Teachers' Perceptions of the Effective Use of Technology in the Teaching of Secondary Expressive Arts in Wales

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ABSTRACT

This paper presents teachers' perceptions of the effective use of technology in the teaching of secondary expressive arts in Wales during a significant period of enforced change, as a result of curriculum reform and pandemic restrictions. Through the use of semi-structured synchronous interviews, teachers' perceptions and thoughts of the effective use of technology in their teaching were collected. Inductive thematic analysis, and latent theme development, revealed several key themes. Purposeful use of the technology was identified along with the affordances of the technology in both COVID-19 and subject-specific contexts. Barriers to using technology suggest how the pandemic has reignited concerns about issues of access. The findings of this paper highlight shared creative processes within the Expressive Arts Area of Learning and Experience, and how teachers' perceptions of the effective use of technology within their specific subject-areas are shaped by a wider learning ecology within the Expressive Arts. Overall, the resultant model, labelled the Purpose to Outcomes (PtO) Process, highlights the perceptions and practical theories of Secondary Expressive Arts teachers in Wales when considering the effective use of technology within their teaching, including their specific subject-area, during significant curriculum reform and pandemic restrictions.

Key words: curriculum for wales, expressive arts, technology affordances, teachers' perceptions

https://doi.org/10.16922/wje.768

Introduction

As part of a national curriculum reform in Wales, the *Curriculum for Wales* (2022) contains six Areas of Learning and Experience (AoLE): Health and Wellbeing; Humanities; Languages, Literacy and Communication; Mathematics and Numeracy; Science and Technology; and the Expressive Arts. Although each AoLE is required to have 'an identifiable disciplinary and instrumental core' (Donaldson, 2016: 12), the Welsh Government (2020) identified five core subject areas that form the basis of the Expressive Arts AoLE, namely Art, Dance, Drama, Film and Digital Media, and Music. However, as Expressive Arts teachers begin to identify the 'connections' (Drake and Burns, 2004: 7) within and between their subject disciplines, government guidance has potentially lacked specificity with potential for disparities on local, regional and national levels (Robinson, 2022).

This study provided secondary teachers from the Expressive Arts AoLE with an opportunity to reflect on their perceptions of effective use of technology within their teaching, including the impact of the enforced 'digital transition' (Sandu and Taylor, 2024: 608) caused by the COVID-19 pandemic. This required teachers of all age groups to rapidly change teaching and learning techniques to accommodate online learning environments. Whilst the pandemic could have been viewed as an opportunity for practitioners to make rapid improvements to their digital confidence, research suggests that teachers often focused their COVID-specific technology usage on what was most comfortable or convenient (Rahiem, 2020). Thus, this study provides data to conceptualise the 'felt difficulties' (Dewey, 1933) of secondary Expressive Arts teachers' perceptions of effective use of technology within their teaching, and how this has been shaped by their experiences.

Literature Review

Curriculum for Wales, the Expressive Arts, and Creative Processes

Developing broad capacities and competencies to encompass what learners are required to be, and know, has been identified as a growing trend within education (Biesta and Priestley, 2013). Successful Futures (Donaldson, 2015) presented an

independent review of education provision within Wales. Responding to this report, Welsh Government introduced *Curriculum for Wales* (Welsh Government, 2015), replicating many elements in Scotland's *Curriculum for Excellence* (Scottish Government, 2004), which was also led by Donaldson, demonstrating the influence of 'transnational policy actors' in the context of education reform (Hulme, Beauchamp and Clarke, 2020: 498).

A key challenge in the new curriculum is to realise the potential for a shared creative process across the Expressive Arts (Chapman, Beauchamp and Griffiths, 2024), as subject areas have their own culture and content (Selwyn, 1999), resulting in potential barriers to cross-curricular collaboration (Hennessy, Ruthven and Brindley, 2005; Howard et al., 2015). This is still a growing strand of the existing literature, and this study therefore aims to provide insight into secondary school Expressive Arts teachers' perceptions of the effective use of technology in their practice, with a particular focus on the impact of Curriculum for Wales, the Expressive Arts AoLE, and shared creative processes.

