Epistemic Indulgence: Freedoms and liberties of learning music in online environments

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Abstract

The development of communication technologies, resulting in the arrival of the Internet and the World-Wide-Web has been rapid, influencing almost all aspects of modern society including education. Concepts of epistemology, how we know what we know, have been forced to rapidly adjust to these new and emerging technologies. Online communities of learners have developed in virtual spaces where community members share knowledge and resources as well as offer support and feedback. This is particularly prominent in the field of learning to play the guitar. This paper presents findings of a systematic literature review to empirically examine the question: What does it mean epistemologically to use digital methods when learning the guitar? With a particular focus on self-directed learning through online communities, notions of epistemic inertia and resonance are discussed, and concepts of epistemic indulgence and discretion are presented. This paper also presents the conception of the evolving communication in online guitar communities, in the form of tablature developed in word processors and simple imaging software, to be a folksonomy, which is itself a product of epistemic resonance.

Key words: Guitar pedagogy, online learning, epistemology of music, epistemic inertia, epistemic resonance.

Introduction and Background

An exponential increase of the transformation of technology, and in particular communication technology, from analogue and mechanical to digital in the closing stages of the twentieth century has given birth to what is typically referred to as the digital age (Kormoczi, 2020; Thomas, 2022). Digital technologies have had formative influences on peo ple's lives (Harasim, 2000; Lengsfeld, 2019) influencing the way in which knowledge is gathered and used (Lata & Owan, 2022). Ross and Hedstrom (2005) describe the digital environment as "fundamentally reshaping how society produces, disseminates, uses, and repurposes information and knowledge" (p. 317). This is an epistemological issue as it involves "concepts of knowledge" (Fumerton, 2009, p. 1) and "cognitive success" (Steup & Neta, 2020, p. 1). Lankshear (2003) claims the intensified digitisation of daily life requires us to "rethink what it means

for people to know things" (p. 167). This includes music.

The modes by which people locate, listen to, store, and disseminate music has also changed in concurrence with the developments in communication technologies (Avdeeff, 2014; Brown & Sellen, 2006; Krause & North, 2016; Nowak, 2014; Park & Kahng, 2010, Schedl & Bauer, 2019). Many facets of education, including locating resources and modes of delivery, have undergone significant parallel changes (Allen & Seaman, 2013; Anderson, 2008; Bennett & Lockyer, 2004; Harasim, 2000; Hill, 2012; Li & Irby, 2008; Palvia et al., 2018; Siemens, Gašević & Dawson, 2015; Sun & Chen, 2016). Naturally, therefore, the education of music has also seen substantial development in these times (Blake, 2018; Camlin & Lisboa, 2021; Crawford, 2013, 2017; Nart, 2016; Partti & Karlsen, 2010; Xu, 2022). With a specific focus on the guitar and popular music, this article will examine the influence of

advancing technologies on the study of music and music pedagogy, and explore ontological and epistemological meaning when using twenty-first century digital methods to study music.

History of guitar pedagogy

The family of musical instruments which are broadly labelled, within the modern Western culture, as 'guitars' stem from lutes built in Europe dating back to the ninth century following the arrival of the ūd in Spain from the near east. From there it spread into Italy and the rest of Europe and an established written repertoire was well developed by the sixteenth century (Smith, 2002). During its history there were two typical modes of learning to play the guitar, one by what we would recognise today as communities of practice (Wenger, 1998), and the other by the apprentice model.

Throughout the instrument's history, guitars have been central and integral to communities and also the broader cultures surrounding them. The modern form of the classical and flamenco guitar was established in nineteenth century Spanish workshops, and consequentially the local culture and the instrument have become inseparable and symbiotic. Central to countless small towns and villages throughout Spain, the luthiers' homes and workshops became the hub of the local communities (Bennett & Dawe, 2001). As the Spanish explorers and pioneer settlers traversed the globe they took their culture, and therefore the guitar, with them to the new world birthing new and hybrid local guitar centred cultures (Clayton, 2001; Reily, 2001). As a result, the guitar was a popular instrument in the Americas during the early twentieth century where new forms of music were rapidly evolving eventuating in enormous influence over the world's popular music of today.

Technological progress in the latter half of twentieth century included faster and cheaper international travel and communication. Together, these factors influenced the guitar's journey to becoming a truly global instrument: "The instrument has gained a central place in, and has helped to define, musical genres worldwide" (Bennett & Dawe, 2001, p. 1). As time progressed, many guitar-centric sub-cultures developed in various locations on every inhabited continent. This gave rise to the births of multiple genres, and sub-genres, of guitar based musics and there are accompanying cultural idiosyncrasies deeply integrated with each genre. These cultural expressions are diverse and intertwined typically involving the whole community of musicians and listeners and include many factors involving lifestyle choices as diverse as apparel and hairstyles, specific vernacular expressions and lingo, and even food and alcohol consumption.

Throughout the development of the modern genres of popular music, guitarists wielding their instruments within its various sub-idioms have typically employed informal learning methods (Green, 2002; Lebler, 2007, 2008). Their genres of music were developed via an almost biological process of evolution involving a mix of self-pedagogy from books and recordings, and oral pedagogic traditions within communities of practice. Reflecting on his own personal journey, Schwartz (1993) describes this process and his local pre-Internet community:

> Many popular musicians, such as myself, learned from books and by imitation of records… I learned basic chord forms and the names of the notes on the guitar from the legendary Mel Bay Modern Guitar Method… Once armed with this basic knowledge, I began trying to figure out songs listening to records. More importantly, I entered a community of guitar players at my Junior High. Some of these musicians took lessons and some knew more skilled players who informally shared their knowledge. We showed off the songs we could play, worked together to figure others out, and created a competitive environment, making each one of us work harder at home with his record collection to learn something no one else had. (p. 281)

Communities akin to the one described here by Schwartz exist all over the world where guitarists gather, sharing knowledge, and offering inspiration and advice. Inevitably, with technological

developments in communications, and particularly since the birth of the Internet, such communities have found themselves moving toward virtual spaces online. Furthermore, new communities, and new types of communities, have developed that only exist in the virtual online arena. Spillane (2019) claims; "YouTube has become the go-to platform for peer-to-peer knowledge sharing, it has transformed and mediated the oral tradition [and] knowledge sharing" (p. 33). This has epistemological implications which will be investigated and discussed in this paper.

These online guitar-based communities of practice exist to serve the same underlying function as geo-located communities; to share knowledge and resources, and to support and inspire each other. The earliest of these communities were email forums, newsgroups and chat rooms. These were quickly followed by peer-to-peer (P2P) file-sharing sites where members could share resources most typically comprising transcriptions of guitar performances. However, there was little oversight, and even less understanding of global copyright laws, in these earliest communities creating a diverse and transient, somewhat chaotic virtual environment.

Most of the filesharing occurring on guitar centred P2P websites employs musical notation in the form of tablature. Rather than standard music notation, tablature indicates the physical placement of notes on the guitar's fretboard rather than the actual pitch of the note being played. This has enormous epistemological repercussions regarding what is music, however very little seems to have been discussed regarding this issue in the academic literature.

There were numerous difficulties in communicating musical meaning via tablature

```
            EADGBe
D:     xx0232
Dmaj7:  xx0222
D7:    xx0212
A:     x02220
A7:    x02020
A7sus4: x02030
Asus4: x02230
A*:    x02250
Bm7:   x24232
G:     320033
Em:    022000
Em7:   020000
```


Figure 1: Examples of expressing chord voicings using word processors.

while employing the limited possibilities of word processers in the earliest days of these online communities and it has taken some time for the protocols to settle. These protocols include the choice of font and the meanings and roles of particular symbols. Community members also generated a wide variety of styles to indicate chord structures. The lack of universality among the communities often caused confusion. Figure 1 shows some examples of community member generated content using simple word processor characters to indicate strumming patterns and chord voicings. Figure 2 exemplifies guitar tablature using the font Courier New which has even spacing for all characters enabling a smooth easy to follow system.

Another issue with tablature is the absence of a universally accepted mode of dictating note duration. Various attempts have been made by online community members to combat this problem but there is no universally accepted method. Figure 3 shows a couple of examples

```
|--------|--------|--------|--------|--------|--------|--------|
|------01|0-------|--------|--------|--11-1-0|--------|--------|
|----02--|-20-----|---0-2-0|--------|--00-2-0|--------|--------|
|-023----|---320--|--2-3---|---03320|--223--0|---03-20|--------|
|3-------|------1-|3-------|--2-----|3-------|--2-----|3-------|
|--------|--------|--------|-3------|--------|-3------|--------|
```
Figure 2: Example of Tablature using Courier New font.

