279r Final Project

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Abstract

In their 2014 paper, Miller et al. propose a new system of interaction that they named *pair research*. Pair research is designed to lead to collaborations within and across different groups, from research groups to study groups, as well as facilitate informal learning. We apply their concept *pair research* to chamber musicians, and identify similarities to pair research as it is used in computer science as well as differences. The adaptation of pair research to chamber musicians did help members share their musical expertise with others.

Introduction

Amateur musicians who are instrumentalists generally do not receive much feedback as to their play. Many amateur musicians no longer have music teachers, and if they play in an orchestra, they are likely to be string players, who play in a section of from three to upwards of sixteen musicians all playing from the same part (Spitzer, 2004). Consequently, the opportunities for direct, individual feedback from the conductor and orchestral colleagues are likely to be limited. Collaboration and help-seeking are helpful to instrumentalists as much as they are to researchers, which suggests attempting to find some mechanism by which to

Chamber music is music that is performed in small groups, generally with one performer to each part (Ulrich, 1966). Due to its small size and intimacy, chamber music is easily conducive to casual, informal pick-up (jamming) sessions, where also feedback can be exchanged. A chamber music session generally runs for a set amount of time, during which a number of pieces or movements are planned to be played through, or the musicians browse through music in a more *ad hoc* manner. On the other hand, some musicians use chamber music as a way to socialize (Baron, 1998). It has been estimated that half of all chamber music is written for stringed instruments (violin, viola, cello, and double bass) only.

However, casual chamber music can be difficult to organize, and when playing with strangers, it can be difficult or awkward for any musician to suggest areas of improvement for their partner(s) (Ulrich, 1966). While a musician may have areas in which they would appreciate advice, it may be difficult to know the specific experience levels or areas of relative expertise. Musicians who would like to engage in casual chamber music for either enjoyment or improvement may find it difficult both to play chamber music and to improve.

We theorize that pair research can be applied to musicians, and one result of that would be chamber music. Consequently, we adapt the pair research framework to amateur musicians interested in chamber music. Musical pair research aims to offer instrumentalists the chance to interact with many

partners with diverse perspectives and expertise, and to get to know them better by playing with them. Chamber music is generally reciprocal, and by asking for and receiving advice, there are no issues with reciprocity or a sense that one musician is indebted to any of the others. Consequently, we allow for groups of various sizes, and not merely strictly pairs. Musical knowledge and technique may spread within a chamber music group. In terms of musical productivity, when each musician is the only person on their part, each musician practices and plays their own part, increasing their fluency on their instrument at the same time. We chose chamber musicians because they represent a type of creative work distinct from academics and researchers, and where pair research as a concept has not yet been applied.

We make the following contributions:

1. A procedure for pair research as applicable to amateur musicians, derived from Miller et al.,
2. The results of two deployments in a group of eight over two weeks (three Rounds of groupings)

The musicians generally appreciated the pair research paradigm, and used it in a variety of ways.

Related work

Pair research has not up until now been applied to musicians of any variety, but pair research itself originates from pair programming (Beck, 2000), in which two programmers work together on the same computer, with one typing and the other observing.

In pair programming, a group stays together for the full iteration of a software project. Because for amateur musicians, music is by definition not a professional endeavor, how long a group will stay together for is much more dependent on interpersonal relationships and affinity to the music being played.

There is a contrast between pair programming, where two people work on the same task, and pair research, where two people work most likely on different tasks (Miller, 2014). Chamber music is interesting, because everyone is working on the same task (the same piece of music) but simultaneously doing something unique (there is only one person on each part in the music).

There has not been much direct examination of how amateur musicians form groups for chamber music, but it appears to be perhaps ad hoc and dependent on multiple factors (Turino, 2008).

Design space

We revisit the questions of design space as expressed by Miller et al., and consider whether any of their recommendations should be changed in a musical context.

How many people should work together? Miller et al suggest that pairs represent the greatest simplicity, and that groups of three often lead to an uneven or poor distribution of work (Levine, 1990). Miller does not seem to object as strongly to larger groups, as his reference to a Node.js learning group suggests. However, for chamber musicians, whenever one person is playing, everyone is playing, and in fact, trios are a not uncommon arrangement for composers to write music for.