Affordances of Technology and their Effective Use within Teaching

In order to use technology effectively, it is argued that teachers need to recognise the potential that a technology or technologies, alone or in combination, offer to their discipline(s). This potential for action is normally labelled an affordance, first highlighted by Gibson (1977; 1979). Allen and Otto (1995) refer to the effective use of affordances as 'effectivities'. Without realising an affordance and then acting on its potential (in the context of this paper, teachers utilising technologies effectively in their teaching and subject area), then the technology or technologies are not being used effectively. A key challenge for teachers is that affordances can be false and hidden (Gaver, 1991) and can exist regardless of a person's ability to perceive them (Ostern and Rosemann, 2021). Whilst affordance theory is largely understood within the fields of technology and teaching more broadly, there is less literature exploring the intersected fields of affordances, technology, and the Expressive Arts. Therefore, this study aims to provide new understanding of affordances within the Expressive Arts specifically, as well as reflecting on secondary school Expressive Arts teachers' perceptions and recognition of affordances within their use of technology in their practice in the aftermath of the COVID-19 global pandemic.

It is suggested that a teacher's ability to perceive an affordance can be limited by their professional development or digital confidence (Norman, 1988). It can also be influenced by circumstances. For instance, Rahiem (2020) discovered that teachers focused on needs-driven, rather than innovation-driven technology use during the COVID-19 pandemic (Dishon, 2022). Indeed, it will emerge below that needs often drove the discovery of new affordances as teachers struggled with the unprecedented challenges of providing education in a global pandemic.

The study draws on existing literature from the established field of affordance theory alongside the evolving fields of inquiry relating to *Curriculum for Wales*, the Expressive Arts AoLE, and the shared creative processes of the Expressive Arts. This results in a uniquely situated, intersected study that draws on existing theory and aims to provide contributions to under-researched area of interest. The study therefore examined the research questions:

> What are secondary school Expressive Arts teachers' perceptions of effective use of technology in their teaching during a global pandemic, and why?

Materials and Methods

Interviews were deemed to be the most suitable method for generating in-depth data about teachers' experiences, thoughts and perceptions, and these were conducted as an 'inter-view', described by Kvale (1996) as an exchanging and interchanging of views between both the participant and the researcher. As research suggests that technology-mediated interviews are convenient and can be more effective than in-person interviews in developing rapport and encouraging disclosure (Jenner and Myers, 2019), semi-structured synchronous interviews were completed via Zoom. In addition, the teachers had become very familiar with this type of technology during COVID restrictions. For the purpose of this study, only audio recordings were used so that participants could feel more comfortable to express themselves without fear of the visual elements of the Zoom call being used within the study (Gray et al., 2020).

The interview schedule ensured the following broad areas were discussed, with related sub-questions/prompts as required, as well as the freedom to explore new ideas as they occurred:

- Effective Use of Technology in Teaching
- Subject Specific Use of Technology in Teaching
- Professional Development Needs relating to Technology in Teaching
- COVID-19 Impact and Future Changes

The research employed non-probability, purposive, opportunity sampling methods to identify and approach potential participants for data collection. Participants were identified and contacted through the use of mediatory contacts and colleagues, with the remit of identifying Expressive Arts practitioners who are actively using technology in their teaching and learning. This enabled the study to approach potential participants who held an above average or 'expert' view (Chein, 1981). In the context of this study, the term 'expert' is used to acknowledge the selection of participants who possess particular expertise (Patton, 2002) in using technologies in the teaching of the Expressive Arts. In addition, the use of mediatory contacts ensured that the participants were not known to the researcher directly, mitigating any potential impact or bias on the collected data (Patton, 2015). The resultant sample, covering all subjects and roles within the Expressive Arts AoLE, are shown in table 1:

To ensure anonymity, respondents are identified by number (e.g. Participant 1 = P1) in this paper.

The aim of thematic analysis within this study was to 'identify patterns and meanings within data' (Finlay, 2021: 103) as a whole across the Expressive Arts AoLE. Therefore, demographical factors such as gender, age, and subject area were not explicitly analysed within the collected data. Instead, such factors were

Table 1: Sample

Participant Code	*Subject / Role*
P1	Film & Digital Media
P2	Expressive Arts
P3	Art
P4	Music
P5	Art / Head of Expressive Arts
P6	Art / Head of Expressive Arts

allowed to present themselves during initial inductive coding. As no significant differences or findings emerged, these factors are not discussed within the results and discussion. Where appropriate, however, findings relating to the subject area of each participant, and those common across multiple subject areas, are presented.