Figure 3: Example of attempts to include note or chord duration in tablature.

of how online guitar community members have used simple word processor symbols and basic imaging software to emulate rhythmic indication in tablature.

Sufficient common practice has evolved in the online guitar communities for some almost universal protocols to have developed. The examples explained by Matthies (2019), in Figure 4 imply a universally accepted system, however old files developed using earlier systems are still easily accessible and may still cause considerable confusion.

Thus, we have seen how a new language of guitar

Guitar TAB Symbols Summary

Here is a quick guide to the most common symbols you will see in text-based Guitar TAB:

- **h** = hammer-on
- **p** = pull-off
- **b** = bend
- **/** = slide up
- **** = slide down
- **PM ‒ ‒ ‒ ‒** = palm muting (above or below TAB)
- **~~~** = vibrato
- **x** = muted hit
- **<>** = natural harmonics
- **t** = tapping
- **()** = grace note or let the note ring out

Figure 4: Common symbols used in online file sharing tablature.

music has evolved, and language is the foundation of epistemology (Chomsky, 1965, 1976; Koster, 1988).

Following the development of social media, online communities found new platforms and became much easier with which to engage. New communities have developed within social media spaces including Facebook, YouTube, Pinterest, Twitter, LiveJournal, Snapchat, Instagram, and TikTok. Online guitar communities also still continue to exist in chatrooms and newsgroups as well as countless informal email communities. These communities are a hotbed of information and resources for music learning, especially informal self-directed learning practices. They are also the locale for cultural development and the canonisation of integral concepts of knowledge. Online learning via user-generated content (UGC) on community sites including YouTube and more structured pedagogic platforms contribute to the codification of the style (Spillane, 2019).

This paper presents findings of a review of the topical discourse and discusses how the use of digital methods, including via online communities influences the study of guitar in the twenty-first century. The paper's main focus addresses the question: What does it mean epistemologically to use digital methods when learning the guitar?

Methodology

The research was conducted using the protocols of a systematic literature review as outlined by Kitchenham and Charters (2007), Xiao and Watson (2019), and Tawfik et al. (2019) in order to ascertain the current state of discourse on the topic of using digital methods to learn the guitar and the epistemological implications. The purpose of a systematic review is to attempt to understand the existing body of literature on a specific topic through the collection, interpretation and explanation existing research (Rousseau, Manning, & Denyer, 2008). As the concepts of epistemology and pedagogy are typically more subjective than objective in nature it was decided to employ a qualitative review method. Therefore, Tawfik et al.'s SPIDER (Sample, Phenomenon of Interest, Design, Evaluation, Research type) model has been adopted.

The sample was defined by inclusion and exclusion criteria designed to focus on online guitar learning. There was deemed no need to set date exclusions as the topic is relatively recent and all discourse was potentially relevant. Earlier discourse will give a description of the development of the topic and more recent discourse will give a picture of the current state of discussions. The search process found an almost ubiquitous presence of popular music content with very little reference to Western art music, Jazz or world music. Further refined searches were conducted to locate any discourse on epistemology of music learning. No exclusion criteria were set for this search content as older papers would also give an historical background against which contemporary pedagogies could be compared.

Searches were initially conducted using purely academic search engines including Google Scholar, Eric, and the University of Adelaide Library's internal search engine. Further searches were conducted using CORE which focusses on open access papers and ResearchGate which is a good mode of finding research by specific authors once prominent researchers have been identified in a specific field.

Generic search engines were used to find industry discourse and governmental reports.

The key words and terms in the research question are *epistemology*, *digital methods* and *learning the guitar*. Search terms were constructed using combinations of these key terms and a variety of synonyms and Boolean operators. No publications were found that address the research question directly. It is the role of this paper to collate the various discourse around the question into a singular cohesive discussion addressing the topic indirectly from available research publications and other topically relevant.

Once suitable publications were identified and located, they were examined for key concepts and collated into topical sub groups. Each publication was analysed to find how it contributes to the discourse and flagged for relevant content. Potential themes in the data were identified and relevant data extracts were located. After collation of the data extracts further analysis was conducted to establish the validity and strength of each theme.

Once data were collected, sorted, and ready for analysis, the protocols of Inductive Thematic Analysis (ITA) as described by Braun and Clarke (2006) were followed to ensure validity of this study. Inductive analysis is most suitable for this type of study as it allows for an exploratory approach driven by data rather than deductive processes that seek to build pre-conceived theories (Guest, McQueen & Namey, 2014). In Braun and Clarke's original (2006) discussion on thematic analysis they suggested themes were found in the data or "emerged" from the data. However, in subsequent publications and presentations on the process (Braun & Clarke, 2014, 2018; Braun, Clarke & Hayfield, 2019) they encourage the concept of "generating" themes from the data, giving the researcher a more active role and thereby potentially more directly addressing the research question or topic on hand.

The vast majority of the publications sourced for this study were qualitative in nature. A few, particularly the industry and governmental reports, also contained quantitative data. Some studies

presented quantitative data with interpretive and/or extemporaneous narrative, for example: "one out of five respondents had studied in music schools, and 6% had studied in a high school with an emphasis on music. Only seven respondents had studied music in a conservatoire and two in a university… A majority of the respondents, therefore, appear to be self-taught, or perhaps community-taught musicians" (Salavuao, 2006, p. 259).

Of the methodologies employed in the studies investigated, the most common form of data collection was via interviews. These were typically semi-structured in order to allow for broad perspectives beyond what could be foreseen by the researchers: "As the aim of our original data collection was to uncover the details of music behaviour across a broad spectrum, we used semi-structured interviews to ensure that the important issues we wanted to discuss were covered" (Brown & Sellen, 2006, p. 37). Surveys, most of them in the form of online surveys, were also common. Other data collection methods included the following; "Transcript analysis of the discourse in online seminars" (Harrasim, 2000, p. 8), "Active participant observation across multiple social media platforms" (Schembri & Tichbon, 2017, p. 194), and "textual, audio, audiovisual, and musical materials" (Ferrari-Nunes, 2010, p. 95). A wide range of data collection was typically seen as beneficial to this topic: "diverse data-gathering tools allowed a diversity of perspectives and information on the research topic to be obtained" (Moore, 2014, p. 255). The empirical studies ranged from ethnographic and auto-ethnographic, to netnographic.

Cox and Forbes (2022, p. 625) described their methodology as novel; "This article presents a novel methodology for one-to-one pedagogy research, namely, 'multisited focused ethnography'," and included implied epistemological assumptions in their description: "The selection of reflexive thematic analysis, where meaning and knowledge are understood as situated and contextual, and researcher subjectivity is conceptualised

as a resource for knowledge production, which inevitably sculpts the knowledge produced…, was consistent with the ontological and epistemological considerations underpinning the research" (p. 633).

Till (2017) observed that few publications on this topic included relevant case studies: "Popular music education (PME) is a fast developing field of study, in terms of educational programmes and activities, but relatively few relevant publications are available featuring, for example, case studies of best practice, or relevant theoretical considerations" (p. 14).

Findings

In the process of researching epistemology of digital music learning it was inevitable that the concepts of ontology would be encountered and need to be addressed before epistemology can be discussed in a contextual sense. This will be followed by presentations of findings on epistemic notions and a focus on online learning and communities of practice.

Ontology

Digital music downloads, in the form of on-demand streaming, now accounts for approximately 87% of music consumption among the most popular genres in the United States (Gotting, 2023). This is a notable increase on the 70% reported in 2015 (Friedlander) and it is expected this will continue to increase (Gotting, 2022). Shembri and Tichbon (2017) discussed how digital music consumers act as cultural curators stating: "The context of an online music subculture therefore offers the opportunity to investigate and better understand cultural production" (p. 192). However, as they focus their research on Vaporwave, a micro genre of electronic music, they do not directly address learning or the epistemology of online music education. They found online community members are remixing existing musical cultural artefacts into new creations that barely resemble the original. Thus, according to participants, the artefacts have been altered so much that copyright is

irrelevant. However, they note this irrelevance also contributes to the lack of worth, cultural and financial, of participant's creations. The ontological questions raised by the concepts of remixes are addressed in the discourse by authors and researchers including McGuire (2014), Kania (2006), Cox (2003), and Wiltsher (2016) who explored the question "What kind of things are musical works?" (p. 430)

Aesthetic content seems to be in inherent property of a musical artefact's ontology with Wiltsher arguing that production is integral to the ontology of a 20th century dance song: "The aesthetic qualities of a brilliant song can survive the vicissitudes of shoddy production, but bad production in dance music destroys the tune" (p. 430). Remixes can be recordings or, as is more often the case, live performances by a DJ (Disc Jockey). However, a remix is not performance of an artefact in any ontological sense as there is no score or preconceived structure behind the mix. A DJ will typically work with the live vibe of the dance floor and this involves an improvisatory aspect. Wiltsher concludes "there is an ontology of dance music to be discovered, and that it will be quite different from ontologies of music already written" (p. 431). Cox discusses Krausz's question "which interpretation of a cultural text, if any, is the single right one?" and takes the conversation from a Western high art centred perspective and addresses it with a focus on contemporary genres. He finds there are different expectations of interpretation of cultural artefacts leading to different sets of ontological and epistemological claims. He concedes that all interpretations involve transformation but the aesthetic character must carry over from the original cultural artefact to the interpretive artefact.

