

Research Methodology

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Voice pedagogy research is a field of vast variety. Unlike the fields of medical or social sciences, where certain kinds of learning are paramount, an incomplete list of voice pedagogy research subjects includes: learning what is happening in the body (Yoshida et al., 1988); what a singer is feeling physically (Bozeman, 2021); the intersection of vocal talent and emotional recognition (Greenspon and Montonaro, 2022); and the effects of socio-economic status on musical abilities (Albert, 2006). Given this breadth of possibilities, it is important to gain the tools to understand both what information exists, and also how we can add to it. Research methods pull from a variety of fields: medical and other 'hard' science fields for one set of questions; social sciences, education, and psychology for another. It perhaps sounds obvious that questions we ask ought to dictate the type of information that we seek (Bryman, 2007), however the implications of this are enormous for any researcher and particularly for one in a research sphere as varied as voice pedagogy. Further, all research is based on assumptions that exist along a spectrum. At one end is the objective; at the other the subjective (Walliman, 2005). The goals and values of the research and the researcher dictate what is to be studied, and from there we can choose the most useful assumptions, starting with a definition of the meaning of existence.

Ontology

The first major assumption the researcher needs to explore is what they are assuming about the nature of reality. Does reality exist outside of our perception of it? This has been a subject of debate for well over two thousand years, starting with the pre- Socratic Greek philosophers, Heraclitus and Parmenides (Gray, 2011, p 17). Heraclitus argued that reality was entirely dependent on the perception of the viewer, which is a perspective that we now label 'becoming' (Gray, 2011, p 17; Graham, 2019) ontology. Similarly, Relativist ontology posits that reality does not exist outside of the viewer's subjective experience (Levers, 2013, p. 2). Parmenides, perhaps in response to Heraclitus (Graham, 2011; Gray, 2011) argued for a single, objective reality that exists regardless of whether it has been perceived by a human mind. This is 'being'

ontology. (Gray, 2011, p. 17). The ontology that a researcher adopts dictates the rest of their work (Hanly and Fitzpatrick Hanly, 2001). An objective, outside reality leaves a world to be discovered by a seeker; a subjective one implies that we create our reality (Walliman, 2005). Being ontology has held sway in most western thought, and for good reason: it allows for naming and categorizing of objects. This has allowed humans to name and categorize the world around them. Development of categorization systems continues to be an important subject today in fields like medicine and computer science (Haendel, Chute, and Robinson, 2018). As we will see, however, 20th and 21st century researchers have begun to tap into the wisdom of perspective to address different research questions.

Epistemology

The ontology our research asks us to adopt will have a direct line towards what we define as knowledge, which is termed epistemology. A being ontology directs us towards discovery of an external truth; a becoming or relativist ontology directs us towards seeking perspectives. As Levers (2013, p 2) puts it, “logically, ontological beliefs confine epistemological beliefs.” Gray (2011) discusses three major epistemological systems: objectivism, constructivism, and subjectivism. Objectivism and constructivism stem from being ontology (Gray, 2011). If there is a world that exists whether someone has seen it or not, then it follows that there is information in that world for us to discover. Objectivism holds that this information is all there is to knowledge (Schneider, 2022). This has major implications for the natural sciences. Constructivism builds on this, saying that, while there is an objective, outside world (Putnam cited in Olssen, 1995) that humans build their own realities on their perceptions of this world (Olssen, 1995). From becoming and relativist ontology, we find Subjectivism. Subjectivism holds that knowledge is entirely based on human perception of the world (Gray, 2011).

Axiology

Axiology is a difficult subject to define, but as with ontology and epistemology, it has major implications for how the researcher proceeds. It is the study of values; within this exploration of research design and methodology, we are understanding how to apply this to research. Where epistemology studies what defines knowledge, axiology is the study of what information is valuable to know (Biedenbach and Jacobsson, 2016, p 140). The selection of topic says much about the researcher and what is important to them. The methods that stem from a research question back this up. Does the researcher value empirical knowledge? Do they value the perspectives of individuals? How did the researcher, her intended audience, and perhaps even