Ethics

Ethical approval was gained through university ethics procedures (name of HEI redacted 20202134) and participants were required to provide their informed consent before participating in the study (Sikes and Piper, 2011). Whilst online and face-to-face ethics are widely regarded as being very similar concepts (Lobe, Morgan and Hoffman, 2020), the recording of interviews and secure storing of files was accommodated by the use of password-protected, cloud-based storage (cf. Frankfort-Nachmias and Nachmias, 1992). Further, the use of online waiting rooms, password protection and other secure measures ensured that each interview was conducted in a private, synchronous call that maintained the anonymity and safety of each and every participant.

Analysis

All interviews were transcribed and an inductive process of reflexive thematic analysis was used to identify and develop both semantic and emerging latent themes. Braun and Clarke (2019; 2020) outline reflexive thematic analysis as being each researcher's individualised approach to data analysis. The use of inductive coding enabled analysis to be driven by the text (Krippendorff, 2013). However, it is acknowledged that pure induction was not deemed possible. As Braun and Clarke (2022) note, no attempt to remove or account for the prior knowledge or experiences of the researcher can be completely successful. Therefore, reflexive thematic analysis allowed any potential impact to be acknowledged, whilst attempting to maintain, as far as possible, inductive analytical processes. The reliability and trustworthiness in the thematic analysis process were developed through member-checking within the research team in the form of diagramming

(Nowell et al., 2017) an iterative form of the conceptual process development (Côté and Turgeon, 2005).

Results

The following technology and teaching-related themes were generated across the collected data:

- Purpose
- Creative processes
- Affordances of technologies
- Perceived effective use of technologies
- Action
- Outcomes
- Reflection-on-action
- Barriers

Each theme is exemplified below through the use of participant quotations and researcher interpretations to maintain validity and relevance to the original meaning conveyed by each participant (Patton, 2002).

Purpose

When discussing the perceived effective use of technology within their teaching, participants emphasised the importance of 'purpose' (P1) and attempting to provide a 'worthwhile learning experience' (P2). This was shared by the majority of the participants, whereby the perceived effective use of technology should be 'authentic' (P3) and not simply just 'ticking a box' (P6). One participant elaborated by stating that 'it's really important not just to think about using technology for technology's sake. What's actually really important is, does it enhance the learning?' (P2). P1 highlighted that teachers should not 'force something' or 'shoehorn something into the curriculum'.

Purpose was also related to the perceived benefits or effects of using the technology itself. P2 stated that 'technology for technology's sake' is not effective.

It was identified that technology should only be used when it enables learners or teachers to 'do something with technology that potentially they couldn't do in another way' (P6).

Creative Processes

The second stage in discerning effective use was how the technology could be used within the creative processes of each Expressive Arts subject-area. At this stage, the technology was not explicitly considered; rather a creative arts 'lens' was applied to the purpose. The majority of the participants referred to the terms 'appraising' (P4), 'performing' (P4, P5, and P6) and 'performance' (P3 and P4). Initially, this suggests a similarity with the creative processes of Music, namely 'composing, performing and appraising' (Beauchamp, 2010: 306). Participants elaborated on these processes and how they encourage learners to use 'technical language' (P1) or focus on 'artistic references' (P3), including when undertaking 'appraisal exercises, where we're listening, and identifying features and analysing music' (P4).

Whilst these concepts originate within the Music curriculum, as a specific subject-area (Major, 2008), the interviews suggest that these processes are shared more widely across the Expressive Arts AoLE. However, the results of this study make a key distinction between the terms compose and 'create' (P1–6) or 'creating' (P1, P2, P4, P5 and P6). Participants referred to several examples of how learners have the opportunity to create within their respective subject areas: 'creating compositions' (P4), 'create sort of paintings' (P6) and 'create the set' (P6). This was encapsulated by one teacher as the 'freedom to create' (P4) and acknowledges a wider conception of creative acts across the Expressive Arts AoLE.

It has been suggested that collaboration between subject-areas can be difficult to achieve (Selwyn, 1999; Howard et al., 2015). However, this study found that secondary teachers within the Expressive Arts found a common ground on which to build their perceived effective use of technology. The identification of creating, appraising and performing as Expressive Arts creative processes provides a response to what Donaldson referred to as 'an identifiable disciplinary and instrumental core' (Donaldson, 2016: 12) that was deemed crucial for each AoLE to identify in order to find effective ways of working in the future.