How should people be matched? Miller et al solicit preferences from people as to what they feel they would like advice on, for the reason that random matching tends to involve each person giving advice in areas they are strongest, as opposed to being helped where they are weakest. We found that whether matching was random did not really change what amateur musicians thought about pair research.

Should preferences be expressed about activities or people? Miller et al focus on activities as opposed to people. We suggest that the same focus on activities is best for musicians, given that music has always been ubiquitous and (hopefully) egalitarian.

Who should specify the activities? In chamber music, it is common for each player to bring some music that they think could be playable for the group, so that the group has some variety and choice as to the music to play. However, for the purposes of pair research, it may have worked better for the repertoire and music to be chosen in advance.

How public should the matching process be? Miller et al suggest a public matching process, unless there is some compelling reason for privacy, for the reason that members can learn more about the skills and musical interests of others. We see no reason not to apply the same reasoning to amateur musicians.

How long should a pair work? Miller et al emphasise the importance of having both members of the pair research group feel as though they got something of value out of each session. Luckily for musicians, it is generally the case that chamber music is always rewarding (Baron, 1998). Timing-wise, it is important to have sufficient time to allow for informal and off-topic chat, both for the socialization factor that some amateur chamber musicians relish, and for the ability to become more familiar (and presumably less nervous) around each other.

How often should groups change? Miller et al bias the matching to encourage new collaborations and discourage repeating recent pairings in order to facilitate a greater spread of knowledge and musical skill. We do not see why this reasoning should not also apply to musicians. (It should be noted that in many sporting and gaming events, there is also an aversion to pairing opponents who have already or recently played each other—for example, as in chess.)

Should pair meetings be fixed time or independently scheduled? Miller et al suggest that although fixed time meetings may guarantee that a session will take place, it removes a lot of flexibility from each person. We suggest that music in particular, as something that should be enjoyed, should be sufficiently enjoyable on its own merits, and not something done out of obligation or force.

What pool of people should be involved? Miller et al note that larger groups can provide a greater pool of expertise but can also lead to more unevenness in terms of ability. We make no comment on this as it applies to music, but we deployed our program to eight string players in Auckland, New Zealand. (This is both for a wider range of chamber music available to string players, and also because stringed instruments share substantial technique.)

User interface

We developed a prototype user interface to manage the process. The UI was implemented as a collaborative spreadsheet. Every round, group members specify the composer and/or salient techniques that they would appreciate a focus and/or advice on (e.g. "late Tchaikovsky" or "feedback on staccato"). Other members fill out a preference matrix according to how interested they are. Miller et al used scores of -1, 0, and 1 to represent minimum interest, indifference, and maximum interest respectively, but to simplify matters for musicians, we used scores from 1 to 5. People with high mutual preference are more likely to be grouped together than people with low mutual preference. Groups sizes are secondary to mutual preference. (However, for one cycle, groups were arranged completely randomly to provide a baseline for comparison.)

Pairings are generated using a weighted graph with some amount of random variance added. In the case that members do not fill out the preference matrix, members are randomly assigned to groups of two, unless a group of size three is necessary. Miller et al point out that matching problems like these are well studied in the literature (Roth, 1992). Participants are reminded by email to fill out the spreadsheet whenever possible.

We did not implement a formal way for participants to temporarily or permanently leave the pair research matching pool. The spreadsheet is a low-fidelity prototype.

User study

The pair research paradigm was deployed to eight amateur musicians in Auckland, New Zealand.

Participant	Gender	Age
1	M	23
2	F	45
3	F	47
4	F	30
5	F	38
6	M	30
7	M	29
8	F	41

Method

We collected two kinds of data about the deployments. Firstly, we collected spreadsheets containing help requests, preference ratings, and the resulting groups for each week to learn about the group assignment process. Secondly, we sent a short survey asking each participant what they thought about their group (whether it was well-formed and logical) and their personal satisfaction. Both questions were responded to on a 5-point Likert scale, and participants could also leave open-ended comments.