the world at large, come to value certain types of knowledge over others? Where the researcher stands on these questions can reflect her personal epistemology and ontologies, or it can simply reflect the epistemology and ontology needed to best answer the research question (Biedenbach and Jacobsson, 2016 p. 150). Hart, for example, gives the reader a lot to unpack when he poses this question: “Are values mere responses of man to a value-neutral nature or are they results of an ongoing interaction of reality and man?” (Hart, 1971, p. 30) The way we answer this connects immediately to our epistemology and ontology. A ‘value-neutral nature’ reflects a being ontology, or a reality that exists outside of the human perception of it. Values being ‘responses of man’ to me indicates a constructivist epistemology, or meaning being layered on top of a world that exists regardless of it; the addition of the word ‘mere,’ however, seems to remove import and value, from this response, and point us in the direction of an objectivist epistemology. Additionally, Biedenbach and Jacobsson, citing Hartman, help us to connect the study of values to ethics, with their discussion of intrinsic values. Humans, they say, have intrinsic value, which is to say they have value “in their own right,” (Biedenbach and Jacobsson, 2016, p 141).

Research Paradigms

A research paradigm pulls these elements into a cohesive philosophy that guides research, methodology and methods (Kivunja and Kuyini, 2017). The paradigm starts to translate our research question and its ensuing ontology, epistemology, and axiology into practical strategies that we can use to put them into action.

Objectivist Paradigms

The dominant paradigm in research over the past 400 or so years is positivism. This paradigm posits that there is an absolute truth to discover, which places it firmly in the line of a being ontology and an objectivist epistemology (Park, Konge, Artino 2020 p 691). It aims to be free of value judgements on the parts of the researchers (Gray, 2011); the researchers therefore work to distance themselves from the subject matter so that they do not bias the process (Maksimovic and Evimov, 2023; Gray 2009; Park, Konge, Artino 2020). Further, it dismisses the importance of individuals’ subjective experiences and values. Park, Konge, and Artino claim this makes it difficult to apply to qualitative and social sciences research (p 692). It has found the most success in quantitative, natural science research, which relies on empirical evidence and measurements (Maksimovic and Evtimov, 2023). Voice research provides us with ample examples of this. Roubeau’s work correlating the measured EGG signals with registration

events (2009, 2004) could be classified as observational, as could Yoshida et al's work observing the sensory innervation of cat larynxes. Also under the positivistic umbrella would be the many studies conducted on excised larynxes (Döllinger et al, 2011; Vennard and Van den Berg, 1960).

Despite its long history and, admittedly, many successes, positivism has been heavily criticized by modern writers and researchers, even those in the 'hard' sciences like physics, which base much of their 'proof' on mathematics rather than events we can observe directly. In voice research, Ingo Titze's 1988 paper, "A Framework for the Study of Vocal Registers," provides us with an example of this: Titze developed a theoretical, mathematical model to describe registration events that were not observable to the naked eye. While it absolutely furthers knowledge in the field, it does not fit with a purely objectivist epistemology. Further, critics claim that the decision of what to research and look for is a choice by the researcher (Williams and May 1996, cited in Gray, 2011). Donald Schön, states that the goal of researcher objectivity actually does a disservice to professionals whose unique experience and expertise brings both intrinsic value and biases to the situation that they ought to be able to acknowledge and exploit (Schön, 1983). Finally, those studying social sciences, particularly with regard to emotions, need frameworks that value the subjective realities of participants, either as valuable by themselves or as valuable because they showed a glimpse of 'reality.' (Walliman, 2005, pp 270-271). Postpositivism and Critical Realism respond to this by adding a dose of humility to a positivistic outlook: they take into account the idea that, while a world exists empirically outside of ourselves, we cannot understand or know the entire picture, but rather can only catch glimpses of it (Gray 2009, Levers, Hanly and Fitzpatrick Hanly, 2001; Maksimovic and Evtimov, 2023). These updates also acknowledge that researchers have biases (Maksimovic and Evtimov, 2023).

Subjectivist Paradigms

Most subjectivist paradigms seem to fall under the umbrella of interpretivism. This follows a becoming epistemology and an axiology that values not truth seeking but rather the perspectives of those studied, as in Roll (2015), where she examines what voice students and teachers are doing in lessons. I've chosen to focus on phenomenology as a sub-paradigm because I found examples of it that seemed relevant to my interests; however, other interpretivist paradigms include symbolic interactionism, realism, and naturalistic inquiry (Gray, 2011, p. 21).