Affordances of Technologies

The teachers then specifically considered technology and how it could be used. Whilst teachers were encouraged to share their perceptions of effective use of technology beyond their experiences of the COVID-19 pandemic, the affordances of technology and their ability to perceive affordances were positively impacted by periods of online learning. This was simply acknowledged by one teacher, who outlined how 'teaching from home allowed you to see what was available' and that they 'would not have gone looking for it' (P1) otherwise. This suggests that the COVID-19 pandemic provided teachers with an opportunity to discover educational and creative affordances that they would previously not have had the chance to realise or act upon. This reinforces the notion that affordances can be dynamic, with the potential to move beyond Gaver's (1991) hidden category of affordances once teachers perceive them (Ostern and Rosemann, 2021).

However, it is important to acknowledge the dynamic nature of affordances and teachers' ability to recognise them. The findings of this study suggest that teachers require opportunities to reflect on their use of technology to ensure that potential affordances and perceived effective uses of technology can be identified and consolidated. As highlighted by one participant, it is important to focus on the positive experiences of online learning during the pandemic, and how these can influence future innovation and shape teacher perceptions:

> I returned back to the classroom and it's not going 'okay, that was, that's there. Now, let's move on. We're back to normal now' … I think we need to really take in that experience of those two lockdowns and really bring that into face-to-face teaching as well. (P4)

Perceived Effective Use of Technologies

After the teachers had identified the purpose of using technology, the creative processes in which it could be used, and the potential affordances of the technology that they wish to act upon, they have arguably developed a perceived 'effective use' (P1–6) or potential 'best use' (P1–6) of technology within their teaching. Overall, a wide variety of perceived effective uses were shared by the participants. These included video demonstrations, multimodal learning, cross-curricular collaboration, digital feedback, and assessment. The most significant

commonality between these perceptions was the importance of learner engagement, exemplified by P1 who stated 'I mean, the best use is when all the kids are engaged and all the kids are doing it. Okay. I think that that would be best use … when everybody's involved.'

One example in the data was the use of video demonstrations to enhance and broaden learning opportunities. These demonstrations can either by produced by the teacher themselves or accessed via online platforms such as YouTube. As P4 noted, for example, 'If I need to show an example of a piece of music, having YouTube to hand is an amazing resource.' However, the same teacher suggested that not all practitioners share the same perceptions about such resources, as 'some teachers frown and turn their nose, you know, at YouTube' (P4). It is the ability to 'pause', 'revisit' and 'rewind' (P2) the video that is regarded as significant, echoing Beauchamp and Kennewell's (2013) notion of interactivity. This was most clearly outlined by one teacher when discussing how videos can support learners who may struggle with learning, stating: 'a kid said, "I don't get that, sir." You know? Well, I just dragged the video back and said, "look at this bit again", you know, so it's great that there's a record there' (P3).

The perceived effective use of video demonstrations was first identified during online learning, such as 'I videoed myself so many times' (P5), and this practice continued once face-to-face teaching had resumed. For example, P5 reported that 'We did make, you know, a big bank of videos showing them demonstrating certain techniques and processes. So we could share those.'

Action

Another important stage in the process was for teachers to assimilate their perceptions of technology into their pedagogy, by moving from consideration to action. The most common aspect of this stage was the importance of accepting that when using technology 'things did go wrong, you did turn up and things didn't work' (P3). Therefore, it was acknowledged that teachers need to be 'quite careful about how you plan those things out' (P6) when preparing to use technology within their teaching and learning. Despite such caveats, each teacher emphasised the benefits of using technology and becoming more 'resilient' (P2) in the classroom, and espoused the general view that 'technology really does help to be part, I suppose, of your whole package, your teaching package' (P5).

Outcomes

Once the act of teaching and actively reflecting during lessons had taken place, the participants referred to the potential 'outcomes' (P3 and P6), 'benefits' (P3, P4, P5, and P6) and 'advantages' (P1, P3, P4, and P5) that resulted from their perceived effective use of technology. Generally, the perceived outcomes of using technology were linked to student understanding and how this impacted each teacher's evaluative processes. A range of benefits were perceived, including the increased engagement of learners, greater access to learning, equal opportunity to succeed, collaboration, and communication. It is important to note that, whilst the term 'outcomes' suggests a neutral consequence of using technology within teaching, the teachers in this study consistently indicated only positive results in doing so. The findings of this study suggest that the teachers would dynamically abandon, or alter, a perceived effective use of technology within their teaching if 'things did go wrong, you did turn up and things didn't work' (P3). This suggests that teachers felt empowered and demonstrated a willingness to experiment with the technology despite potential barriers when being implemented.

