

Authors' Response to RC3 by Emilia Gómez (Referee)

Thank you very much for your careful reading of our manuscript and very helpful comments and suggestions. We apologize for our not so quick response due to the unusual situation in our university affected by the Coronavirus epidemic and its prevention.

In the following authors' response to the reviewers' comments, we will italicize the comments, and add our answers below. In the answers, page and line numbers and figure numbers are based on the previous manuscript uploaded as the discussion paper.

General comments

The paper presents an interdisciplinary study relating climate, music and education, and contrasting these aspects in two different countries and cultures Japan vs Germany and Northern Europe. The paper is structured on a series of educational activities which include the explanation of climate concepts and cycles and some exercises where students relate climate to colors and generate music imitating certain climate related processes, e.g. rain. The important climate concepts which are addressed are: (1) the asymmetric seasonal progression around Japan (autumn to midwinter and midwinter to spring); (2) the large day-to-day variation in mean surface temperature in winter in Germany, which is related to the Fasnacht; and (3) The traditional mid-upper event in Northern Europe, corresponding to the Summer Solstice, compared to summer climate in Japan. After including these climate concepts, the paper is structured around a set of educational activities carried out at the Faculty of Education where students were asked to compose a set of songs representative of these concepts.

The paper is very interesting and contributes to current state of the art, in particular given its interdisciplinarity, novelty and cross-cultural elements of comparison. However, I think the paper needs to be improved in terms of the description of the involved musical concepts, the methodology of the experiments and the presentation of the results in a rigorous way. I provide some comments for improvement from my expertise on music and computing.

Thank you very much for your showing an interest in our manuscript and for your giving us many valuable comments. We will revise our manuscript after the following manner by the consideration your general and specific comments and suggestions as below.

We think that your suggestion on the description of the involved musical concepts, the methodology of the experiments and the presentation of the results would be very important, especially in evaluating the effects of the activities in somewhat statistical and objective way. However, construction of a kind of method for achieving a certain goal such as acquiring ability on musical expressions is somewhat different from the purpose of this research. In the ESD (Education for Sustainable Development) Teacher Education, it would be also very helpful for promoting the university students' "Fundamental ESD literacy" as stated in the text (L35-36 in P2) through their accumulation of the experiences of interactive consideration between "careful examination of the climate data" and "deeper appreciation of the seasonal feeling" expressed in the music works or traditional events (L40-42 in P2). Such activity would contribute not only to promoting the students' "Fundamental ESD literacy" as the pre-service teacher training but also to their ability to discover the various possibility in their development of such kind of interdisciplinary study materials as those relating to "climate and music" when they become teachers.

Thus our studies have firstly focused on the various aspects of the climate and seasonal cycle including their variability as an important background of the cultural generation such as music and then we have examined the music works etc. and climate and seasonal features, in order to propose the various possibility for the study materials (not directing to choosing only one way of them). In other words, we have respected the "diversity" also in development of the study materials by the future teaches. So, in the evaluation of the students' works in the interdisciplinary activities, we checked how deeply they considered what they try to express with integrating what they have learned throughout that class.

For that reason, our studies have mainly discussed on what kind of climate and seasonal phenomena relating to the music etc. can be used for the study materials in our interdisciplinary lesson practice and the typical examples of the students' works with the students'/our explanation/comments are presented in our papers rather than the general analysis results in somewhat statistical and objective way.

In the revised version, we will add further statements relating to the above with re-constructing mainly the Introduction, although we have already mentioned in the discussion paper.

Specific comments

I add here some comments for improving the paper:

- I think the structure of the paper could be better balanced. My advice would be to structure the paper in three main sections for each of the analyzed climate concepts:

(1) description of the climate concept and characteristics;

(2) description of associated music / colors with these events, including a list of musical pieces and art works;

(3) presentation of the activity including the followed methodology;

and

(4) analysis of students results: study on the use of colors, instruments and temporal patterns, agreement between students, and conclusions on how climate concepts are related to musical ones.

Thank you very much for your suggestion. As for the viewpoint in this paper, please also refer to our answer to your general comments. In addition, as for the evaluation of the students' works, we will add a little more explanation to the answer to your general comments, as follows (also relating to (3) and (4)).

We paid attention to what the students felt, what they paid attention to, and how they tried to express them. Furthermore, we paid attention also to the relationship between what they want to express and how they had expressed it (e.g., combination of sounds, rhythm, etc.).

