Mishra and Koehler, 2006) to an aesthetic experience. That is, teaching-artists simultaneously apprehend and manipulate their technological knowledge with their pedagogical knowledge, deep understanding of artform skills (content) and aesthetic practice. Further, when these four knowledge fields synthesise, new knowledge and understanding is formed that is more complex than TPACK, instead the addition of aesthetic knowledge to the model creates a new central field: TPAACK.

Accounting for the Aesthetic: TPAACK

The TPACK model, as it is defined by Mishra and Koehler (2006), offers a partial explanation of the requisite knowledge fields at play in technology integrated arts learning experiences, but fails to account for the aesthetic knowledge integral to the creation of an aesthetic experience which is an intrinsic aim for art of all kinds. Mishra and Koehler, architects of the TPACK model had themselves queried if the TPACK model had application in aesthetic domains such as the fine arts and the evidence generated in the creative development of *Creature Interactions* responds to their prompt.

The transformation of the learning experience generated by the attendance to and development of the aesthetic domain in this critical incident suggests that their hunch is correct. Affect and more specifically, the aesthetic domain makes a unique contribution to the integration of technology in arts learning. I suggest that in the context of the arts, another

intersecting field be added; that is aesthetic knowledge (See Figure 2).

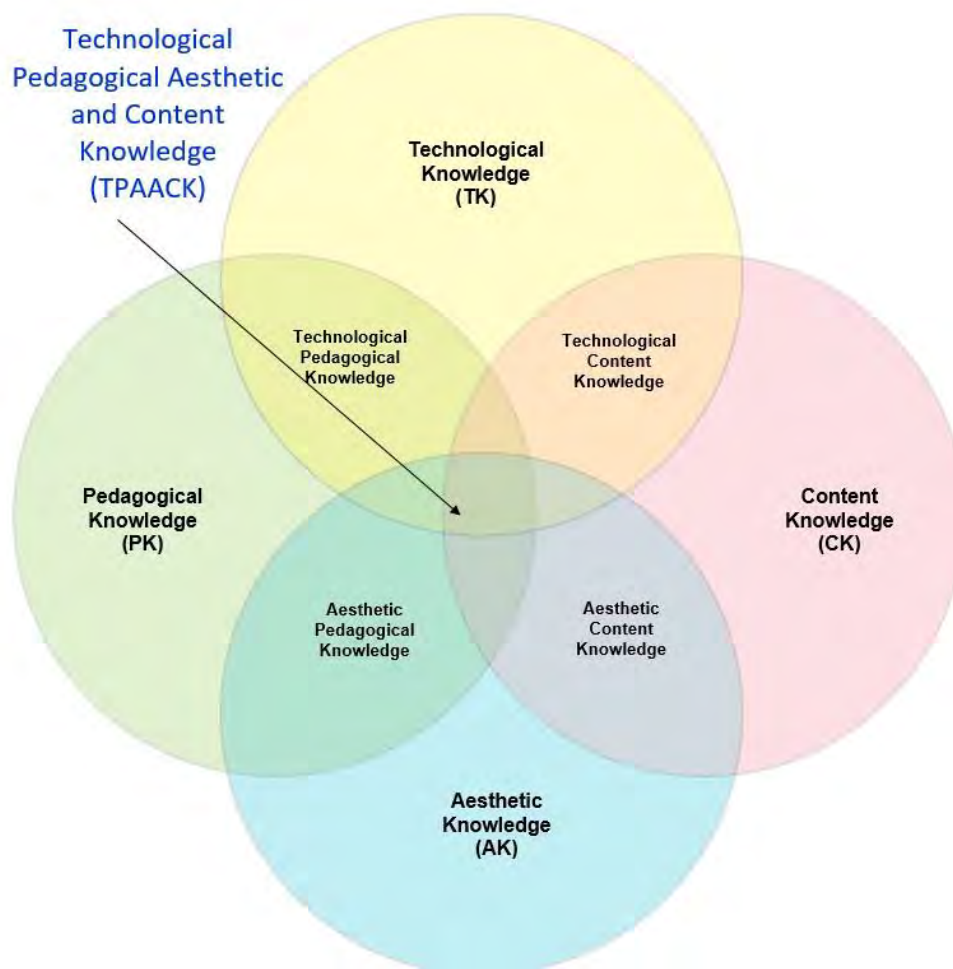


Figure 2. TPAACK Model (Adapted from Mishra & Koehler, 2006).