The engagement of learners was arguably one of the most significant outcomes highlighted by the teachers. They suggested that their learners were more willing to engage with the learning process as a result of using the technology, because:

> They're not doing it because they have to. They're doing it because they wanted to and they were creating great work. And you could see they were spending longer than an hour, than their allocated hour a week with me. (P4)

Improved engagement was a perceived positive impact of the use of technology during online learning and the COVID-19 pandemic. The effective use of technology to conduct synchronous and asynchronous learning, where teachers were available 'on speed dial' (P2) to learners, resulted in a greater motivation to learn outside of conventional lesson hours. Participants outlined the importance of openly communicating with learners and suggested that this practice could be continued during face-to-face teaching, such as 'I think it's the world we live in. I think it's amazing. The fact that we have the technology to be able to communicate that way' (P4). Such views echo the importance that the teachers attached to the role of technology in enhancing relationships during the pandemic, as part of a 'moral

imperative' to 'support children and their parents with additional teaching and learning resources' (Beauchamp et al., 2021: 14).

Another outcome specific to the Expressive Arts AoLE was the potential for technology to enable learners to access each of the creative processes and to have an equal opportunity to find success within their respective subject-areas. For instance, technology within the Expressive Arts provides all learners with the opportunity 'to succeed, and to achieve' (P4), even those who 'can't draw' or 'can't paint' (P6). The teachers described how learners, through the use of technological creative software such as Garageband in Music, can create a piece of music without having to play a musical instrument. This process is best exemplified by the following interview extract:

> He couldn't read a note. But because he had the technology to record him playing and create those compositions, he got 100% and it's given the students of all abilities the opportunity to succeed and that's what I'd say the technology does. (P4)

Reflection-on-Action

Whilst reflection-in-action has been regarded as a rapid form of reflection (Eraut, 2006), reflection-on-action is a more methodical act of reflecting on a wide range of past, present and future situations (Weick, 1995). Participants labelled this as a process of 'looking back' (P4) at previous experiences, with one teacher acknowledging that 'every lesson was a life lesson' (P1). This was most specifically linked to the experiences of online teaching during the COVID-19 pandemic. The teachers discussed their reflections during the aftermath of the pandemic, where:

> you might have taught something and realise, 'right, I didn't, that didn't work. I didn't, you know, I didn't teach that right. It didn't, you know, the kids were engaged with it, how could I do differently'. (P1)

The teachers deemed it important to conduct this reflective process to consider 'how can I incorporate this into the future?' (P2) and 'what were the benefits of COVID? What can we keep? How can we keep this going?' (P3).

The process of evaluating and reflecting on one's teaching has been identified as relevant to the teaching profession since its early development (Starkey, 2010).

However, this study suggests that sharing one's post-teaching reflective processes can have a positive impact. 'Sharing practice' (P1, P3, P4, P5, and P6) was referred to by the majority of participants, but this study suggests that Expressive Arts teachers are often isolated from this process. One teacher suggested that educators within the Expressive Arts AoLE would not necessarily recognise best practice due to a lack of peers to reflect and learn from:

> They don't know what best practice would look like. If you asked most teachers, they wouldn't know what best practice necessarily looked like for Media, because they didn't see anybody else teaching it. (P1)

Whilst this is a limiting factor, it has arguably resulted in teachers seeking support and shared reflections beyond the walls of their institution, through the use of technology. Social media were widely regarded as an effective arena for sharing practice. For instance,

> I'm a member of Facebook groups, that are always sharing stuff, you know … And other people use Twitter or a variety of different, Facebook is enough for me. That's been very helpful. (P3)

It is suggested therefore that sharing the reflective process, as well as the results of one's own reflections and experiences, can have a positive impact on the perceptions of effective use of technology.