Phenomenology is a type of qualitative research whose goal is to learn from the subjective experiences of the participants (Randles, 2012). There are two major branches of it: transcendental phenomenology and hermeneutic phenomenology (Randles, 2012). The former involves the researcher separating herself from the subject and only working with the subjective experiences of the subject (Randles, 2012). The latter involves acknowledging the researcher, with all of her experiences and biases, as the impetus for the research in the first place (Neubauer, Witkop, Varpio 2019). Hermeneutical phenomenology offers a way to bridge the gap between research and practice because it requires no other statistical knowledge. This is a major, practical benefit: the methods of data collection require little or no translation into 'useful information' for the research's intended audience. This is particularly useful for fields like music education, where teachers might not have the background to translate data heavy research into applicable classroom skills (Randles, 2012). Although phenomenology is not specifically mentioned, I would use Christine Roll's 2015 paper, "The Evolution of the Female Broadway Belt Voice," as an example of this. She presents her experience as a musical theater belter as an asset to her research; she uses narrative description of the events to present a clear picture of what the voice teachers are doing and, importantly, what the singers are experiencing as a crucial part of her data. I found the descriptions of the exercises and sensations by the singers to be immediately applicable to my own teaching, which I suspect was deliberate and which falls easily in line with Randles' emphasis on the practicality of hermeneutic phenomenology for immediate use in teaching, without the need to translate from numerical data (Randles, 2012). A further benefit of phenomenology and perhaps other interpretivist paradigms would be for learning how my students experience singing and their voices, and understanding how different people develop a kinesthetic awareness.

Data collection

Quantitative Research

It will be useful at this point to present an overview of qualitative and quantitative research, which refer to means of collecting data (Thanh and Thanh, 2015). Quantitative research deals with the collection and analysis of numerical data. It stems from a being ontology and realist epistemology. It is often, though not always, deductive, meaning that it is used to test hypotheses, and seeks to distance itself from the biases of the researcher (Ghanad, 2023;

Quieros, Faria, and Almeida, 2017; Walliman, 2005). Quantitative researchers seek to exercise a high degree of control over their subjects (Walliman, 2005), with the goal of reducing intervening variables (Gray, 2011) and therefore making the results generalizable to a large population (Gray, 2011; Ghanad, 2023; Quieros, Faria, and Almeida, 2017). To this end, it is ideally done with a large, random sample of the test population (Gray, 2011). Quantitative studies that do not use random sampling are referred to as 'quasi-scientific' (Gray, 2011) because of this lack of generalizability. It seeks to answer questions that deal with relationships between variables, for example "how long, how many, and the degree to which" (Ghanad, 2023, p. 3794), but does not focus on understanding the context of the research question (Quieros, Faria, and Almeida, 2017). Importantly, quantitative research is usually seeking to demonstrate relationships as they exist at a certain point in time, and not how those relationships develop over periods of time (Quieros, Faria, and Almeida, 2017). Some more specific research methods associated with quantitative methodologies are Correlational Studies, where variables are defined and correlation measured (Quieros, Faria, and Almeida, 2017); Multivariate Analysis, where multiple variables are defined and analyzed in a statistical model (Quieros, Faria, and Almeida, 2017); Field Experiments, where main and control groups are defined and relationships either established or not (Quieros, Faria, and Almeida, 2017); Simulations, where a priori hypotheses are tested on mathematical and computer models (Quieros, Faria, and Almeida, 2017), and Surveys, where data are collected and evaluated inductively (Quieros, Faria, and Almeida, 2017), meaning that they are not testing a hypothesis (Gray, 2011; Walliman, 2005; Bryman, 2006). Of these research methods, I found the most voice research using simulations and surveys: Isogai et al.'s (1988) work on vocal fold vibration using a model, and Mohsen Motie-Shirazi et al.'s (2021) exploration of Intraglottal aerodynamic pressure and energy are both examples of this. Research on live subjects tended to be surveys, such as Roubeau et al.'s 2004, "Phonétogramme Par Registre Laryngé" and Yoshida et al.'s 1988, "The Peripheral Sensory Innervation of the Larynx in Cats." I imagine that these two are the most common because variables would be difficult to control for ethically in a study of the human body and specifically something as life-supporting as the airway. Anything in vivo would therefore need to be exploratory, and testing variables would be best left to something outside of the body. In my mixed methods work, I will likely add a survey to correlate a perceived change using spectral analysis on Voce Vista.