It is also important to say that what we aimed in this activity is not the workmanship. We aimed to provide an opportunity for all the students, both with a lot of music experience and with little music experience, to feel familiar with the various ways of feeling and expression (diversity), through the trial of expressing what they feel and the performance/appreciation of such works.

Considering your suggestions (also considering the comments by another reviewer Louise Arnal), we will try to reconstruct the manuscript as follows (the titles of the sections and subsection are only tentative and will be finally determined in the revised version).

1 Introduction

2 Viewpoint to grasp the characteristics of the seasonal cycles in is paper

**We will add a new section also considering the Arnal's comments.*

3 Interdisciplinary lesson studies on climate and cultural understanding education with attention to the asymmetric seasonal march from autumn to the next spring around Japan

3.1 Asymmetric features of the seasonal march from autumn to the next spring and the relating "seasonal feeling" around Japan

3.2 A report of interdisciplinary lesson practice for the university students in teacher training course

3.2.1 Outline of the lesson practice

3.2.2 Difference of the seasonal feeling between early winter and early spring around Japan expressed in the students'

works in Activities (2) and (3)

4 Interdisciplinary lesson studies with attention to the seasonal cycle and the "seasonal feeling" around Germany and Northern Europe

4.1 Remarks on the seasonal cycle and the "seasonal feeling" around Germany

4.2 Remarks on the seasonal cycle and the "seasonal feeling" around Northern Europe

4.3 A report of interdisciplinary lesson practice on the seasonal cycle and the "seasonal feeling" around Germany for the university students in teacher training course

4.3.1 Outline of the lesson practice

4.3.2 Discussion from the students' composition works in Activity (2)

4.4 A report of interdisciplinary lesson practice on the seasonal cycle and the "seasonal feeling" around Northern Europe for the university students in teacher training course

4.4.1 Outline of the lesson practice

4.4.2 Discussion from the students' composition works in Activity (2)

5 Discussions

6 Summary and conclusions

Although it seems that only small change might be made for the construction, we think that adding of the new "Section 2" would be very important. After the Amal's comments, we will mention what kind of climate/seasonal features we should pay attention to. We have already mentioned on this in the discussion paper from L399 to 410 of P13 in the section "Summary and discussions". However, now we reached to think it would be much better to move this part to the new "Section 2", with adding more detailed explanations. Then it would be also made clear that we are focusing the rather different view points on the characteristics of the seasonal cycles treated between the new sections 3 (asymmetric seasonal progression in Japan) and 4 (Germany and northern Europe).

That is, as for the new section 3, we are paying attention to the asymmetric seasonal progression from autumn to the next spring around Japan, which is due to the fact that some meteorological/climatological elements in the same region show sometimes rather large phase lag of their seasonal cycles among each other.

On the other hand, in the discussions for the seasonal cycles in Germany and northern Europe comparing with those around Japan, we are focusing on the features found from the air temperature data that the duration of the highest stage of the seasonal mean temperature around Germany is rather longer (from the beginning of June to late August) than in Northern Europe (from late June to late July), and that the day-to-day temperature variation is also large in both regions to result in the frequent appearance of the extreme low temperature days in winter there (which is the rather different characteristics from those around Japan).

Thus we still think it better that the topics on Germany and northern Europe are not separated into the different sections (although the subsections on these regions are separated).

We would also like to mention that we think it better to describe the climate/seasonal characteristics and the related seasonal feelings including some introduction of the songs or traditional seasonal events in the same subsection, without separating them into the different subsections, because they are closely related to each other and we should comprehend them as the set of "climate and music".

- In general I think the paper focuses a lot on the climate concepts but it does not describes the relevant musical concepts, e.g. which songs are linked to the climate events in each culture, which are the properties of these songs (emotion, instruments, tempo). We miss also a description of the musical instruments used in the study, and a description of other musical concepts considered (e.g. tempo and timbre). It is very important to describe this in order to fully understand the links and results of the experiments.

Thank very much for your valuable comments. At one viewpoint, we do agree with you. However, the purpose of our study is as mentioned above (as an answer to the general comments and the first specific comments) and the description in this paper needs to be constructed basically as it is, at least at the first step. As for the evaluation of the students' works in the interdisciplinary activities, we checked "how deeply they considered what they try to express with integrating what they have learned throughout that class", as mentioned in the answer to the general comments.