Barriers

During the research, it became apparent that participants noted a range of factors that can have a limiting impact on the perceived effective use of technology within their teaching. The teachers often referred to the lack of technological resources, in that 'what needs to be in place is the technology, is the actual computers' (P1), as well as a lack of funding that prevented the use of technology within lessons, where 'I suppose it's just funding really, that's the massive, massive barrier' (P2).

The COVID-19 pandemic resulted in hardware being provided to schools and children, but participants indicated that this possible enabler in fact became a barrier, as it could result in the wrong technology in the wrong place. As P6

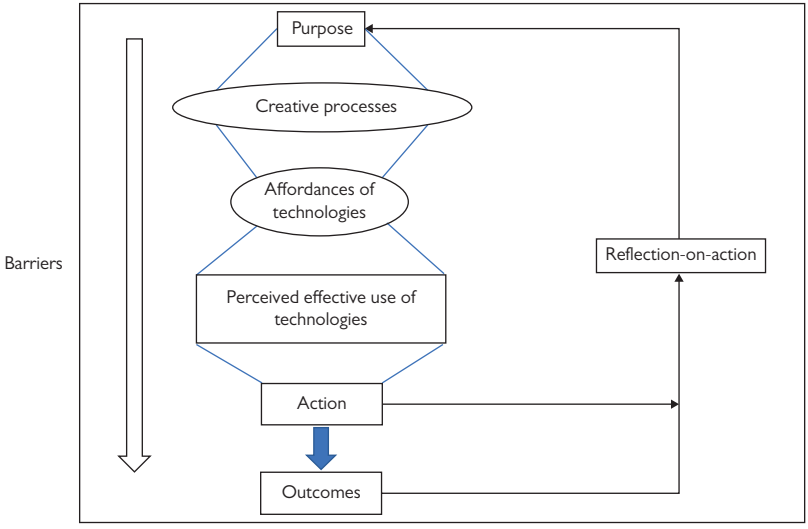
explained, 'there's a magnitude of Chromebooks. But Chromebooks actually are of no use in an Expressive Arts department'. In contrast, the teachers noted equity issues raised by students who had limited access to technology outside of the classroom; a past concern that was reignited during the pandemic (Di Pietro et al., 2020). This was important because the teachers wanted to 'make sure that what we're offering is inclusive to all of our students' (P6).

Discussion

Taken together these technology and teaching-related themes can be represented in a Purpose to Outcomes (PtO) process outlined in Figure 1. This process was not consciously articulated by the teachers and does not represent a strictly sequential progression, but represents an iterative, linear conceptualisation of the thoughts and perceptions expressed by the teachers in this study.

Figure 1 here.

Figure 1: Purpose to Outcomes (PtO) process: Teachers' Perceptions of the Effective Use of Technology in the Teaching of Secondary Expressive Arts in Wales



This process begins with questions about purpose, where the teachers considered how technology could be used in a way that was perceived to have a worthwhile impact within both their subject-area and their teaching as a whole. This relates to the concept of reflection-before-action, analysing the potential use of the technology before the lesson itself (Edwards, 2017).

The use of technology was then viewed through an expressive arts lens, to consider creative processes. This particularly considered the core elements of the expressive arts curriculum, and how technology can be used to influence or enhance each of these. This reflected the findings of Burke (2021) which considered the online teaching of creative arts in higher education, as pre-service teachers 'approach learning creatively to yield effective student engagement' (353). The identified processes of creating, appraising and performing reflect the key components of composing (an act of creation), appraising (informed discussion using appropriate language and vocabulary) and performing, as found within Music education (Major, 2008; Beauchamp, 2010), but reflect similar creative processes in other areas of the expressive arts such as composition, performance, and appreciation in Dance (Smith-Autard, 2002). This suggests an emerging 'identifiable disciplinary and instrumental core' (Donaldson, 2016: 12) that expressive arts teachers seek to build from.

A central consideration for teachers, at this stage, was the educational and creative affordances of the technology that they could use. Affordances are defined as a potential for action (Gibson, 1977; 1979), related to the technology and its use within teachers' pedagogy. The impact of the COVID-19 pandemic, and the periods of online learning that ensued, enabled and forced teachers to recognise and recategorize the perceived (new) educational and creative affordances of their surrounding environment. In this context, the teachers surrounding environments shifted from having hidden to perceptible (Gaver, 1991) affordances. Such shifts generated new perceptions and subsequent understandings of the effective use of technology, which align to existing trends of learner-centred approaches when using technology within teaching and learning (Sanchez and Aleman, 2011).