The addition of the field depicting ‘Aesthetic Knowledge’ is an acknowledgement of the unique conditions of art making and arts learning which feature the affective domain. The expanded acronym for technology integrated arts learning is TPAACK. The central field of the TPAACK model transforms the requisite fields of technological knowledge, pedagogical knowledge, content knowledge and aesthetic knowledge into a new and distinct way of understanding the world. This view asserts the criticality of including the aesthetic dimension. Like TPACK, the mere presence of the requisite knowledge fields is not enough to call forth the optimal state that is the represented by an integration and transformation of these fields into new knowledge (Angeli, et. al. in Herring, et. al., 2016). Langer might suggest that the learning experience itself is transformed in to an artwork where the components create the “illusion” of a unified indivisible whole, bringing together form and feeling (Langer, 1953, p.

66). Rather than an integration, in the new TPAACK model all knowledge is entangled. This echoes the work of Barad who presents the notion of entanglement as emergent, where there is, “an ongoing responsiveness to the entanglements of self and other, here and there, now and then” (Barad, 2007, p. 394). This requires a solid foundation of knowledge (technological, content, pedagogical and aesthetic) from which to confidently read the room and recognise the emerging opportunities for learning, then catalyse these opportunities into rich arts learning. This re-framing of TPAACK highlights the emergent nature of the work, suggesting that the entanglement of the intra-action generates a new mode of thought in action. TPAACK only exists when the requisite knowledge fields transform into a new understanding featuring aesthetic experience.

TPAACK challenges arts educators to balance, weave and catalyse the unfolding cognitive, affective and sensory engagement of participants into the form of an aesthetically-driven arts learning experience. This cannot occur in the absence of a conscious attendance to and use of teaching artist’s aesthetic knowledge to synthesise epistemic fields while tapping into participants’ “felt experiences” (McLean, 1996, p. 60). In the practice of *Creature Interactions*, aesthetic knowledge was evident when the teaching artist tapped into their artistic intuition to inform decisions inside the workshop form. Specifically, this was seen in the artists’ pedagogical and artistic choices; knowing when to ask a curious question, when to offer a more advanced movement, when to pair children together and offer a new challenge. This was seen during a workshop frame (a projected scene) featuring projected interactive ‘wire frame’ animals (see Figure 3). The teaching artist balanced children’s interactions with the technology, movement skills and other children. Here aesthetic knowledge was required to ensure that participants were not frustrated by other children’s interference while interacting with projections, or bored when they discovered how these projections worked. After the initial curious engagements, the teaching artist paired children up or drew them into teams, and challenged them to work as teams to see if they can use their bodies to “*lift the animal up high*” or “*create a whirlpool*”. These challenges set by the teaching artist seeded new ways of moving with the projections and others, activating artistry. Here, aesthetic understanding was critical in ensuring that the participants experienced a fulsome digital arts learning experience.

In the context of *Creature Interactions*, affect, the senses and cognition are recognised as central to aesthetic ways of understanding the world: aesthetic knowledge. Aesthetic knowledge requires the teaching-artist to simultaneously foster and manage perception, affect and cognition while attending to the phases of aesthetic experience. The teaching-artists are thus the “connective thread that tie the [work] together somatically, emotionally, and physically” (Bowditch et. al., 2019, p. 21) and technologically. The addition of the aesthetic knowledge to the TPACK framework allowed the teaching-artist to explicitly attend to the participants’ aesthetic experience, generating stronger engagement and experimentation with

movement and the technology, ultimately improving the arts learning experience through a “unity of experience” (Langer, 1953, p. 126).



Figure 3. Creature Interactions: Workshop scene featuring interactive ‘wire frame’ animals; Image credit: Darren Thomas and Stalker Theatre.