Results

Participant	R1 group	R1 satisfaction	R2 group	R2 satisfaction	R3 group	R3 satisfaction
1	4	5	4	5	4	4
2	4	4	3	4	4	5
3	5	5	4	5	5	5
4	4	4	4	5	4	5
5	5	5	4	4	5	4
6	5	5	3	4	5	4
7	4	4	4	5	4	4
8	4	5	4	4	5	4
Mean	4.38	4.63	3.75	4.5	4.5	4.375
Stdev	0.52	0.52	0.46	0.53	0.53	0.52

Users were generally quite satisfied with the groupings generated. Not only were the groupings plausible, but the users also thought that the algorithm took care to generate the groupings.

While every person made a specific request in Round 1, either in terms of a specific composer or genre of music, or in terms of a technique they wanted to focus on in the music, by Round 3 only half of the musicians expressed a preference, suggesting that they saw the request as optional. Of those who did

not express any preferences, the consensus was that they were happy to play and learn from any style of music.

None of the participants had played chamber music in the last three months, and three of the eight musicians commented that they had not played chamber music for a year.

Although initially we thought that the amount of time that a group spent playing together would be a proxy for the cohesion of the group, every group in every Round stuck to playing together for an entire afternoon, from 1pm to 5pm, or 2pm to 6pm. As a result, we were not able to infer anything about the groups at this time. Participants said that they chose the times in advance of each session, but also that they never felt anything that would encourage them to end a session earlier than planned. Indeed, two of the participants said that they wished sessions might have gone on for longer.

Some participants did think that while it was useful to hone musicianship and technical ability through sight-reading music (playing previously unseen music without preparation), something different to try in the future would be to for each group to nominate for itself a piece to play in advance, which would allow for preparation and a higher standard of play.

Participants appreciated switching groups every Round, to benefit from a wide range of players and abilities. They also enjoyed playing a wider variety of music, which allowed them to use different techniques and share technical advice.

Participants also cited this study as a way to meet instrumental musicians who they previously had not known, and four expressed a definite willingness to play more chamber music in the future within three months, while four expressed continued interest in chamber music, but felt they were sufficiently busy that they did not expect to play more chamber music in the near future.

Discussion

The goal of the pair research group pool was that participants would have fun making music together, but also that they would exchange technical advice and remarks on musicality, given that amateur musicians do not generally have many avenues through which they can receive advice on their play.

It is possible that in addition to the spreadsheet generating groupings that motivated participants to play chamber music, just the fact that somebody put eight musicians in the same pair research grouping pool may have increased interest in chamber music. In other words, it is possible that the biggest obstacle to casual chamber music is the difficulty of finding common times to meet, or the difficulty in finding the motivation to organize a get-together.

It appears that there was not a statistically significant difference in satisfaction between the randomly generated groups in Round 2 and the properly assorted groups in Rounds 1 and 3. While it appears that the participants were less convinced the groups were logically formed, it also appears that that knowledge or feeling did not decrease the enjoyment the players had. This also suggests that while focused and dedicated grouping of the musicians was useful, it was not essential, given the scores given during the randomly assigned Round.

Since the groups found times to meet relatively early on, the Rounds proceeded as though times had been fixed in advance. While on the face of things, this would seem to reduce flexibility, it also seems as though having a fixed, unchanging time to meet was also a motivating factor for participants to commit to.

Limitations

To test the effectiveness of pair research as applied to musicians, we deployed the system in one group of eight. The obvious weakness is the small sample size with which to have worked with, although part of the reality of classical music is that not many people play classical music or even play an instrument compared to in the past. We collected observations and took comments throughout the three Rounds, the advantage of which is that we took *in situ* data, with the disadvantage that bias is introduced through participant observation (Miller, 2014).

Future Work

It would be useful to deploy pair research group pools in a larger group of participants for greater reliability of the results. Future groups could also have a greater diversity of ages, and we could examine whether older musicians, who might be less used to computers, might not enjoy pair research as much. As confusion about the ownership of musical technique is not an issue in chamber music, we avoid the corresponding potential pitfall that Miller et al suggest.

Conclusion

This paper presented pair research in the context of chamber music, as people come together to make music and to learn from each other. We found that the participants appreciated meeting new chamber musicians, playing new music, and sharing technical advice and musical knowledge.

While there are differences in pair research as it occurs in an academic or a commercial software environment and a musical environment, there were sufficiently many factors in common that meant the principles and framework behind pair research worked well for musicians too. An obvious next

target for pair research might be people who engage in recreational sport and who want to improve their games.

Acknowledgements

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