The next step in the process represents the incorporation of the Perceived Effective Use of Technologies into Action in the classroom, leading to relevant Outcomes. During the latter two stages, teachers outlined how they reflected on their actions and how they reacted to surprising problems or issues that may arise during a lesson (Moghaddam et al., 2020), represented by both

Reflection-on-Action during the 'Action' phase, and in considering Outcomes. This ensured that any lessons learnt were considered at the start of the next cycle of this process, to generate a new and/or improved outcome(s).

This suggests a cyclical and iterative process, where teachers' perceptions and understandings, of both technology and subject matter, are refined each time a cycle of the process is completed. Parallels can be drawn between this process and the concept of 'Reflection' found within existing theoretical models (for instance, Wilson, Shulman and Richert, 1987). The experiences of online learning represented what Eraut (2006) labelled as rapid forms of reflection and each reflection-on-action can account for past and present experiences (Weick, 1995), whilst having an impact on future situations and cycles of the PtO process itself.

The data suggest, however, that barriers can occur at all stages of this process, which is represented by the Barriers 'enclosing box' in Figure 1. Overall, professional development, digital confidence, teacher workload, funding, access, and school ethos were the most commonly identified barriers, which generally reflect the findings of previous research (Hew and Brush, 2007; Kopcha, 2012; Palak and Walls, 2009; Park and Ertmer, 2008; Yang and Huang, 2008; Lowther et al., 2008). Some of these barriers were internal to the school, such as funding, access to resources, and time, and some were specific to the teacher, such as digital confidence. None of these were considered insurmountable, but the teachers felt it was important to acknowledge their existence and potential impact.

In outlining a PtO process for technology use in secondary expressive arts, it is evident that expressive arts teaching with technology is part of a learning ecology, where learning 'not only as existing simply in the minds of individuals, but also as embedded in a network of relationships between participants, practices, pedagogies, and technologies in a situated environment' (Lin, 2011: 12). The current study suggests that such ecologies are not generic. In this instance, the ecology is specific to the particular practices of the expressive arts, which in turn have a significant impact on the pedagogy and uses of technology adopted by the secondary teachers in this study. This suggests an emerging 'identifiable disciplinary and instrumental core' (Donaldson, 2016: 12), a central aspect of how *Curriculum for Wales* was constructed. Zhao and Frank (2003) expand the concept of learning ecologies by relating to ecology in the natural world. In this context, the expressive arts teachers are a biotic (organic) part of the system and the technology abiotic (inorganic), who operate in a particular habitat and niche i.e. their classroom and

the expressive arts department. This resonates with the findings of this study, in that the secondary expressive arts teachers outlined a dynamic process, where the degree and type of technology use is 'mediated or filtered by teachers' perceptions' (Zhao and Frank, 2003: 817); in this case, their perceptions of the expressive arts and associated creative processes.

Conclusions

Overall, the study concludes that secondary Expressive Arts teachers in this study articulated a shared process and perceptions of how technology can be implemented and utilised effectively across their individual subject-areas and the Expressive Arts disciplines as a whole. This resulted in the PtO process, a representation of participants' perceptions, and how they continue to adapt and shape these perceptions during changing and demanding circumstances of teaching and learning. Due to the shifting landscape of Welsh education at the time of study, including processes of major curriculum reform, the COVID-19 pandemic, and the recognition of 'an identifiable disciplinary and instrumental core' (Donaldson, 2016: 12), the PtO process provides contributions to the intersected field of technology and the Expressive Arts. This process is considered to make contributions through the identification and conceptualisation of secondary school Expressive Arts teachers' perceptions of effective use of technology in their teaching during a global pandemic, whilst making an important contribution to the limited research-base on the use of technology in the Expressive Arts.

The findings are not generalisable to the wider target population, but provide an important foundation for potential future research in a currently under-researched cross-section of the field. Therefore, further research could explore the iterative component of the resultant PtO process, to identify if it, and its related parts, change or evolve over time when improved perceptions and understandings are considered across a larger sample. Research could also investigate the role of particular technologies, disciplinary pedagogies, and specific Expressive Arts subject areas to understand any potential impact on the developed PtO process and its related parts.

The authors received no funding for the research, authorship, and/or publication of this article.

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