While exploring the ontology of digital music and the concepts of downloading from online suppliers McGuire (2014) notes the following: "In digital music, copies of recordings are no longer duplications, but rather part of a clonal colony" (p. 3) and uses a biological analogy to help explain:

"like a field of genetically identical mushrooms that has reproduced by vegetative asexual procreation" (p. 3). Live streamed recordings temporarily "exist" in much the same way as a live performance, while downloaded recordings exist in much the same way as a hard copy on CD, vinyl or tape. Kania (2006) suggests an ontology of popular contemporary music needs to reflect the way informed audiences talk about Rock and recognise both the centrality of recorded tracks to the culture and the value of live performances. His ontological foundation is the studio recording as the artefact, which can then also be performed live. He goes on to suggest that a cover version is a recording or performance that intends to "manifest the same song" (p. 412). Although there is deep philosophical discourse regarding the ontology of digital music, none of these authors however adequately address the concepts of epistemology, especially the epistemology of online learning.

Epistemology

There are a number of epistemological concerns within 21st century digital music including diversity, authenticity, and reasons for and against learning music online. The discourse includes concepts of epistemic inertia and epistemic resonance. Hallenbeck (2019) states music functions as a response to a set of shared cultural concerns and meaning in music cannot be separated from its social context. In his discussion on contemporary musicology Tagg (2011) employs the phrase epistemic inertia to describe the dominance of Western art music's hold on academia: "[C]onventional musicology is to a significant extent a conceptual disaster zone. It may have developed valid theories about harmonic narrative in European art music, but it has, in my view, been intellectually about as open-minded as religious fundamentalism in dealing with anything outside its own restricted frames of reference" (p. 7). Manson (2009) defines two distinct forms of epistemic inertia. One is individual epistemic inertia where an individual may not be

rationally able to accept a truth because it does not fit with other fundamental beliefs they hold. The other is social epistemic inertia where beliefs are "sustained, revised, checked and confirmed in a variety of complex social ways" (p. 294). It can reasonably be argued that both of these forms of epistemic inertia have been, and are, at play in musicology of non-traditionally sourced musics including online contemporary popular and art music. Till (2017) picks up on this notion stating it is "sidelining popular music as a fringe activity" despite popular music comprising the majority of society's musical activity. Till's epistemology is radically different in his teaching practice. He states he conceives popular music as principally a recorded medium. He employs a blended learning approach and a flipped classroom model with rhizomatic learning approaches which allows for maximal student autonomy. This approach inherently avoids epistemic inertia by allowing students to choose their own ensembles, musical genres, musical content and even define their own assessment criteria.

Till (2017) has deliberately engaged with pedagogies that minimise requirements to rely on written scores and traditional music theory. By emphasising technological, oral and aural approaches he is engaging with pedagogies that are naturally occurring in the online popular music communities. He states he values the existing knowledge of the student cohort which is in keeping with the notion of epistemic resonance discussed by Ferrari-Nunes (2010). His pedagogic practice includes participation in blogs, online discussion boards and social media including Facebook groups as class activities. He states this teaching method helps to keep the curricula current, and offers the cohort, individually and collectively, a sense of ownership of the learning activities. This is a very contemporary epistemology when compared to how traditional music classes have typically been delivered and includes, and in fact relies on, a high degree of social connectivity. There is a hive-mind aspect to the epistemology of

this blended learning and flipped model pedagogy. It engages with the important characteristics of informal music learning and employs them in formal settings.

One common topic addressed in the discourse is how consumers learn about new music, that is; what epistemological methods are employed or even engaged with instinctively. Brown and Sellen (2006) state that the social aspect is inherent in musical epistemology regarding; "social methods of finding out about music were very important" (p. 44). They found friends "filtered" music for each other, deciding what others would like to listen to. This implies a community driven epistemology. Their study was conducted using interviews of real-world consumers. The shift to online music consumption has broadened the social network to include people that never meet in the real world and this has resulted in a new development in this epistemological concern as music enthusiasts are discovering a greater variety of music as a result. Brown and Sellen describe this activity as "exploring" (p. 48) which implies a greater emphasis on the explorer and less on the social network as the active agent, but rather the vista.

Cox (2016) further supports this shift away from social learning due to the gravitation to online spaces. Her research examined higher learning and found online learning is swiftly transforming education and places "novel demands" (p. 11) on learners. She claims learners are now forced to navigate new territories and this implies a greater focus on self-directed learning and developing relationships with technology. Fundamental to her discussion is the alone/together paradox described by Turkle (2011). How a learner develops knowledge in online settings is largely dependent on their technological capabilities and their relationship with technology both hardware and software in the real world and in online spaces. These skills, which are inherently necessary to navigate online learning, are independent yet co-dependant. Magnusson (2009) explored concepts of virtual embodiment and epistemic tools in music

technologies and claimed an observed interaction between computational systems and culture. He called for further research in "ethnocomputing" where software is analysed in a way similar to how we would engage critically with other arts including music, literature and film.

In a dissertation on music making, learning and sharing in Shetland's *Sprees*, Ferrari-Nunes (2010) proposes the notion of epistemological resonance as seeking to "perceive, describe and understand the phenomenal effects of the conceptual environments we inhabit and grow with, learning to sense through ideas and actions" (p. 9). He defines the *Spree* as a "key local practice that manifests the principles of an epistemological tradition – a way of knowing and being that is shared across multiple generations" (p ii). Epistemological principles addressed include horizontality, interpersonal and intergenerational knowledge, resourcefulness, and nuance of character appreciation. Horizontality refers to equity of access to information and removal of barriers due to learner diversity. The *Spree*, as a tradition, encourages engagement with past, current and novel modes and styles of musical expression, remaining open to outside influences, which implies, in the twenty first century, online influences.

Ferrari-Nunes noticed there is no single modern local native music tradition in Shetland, as it is a disparate collective. He found local musicians have crafted their own styles using whatever variety of tools were at hand. This included various musical instruments and recording technologies and in recent times has enveloped the Internet into its conglomeration. There is still a sense of local community as musicians influence each other stylistically, and in repertoire. What he did notice was also a collective taste for genre diversity, which has been both enabled and amplified by the arrival of the Internet. Online communities, which include non-local entities, now contribute to the local epistemological tradition of music learning. Ferrari-Nunes concludes on open approach to cultural growth incorporates an understanding of alternative epistemologies including ones based in feeling, thinking and experience. He states this is one method of encountering epistemological growth by expanding conceptual horizons and changing one's inner resonance with relationships and with the present.

The resonance that occurs through deep relationships featuring shared interpersonal knowledge such as those that are common among active Shetland musicians is characterised by people listening and paying attention to who each individual is, what they have to contribute, what they do well and what needs help. The epistemic resonance is a fundamental aspect of the music community and exhibits utmost respect and care, long-lasting intergenerational engagement and a "well spun matrix of interpersonal knowledge" (p. 255). Salavuo and Hakkinen's (2005) case study found the majority of online music community members were either self-taught or community-taught musicians, and their discussion supports the notion of epistemic resonance existing in online music communities.

Diversity of music learning cohorts is a common topic in the discourse (Cox, 2016; Ellefsen & Karlsen, 2020; Moore, 2014; Parkinson & Smith, 2015; Rao & Tanners, 2011). Moore also observed a "disparate nature of music provision" within the education system she investigated in Ireland (Herron, 1985; Smyth & Calvert, 2011). This has led to an historical paradigm of higher education in music being a "privilege of students with economic and cultural capital enabling them to access private instrumental and/or theory tuition" (p. 250). Moore (2012) acknowledges an overemphasis on Western classical traditions in the local education system and this has alienated students with diverse musical backgrounds from access to higher education. She argues that learners should have equal epistemic access to knowledge at the secondary level, they should have agency in negotiating access to higher music education and they should receive positive affirmation of their musical identities and personal future musical pathways. However, she does not

address the possibilities of online learning in her discussion.