Conclusion

Arts learning presents a unique set of knowledge that is fundamentally concerned with aesthetic understanding and affect. Aesthetic knowing holds primacy in arts encounters and is present in arts learning across any domain; digital or analogue. When technology and arts learning intersect, a complex field of interacting knowledge is created which requires skill on behalf of the arts teacher/teaching artist to unify the knowledge fields into a coherent whole. This coherent whole requires a careful balancing and negotiation of the requisite knowledge fields to create a unified learning experience: TPAACK. TPAACK expands Mishra and Koehler’s TPACK model to include the fundamental quality of art and arts experience: aesthetic knowledge. Synthesising the requisite knowledge fields of TPAACK is complex and challenging as arts teachers/teaching artists navigate the emergent qualities of the aesthetic domain and its intra-action with other domains of knowledge. The central field of the TPAACK model transforms the requisite fields of technological knowledge, pedagogical knowledge, content knowledge and aesthetic knowledge into a new and distinct way of

understanding the world through a unified technology integrated arts learning experience.

References

- Abbs, P. (1987). *Living powers: The arts in education*. Falmer Press.
- Abbs, P. (1994). *The educational imperative: A defence of Socratic and aesthetic learning*. Falmer Press.
- Anderson, M. (2005). New stages: Challenges for teaching the aesthetics of drama online. *Journal of Aesthetic Education*, 39(4), 119-131. <https://doi.org/10.1353/jae.2005.0035>.
- Barad, K. M. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. Duke University Press.
- Bix, S. and Witt, P. (2020). Introducing constraints to improve new product development performance. *Research-Technology Management* 63(5), 29–37, <https://doi.org/10.1080/08956308.2020.1790238>.
- Booth, E. & Taylor, J. (2016). *A new framework for understanding the field of artists who work in education and community settings*, LCE Summer 2016. Lincoln Center Education/Teaching Artist Development Lab.
- Bowditch, R., Casazza, J., & Thornton, A. (2019). *Physical dramaturgy: perspectives from the field*. Routledge.
- Cameron, D., Wotzko, R., & Anderson, M. (2018). *Drama and digital arts cultures*. Bloomsbury Publishing. <https://doi.org/10.5040/9781472592231>.
- DeCoursey, M. (2018). *Embodied aesthetics in drama education : theatre, literature and philosophy*. Bloomsbury Academic. <https://doi.org/10.5040/9781350026742>.
- Deleuze, G. (1994). *What is philosophy?* Columbia University Press.
- Dewey, J. (2005). *Art as experience*. Perigee Books.
- Haught-Tromp, C. (2017). The green eggs and ham hypothesis: How constraints facilitate creativity. *Psychology of Aesthetics, Creativity, and the Arts* 11(1), 10–17. <https://doi.org/10.1037/aca0000061>.
- Herring, M., Koehler, M., & Mishra, P. (2008). *Handbook of technological pedagogical content knowledge (TPCK) for educators*. Routledge for the American Association of Colleges for Teacher Education.
- Herring, M. C. M., Mishra, P., Koehler, Matthew J. (2016). *Handbook of technological pedagogical content knowledge (TPACK) for educators* (2nd ed.). Routledge.

