Loop Station Conducting (LSC): A Study on Live Looping as an Ensemble Conducting Approach

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Abstract: This practice-oriented self-study is motivated by an apparent gap in the literature on music technology research in both performative and pedagogical practices. Thus, the aim is to investigate live looping as a style of ensemble conducting guided by the following research question: "What perspectives relevant to conducting can live looping offer as an ensemble conducting approach?" Using three contexts of hermeneutic meaning interpretation to analyze empirical material collected during interviews with a nine member focus group of music teacher students at a Norwegian university, I find that live looping through loop station conducting as an ensemble conducting approach offers several perspectives relevant to conducting, in that it can achieve the following: Create anticipation, evoke a sense of mastery and a sense of feeling secure, serve as an efficient supplement to conducting, create an immediate and holistic impression of the end result, and serve as a creative and/or pedagogical approach.

Keywords: live looping, loop station conducting, musical leadership, ensemble conducting, musical concepts

Traditional conducting comprises part, but not all, of the musical leadership knowledge and skills needed in performative and pedagogical practices (Øien, 2021). Based on the continually evolving state of such practices, this study investigates loop station conducting (LSC) as a

possible ensemble conducting approach. The purpose of this investigation is to examine what this approach can contribute in meeting the current need for musical leadership expertise regarding technological development within the field of music.

Aim and Research Question

The overall aim of this study is to develop new knowledge and practices to address current musical leadership needs by examining live looping as a possible approach to developing insights relevant to conducting in academic, voluntary, and professional music performance contexts. The aim of this study is motivated by an apparent gap in the literature on live looping in musical ensembles (Mattsson, 2015). As a result of technological shifts, production literacy has changed on a broad level, and performances, both on and off stage, have become more technically creative, as recording and performance practices trend towards each other (Knowles & Hewitt, 2012). If knowledge relevant to conducting is offered through both research-based and practice-relevant teaching, these trends can guide efforts to strengthen and shape professional practices. From this perspective, one possible contribution is to develop the competence needed to integrate various technologies into ensemble conducting, in the music teacher education and voluntary and professional music performance practices. The lack of research at the intersection of pedagogy in music, combined with the technological shifts within studio and performance practices, and an increased focus on research-based and practice-relevant education, may validate the relevance of this study. Knowles and Hewitt (2012) provide an overview of emerging trends in the adaption of recording studio practices into live music performance; this study seeks to supplement their work with a specific focus on exploring the adaption of technology into ensemble conducting practices, as indicated by the following research question that guides this study: "What perspectives relevant to conducting can live looping offer as an ensemble conducting approach?" The findings will be relevant to conducting practices in academic, voluntary, and professional music performance contexts.

Background and Previous Research on Live Looping

In recent decades, researchers and politicians across the world have devoted much attention to teacher education (Darling-Hammond et al., 2017). While each country faces its own unique set of challenges in addressing teacher education needs, a significant aspect of those challenges pertains to the gap between the education offered and the education needed in school systems and academic institutions. Researchers continue to argue for the strengthening of teacher education and teaching practices to address this disparity (Darling-Hammond et al., 2017; Forzani, 2014). In the Norwegian context, this is expressed through an increased focus on quality and collaboration in teacher education, emphasizing that teacher education programs provide teaching based on research of high quality and relevance to the teaching profession (Kunnskapsdepartementet, 2017, p. 7). The same trends are seen in Denmark (Ministry of Higher Education and Science, 2019) and partly in Sweden (Weisdorf, 2017, p. 20). Research on teacher education also reflects that the international focus on pedagogies of teacher education has increased (Acta Didactica Norge, 2019). Both music teacher education and music technology scholars argue that music technology is an under-researched subject in didactic practices, despite its increasingly important role in music education and society in general (MusTed, 2019). Within the voluntary and professional music performative fields, the boundaries between recording studio and live stage have gradually blurred, as trends from these arenas continue to cross borders (Knowles & Hewitt, 2012). An example of this is the use of live recording and live looping on stage related to composition and arrangement (2012). Sounds, physical movements, and visual elements offer many opportunities to guide and adjust an audience's interpretation and appreciation of music (Kjus & Danielsen, 2016, p. 324). Still, this potential has been essentially unexplored in voluntary and professional music performance, particularly pertaining to live looping and ensemble conducting. Considering the need for new knowledge about instructional practices in teacher education, especially regarding music technology (MusTed, 2019), combined with

an increased focus on pedagogies of teacher education (Acta Didactica Norge, 2019), this study can also contribute to the field of research-based and practice-relevant teaching in the field of music.