Authenticity is a long and well understood concept in the formal education of the traditions of Western art music, World music and even folk music (Johnson, 2000; Kruse, 2018; Nketia, 1967; Palmer, 1992; Schippers, 2009; Scott-Kassner, 2006). However, the epistemology of authenticity in popular music education is more complex and ambiguous (Dyndahl & Nielsen, 2014; Green, 2006; Parkinson & Smith, 2015; Woody, 2007). Green (2002) notes the existence of an "ideology of authenticity" (p. 99) through informal learning among contemporary musicians stating it is a form of natural expression, compared to what is generally experienced through formal training or education. Parkinson and Smith (2015) note an "epistemic tension" (p. 102) in higher Popular Music education which corresponds to these notions of authenticity. They observe an "epistemic drift" (p. 101) toward vocational training in the United Kingdom and this is evident in music education. They conclude "The HPME [Higher Popular Music Education] community has an opportunity and a responsibility in this moment to move iteratively and mindfully towards an epistemology of authenticity in its institutionalised beliefs and practices" (p. 118). However, this paper also does not discuss the possibilities of online learning in addressing this issue.

Online Learning

Epistemology addresses concepts of how learning is achieved and how knowledge is constructed. In online learning environments important aspects of cognitive presence and epistemic engagement only occur when the pedagogy and the social presence are well established (Sun & Chen, 2016).   A common criticism of the online learning space particularly in music is the lack of adequate personalised and effective feedback on the learner's performance (Chanway, 2023; Hoang, 2022; Jensen, Bearman & Boud, 2021; Kāo, & Niitsoo, 2014; Peczek, 2015). Steele and Holbeck (2018) assert the importance of quality feedback: "A majority of the learning in the online environment can be self-guided but without effective feedback learning can be difficult" (p. 1). There have been some attempts at addressing this issue. These include video exchange platforms and learning via real-time video streaming on platforms including, for example, Skype or Zoom. There has been a move in formal settings to employ peer feedback (Goodrich, 2021; Ruthman, 2007), which is natural in informal popular music learning environments (Johnson, 2017a; Green, 2002). Recently Fender Play have experimented with "Feedback Mode" which involves an Artificial Intelligence (AI) assessing the students' performance and giving scores based on certain criteria. Figure 5 shows a screen shot of the feedback interface.

For more detailed feedback the learner can examine the tablature with a timeline of their performance showing where and when they were most accurate or need more improvement. Figure 6 shows a screenshot demonstrating the detailed feedback in conjunction with the tablature.

There are epistemological implications here regarding the use of an AI to deliver feedback to
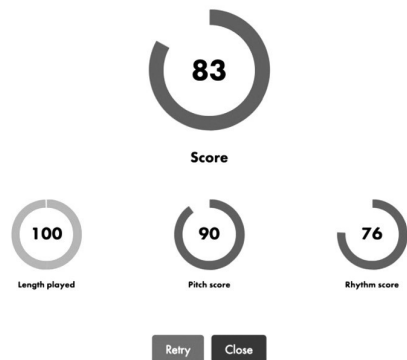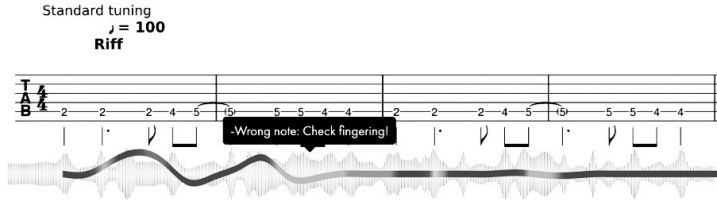

Figure 5: FenderPlay Feedback Mode interface (FenderPlay, 2023).

Detailed Feedback:

- The grey sound wave shows what you played.
- The colored line on top compares your playing to the tab.
- Green means you played the correct notes or chords and a straight line means your timing was right on.
- Yellow and red highlights areas needing improvement. Wavy sections indicate rhythmic errors.
- Hover over the yellow and red sections to view messages with more detail on what and how to improve for next time.

Figure 6: FenderPlay Feedback Mode detailed feedback (FenderPlay, 2023)

learners in the place of human social interaction in the learning process.

Similarly, discussion about the meaningfulness of online relationships investigate their effectiveness, including in education. In his report on research investigating the role of online communities in music learning, Salavuo (2006) states there is no evidence that a lack of face to face connectivity makes relationships less meaningful. Thus, online learning, particularly one using socially grounded epistemologies are equally valid in online spaces as in the real world. Salavuo also observed the cognitive diversity of online music communities can be very large in comparison to most traditional or institutional music communities. This will inherently lead to a broader perspective on epistemology.

Autonomy is an integral aspect of online learning and also has epistemological implications. In a comparative study between two groups of students, one learning face-to-face in lectures,

and the other engaging with online learning methodologies, Shapley (2000) found students who successfully learned the material and mastered the concepts on their own scored slightly better than average on assessments. Much of the discourse on the epistemology of online learning suggests the presence of constructivist epistemology where knowledge is developed by the learner rather than revealed to the learner (Cox, 2016; Crotty, 1998; Johnson, 2017b; Keast, 2004, 2009; Lincoln & Guba, 1986; Merriam, 2004).

The constructivist paradigm is inherent in autonomous learning which, in turn, is inherent in online learning. As early as the turn of the century Wolfe (2000) observed constructivism in action within online learning environments: "Emerging Web technologies may lead to a renaissance in informal education because the Web holds the promise of promoting self-directed life-long learning, expanding learning beyond the classroom,

and supporting alternative social organisations for learning and teaching" (p. 93). The process of learning is an integral concept to epistemology. Blake (2018) highlighted the importance of the process in online music learning; "Online music coursework should rise to the challenge of taking a constructivist based teaching approach so that students can experience the learning process, not just simply experience learning" (p. 8). The process of learning is fundamental to the definition of epistemology.

In 2002 Resnick observed where new technologies were being used in education, the technologies were used to "reinforce outmoded approaches to learning" (p. 32), with approaches to pedagogy being unaffected by the use of digital technologies. By 2010, Davidson and Goldberg claimed the way we learn has changed dramatically stating learning institutions had become simultaneously innovative, flexible and robust. More recent publications have discussed epistemological issues around music (Adveeff, 2014; O'Hara, 2018; Schembri & Tichbon, 2017), and music education (Abramo, 2014; Allsup, 2020; Corintha & Cabral, 2022; Parkinson & Smith, 2015). This paper explores the current state of epistemology in music research reflecting on concepts of knowledge and cognitive success in digital age music.

Why Learn Music Online?

One other topic found in the discourse, particularly surrounding online music learning, is the question of why. Why learn music, and why use online methods? From the perspective of the students Xu (2022) suggests "the purpose of students' learning music is to improve their own quality and self cultivation" (p. 4). From a broader perspective and examining the role of music education in higher learning Xu suggests "the purpose of music education… is to cultivate all-round developed talents, improve college students' aesthetic ability and artistic appreciation…, [and] develop thinking ability and creativity" (p. 4).

Regarding online music learning Xu's research

found new media technology-assisted teaching, as it is observed to be applied in higher music education, has many benefits including the following list: "provides a platform for teacher-student communication, resource sharing, and students' cooperative learning, breaks the restrictions of time and space, promotes students' autonomous learning, strengthens the communication between teachers and students, stimulates students' learning interest and initiative, and improves students' knowledge level and music literacy" (p. 10). Xu also observed students' cooperation and team awareness was also greatly improved though this mode of music education and claimed it better achieves the purpose of music education.

There is an epistemic assumption that engaging with online music communities will help participants learn. Salavuo's (2006) case study found motives that have to do with learning and advancing knowledge turned out to be "quite significant reasons" (p. 262) for participation in online music communities. Self directed learning in informal settings is the normal mode for music education as a leisure activity. Lorenzo de Reizabal (2022) observed participants in this type of music education are most typically adults who generally have an epistemic curiosity towards a deeper understanding of music.

Another reason to learn music online is exposure to music that would otherwise be unobtainable. Spillane (2019) implied that the Internet has improved knowledge and understanding of outlying and/or geographically disparate musics: "Prior to the arrival of the Internet, the performance techniques of the Gypsy jazz guitar style, linking back to the style of Django Reinhardt, were not widely known and often misunderstood. Today the music has become a codified form of jazz in its own right and the Internet media-sharing platform YouTube has been instrumental in the documentation and dissemination of the genre's performance practices" (p. 33).

Discussion

Informal and self-directed learning is the norm for popular musicians (Cremata, 2017; Green, 2002; Green, Lebler, & Till, 2016; Till, 2017) and this lends itself perfectly to the online learning environment. There are now countless tools and resources for online music learning (Cooper, Dale & Spencer, 2009; Lee, Baker & Haywood, 2018). This has challenged traditional ontological and epistemological perspectives on music and on music literacy, creating a perceived need for new meanings of music literacy (May, Broomhead & Tsugawa, 2020).