But in the future, if we have a chance to collaborate with you or those who are in the similar fields to you, it would be also interesting for us to research further, also including your suggestions on the analyses of the lesson practice directly.

The small percussion instruments used in our lesson practice are rather popular in the music education and could be referred to easily from the commercial base websites (not from the papers or books in the special fields) and we did not make detailed explanation on these instruments in this paper.

We will add the reason for use of the small percussion instruments in the lesson practice in the text. As we mentioned above, by using such instruments, all the students, regardless of their musical experience (skills), could take part in the activity easily; they can easily touch the instruments (which were born in the human's life) and can devise various ways to play percussion instruments.

- 2.2.1: please describe better the expression of the four seasons (Itten 1961) and relate it to the results in Figure 9 commented in 2.2.2.

The "four seasons painting" is the exercise developed by Itten, when he was teaching in the preliminary course at the Bauhaus in Germany from 1919 to 1922. Originally, this method is to express the differences between the seasons with combination of the various colors created by mixing paints. In our activity, the colored papers were used in order to make the activity much more easier for the students.

In the revised manuscript, such explanation will be added.

- I miss a more rigorous analysis of the results of the three experiments, as Figures 11-19 and 20 only present and comments few examples. We would need to understand the results for all students following the same methodology, and see if we can get some conclusions on the general findings and individual differences in the way they related music, climate and emotions. It would then be interesting to analyze the agreement between the students, and if they select the same instruments and temporal patterns in the same way.

Thank you very much for your valuable comments. In this paper, however, as we answered to the general comments, our studies have mainly discussed on what kind of climate and seasonal phenomena relating to the music etc. could be used for the study materials in our interdisciplinary lesson practice and the typical examples of the students' works with the students'/our explanation/comments are presented in our papers rather than the general analysis results of the lesson practices in somewhat statistical and objective way. We are mainly aware of "how deeply they considered what they try to express with integrating what they have learned throughout that class", rather than the workmanship of the students (although the workmanship and the interest in the activity were rather different among the students).

Thus we are afraid if you might still miss the results on the general analyses for all students, etc., but it would be grateful to you to understand also our aim of this study. In the future works, however, we also feel it is necessary to investigate how to advise to the various levels of students differently, etc. (e.g., students with high music interest and skill vs. those with low ones) through our further activities.

I advise the authors to consider and relate to the large corpus of literature relating music to emotions that one would need to cite here, such as:

[1] Juslin, P. (2019). Musical emotions explained. Oxford University Press.

[2] Meyer, L. (1956). Emotion and the Meaning of Music. Oxford University Press.

[3] Eerola, T., and Vuoskoski, J.K. (2013). A review of Music and Emotion studies: approaches, emotion models, and stimuli. Music Perception: An Interdisciplinary Journal, 30, 307-340.

[4] Balkwill, L.L. and Thompson, W.F. (1999). A cross-cultural investigation of the perception of emotion in music: psychophysical and cultural cues. Music Perception, 17, 43-64.

Thank you very much for information on the books and papers about music analysis. Meyer (1956) is one of the foundations of music education, and one of the present authors has read that book. In this paper, we will also refer to some of them for presenting the aim and construction of this paper.

Technical corrections

- I suggest the authors to add some complementary material to the paper which that can be useful for future educational and research activities on the area. I suggest to include a list of representative songs from Japan and Germany representative of each climate season

Although we have not decided what representative songs in Japan and Germany (how many, what seasons, etc.) will be listed up in the revised version, we are considering to show the information on the titles and composers of several songs for the specified season in Japan and Germany, maybe, as follows.

* Early winter vs. early spring in Japan (mainly school songs)

*Spring in various stages in Japan vs. spring (mainly for May) in Germany

(As for Japan, mainly school songs or children songs. As for Germany, children songs and art songs)

- Figures 19 and 20 are difficult to ready. I would suggest to add a description in the text.

Although the explanation of the works given by the students for Figs. 19 and 20 is described in the text, we will consider how the further explanation can be added in the text.

As a conclusion, I think the paper topic is very interesting and there is a lot of work behind it, but I think it would benefit a lot from a change in the structure and a more detailed description of the results, so that the paper is self-contained for publication.

Thank you very much for your valuable comments.