Qualitative research, by contrast, is deliberately not numerical. It seeks to answer 'why' questions that give more in depth and context to descriptions of phenomena over time (Quieros,

Faria, and Almeida, 2017; Gill, 2020). It can be used in objectivist, constructivist, and subjectivist research (Gray, 2011), though, given that the biases of the researcher are more difficult to separate than in numbers-based work, it is more commonly associated with the latter to epistemologies (Gray, 2011). It often, though not always, views the background and perspectives of the researcher as an advantage (Quieros, Faria, and Almeida, 2017; Gray, 2011), an example of this being in Christianne Roll's 2015 paper, "The Evolution of the Female Broadway Belt Voice," where she cites her background as a musical theater belt singer and teacher as an advantage for both "analyzing the results" and "facilitating the interviews" (p. 2) in her research. It is closely associated with social science research (Moriarty, 2011, cited in Quieros, Faria, and Almeida, 2017), where the specific perspectives of subjects are the topic of study. Focus groups, where interviews of the recruited group are conducted, transcribed and analyzed (Quieros, Faria, and Almeida, 2017); Case studies, where empirical data collected and analyzed verbally (Yin, 2003); structured interviews, where specific questions are formulated and asked (Quieros, Faria, and Almeida, 2017); in-depth interviews, where allowance is made for more depth from the studied and improvisation from the researcher (Quieros, Faria, and Almeida, 2017); observation, where individuals and situations are observed (Quieros, Faria, and Almeida, 2017); ethnography, where observations are situated within a cultural context (Soukup et al, 2016); and field research, which combines elements from interviews and observations as needed (Quieros, Faria, and Almeida, 2017; Gray, 2011; Walliman, 2005). Roll provides us with examples of many of these concepts. She observes lessons from four 'master teachers', collecting field notes, and then conducts semi-structured interviews with both the teachers and their students. She explains that, given that her goal was understanding both the singers' and the teachers' perceptions of what they were doing, that it was important for the interviews to be able to progress in an exploratory way. She then explains that she recorded and transcribed interviews. She additionally used her data to create case studies of each teacher, and seemed to use thick description, or deep analysis of her field notes for the purpose of building trustworthiness with the reader (Ravelo, 2023). For my own work, where I am also interested in my students' evolving perceptions of their kinesthetic awareness, I can see where the use of semi-structured interviews and observations documented in case studies could help in my efforts to document their perceptions of what they are doing. Qualitative methods tend to be very time consuming per studied participant, which can translate to increased costs for the research (Quieros, Faria, and Almeida, 2017). Likely related to this is a major difference in sampling strategies. Qualitative strategies are not random (Gill, 2020 p. 579), and sample sizes tend to be small (Gray, 2011; Gill, 2020). There are four major types of qualitative sampling:

Convenience, where participants volunteer to be in the study (Gill, 2020; Walliman, 2005); Snowball, where current participants recommend others (Gill, 2020; Walliman, 2005); Purposive, where participants are selected based on their abilities or knowledge about the research subject (Gill, 2020; Walliman, 2005; Palinkas et al 2016); and Theoretical, where the researcher is 'creating theory' (Gill, 2020, p. 580). Of these I found the most evidence of purposive sampling in voice research on live humans, regardless of whether the study was qualitative or quantitative (Roubeau, 2009; Roll, 2016). In the case of Roll's paper, the whole point of the paper is to investigate what voice teachers and students think they are doing to generate successful female belters. As such, it makes sense to have skill in singing and success in teaching to be the barriers to entry.

Mixed methods the Pragmatic Paradigm

Mixed methods approaches refer to research that uses both qualitative and quantitative methods. In collecting data from different viewpoints (Gray, 2011) they seek convergence and a corroboration of findings, which is commonly termed triangulation (Greene, Caracelli, and Graham, 1989, Bryman, 2006).

Mixed Methods are viewed along a continuum (Gray, 2011). Purists state that, since different paradigms contain fundamentally different assumptions about the nature of reality and knowledge, combining them creates logically senseless research (Greene, Caracelli, and Graham, 1989, Hampton and McKinley 2023) Some situationists seek triangulation across different studies but not within the same study (Rossman and Wilson 1985 cited in Greene, Caracelli, and Graham, 1989), while others simply feel that different research questions call for different approaches, and that a researcher should adapt his or her stance based on the information she seeks (Gray, 2011). Pragmatists take all this a step farther and state that the primary research concern ought to be the problem itself. It is therefore appropriate to combine qualitative and quantitative approaches into one study (Greene, 1987).