With the development of the Internet, communities of guitar players have gravitated to online spaces (Lee, 2022; Salavuo, 2006, 2008; Salavuo & Hakkinen, 2005; Waldron, 2009). The development of protocols for various symbols and their semantics in online sharing of guitar transcriptions via tablature is a form of "folksonomy" (Barrows, 2013; Vander Wal, 2005a, 2005b). This seems to parallel with Sordo et al's (2013) description of musical folksonomies: "Music folksonomies include both general and detailed descriptions of music, and are usually continuously updated…, music folksonomies have an inherent loose and open semantics, which hampers their use in many applications, such as structured music browsing and recommendation" (p. 346). This is a form of community based epistemology, or as Ferrari-Nunes (2010) describes, an epistemic resonance.

Perhaps the most common and enduring topic throughout the discourse around online music communities is copyright issues (Harrower, 2005; Jackson, 2001; Liong & Dixit, 2004; Peng, 2022; Pollack, 1999, Regelski, 2006; Solo, 2014; Thibeault, 2012). Patil and Dangat (2014) stated "it is undeniable the prosperity of P2P software has accelerated the spread of the piracy and increased the difficulty of protection of intellectual property rights" (p. 7390). In the early days of the online music industry there were numerous attempts at minimising piracy and new models for legal online distribution emerged, the most successful of which are iTunes and Spotify (Wikstrom, 2014). Davies et al. (2015) explored the concept of epistemic implications of online music piracy. They found what they describe as "epistemological dissonances, driven by differing levels of understanding about (and access to) the underlying technological, legal, and social structures of an evolving marketplace" (p. 41). Their study found most of the epistemological dissonances were founded on varying levels of understanding, and mis-understanding, about the underlying technological, legal, and social structures of the online music industry. They propose to remove these epistemological boundaries and that some form of educational process should be developed to inform users of digital music the "technical architecture" underpinning the industry and claim this would help to reduce piracy.

Epistemology asks how we know what we know. If that process involves illegal practices of piracy in order to obtain knowledge, then their epistemological morals at stake. Is knowledge paramount and should it be free to all who enquire? The online space seems to offer this, yet at what expense? Learners who are maximising their epistemic freedom have the opportunity to indulge in whatever modes, honest or dis-honest, if they see this as paths to knowledge. If knowledge is attained through improper means, even if the learner was not aware at the time, it cannot really be forgotten as recompense. In the context of online music learning, epistemic freedom comes at an expense. However, the expense is not the learners', it is the original content creators' and they may never know what it is they are paying.

It can safely be assumed that the notion of non-geographically bound communities now influencing local music traditions, as observed by Ferrari-Nunes (2010) is the norm globally. Similarly, Moore's (2014) observation of higher education having historically been available to the privileged is also not just a local phenomenon and is observed in other parts of the world (Bates, 2014; Coppola &

Taylor, 2022; Escalante, 2020; Hannan, 2000a, 2000b; Palmer, 2018)

Epistemic Indulgence

The underlying epistemology of learners teaching themselves how to play an instrument using online resource, and especially engaging with online communities, is not dissimilar to how musicians have learned using the oral tradition in the past. Storr (1993) refers to this as a kind of "neurogamy" that is present in music communities and at music events (Finestrone, 2022). Other authors refer to this as epistemic resonance.

Manson (2009) describes epistemic inertia as the maintenance of existing epistemology(ies) through established social or institutional traditions that typically resist change. Ferrari-Nunes (2010) describes epistemic resonance as a matrix of interpersonal knowledge that occurs through deep relationships characterised by community members paying attention to each individual, what they have to contribute, what they do well and what needs help. There is a third type of epistemology emerging among self-directed learners using online resources to inform themselves. That is an epistemic indulgence: Self-guided learners using online resources to teach themselves have the freedom to learn whatever they choose, in whatever order, using whatever resources they find best suits them and their whims: "you are free to chart your musical journey on your own terms" (Schiebel, 2022).

Student autonomy minimises epistemic inertia by maximising epistemic indulgence. However, there is a relationship between these three epistemic notions. Students enrolled in formal education will encounter both epistemic inertia and resonance. Self-guided learners, engaging with epistemic indulgence by using online resources, who also participate in online communities of practice will also encounter epistemic resonance. In these cases, there will need to be a degree of epistemic discretion for the learning to be maximally successful. Figure 7 illustrates these relationships.

Salavauo's (2006) case study found less than a

third of online music community members could read music notation even though the proportion of self-claimed songwriters among the participants was high. Tian (2020) argued that music students in online learning environments need to also be taught the necessary epistemological skills to successfully operate in that space: "Cultivating the ability of students in music majors to learn autonomously in an online environment, and mastering the scientific, reasonable, and advanced autonomous learning styles and teaching methods is conducive to improving the abilities of the students" (p. 1). He continues by stating these skills are also highly transferable as "education should aim at training students' independent thinking and self-management ability, and provide students with the skills and abilities needed for independent learning in the future" (p. 1). Not only the skills of the user regarding how to use the technology, but also the technology itself being employed has epistemological implications as it was observed to influence the choice of music being listened to and therefore studied. Brown and Sellen (2006) found their participants' choice of music was determined to a large extent by what technology was available in the places they listened to music.

Online learning offers greater student autonomy and freedom to explore opportunities to learn and resources to inform the learner. This allows for maximal epistemological indulgence for a self-directed student, for example a self-taught musician using the Internet. However, as Salavuo (2008) states "taking advantage of the emerging possibilities requires pedagogical understanding" (p. 10). Such learners may need to develop the skill of epistemic discretion to maximise their learning. This can be achieved through active involvement in online communities. In more formal settings of online music education there is also constant change and an ever-growing body of resources that can be employed. Educators need to keep themselves abreast of the challenges and possibilities these may offer: "The change towards more meaningful activities that result in a deeper
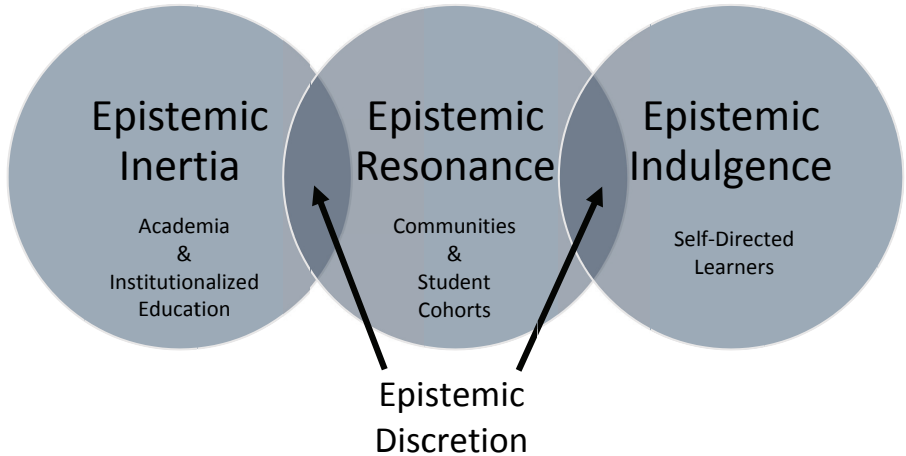
Figure 7: Relationships between Epistemic Inertia, Resonance, Indulgence and Discretion.

learning requires rethinking the practices and the learning culture of music education, and education in general" (Salavuo, 2008, p. 15).

Conclusion

The development of online learning has been rapid and has influenced all subject areas including music. Concepts of epistemology have been forced to accommodate twenty first century technologies. We have observed discussion on online communities and epistemic resonance as well as the dissonance between broadening online resources and epistemic inertia. Through this research the concept of epistemic indulgence was developed where self-directed online learners have greater freedom and access to knowledge, however this comes at various expenses and requires epistemic discretion for maximal learning potential. This paper has also presented the notion of the evolving communication in online guitar communities, in the form of tablature developed in word processors and simple imaging software, to be a folksonomy, which is itself a product of epistemic resonance.

References

Abramo, J. (2014). Music education that resonates: An epistemology and pedagogy of sound. *Philosophy of Music Education Review, 22*(1),78–95. https://doi.org/10.2979/philmusieducrevi.22.1.78.

Avdeeff, M. (2014). Engagement and technologies of taste. In A. Bennett & B. Robarbs (Eds), *Mediated youth cultures: The internet, belonging and new cultural configurations*. Ch 8. Palgrave Macmillan.