A search in the databases Oria and Google Scholar reveals that prior research on live looping primarily focuses on studio recording and performative practice contexts (Kjus & Danielsen, 2016; Knowles & Hewitt, 2012; Marchini et al., 2017; Mattsson, 2015; Mitchell & Heap, 2011; Renzo & Collins, 2017). Live looping in this study is considered a real-time recording of patterns of sound that are repeated, a tradition that has its origins all the way back to Pierre Schaeffer's use of gramophone records to capture sound effects in the late 1940s, as well as Lester William "Les Paul" Polfuss and Karlheinz Stockhausen's tape recordings of their experiments with recording, layering, and manipulating sound during the 1950s (Mattsson, 2015, p. 53). Terry Riley was the first musician to use tape loops and delay/feedback by developing the Time Lag Accumulator system, the prototype for the live looping technology we use today (Marchini et al., 2017; Mattsson, 2015). In the 2000s, the expanded availability and use of real-time sound processing recording tools led to the development of devices with features and interface pages designed and directed towards both studio recording and performative practices, also referred to as *threshold technologies* (Knowles & Hewitt, 2012). Artists are using these looping technologies in what is referred to as "a hybrid of studio and performance practices" (Renzo & Collins, 2017, p. 409), where the performance is mediated by a technological artifact that brings multitrack recording from its traditional studio domain into the live arena (2017, p. 410). A larger range of musicians are using digital studio technology to create and rework their music in live stage performances (Kjus & Danielsen, 2016, p. 320). Examples of such technological devices include the software production tool Ableton Live (Knowles & Hewitt, 2012) and the digital loop pedal Boss RC-300 Loop Station (Mattsson, 2015, p. 55). These products appear to be industry standards for software and hardware products in loop technology. Live looping is usually practiced as a solo performance (Mattson, 2015, p. 61); starting from scratch and allowing the loop composition to emerge as an improvisation in dialogue with itself is the classic form of live looping (2015, p. 58).

Making production methods more obvious may lead to a new level of transparency that matters partly because it affects the listeners' aesthetic judgments (Renzo & Collins, 2017, p. 418). In light of this principle, technological innovations that extend and expand upon previous practices can enhance opportunities to better understand conducting techniques and, thus, the somewhat opaque production process (2017, p. 415) may become more transparent through performative and pedagogical practices. Many music pedagogical concepts seek to enable musical participation; some of the best known were developed by Emile Jaques-Dalcroze, Carl Orff, Shinichi Suzuki, Zoltan Kodaly, and John Paynter (Hanken & Johansen, 1998, p. 99). The use of loop technology in music education teaching has been researched in the past (Heyworth, 2011, p. 54), and a possible next step is to explore portable technologies as a means of further engaging teachers in creative music making (p. 61). Furthermore, research on live looping in musical ensembles is an unexplored field (Mattsson, 2015, p. 51), which also seems to be the case within the music pedagogical context. In this study, live looping as an ensemble conducting approach is investigated in a music pedagogical context using a *Boss RC-300 Loop Station*.

Theory

Various theoretical perspectives form the basis of this study. Together, these perspectives provide a framework for investigating live looping as an ensemble conducting approach, which, in this case, is examined in a music teacher education context.

Constructionism

This study is informed by constructionism as a fundament for the making of meaning (Crotty, 1998, p. 42). Crotty argues that meaning in the humanities cannot be detected; instead, it is constructed through interactions between people and the outside world in social contexts (1998, p. 42). Based on the constructionistic point of view, meaning-making is not purely objective or subjective, and meaning is not discovered or created but contextually constructed in interaction with others through

interpretation: "What constructionism claims is that meanings are constructed by human beings as they engage with the world they are interpreting" (Crotty, 1998, p. 43). Meaning is constructed, according to Crotty (1998, p. 43), at the intersection of the objective and subjective. This corresponds, as I see it, with the way I seek to make meaning of empirical data material through interpretation.