Greene, Caracelli, and Graham (1989) and Maarouf (2019), advocate for pragmatism, though they seem to take the logical concerns raised by the purists and situationists very seriously. Greene, Caracelli, and Graham land on the recommendation that triangulation is best achieved with research that uses methods in the same paradigmatic framework. Maarouf, likewise, states that research needs to be presented as a coherent paradigm that conceptualizes ontological,

epistemological, and axiological stances so that it doesn't present us with logical fallacies, and that the same basic ontological and epistemological assumptions can be used for both quantitative and qualitative research. For example, empirical evidence can take the form of numbers and statistics but it can also take the form of descriptions. Hanly and Fitzpatrick Hanly (2001) discuss Critical Realism in a way that proves useful to this discussion. They posit that the major stance of Critical Realism is an insistence that, while there is an objective reality, it is impossible to understand its entire scope. It is therefore firmly within the bounds of Critical Realism to learn a perspective from an interview or, in the context of the article, a psychological patient, and to understand this as a piece of reality and our continued inquiry into this is a form of objectivist truth seeking. Turning our attention back to triangulation, Greene, Caracelli, and Graham recommend using quantitative and qualitative data collection methods that are different from one another and which compliment and compensate for the weaknesses in the other method. In my own study design, I can see how finding ways to triangulate my data could prove useful. I am interested in correlating singer perceptions of physical actions with the actions themselves. I would be interested in doing a combination of singer observations and interviews, which is subjective, and acoustic measurements via Voce Vista, which is more objective, to hopefully find ways to triangulate and validate events that they are experiencing. I feel that this could be situated most easily in a constructivist epistemology, though it could also work in a Critical Realist epistemology as described by Hanley and Fitzpatrick Hanly (2001), if we view singer perceptions of their actions and resulting sensations as perspectives on an external reality.

Ethics and insider research

The last subjects to consider concern ethics generally, and ethics as they relate to insider research. Doucet and Mauthner (2002) posit that our goal as researchers is to develop "responsible knowledge," (p. 14) which is intimately connected to our discussion of axiology at the beginning of the paper. What knowledge we choose to value is related to how that knowledge was obtained (Doucet and Mauthner, 2002), how it is presented (Doucet and Mauthner, 2002), how it might be used for good or ill in the future (Walliman, 2005), and how good or ill use are defined (Walliman, 2005). Plagiarism, or the presentation of another researcher's work as your own (Walliman, 2005), is unethical, as is claiming sole authorship of collaborative work (Walliman, 2005). Additionally, deliberately leaving out information that does not support a theory or hypothesis is misleading and could result in harm from use of the research (Doucet and Malthaner, 2002). In order to collect 'responsible' information, (Walliman,

2005), the researcher must protect the intrinsic value (Biedenbach and Jacobsen, 2016; Kivunja and Kuyini, 2017) of the research subjects, from whom the data will likely come. The researcher needs to display transparency regarding the process, intent, and use of the research, and needs to provide potential subjects with information required to participate with informed consent (Walliman, 2005), which includes making sure they have ample time to process any provided information (Walliman, 2005). It is additionally crucial that subjects' privacy be protected (Kivunja and Kuyini, 2017), as Roll does when she clearly goes to great lengths in her research on belting techniques, and that power dynamics do not lead to their feeling coerced to participate in any way, including if they want to leave my research while it is in process (Kivunja and Kuyini, 2017; Walliman, 2005).

All of these issues are compounded by the fact that I will likely be working as an Insider Researcher, meaning a researcher who is part of the community of practice being studied (Costley, Elliott, and Gibbs, 2010). In my case, I am the leader of said community of practice, my voice studio, and I will need to practice continual self reflection to avoid issues in power dynamics that could arise due to my being in a position of authority over my students. This is because, while I am financially dependent on them, I hold the information that they need in order to learn to sing. I could cause physical and emotional harm if I do not handle this responsibility properly, and it will be important I practice continual self-reflection to monitor my own role in the power dynamics at play (Biedenbach and Jacobssen, 2016; Costly, Elliott, and Gibbs, 2010). I will further need to be aware of ways in which power dynamics could impact outcomes of the research itself (Walliman, 2005): subjects might wish to please the researcher especially if, as will be my situation, the researcher is someone with whom they have a preexisting relationship that contains a power differential (Walliman, 2005). Although, knowing them personally, I am certain that the intent would be to be helpful, such 'teacher pleasing,' would actually pollute my results and damage the knowledge that I am trying to create. Doucet and Mauthner (2002) tie this self-reflection, or reflexivity, back to epistemology, emphasizing that, while the researcher can never fully understand all of the factors that have impacted her and the choices she made in her work, she has an obligation to her readers and to others affected by her research to attempt to be as reflexive as possible. This leads to greater transparency in her work and allows others to take in the knowledge she has created fully aware of her epistemological positions (p. 15). Self reflection and transparency of both background and epistemological positions on the part of the researcher, it seems, allow for fuller consent on the

parts of both the participants and also for proper contextualization on the part of those who consume the research.