Allen, I. E., & Seaman, J. (2013). *Changing course: Ten years of tracking online education in the United States*. Sloan Consortium.

Allsup, R. E. (2020). Epistemology and qualitative research in music education. In C. M. Comway (Ed), *Approaches to qualitative research: An Oxford handbook of qualitative research in American music education,* Vol. 1 (pp. 37-55). Oxford University Press. ISBN:9780190920890

Anderson, T. (Ed). (2008). *The theory and practice of online learning*. Athabasca University Press.

Barrows, A. (2013). The phonics of folksonomies: Learning how to listen with Grooveshark. *PNLA Quarterly, 77*(4),27-31.

Bates, V. C. (2014). Rethinking cosmopolitanism in music education. *Action, Criticism & Theory for Music Education, 13*(1),309-327.

Bennett, A., & Dawe, K. (2001). *Guitar Cultures*. Berg.

Bennett, S., & Lockyer, L. (2004). Becoming an online teacher: Adapting to a changed environment for teaching and learning in higher education. *Educational Media International, 41*(3),231-248, DOI: 10.1080/09523980410001680842

Bigham, D. J. (2013). *Hearing connections: An actor-network study of online guitar activities* [Doctoral dissertation, University of California]. San Diego ProQuest Dissertations Publishing, 3557205.

Blake, J. N. (2018). Distance learning music education. *Journal of Online Higher Education, 2*(3),1-23.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(25),77-101. DOI:10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2014). Thematic analysis. In A. C. Michalos (Ed.) *Encyclopaedia of quality of life and well-being research* (pp. 6626-6628). Springer.

Braun, V., & Clarke, V. (2018, June 25). *Thematic analysis - an introduction* [Video]. YouTube. https://www.youtube.com/watch?v=5zFcC10vOVY&t=9s

Braun, V., Clarke, V., & Hayfield, N. (2019). *Thematic analysis part 4 – Braun, Clarke & Hayfield* [Video]. YouTube. https://www.youtube.com/watch?v=6uGDc9CQqLU

Brown, B., & Sellen, A. (2006). Sharing and listening to music. In K. O'Hara & B. Brown (Eds) *Consuming music together: Social and collaborative aspects of music* (pp. 37-56). Springer.

Camlin, D. A., & Lisboa, T. (2021). The digital 'turn' in music education. *Music Education Research, 23*(2),129-138.

Chanway, M. (2023, January 23). *Problems with free online guitar lessons*. Gitarrenunterricht Zürich. https://zuerichgitarrenunterricht.ch/problems-with-free-online-guitar-lessons/

Chomsky, N. (1965). *Aspects of the Theory of Syntax*. MIT Press.

Chomsky, N. (1976). *Reflections on Language*. Fontana/Collins.

Clayton, M. (2001). Rock to raga: The many lives of the Indian guitar. In A. Bennett & K. Dawe (Eds). *Guitar cultures* (pp. 179-208). Berg.

Cooper, S., Dale, C., & Spencer, S. (2009). A tutor in your back pocket: Reflections on the use of iPods and podcasting in an undergraduate popular music programme. *British Journal of Music Education, 26*(1),85-97.

Coppola, W. J. & Taylor, D. M. (2022). Cultural humility in music teacher education: Toward transformative dialogues on power, privilege, and social (in)equity. *Action, Criticism & Theory for Music Education, 21*(1),110-141.

Corintha, I., & Cabral, G. (2022). Improvisation pedagogy: An epistemological perspective of the 4'E' Model within digital musical instruments, *Revista Vórtex, 10*(1),1–18.

Cox, A. B. (2016). *Adult learning in online educative spaces: a constructive-developmental perspective* [Doctoral dissertation, University of Georgia]. https://getd.libs.uga.edu/pdfs/cox_alexandra_b_201612_phd.pdf

Cox, C. (2003). Versions, dubs, and remixes: Realism and rightness in aesthetic interpretation. In A. D. Ritivoi (Ed). *Interpretation and its objects, Studies in the philosophy of Michael Krausz* (pp. 285-292). Brill. ISBN: 90-420-1167-X.

Cox, D., & Forbes, M. (2022). Introducing multi-sited focused ethnography for researching one-to-one (singing voice) pedagogy in higher education. *Music Education Research, 24*(5),625-637. DOI: 10.1080/14613808.2022.2138842

Crawford, R. (2013). Evolving technologies require educational policy change: Music education for the 21st century. *Australasian Journal of Educational Technology, 29*(5),717-734.

Crawford, R. (2017). Rethinking teaching and learning pedagogy for education in the twenty-first century: Blended learning in music education. *Music Education Research, 19*(2),195-213.

Cremata, R. (2017). Facilitation in popular music education. *Journal of Popular Music Education, 1*(1),63-82. DOI:10.1386/jpme.1.1.63_1

Crotty, M. (1998). *The Foundations of social research: Meaning and perspective in the research process*. Sage. ISBN:9780367718145.

Davidson, C. N., & Goldberg, D. T. (2010). *The future of thinking: Learning institutions in a digital age*. The MIT Press. https://doi.org/10.7551/mitpress/8601.001.0001 ISBN electronic: 9780262266529.

Davies, C., Parry, G., Carruthers, J., & Kepple-Palmer, M. (2015). The epistemological foundations of music piracy in the digital marketplace. *Foresight and STI Governance, 9*(4),42–53. DOI: 10.17323/1995-459x.2015.4.42.53

Dyndahl, P., & G. Nielsen, S. (2014). Shifting authenticities in Scandinavian music education. *Music Education Research, 16*(1),105-118.

Ellefsen, L. W., & Karlsen, S. (2020). Discourses of diversity in music education: The curriculum framework of the Norwegian schools of music and performing arts as a case. *Research Studies in Music Education, 42*(2),270-290.

Escalante, S. (2020). Exploring access, intersectionality, and privilege in undergraduate music education courses. *Journal of Music Teacher Education, 29*(2),22-37.

FenderPlay. (2023, January 23). *What is feedback mode*. FenderPlay. https://play-support.fender.com/hc/en-us/articles/4410149175693-What-is-Feedback-Mode-#%E2%80%9Cscore%E2%80%9D

Ferrari-Nunes, R. (2010). *SPREE: Shetland's epistemological tradition of music making* [Doctoral dissertation, University of Aberdeen].

Finestrone, F. (2022). Music: For a sustainable community and the promotion of well-being. *Elementa. Intersections between Philosophy, Epistemology and Empirical Perspectives, 2*(1-2),85-99.

Friedlander, J. P. (2015). *News and notes on 2015 RIAA shipment and revenue statistics*. Recording Industry Association of America. www.riaa.com/wp-content/uploads/2016/03/RIAA-2015-Year-End-shipments-memo.pdf

Fumerton, R. (2009). *Epistemology*. Wiley. ISBN:9781405150354

Goodrich, A. (2021). Online peer mentoring and remote learning. *Music Education Research, 23*(2),256-269.

Gotting, M. C. (2022). *Digital music revenue in the United States from 2017 to 2027, by format*. Statista. https://www.statista.com/forecasts/455711/digital-music-revenue-format-digital-market-outlook-usa

Gotting, M. C. (2023). *Digital music, statistics and facts*. Statista. https://www.statista.com/topics/1386/digital-music/#topicOverview

Green, L. (2002). *How popular musicians learn: A way ahead for music education*. Ashgate.

Green, L. (2006). Popular music education in and for itself, and for 'other' music: Current research in the classroom. *International Journal of Music Education, 24*(2),101-118.

Green, L., Lebler, D., & Till, R. (2016). 'Editors' introduction: Popular music in education. *IASPM Journal, 5*(1),1-3.

Guest G., McQueen, K. M., & Namey, E. E. (2014). *Applied thematic analysis*. Sage. ISBN:9781412971676

Hallenbeck, A. (2019, January 17-19). *Ornette Coleman's cry of jazz: Music, meaning, and the ethics of transcription* [Paper presentation]. Documenting Jazz, Dublin, Ireland.

Hannan, M. F. (2000a). The training of contemporary popular musicians. *Music Forum, 7*(1),18-20.

Hannan, M. F. (2000b, July 8). Issues in the training of contemporary popular musicians [Paper presentation]. The International Association for the Study of Popular Music United Kingdom Conference, Guildford, UK.

Harasim, L. (2000). Shift happens: Online education as a new paradigm in learning. *The Internet and Higher Education, 3*(1-2),41-61.

Harrower, A. (2005). Copyright issues in internet music. *Contemporary Music Review, 24*(6),483-488.