Hermeneutical Philosophy

In analyzing the empirical data of this study, I find Gadamer's (2008) hermeneutical philosophy appropriate relative to interpreting research participants' opinions. Gadamer argues that all interpretation presupposes that we carry with us an understanding of the world (Alvesson & Sköldberg, 2008) and that our prejudices and understandings constitute a whole, where we can take individual elements, and not the whole, into critical testing (Krog, 2014). Prejudice here is considered in a positive light, as the condition of understanding (Gadamer, 2012, p. 314). As such, our understanding is never without preconditions that are somehow disengaged and unbiased but also are within a horizon that carries the potential to expand. This further implies the possibility of being transformed in the face of new understandings, which, in turn, presupposes the ability to truly listen to the understanding and point of view of others. Gadamer (2012) further argues that we are not caught in a horizon but that our understandings and prejudices constantly evolve through meetings and dialogues with others and with the world that surrounds us, as was my experience in meeting with the research participants and engaging with the empirical material of this study. The content of the horizon is not primarily individually conditioned; it is better described as a shared premise that is common to members of a culture, a principle that can conceivably be transferred to the study's focus group. In this way, the hermeneutic circle (Gadamer, 2012, p. 302) may be understood as a relationship between different horizons meeting with one another, where meaning and understanding are constructed through dialogue and interpretation. By thinking of the concept of prejudice as the knowledge we carry with us in our meetings and interactions with the outside world,

Gadamer (2012) argues that the more prejudices we possess, the greater our capacity for understanding other horizons. According to this point of view, prejudice may be considered as something positively related to making meaning in the form of developing understandings, insights, experiences, and perceptions.

Musical Concepts

Producer, musician, artist, and songwriter Daniel Lanois's multifaceted practices offer pluralistic perspectives on possible aspects of musical leadership relevant to conducting (Øien, 2020, p. 7). The research question of this study is examined in view of his concepts of "preparing" and "operating by limitation." "Preparing" is highlighted as one of the most important concepts in his practice, where preparations essentially constitute Lanois's "whole thing" and are his "best friend" (Reserve Channel, 2013; Øien, 2020). He emphasizes that preparation symbolizes engagement and commitment:

> "For example, when he arrives at the studio in the morning, he prepares the recording room, and programs beats, makes sound collages, and more, so that when the band arrives in the afternoon, they are not just walking into 'thin air'." (Øien, 2020, p. 27)

This principle is worth investigating in an educational context as well, especially in light of the potential opportunities the use of live looping allows. "Operating by limitation" (Neilyoungchannel, 2010) is about exploiting creative potential disguised as limitations that may be economic, technological, or time-related (Øien, 2020, p. 25). By working within constraints, musicians can develop their creativity and ability to exploit the potential of boxes, tools, and gear that are available (2020, p. 21) that may not otherwise have been considered. Conductors may not always have access to all desirable resources. However, from the "operating by limitation" perspective, the working process and the sounding result is not only about available equipment and resources but, rather, the expertise of the person who uses the equipment. Lanois proposes that musicians need only one specific effect to arrive at a unique outcome (Øien, 2020, p. 25), which in this study is represented by the digital loop pedal *Boss RC-300 Loop Station*.

Method

In this part of the text I explain the research framework, the process of generating and analyzing empirical material, and ethical considerations of the study, to illuminate the study's research design and process in a transparent and verifiable manner.

Framework

My epistemological and ontological frame of understanding for this article is based on the concept of constructionism (Crotty, 1998, p. 42); my positioning is based on a constructionistic view where opinions, understandings, and insights are developed in meetings between people. This constructionist positioning further grounds my scientific theoretical foundation in hermeneutics. Gadamer (2012) points to hermeneutics as something more than a logical method of understanding, placing the spiritual sciences' experience closer to philosophy, history, and art than to science. In light of such perspectives, Gadamerian hermeneutics may constitute areas of experience where prejudices are revealed and horizons are transformed and expanded through dialogue, during which we put our preconceptions at risk. This approach seeks to develop understanding which is not necessarily confirmed by traditional scientific methods. In other words, through expanding our horizons, we may develop insights to better understand ourselves and others. Methodologically, I consider this a practice-oriented self-study (Bleijenbergh et al., 2011, p. 147; Cochran-Smith & Lytle, 2009, p. 154), engaging me as both participant and researcher in a study related to my own field of practice and informed by a constructionistic viewpoint, where the making of meaning is understood as being constructed at the intersection of objectivism and subjectivism. I found this an appropriate framework for this study in the making of meaning, interpretation, reflection, and ethical considerations.