Conclusion

I find myself very drawn to both a constructivist epistemology and mixed methods research paradigms. Some of this is practical- while I am interested in 'purely scientific' work, I have neither the educational background currently, nor do I have the access to instruments to measure some of the things that I would want to measure. Some of it, I am realizing, comes from my own worldview. I started this paper very committed to the idea that the research question entirely dictates the course of the research; I have to concede to some of the writers that I read and admit that my choice of a research question says a lot about my own ideas and biases. Constructivism appeals to me in no small part because it seems in line with books I have read describing modern thinking in neuroscience- namely that the brain constructs a reality based on stimuli that it receives from the world around it, (Barrett, 2017) and that information, perhaps ironically, is probably based in objectivist research. Regardless, I also find the intersection between perception and reality in the voice fascinating, and am looking forward to delving into this further in future work.

Reference list

Albert, D.J. (2006). Socioeconomic Status and Instrumental Music: What Does the Research Say about the Relationship and Its Implications? *Update: Applications of Research in Music Education*, 25(1), pp.39–45. doi:<https://doi.org/10.1177/87551233060250010105>.

Allemang, B., Sitter, K. and Dimitropoulos, G. (2021). Pragmatism as a Paradigm for Patient-oriented Research. *Health Expectations*, 25(1), pp.38–47. doi:<https://doi.org/10.1111/hex.13384>.

Barrett, Lisa Feldman (2017). *How Emotions Are Made*. Pan Books Ltd.

Biedenbach, T. and Jacobsson, M. (2016). The Open Secret of Values: the Roles of Values and Axiology in Project Research. *Project Management Journal*, 47(3), pp.139–155. doi:<https://doi.org/10.1177/875697281604700312>.

Bozeman, K. (2021). *Kinesthetic voice pedagogy 2 : motivating acoustic efficiency*. Gahanna,

Oh: Inside View Press.

Bryman, A. (2006). Integrating Quantitative and Qualitative research: How Is It done? *Qualitative Research*, 6(1), pp.97–113.

Bryman, A. (2007). The Research Question in Social Research: What is its Role? *International Journal of Social Research Methodology*, [online] 10(1), pp.5–20.
doi:<https://doi.org/10.1080/13645570600655282>.

Chang, Q. (2022). The Contribution of a Hermeneutic Approach to Investigate Psychological Variables in Second Language Acquisition. *Frontiers in Psychology*, 13.
doi:<https://doi.org/10.3389/fpsyg.2022.1055249>.

Costley, C., Elliott, G. and Gibbs, P. (2010). *Doing work based research : Approaches to enquiry for insider-researchers*. London: Sage.

Döllinger, M., Kobler, J., Berry, D.A., Mehta, D.D., Luegmair, G. and Bohr, C. (2011). Experiments on Analysing Voice Production: Excised (Human, Animal) and in Vivo (Animal) Approaches. *Current bioinformatics*, [online] 6(3), pp.286–304.
doi:<https://doi.org/10.2174/157489311796904673>.

Doucet, A. and Mauthner, N. (2002). Knowing Responsibly: Linking Ethics, Research Practice and Epistemology. *Ethics in Qualitative Research*, [online] pp.123–145. Available at: https://www.andreadoucet.com/wp-content/uploads/2014/01/Knowing_Responsibly.pdf [Accessed 4 Aug. 2024].

Gill, S.L. (2020). Qualitative Sampling Methods. *Journal of Human Lactation*, 36(4), pp.579–581. doi:<https://doi.org/10.1177/0890334420949218>.

Graham, D.W. (2019). *Heraclitus (Stanford Encyclopedia of Philosophy)*. [online] Stanford.edu. Available at: <https://plato.stanford.edu/entries/heraclitus/> [Accessed 24 May 2024].