- Iseminger, G. (2018). The aesthetic function of art. In *The aesthetic function of art*. Cornell University Press.
- Jones, C., Lorenzen, M., & Sapsed, J. (2015). *The Oxford handbook of creative industries* (C. Jones, M. Lorenzen, & J. Sapsed, Eds.; First edition.). Oxford University Press.
- Langer, S. K. (1953). *Feeling and form: A theory of art*. Charles Scribner's Sons.
- Macrides, E., & Angeli, C. (2018a). Domain-Specific Aspects of Technological Pedagogical Content Knowledge: Music Education and the Importance of Affect. *TechTrends*, 62(2), 166–175. <https://doi.org/10.1007/s11528-017-0244-7>
- Macrides, E., & Angeli, C. (2018b). Investigating TPACK through music focusing on affect. *Campus-Wide Information Systems*, 35(3), 181–198. <https://doi.org/10.1108/IJILT-08-2017-0081>
- Macrides, E., & Angeli, C. (2020). Music Cognition and Affect in the Design of Technology-Enhanced Music Lessons. *Frontiers in Education (Lausanne)*, 5. <https://doi.org/10.3389/educ.2020.518209>
- Manning, E. and Massumi, B. 2014. *Thought in the act: Passages in the ecology of experience*. Minneapolis: University of Minnesota Press.
- Markauskaite, L. (2017). *Epistemic fluency and professional education innovation, knowledgeable action and actionable knowledge* (1st ed.). Springer Netherlands.
- Martin, B. (2015). Successful implementation of TPACK in teacher preparation programs. *International Journal on Integrating Technology in Education*, 4(1), 17-26. <https://doi.org/10.5121/ijite.2015.4102>.
- McLaren, P. (1988). The liminal servant and the ritual roots of critical pedagogy. *Language Arts*, 65(2), 164-180.
- McLean, J. (1995). *An aesthetic framework for drama education*. National Association for Drama in Education (Australia), Brisbane. <http://worldcat.org/z-wcorg/database>.
- McLean, J. (1996). *An aesthetic framework in drama: Issues and implications*. National Association for Drama in Education (Australia).
- McLean, J. (2009). *Lines of flight: Teacher-artists' stories about collaborating*. [Doctoral thesis]. Griffith University, Brisbane, Australia.
- Medeiros, K. E., Steele, L. M., Watts, L. L., and Mumford, M. D. 2018. Timing is everything: Examining the role of constraints throughout the creative process. *Psychology of Aesthetics, Creativity, and the Arts* 12(4), 471–488. <https://doi.org/10.1037/aca0000148>.
- Millen, R. A., & Gable, R. (2016). Closing the gap between technological and best practice

- innovations: TPACK and DI. *K-12 Education*. 33.
https://scholarsarchive.jwu.edu/k12_ed/33
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054. doi:10.1111/j.1467-9620.2006.00684.x.
- Nelson, J., Christopher, A., & Mims, C. (2009). TPACK and web 2.0: Transformation of teaching and learning. *TechTrends*, 53(5), 80-85. <https://doi.org/10.1007/s11528-009-0329-z>
- O'Sullivan, S. (2001). The aesthetics of affect: Thinking art beyond representation. *Angelaki : Journal of Theoretical Humanities*, 6(3), 125–135.
<https://doi.org/10.1080/09697250120087987>.
- Schubert, E., North, A. C., & Hargreaves, D. J. (2016). Aesthetic experience explained by the affect-space framework. *Empirical Musicology Review*, 11(3-4), 330–345.
- The World Innovation Summit for Education. (2015). *2015 WISE education survey: Connecting education to the real world*. https://www.wise-qatar.org/sites/default/files/asset/document/eng_inside-survey-201512.pdf.
- The World Innovation Summit for Education. (2020). *WISE global education barometer: Youth perceptions on their education and their future*. [wise-qatar.org/app/uploads/2020/01/wise19_etude_en_papier_210120_web_final.pdf](https://www.wise-qatar.org/app/uploads/2020/01/wise19_etude_en_papier_210120_web_final.pdf).
- Thompson, A. D., & Mishra, P. (2007). Editors' remarks: Breaking news: TPCK becomes TPACK! *Journal of Computing in Teacher Education*, 24(2), 38-64.
- Torrents Martín, C., Ric, Á., & Hristovski, R. (2015). Creativity and emergence of specific dance movements using instructional constraints. *Psychology of Aesthetics, Creativity, and the Arts*, 9(1), 65–74. <https://doi.org/10.1037/a0038706>.
- Ulvund, M. (2016). Supporting the performative and narrative competencies. In A. Berggraf Sæbø (Ed.), *International yearbook for research in arts education 4/2016: At the crossroads of arts and cultural education: Queries meet assumptions* (Vol. 4, pp. 141-152), Waxmann.
- Wiggins, Jackie. (2015). *Teaching for musical understanding* (3rd ed.). Oxford University Press.

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