On Generating the Empirical Material

This study is based on a teaching class during which I conducted the song "Three Little Birds" by Bob Marley and The Wailers for a nine-member

focus group of music teacher students at a Norwegian university. The conducting was performed pre-instrumental and by ear without use of a written score, using live looping as an ensemble conducting approach. After the 15-minute session, the focus group gathered in a circle where I informed them about my research project and invited them to share their reflections on the loop station conduction (LSC) session jointly for 15 minutes. Immediately afterwards, the focus group was assembled in a computer lab for 90 minutes, during which time they individually wrote reflection letters about their LSC experience by answering 4 questions I provided; they submitted their letters to me anonymously. This generated 4,477 words of data which together with data collected during the 15-minute teaching class and the 15-minute conversation formed the empirical basis for further analysis. The empirical data material can, therefore, be understood as generated through focus group discussion/interview (Kvale & Brinkmann, 2015, p. 179) combined with data-supported interviews (2015, p. 178) in the form of individual reflection letters written by the nine research participants and submitted anonymously. An audio-visual clip briefly demonstrates the use of live looping through the LSC conducting approach, which can be viewed by scanning Figure 1 with a QR scanner or by following the link below. Even though this video example was filmed without the research participants present, it will provide the reader with an impression of the approach carried out during the teaching session.

Figure 1: Video Demonstrating Live Looping as an Ensemble Conducting Approach. https://mediasite.nord.no/Mediasite/Play/85af8b4968264216b2e8b108255967391d

On Analyzing the Empirical Material

The analysis phase of this study is based on Kvale and Brinkmann's (2015) three contexts of hermeneutic interpretation, which are as

follows: (a) *self-understanding* through the whole reading, in which I as researcher/interpreter try to formulate what the interviewees themselves perceive as the meaning of their statements; (b) *critical understanding* based on common sense within the context of what would be considered a generally reasonable interpretation; and (c) *theoretical understanding*, where a theoretical framework is used in the interpretation of a statement (pp. 241–243). In the first steps of the analysis, I rely on the self-understanding and critical understanding contexts (Kvale & Brinkmann, 2015, p. 241). Furthermore, I examine the empirics from the theoretical understanding context (Kvale & Brinkmann, 2015, p. 241) by applying Lanois's concepts of "preparing" and "operating by limitation" (Øien, 2020). The three interpretative contexts offer different research perspectives and lead to different interpretations and understanding, which further form the basis for the findings of this study.

Research Ethics and Challenges

This study generates data material primarily from written interview responses by nine research participants in a focus group. With the approval of the Norwegian Centre for Research Data (NSD), the study has not been reported to NSD because it does not reveal sensitive personal information that can be traced back to the research participants. Nevertheless, I always consider the different phases of the analysis against the risk of doing harm. To do this I highlight the process of generating and analyzing data material in a transparent manner. The focus of the study is crucial in this process. I had and have no intention of criticizing the research participants. Therefore, this study focuses on expanding horizons by developing understandings in dialogue with the data material from a perspective that can inform the research question instead of assessing personal points of view. Furthermore, the question of who owns the opinions that emanated from the analysis is not just about interpretative validity, but also about ethics and power and about the right to impart specific meaning to the opinions of others (Kvale & Brinkmann, 2015, p. 244). Here, I am in danger of taking on an all-knowing role, something I can never be sure to avoid. This is an important challenge

to be aware of as I present my research position and analysis process in a transparent and verifiable way, which I strive to do throughout this text.

Findings

By using the three aforementioned interpretation contexts of self-understanding, critical understanding, and theoretical understanding (Kvale & Brinkmann, 2015) and applying the concepts of "preparing" and "operating by limitation" (Øien, 2020) to analyze the empirical material, I found that live looping using the LSC approach offered several perspectives relevant to conducting which are elaborated on later in this article. In this part of the text the findings are presented briefly, supported by excerpts of the data gleaned from the focus group participants' written reflections. Further considerations on the findings are made in the discussion and conclusion sections Fictive names are employed to refer to the individual student.