Herron, D. (1985). *Deaf ears? A report of the provision of music education in Irish schools*. The Arts Council. https://www.artscouncil.ie/uploadedFiles/wwwartscouncilie/Content/Research_and_Publications/Music/Deaf_Ears.pdf

Hill, P. (2012). Online educational delivery models: A descriptive view. *Educause Review, 47*(6),84-86.

Hoang, D. (2022, April 1). *Can you learn guitar online?: An honest answer*. Guitar Advice. https://guitaradvise.com/can-you-learn-guitar-online/

Jackson, J. (2001). Youth and the popular music business. *Queensland Journal of Educational Research, 17*(1),85-105.

Jensen, L. X., Bearman, M., & Boud, D. (2021). Understanding feedback in online learning: A critical review and metaphor analysis. *Computers & Education, 173*(2021),104271.

Johnson, C. (2017a). Teaching music online: Changing pedagogical approach when moving to the online environment. *London Review of Education, 15*(3),439-456.

Johnson, C. (2017b). *Undergraduate online music course offerings rising exponentially: A research study* [Paper presentation]. 10th International Conference for Research in Music Education, Bath, UK.

Johnson, S. (2000). Authenticity: Who needs it? *British Journal of Music Education, 17*(3),277-286.

Kania, A. (2006). Making tracks: The ontology of rock music. *The Journal of Aesthetics and Art Criticism, 64*(4),401-414.

Kão, K., & Niitsoo, M. (2014). Matchmysound: Introducing feedback to online music education. In Y. Cao, T. Väljataga, J. K. T. Tang, H. Leung & M. Laanpere (Eds). *New Horizons in Web Based Learning. ICWL 2014. Lecture Notes in Computer Science, vol 8699* (pp. 217-225). Springer. https://doi.org/10.1007/978-3-319-13296-9_24

Keast, D. A. (2004). *Implementation of constructivist techniques into an online activity for graduate music education students* [Doctoral Dissertation, University of Missouri-Columbia]. Columbia ProQuest Dissertations Publishing, 3144428.

Keast, D. A. (2009). A constructivist application for online learning in music. *Research and Issues in Music Education, 7*(1),1-8.

Kitchenham, B., & Charters, S. (2007). *Guidelines for performing systematic literature reviews in software engineering Version 2.3*. University of Durham.

Kormoczi, R. (2020, June 24). *What is the digital age*. Times International. https://timesinternational.net/the-digital-age/

Koster, J. (1988). On language and epistemology. *Groningen Papers in Theoretical and Applied Linguistics TENK, 6*,59-74.

Krause, A. E., & North, A. C. (2016). Music listening in everyday life: Devices, selection methods, and digital technology. *Psychology of Music, 44*(1),129-147.

Kruse, A. J. (2018). Hip-Hop authenticity and music education: Confronting the concept of keeping it real. *Journal of Popular Music Education, 2*(1-2),149-164.

Lankshear, C. (2003). The challenge of digital epistemologies. *Education, Communication & Information, 3*(2),167-186, DOI: 10.1080/14636310303144

Lata, N., & Owan, V. J. (2022). Contemporary trends and technologies in research libraries: An overview. In T. M. Masenya (Ed). *Innovative technologies for enhancing knowledge access in academic libraries* (pp. 40-56). IGI Global. https://doi.org/10.4018/978-1-6684-3364-5.ch003

Lebler, D (2007). *Getting smarter music: A role for reflection in self-directed music learning* [Doctoral Dissertation, Queensland University of Technology]. https://eprints.qut.edu.au/16482/1/Don_Lebler_Thesis.pdf.

Lebler, D. (2008). Popular music pedagogy: Peer learning in practice. *Music Education Research, 10*(2),193-213. DOI:10.1080/14613800802079056

Lee, D. (2022). The impact of COVID-19 on virtual guitar communities: An immersive netnography. *Journal of World Popular Music, 9*(1.2),246-268. https://doi.org/10.1558/jwpm.23357

Lee, D., Baker, W., & Haywood, N. (2018). Instrumental teacher education and the incoming tide of information technology: A contemporary guitar perspective. *Australian Journal of Teacher Education, 43*(5),16-31.

Lengsfeld, J. (2019). *Digital era framework*. Lengsfeld. IDN-DNB: 1178463370. https://joernlengsfeld.com/files/digital-era-framework-en.pdf

Li, C-S., & Irby, B. (2008). An overview of online education: Attractiveness, benefits, challenges, concerns and recommendations. *College Student Journal, 42*(2),449-459.

Lincoln, Y. S., & Guba, E. G. (1986). But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. *New Directions for Program Evaluation, Special Issue Naturalistic Evaluation, 1986*(30), 73-84. .

Liong, Y-L., & Dixit, S. (2004). Digital rights management for the mobile internet. *Wireless Personal Communications, 29*(1),109-119.

Lorenzo de Reizaba, M. (2022). Music education models in the 21st century: The music mediation model for social engagement. *Revista Educación, 46*(2),666-686. https://doi.org/10.15517/revedu.v46i2.49922

Magnusson, T. (2009). *Epistemic tools: The phenomenology of digital musical instruments* [Doctoral Dissertation, University of Sussex]. https://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.505911

Manson, N. C. (2009). Epistemic inertia and epistemic isolationism: A response to Buchanan. *Journal of Applied Philosophy, 26*(3),291-298. DOI: 10.1111/j. 1468-5930.2009.00453.x

Matthies, A. (2019). *How to read guitar TAB: Ultimate guide with diagrams*. Guitar Gear Finder. https://guitargearfinder.com/lessons/how-to-read-guitar-tab/

May, B. N., Broomhead, P., & Tsugawa, S. (2020). A music literacy-based rationale for popular music ensembles and experiences in music education. *International Journal of Music Education, 38*(3),470-491.

McGuire, C. (2014). The concrete and the ephemeral of electronic music production. *Dancecult: Journal of Electronic Dance Music Culture, 6*(1). DOI: 10.12801/1947-5403.2014.06.01.12

Merriam, S. B. (2004). The role of cognitive development in Mezirow's transformational learning theory. *Adult Education Quarterly, 55*(1),60-68.

Moore, G. (2012). 'Tristan chords and random scores': Exploring undergraduate students' experiences of music in higher education through the lens of Bourdieu. *Music Education Research, 14*(1),63–78. DOI:10.1080/14613808.2012.657164

Moore, G. (2014). Mind the gap: privileging epistemic access to knowledge in the transition from leaving certificate music to higher education. *Irish Educational Studies, 33*(3),249-268. DOI: 10.1080/03323315.2014.926165

Nart, S. (2016). Music software in the technology integrated music education. *Turkish Online Journal of Educational Technology, 15*(2),78-84.

Nketia, J. H. K. (1967). The place of authentic folk music in education. *Music Educators Journal, 54*(3),41-133.

Nowak, R. (2014). Investigating the interactions between individuals and music technologies within contemporary modes of music consumption. *First Monday, 19*(10), https://doi.org/10.5210/fm.v19i10.5550.

O'Hara, W. (2018). Music theory and the epistemology of the internet; Or, analyzing music under the new thinkpiece regime. *Analitica: Rivista online di studi musicali, 10*. https://cupola.gettysburg.edu/consfacpub/19/

Palmer, A. J. (1992). World musics in music education: The matter of authenticity. *International Journal of Music Education, 92*(19),32-40.

Palmer, E. S. (2018). Literature review of social justice in music education: Acknowledging oppression and privilege. *Update: Applications of Research in Music Education, 36*(2),22-31.

Palvia, S., Aeron, P., Gupta, P., Mahapatra, D., Parida, R., Rosner, R., & Sindhi, S. (2018). Online education: worldwide status, challenges, trends, and implications. *Journal of Global Information Technology Management, 21*(4),233-241.

Park, C. H. & Kahng, M. (2010). *Temporal dynamics in music listening behavior: A case study of online music service* [Paper presentation]. IEEE/ACIS 9th International Conference on Computer and Information Science, DOI: 10.1109/ICIS.2010.142.

Parkinson, T., & Dylan Smith, G. (2015). Towards an epistemology of authenticity in higher popular music education. *Action, Criticism and Theory for Music Education, 14*(1),93-127. ISSN 1545-4517.

Partti, H., & Karlsen, S. (2010). Reconceptualising musical learning: New media, identity and community in music education. *Music Education Research, 12*(4),369-382.

Patil, S. R., & Dangat, S. S. (2014). A survey: Peer-to-peer traffic identification technologies. *International Journal of Computer Science and Information Technologies, 5*(6),7389-7392.