Gray, D.E. (2011). *Doing Research in the Real World*. 2nd ed. Los Angeles Sage.

Greene, J.C., Caracelli, V.J. and Graham, W.F. (1989). Toward a Conceptual Framework for MixedMethod Evaluation Designs. *Educational Evaluation and Policy Analysis*, [online] 11(3), pp.255–274. doi:<https://doi.org/10.2307/1163620>.

Greenspon, E.B. and Montanaro, V. (2022). Singing ability is related to vocal emotion recognition: Evidence for shared sensorimotor processing across speech and music. *Attention, Perception, & Psychophysics*, 85(1), pp.234–243.

doi:<https://doi.org/10.3758/s13414-022-02613-0>.

Haendel, M.A., Chute, C.G. and Robinson, P.N. (2018). Classification, Ontology, and Precision Medicine. *New England Journal of Medicine*, [online] 379(15), pp.1452–1462.

doi:<https://doi.org/10.1056/nejmra1615014>.

Hampson, T. and McKinley, J. (2023). Problems Posing as solutions: Criticising Pragmatism as a Paradigm for Mixed Research. *Research in Education*, [online] 116(1), p.003452372311600.

doi:<https://doi.org/10.1177/00345237231160085>.

Hanly, C. and Fitzpatrick Hanly, M.A. (2001). Critical Realism: Distinguishing the Psychological Subjectivity of the Analyst from Epistemological Subjectivism. *Journal of the American Psychoanalytic Association*, 49(2), pp.515–532.

doi:<https://doi.org/10.1177/00030651010490021001>.

Hart, S.L. (1971). Axiology--Theory of Values. *Philosophy and Phenomenological Research*, [online] 32(1), pp.29–41. doi:<https://doi.org/10.2307/2105883>.

Isogai, Y., Horiguchi, S., Honda, K., Aoki, Y., Hirose, H. and Saito, S. (1988). A Dynamic Simulation Model of Vocal Fold Vibration. In: O. Fujimura, ed., *Vocal Fold Physiology, Voice Production, Mechanisms and Functions*. New York: Raven Press, pp.191–218.

Kivunja, C. and Kuyini, A.B. (2017). Understanding and applying research paradigms in educational contexts. *International Journal of Higher Education*, [online] 6(5), pp.26–41.

doi:<https://doi.org/10.5430/ijhe.v6n5p26>.

Levers, M.-J.D. (2013). Philosophical paradigms, Grounded theory, and Perspectives on Emergence. *SAGE Open*, 3(4), pp.1–6. doi:<https://doi.org/10.1177/2158244013517243>.

Maarouf, H. (2019). Pragmatism as a Supportive Paradigm for the Mixed Research approach: Conceptualizing the ontological, epistemological, and Axiological Stances of Pragmatism.

International Business Research, [online] 12(9), pp.1–12. Available at:

<https://pdfs.semanticscholar.org/1664/345132a79488e36127f07e62897dfee3fe0b.pdf>

[Accessed 26 Apr. 2024].

- Maksimović, J. and Evtimov, J. (2023). Positivism and post-positivism as the Basis of Quantitative Research in Pedagogy. *Research in Pedagogy*, [online] 13(1), pp.208–218. doi:<https://doi.org/10.5937/istrped2301208m>.
- McSweeney, K. and WinklerPrins, A. (2020). Introduction to the Special Issue: Fieldwork in the 21ST st Century. *Geographical Review*, 110(1-2), pp.1–7. doi:<https://doi.org/10.1080/00167428.2019.1689361>.
- Mohsen Motie-Shirazi, Matías Zañartu, Peterson, S.D. and Erath, B.D. (2021). Vocal Fold Dynamics in a Synthetic self-oscillating model: Intraglottal Aerodynamic Pressure and Energy. *The Journal of the Acoustical Society of America*, 150(2), pp.1332–1345. doi:<https://doi.org/10.1121/10.0005882>.
- Neubauer, B., Witkop, C. and Varpio, L. (2019). How Phenomenology Can Help Us Learn from the Experiences of Others. *Perspectives on Medical Education*, [online] 8(2), pp.90–97. doi:<https://doi.org/10.1007/s40037-019-0509-2>.
- Olssen, M. (1995). The Epistemology of Constructivism. *Access: Contemporary Issues in Education*, [online] 13(2), pp.82–94. Available at: [efaidnbmnnnibpcajpcglclefindmkaj/https://pesaagora.com/access-archive-files/ACCESSAV13N2_082.pdf](https://pesaagora.com/access-archive-files/ACCESSAV13N2_082.pdf) [Accessed 8 Jun. 2024].
- Palinkas, L., Horwitz, S., Green, C., Wisdom, J., Duan, N. and Hoagwood, K. (2015). Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research. *Administration and Policy in Mental Health and Mental Health Services Research*, 42(5), pp.533–544.
- Park, Y.S., Konge, L. and Artino, A.R. (2020). The Positivism Paradigm of Research. *Academic Medicine*, 95(5), pp.690–694. doi:<https://doi.org/10.1097/acm.0000000000003093>.
- Quieros , A., Faria, D. and Almeida, F. (2017). Strengths and Limitations of Qualitative and Quantitative Research Methods. *European Journal of Education Studies*, [online] 3(9), pp.369–386. doi:<https://doi.org/10.5281/zenodo.887089>.
- Randles, C. (2012). Phenomenology. *Update: Applications of Research in Music Education*, 30(2), pp.11–21. doi:<https://doi.org/10.1177/8755123312436988>.