Based on the evidence, this study revealed that live looping through LSC may offer several perspectives relevant to conducting in that it can:

A) Create Anticipation

Having to conduct "Three Little Birds" by ear for a nine-person ensemble based on limitations such as time (15 minutes) and equipment (no instruments) required a great deal of preparation. The teaching class, or workshop, began with the group being exposed to music played through the loop station as they entered the room, "which probably helped to set the group on what nature the work in the workshop would be of" (Anna). Of course, a similar room preparation could have been accomplished in a lesson without the use of any technological equipment, but I still chose to mention it, as the loop station seemed to affect the session already at this stage by catching the attention of the research participants and creating anticipation: "Today's workshop in LSC started with a quiet attendance at Black Box. Background music was played [through the loop station] as we entered, creating a social and relaxed atmosphere" (Dina). Another research participant described his expectations, which apparently were created by the loop station and concepts of "preparing" and "operating by limitation":

The room was tidy, the stage curtains were pulled back, and in the middle of the room was a loop machine [playing music] and a microphone on a stand … When I walked into the classroom, I realized that something was out of the ordinary. (Adrian)

B) Evoke a Sense of Mastery and a Sense of Feeling Secure

The participants seem to have perceived the use of LSC as time saving and effective, and it appears to have impacted on their sense of mastery: "My sense of mastery came earlier, since the time we spent learning the material was so short" (Adrian). In addition, live looping seems to work well in providing both a motivating start-up impulse and an overall picture of the arrangement of the song, as well as in creating a sense of mastery and security: "I think it was really fun to see how to create music using only the voice" (Benjamin). The feeling of mastering the song arrangement seems to have persisted even after the loops were turned off: "And then you get a great AHA experience when the loop is turned off at the end, and the assembly/ensemble experiences itself regardless of the recording" (Dina). Several of the research participants claimed that it felt safe to have a recorded voice in the background to lean on. It did not take long before they stood there as an ensemble and performed a section of "Three Little Birds" without support from the loop station or an ensemble conductor:

The whole session took maybe ten to fifteen minutes, and then everyone was comfortable with the voice and the rhythm. You did not become insecure when the loop station was turned off. The approach also felt very effective, as we did not have to feel insecure about our own voices. It was just listening to the loop possibly supplemented by small corrections to some tones that could be difficult to hear. (Elaine)

C) Serve as an Efficient Supplement to Conducting

Live looping as an ensemble conducting approach was experienced as a very effective and at the same time comprehensive way to introduce the

group to the arrangement of the song that was to be learned a capella: "I think that if you did this without the help of technology like the loop machine, you would end up spending a lot more time introducing the focus group into the arrangement and in teaching the different groups their voice" (Anna). Time may be one of the framework factors and resources in a conducting situation. In light of this, LSC has potential as a possible approach: "Based on what I observed in the focus group, the loop machine shows great potential in increasing the efficiency of music teaching and can, therefore, help increase what you are able to teach in a single lesson" (Anna).

Although this study was conducted in a pedagogical context, LSC can offer perspectives relevant to ensemble conducting in a more general and broader sense as a result of how the approach impacts on the rehearsal of different voices: "LSC also works well to learn the voices quickly and efficiently" (Benjamin). LSC can also influence how the ensemble is effectively included throughout the rehearsal process. Following are three data excerpts illustrating how the research participants experienced the approach as efficient: (1) "Due to the repetitive nature of the method, it will be easy to include all participants from the first second … As a participant, I feel that this was an effective way to work" (Cathrine). (2) "Live looping can work, for example, for a bandleader as a faster way to get everyone to learn their voices" (Beatrice). (3) "This was a great and effective way to learn the voices, and within minutes, we didn't need the looper to keep the song going" (Dave).

The research participants experienced LSC as a supporting function when the voices and the arrangement were looped one by one, as well as when being given oral instruction in the form of singing while the track played. Following are reflections from four participants that support this finding: (1) "It was much easier to work pre-instrumentally with a loop track playing in the background than if we only had ourselves and the teacher to support us during the rehearsal" (Adrian). (2) "But the looper was a very good tool for learning the voice, because the voice I was singing repeated" (Beatrice). (3) "If you lose the voice you are singing, you can quickly navigate by ear by listening to the loop" (Collin). (4) "LSC makes it much easier to relate to both tempo and pitch when

you have a reference … It worked as a very good support tool. Live looping works very well when a group is rehearsing an arrangement" (Dave).