Peczek, E. (2015). *Guitar lessons vs teaching yourself*. Classical Guitar Academy. https://www.classicalguitaracademy.co.uk/guitar-lessons-vs-teaching-yourself/

Peng, F. (2022). Music copywriting and the problems of music education: Overcoming prohibitions and the use of music in teaching. *Music Education Research, 25*(1),1-12. https://doi.org/10.1080/14613808.2022.2128319

Pollack, W. M. (1999). Tuning in: The future of copyright protection for online music in the digital millennium. *Fordham Law Review, 68*, 2445.

Rao, K., & Tanners, A. (2011). Curb cuts in cyberspace:

Universal instructional design for online courses. *Journal of Postsecondary Education and Disability, 24*(3),211-229.

Regelski, T. A. (2006). Reconnecting music education with society. *Action, Criticism, and Theory for Music Education, 5*(2),1-20.

Reily, S. A. (2001). Hybridity and segregation in the guitar cultures of Brazil. In A. Bennett & K. Dawe (Eds). *Guitar Cultures* (pp. 157-178). Berg.

Resnick, M. (2002). Rethinking learning in the digital age. In G. S. Kirkman, P. K. Cornelius, J. D. Sachs, & K. Schwab (Eds). *The global information technology report 2001–2002: Readiness for the networked world* (pp. 32-37). Oxford University Press.

Ross, S. & Hedstrom, M. (2005). Preservation research and sustainable digital libraries, *International Journal of Digital Libraries, 5*,317–324. DOI: 10.1007/s00799-004-0099-3.

Rousseau D. M., Manning, J. & Denyer, D. (2008). Evidence in management and organizational science: Assembling the field's full weight of scientific knowledge through syntheses. *AIM Research Working Paper Series: Advanced Institute of Management Research*. ISSN: 1744-0009

Ruthmann, S. A. (2007). Strategies for supporting music learning through online collaborative technologies. In J. Finney & P. Burnard. (Eds). *Music education with digital technology* (pp. 131-141). Continuum International Publishing Group.

Salavuo, M. (2006). Open and informal online communities as forums of collaborative musical activities and learning. *British Journal of Music Education, 23*(3),253–271. DOI:10.1017/S0265051706007042

Salavuo, M. (2008). Social media as an opportunity for pedagogical change in music education. *Journal of Music, Technology & Education, 1*(2-3),121-136.

Salavuo, M. & Hakkinen, P. (2005). Epamuodolliset verkkoyhteisot musiikin oppimisymparistoina. Tapaus: mikseri.net (Informal online communities as music learning environments. Case: mikseri.net. *Musiikki, 1*(2),112–38.

Schedl, M. & Bauer, C. (2019). Online music listening culture of kids and adolescents: Listening analysis and music recommendation tailored to the young. *arXiv preprint* arXiv:1912.11564.

Schembri, S., & Tichbon, J. (2017). Digital consumers as cultural curators: The irony of vaporwave. *Arts and the Market, 7*(2),191–212.

Schiebel, C. (2022, May 2). *How to learn to play guitar by yourself (step by step)*. Guitar Lobby. https://www.guitarlobby.com/learn-to-play-guitar-by-yourself/

Schippers, H. (2009). *Facing the music: Shaping music education from a global perspective*. Oxford University Press.

Schwartz, J. (1993). Writing Jimi: Rock guitar pedagogy as postmodern folkloric practice. *Popular Music, 12*(3),281-288.

Scott-Kassner, C. (2006). Global music-The struggle for authenticity and ownership: A brief overview of the past and future in multicultural approaches to music education. *The Mountain Lake Reader, (Spring, 2006),*8-15.

Shapley, P. (2000). On-line education to develop complex reasoning skills in organic chemistry. *Journal of Asynchronous Learning Networks, 4*(2),43-52.

Siemens, G., Gašević, D., & Dawson, S. (2015). *Preparing for the digital university: A review of the history and current state of distance, blended, and online learning*. Athabasca University Press.

Smith, D. A. (2002). *A History of the lute from antiquity to the renaissance*. Lute Society of America. ISBN:9780971407107

Smyth, E., & Calvert, E. (2011). *Choices and challenges: Moving from junior cycle to senior cycle education*. The Liffey Press in association with ESRI, NCCA and Department of Education & Skills. https://www.esri.ie/publications/choices-and-challenges-moving-from-junior-cycle-to-senior-cycle-education

Solo, A. (2014). The role of copyright in an age of online music distribution, *Media & Arts Law Review, 169*. https://ssrn.com/abstract=2462006

Sordo, M., Gouyon, F., Sarmento, L., Celma, O., & Serra, X., (2013). Inferring semantic facets of a music folksonomy with Wikipedia. *Journal of New Music Research, 42*(4),346-363.

Spillane, J. (2019, January 17-19). Documenting 'Gypsy Jazz': Understanding the posthumous influence of Django Reinhardt and the ongoing interpretation and codification of his music through pedagogy and performance [Paper presentation]. *Documenting Jazz, Dublin, Ireland*.

Steele, J., & Holbeck, R. (2018). Five elements that impact quality feedback in the online asynchronous classroom. *Journal of Educators Online, 15*(3),n3.

Steup, M., & Neta, R. (2020). *Epistemology*. Stanford Encyclopedia of Philosophy. https://plato.stanford.edu/entries/epistemology/

Storr, A. (1993). *Music and the Mind*. Random House Publishing Group.

Sun, A., & Chen, X. (2016). Online education and its effective practice: A research review. *Journal of Information Technology Education: Research, 15*,157-190. http://www.informingscience.org/Publications/3502

Tagg, P. (2011). Caught on the back foot: Epistemic inertia and visible music. *IASPM Journal 2*(1-2),3-18. http://doi.org/10.5429/2079-3871 (2011) v2i1-2.2 en

Tawfik, G. M., Dila, K. A. S., Fadlelmola Mohamed, M.W., Tam, D. N. H., Kien, N. D., Ahmed, A. M., & Huy, A. T. (2019). A step by step guide for conducting a systematic review and meta-analysis with simulation data. *Tropical Medicine and Health, 47*(46). https://doi.org/10.1186/s41182-019-0165-6

Thibeault, M. D. (2012). From compliance to creative rights in music education: Rethinking intellectual property

in the age of new media. *Music Education Research, 14*(1),103-117.

Thomas, D. (2022). *What is the digital age?* Ventiv Technology. https://www.ventivtech.com/blog/what-is-the-digital-age#:~:text=The%20era%20started%20during%20the,beginning%20of%20the%20Information%20Era%E2%80%9D.

Tian, L. (2020). Development of online music education supporting autonomous learning. *IOP Conference Series: Materials, Science and Engineering.* 750 012012. https://iopscience.iop.org/article/10.1088/1757-899X/750/1/012012

Till, R. (2017). Popular music education: A step into the light. In G. Dylan Smith, Z. Moir, M. Brennan, S. Rambarran & P. Kirkman (Eds.) *The Routledge Research Companion to Popular Music Education* (pp. 14-30). Routledge.

Turkle, S. (2011). *Alone together: Why we expect more from technology and less from each other.* Basic Books.

Vander Wal, T. (2005a, November 2). *Folksonomy definition and Wikipedia. Off the top.* Vanderwall.net. http://www.vanderwal.net/random/entrysel.php?blog=1750

Vander Wal, T. (2005b, January 18). *Folksonomy explanations. Off the top.* Vanderwall.net. http://www.vanderwal.net/random/entrysel.php?blog=1622

Waldron, J. (2009). Exploring a virtual music 'Community of Practice': Informal music learning on the internet. *Journal of Music, Technology and Education, 2*(2 and 3),97-112. DOI: 10.1386/jmte.2.2-3.97_1

Wenger, E. (1998). *Communities of Practice: Learning, Meaning, and Identity.* Cambridge University Press.

Wikstrom, P. (2014). The music industry in an age of digital distribution. In M. Castells, D. Gelernter, J. Vázquez, E. Morozov & M. Hyppönen (Eds). *19 key essays on how internet is changing our lives* (pp. 423-467). Turner.

Wiltsher, N. (2016). The aesthetics of electronic dance music, Part II: Dancers, DJs, ontology and aesthetics. *Philosophy Compass, 11*(8),426-436.

Wolfe, C. R. (2000). *Learning and Teaching on the World Wide Web.* Academic Press.

Woody, R. H. (2007). Popular music in school: Remixing the issues. *Music Educators Journal, 93*(4),32-37.

Xiao, Y., & Watson, M. (2019). Guidance on conducting a systematic literature review. *Journal of Planning Education and Research, 39*(1),93–112. https://doi.org/10.1177/0739456X17723971

Xu, Y. (2022). The new media environment presents challenges and opportunities for music education in higher education. *Journal of Environmental and Public Health* 2022, Article ID 9261521. https://doi.org/10.1155/2022/9261521

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