- Ravelo, C. (2023). *Using Thick Description to Demonstrate Trustworthiness in Qualitative Research*. [online] Statistics Solutions. Available at: <https://www.statisticssolutions.com/using-thick-description-to-demonstrate-trustworthiness-in-qualitative-research/>.
- Roll, C. (2016). The Evolution of the Female Broadway Belt Voice: Implications for Teachers and Singers. *Journal of Voice*, 30(5), pp.639.e1–639.e9. doi:<https://doi.org/10.1016/j.jvoice.2015.07.008>.
- Roubeau, B., Henrich, N. and Castellengo, M. (2009). Laryngeal Vibratory Mechanisms: the Notion of Vocal Register Revisited. *Journal of Voice*, 23(4), pp.425–438. doi:<https://doi.org/10.1016/j.jvoice.2007.10.014>.
- Roubeau, B., Michèle Castellengo, Bodin, P. and M Ragot (2004). Phonétogramme Par Registre Laryngé. *Folia Phoniatica Et Logopaedica*, 56(5), pp.321–333. doi:<https://doi.org/10.1159/000080068>.
- Schneider, H.J. (2022). Objectivism vs. Subjectivism. *Handbook of Pragmatics Online*, pp.1041–1043. doi:<https://doi.org/10.1075/hop.m2.obj1>.
- Schön, D.A. (1983). *The Reflective Practitioner : How Professionals Think in Action*. Aldershot, U.K.: Ashgate, , Cop.
- Sol, K. and Heng, K. (2022). Understanding Epistemology and Its Key Approaches in Research. *Cambodian Journal of Educational Research*, [online] 2(2), pp.80–99. doi:<https://doi.org/10.62037/cjer.2022.02.02.05>.
- Soukup, T., Lamb, B.W., Sevdalis, N. and Green, J.S. (2016). Undertaking Field Research. *Journal of Clinical Urology*, 10(1), pp.58–61. doi:<https://doi.org/10.1177/2051415816651562>.
- Thanh, N.C. and Thanh, T.T.L. (2015). The Interconnection Between Interpretivist Paradigm and Qualitative Methods in Education. *American Journal of Educational Science*, 1(2), pp.24–27.
- Titze, I.R. (1988). A Framework for the Study of Vocal Registers. *Journal of Voice*, 2(3), pp.183–194. doi:[https://doi.org/10.1016/s0892-1997\(88\)80075-4](https://doi.org/10.1016/s0892-1997(88)80075-4).

Vennard, W, van den Berg, J (1960). The Vibrating Larynx. YouTube, 22 November 2020, viewed December 15, 2023, (<https://www.youtube.com/watch?v=AcC9i7nYTK4&t=387s>)

Walliman, N. (2005). *Your Research Project*. 2nd ed. London: Sage Publications Ltd.

Yin, R.K. (2003). *Case Study research: Design and Methods*. 3rd ed. Thousand Oaks, Calif.: Sage Publications.

Yoshida, Y., Tanaka, Y., Saito, T., Hirano, M. and Kanaseki, T. (1988). The Peripheral Sensory Innervation of the Larynx in Cats. *Vocal Physiology: Voice Production, Mechanisms and Functions*, 2, pp.93–113.