The fact that the voices were played in the background seemed to make it easier to keep up and maintain a steady tempo, which may conceivably serve as an efficient supplement to conducting: "I think it is easier for younger/less musically experienced students to understand rhythm/voice when you hear it in the context of the new rhythm/voice being introduced continuously" (Dina).

D) Create an Immediate and Holistic Impression of the Final Result

The process was affected by the fact that the LSC approach can also impact how the product is perceived: "The most obvious thing I came across is that it will immediately sound like music" (Cathrine). This may also be relevant for choir conducting: "I also imagine that this can be very useful in the choir context. If the conductor had used it to teach the voices, we would have heard what the final result would be" (Benjamin). One cannot take it for granted that everyone will always be able to form a picture of the final song arrangement along the way; therefore, LSC can have a supporting function in this area as well: "It was cool to hear how the different voices together become an accompaniment when they are put together in layers" (Adrian).

E) Serve as a Creative and/or Pedagogical Approach

The participants' feedback indicates that LSC has educational potential, which I argue is a key component of ensemble conducting in most contexts. The research participants emphasize this in their reflections on the approach:

> It was very creative, and in my opinion, a very pedagogical way to present a choir arrangement. I especially liked the learning by ear approach, where one had to focus (zoom in) on one recorded voice/loop at a time to learn it in

relation to the other voices … I think LSC can work well in teaching situations with larger groups and relatively simple arrangements … For example, in conducting school choirs, group lessons in schools of music and performing arts, and music lessons in primary school. (Dina)

As a conducting approach, LSC can be experienced as a creative and new way of learning a song arrangement:

I experienced the approach as fun and creative … I think LSC can be very good to use in conjunction with workshops, or as part of courses (for example, rhythmic choral conducting courses?). It is an innovative (in my eyes) approach that fits well with shorter exercises/events—just the kind of exercises one does at a workshop or course. Maybe it works well for some choir groups to use as part of their exercises … It was a new way of rehearsing an arrangement that was creative, that kept you working, and was generally fun to perform. (Elaine)

As an educational approach, LSC can represent different perspectives relevant to conducting. Three participants articulated this idea well: (1) "I envision that live looping is a great fit for experienced music students, such as secondary or high school. It is a very convenient way to teach rhythmic compositions" (Collin). (2) "It is also easy to combine singing with rhythmic elements, such as hand clapping and/or foot stomping … I think this can work in several educational teaching contexts" (Cathrine). (3) "I experienced this experiment as overwhelmingly positive and hope to see it more used in 'real' teaching situations … and I hope that the work with the focus group will help inform others about this tool and its potential" (Anna).

Summary of the Findings

To summarize the findings, live looping through LSC as an approach offers several perspectives relevant to conducting in that it can achieve the following: a) create anticipation; b) evoke a sense of mastery and a sense of feeling secure; c) serve as an efficient supplement to conducting; d) create an immediate and holistic impression of the final result; and e) serve as a creative and/or pedagogical approach.

Discussion

Prior to conducting this experiment, I considered the concepts of "preparing" and "operating by limitation" in many ways and for many reasons, such as organizing the classroom so that the students would not just walk into "thin air" (Reserve Channel, 2013; Øien, 2020, p. 27). Ten minutes before the lesson started I opened the door of the classroom so I could welcome everyone as they entered the room. The students walked into a tidy room, emptied of tables and chairs, to find only a microphone on a stand, a loop station, and speakers providing background music played through the loop station. The lesson began at 12:30 p.m. without any pre-session comments or conversations. As mentioned, a similar room preparation could have been completed in a lesson without the use of any technological equipment, but the loop station seemed to affect the participants already at this stage, both visually and audibly. As part of the preparation, a short arrangement was created of only the chorus of "Three Little Birds" by Bob Marley and The Wailers, which was to be rehearsed pre-instrumentally by ear. This way of relating to both technology and the concepts of "preparing" and "operating by limitation" seems to have evoked a sense of mastery, among other things. Also, preparing an arrangement and recording it on the loop station while conducting the ensemble may have given the participants an immediate preview of what the end result may be like, of course, with room for interpretation. In this way, the technology, together with the concepts of "preparing" and "operating by limitation" (Øien, 2020), may have impacted on the outcome of the ensemble conducting in certain cases. "Preparing" is, according to Lanois, a concept that presents preparation as a symbol of engagement and commitment, for example, by preparing a recording room, programming beats, making sound collages, and more, so that when the band arrives, they are not just walking into "thin air" (Reserve Channel, 2013; Øien, 2020, p. 27). In this study the concept of "preparing" asserted itself through actions, such as the preparation of the classroom, the song arrangement, the use of the loop station, and the process of generating data material.

"Operating by limitation" involves exploiting the creative potential that limitations, such as economic, technological, or time-related constraints,

can provide (Neilyoungchannel, 2010). Thus, exploiting limitations may strengthen the product through its ability to release creativity. Lanois highlights the importance of mastering equipment and learning to get the most out of the few effects that are available. According to Lanois, musicians need only one specific effect to produce a unique outcome, provided they make the most of what they have available to create their sound, such as the use of a loop station in this case. LSC is an example of utilizing the musical resources available to achieve a desired outcome. For example, in this study, by exploring the melodic potential of the voices of the research participants to recreate the instrument functions in the original recording, polyphonic harmonies occurred. Despite the use of only human bodies and voices and one technological tool, we see an example of how the resource utilization principle can facilitate the creation of expression.

Live looping may ease the process of learning and remembering voices and keeping track of musical elements, such as tempo and pitch. However, conductors who choose to implement music technology into their practice are not exempted from possessing conducting skills. Indeed, the opposite is true, as the preparations now also include the implementation and use of what may be a demanding technology to use. It is a broad trend that musicians reanimate their studio practice as a result of incorporating new forms from recording practices into live performances (Kjus & Danielsen, 2016, p. 320). One possible contribution of the adoption of live looping into a conducting practice may be implications that arise from technology, such as reanimating studio practice in light of the concept of the hermeneutic circle. The circle carries with it a positive opportunity for recognition through the preparation of structures based on the cases themselves (Gadamer, 2012, p. 303). Perhaps principles of using technology derived from studio and performative practices that are transferred into conducting practices may contribute as part of a hermeneutic spiral where horizons meet, interpret, and develop by being put into play by and with each other. In a hermeneutic view, bringing a technological tool like the loop station in dialogue with the musical concepts of "preparing" and "operating by limitation" may offer perspectives relevant to other fields or practices, such as, in this case, conducting.

By examining the musical concepts noted previously from new perspectives and in new contexts, and by further challenging understanding of live looping, this study contributes as an example of how different practices can be informed by each other. On the other hand, rigid use of the technology, as shown in this experiment, surely offers a limited potential for developing insights. It may even negatively impact different aspects of conducting, for example, aesthetically and creatively. Nevertheless, this study does not seek to develop or offer a best-practice method but, rather, to investigate the use of music technology in an ensemble conducting context, specifically, by exploring live looping through LSC as an ensemble conducting approach. This implies that LSC is not suggested as an alternative to traditional conducting; instead, it may be a supplement that can support various forms of conducting. To further explore potential live looping techniques within various practices there is clearly a need to investigate different technologies of music and their use from other perspectives. This is, of course, a multifaceted dialogue that I address as part of an ongoing discourse. Therefore, I welcome other researchers to continue and expand this important discourse within the performative fields of research and music.

To articulate a clear conclusion is both demanding and possibly something to the side of the purpose of this study. This study is designed to investigate the research question: "What perspectives relevant to conducting can live looping offer as an ensemble conducting approach?" The main aim is to investigate LSC as a possible approach to develop insights into conducting relevant to the contexts of music teacher education and voluntary and professional music performance practices. The findings are presented and discussed from a hermeneutic point of view on how different practices can inform each other. I argue that the study shows that different practices can inform each other in a way that may offer new insights and understandings, although this cannot in itself be addressed directly back to the research question. By narrowing the focus to exploring live looping as an ensemble conducting approach, insights were gained on only a very limited part of the technological and performative fields of music. Precisely by examining fragments of a whole, different research perspectives may constitute the interaction between parts and

the whole and offer possible contributions to further research discourses. Therefore, the closest I can come to a reasonably clear conclusion for this article is in the form of a quote from one of the research participants: "Essentially, I think the loop machine is a technology that needs to be investigated more thoroughly" (Anna).

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