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IMPROVISATION AS THE FOUNDATION OF FLOW IN MUSIC EDUCATION: CONNECTIONS TO ATTITUDES, GENDER AND GENRE

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Abstract/Izvleček

The aim of our study was to explore the connection between improvisation and flow. Data were collected from 252 tertiary music students from Slovenia and Croatia (121 male and 131 female musicians), who filled in The Questionnaire on Attitudes to Music Improvisation, The Inventory on Feelings associated with Music Improvisation, and the Work-related Flow Inventory. The results show that the female students have significantly more negative feelings and attitudes toward improvisation, and they experience less flow while improvising. Differences were even more pronounced when comparing students who only played classical music with those who played other genres, as well. Regression analysis showed that we can explain 71% of the variance in flow with attitudes toward improvisation.

Keywords:
attitudes, flow, higher music education, improvisation, music students

Ključne besede:
stališča, zanos, visokošolsko izobraževanje, improvizacija, študenti glasbe

Improvizacija kot izvor doživljanja zanosa v glasbenem izobraževanju
Povezava s stališči, spolom in z glasbenim žanrom

Namen raziskave je bil preučiti povezanost med improvizacijo in zanosom. Podatki so bili pridobljeni na 252 študentih Akademije za glasbo v Ljubljani in Zagrebu (121 moških in 131 žensk), ki so izpolnjevali Vprašalnik stališč do glasbenega improvizacije, Vprašalnik čustev, povezanih z glasbeno improvizacijo, in Vprašalnik delovnega zanosa. Rezultati so pokazali, da imajo ženske pomembno več negativnih čustev in stališč do improvizacije. Opazne razlike so se pojavile tudi glede na glasbeni žanr, saj so tisti študenti, ki igrajo tudi druge glasbene žanre, imeli pozitivnejša stališča in pozitivna čustva do improvizacije kot tisti, ki igrajo zgolj klasično glasbo. Regresijska analiza je pokazala, da lahko pojasnimo 71 % variance v zanosu s stališči do improvizacije.

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Introduction

Definition and complexity of improvisation

The word *improvises* stems from the Latin word for unforeseen (*in* + *provisus*) (Merriam-Webster, 2020). Although its defining features are artistic freedom and extemporaneous expression, we must not overlook the importance of the cultural and musical rules by which it is constrained. As explained by Azzara (2002, p. 172), "improvisation means that an individual has internalized a music vocabulary and is able to understand and to express musical ideas spontaneously, in the moment of performance". On the other hand, the potential for such creativity is considered to be present in its basic form in all people from an early age (Burnard, 2012). The skills that allow us to improvise are often understood as a continuum, but as Biasutti (2015) points out, it is difficult to discern where the expert levels begin.

As its definition implies, the act of improvising is a complex endeavour that entails many processes occurring simultaneously. Beaty (2015, p. 109) explains: "The improvising musician faces the unique challenge of managing several simultaneous processes in real-time—generating and evaluating melodic and rhythmic sequences, coordinating performance with other musicians in an ensemble, and executing elaborate fine-motor movements—all with the overall goal of creating aesthetically appealing music". Despite its complexity, the subject is being tackled in many different fields, with new psychological models explaining the cognitive processes involved (Biasutti and Frezza, 2009; Kenny and Gellrich, 2002; Loui, 2018; Sawyer, 2011), new educational methods being developed (Beegle, 2010; Biasutti, 2017), and neuroscientific glimpses into the brain being offered (Landau and Limb, 2017).

The importance of improvisation and its place in Western education systems

Musical improvisation constitutes a core component of musicianship. It helps with the development of many integral skills such as expressiveness and communication, audiation, the ability to play by ear, and music agency (Azzara, 1993; Higgins and Mantie, 2013). Since it is based on many complex rules but encourages flexibility and novelty, it allows students to understand these rules on a deeper level and incorporate them in their actions, instead of simply memorising and recreating them.

As such, improvisation promotes divergent and higher-order thinking, as well as improvements in music performance (Azzara, 1993; Menard, 2013).

It enhances musical awareness (Kratus, 1991) and frequently leads to improved self-confidence and stronger motivation to keep playing music (Gruenhagen, 2017; Riveire, 2006). It also supports development on a psycho-social level, increasing trust among musicians who improvise together (Hart and Di Blasi, 2013; Monk, 2013), while serving as a medium for expression of one's identity (Smilde, 2016) and a facilitator of self-actualisation (MacDonald et al., 2006).

As Landau and Limb (2017) point out, this ability is therefore critical to students' engagement with music as well as to their overall musicality. However, it would be erroneous to think of it solely as an ability. Improvisation in music education must also be considered for its value as an experience (Higgins and Mantie, 2013). We always improvise "on something" (Ramshaw, 2010), which is why there is history and culture present in every improvisation. Traditional elements are rearranged and challenged, while new elements are added, and this process can be crucial in students' sense of identity. One might even argue that improvisation is the condition of human existence (Lewis, 2009). In light of this, many scholars emphasise the meaning of improvisation not as a product, but as a process enabling students to be more reflective about their actions (Biasutti, 2017) and showing "value in searching for, rather than stipulating what is right" (Higgins and Mantie, 2013, p. 43). Despite the evidence for its importance, improvisation is not often practised in Western formal music education.

In the 19th century, improvisation became marginalised in formal music education. It was pushed to the periphery as interpretive literacy gained importance along with the development of a printed press and the codification of music (Sarath, 2013). Certain skills, such as the ability to play by ear or to create music, are nowadays largely overlooked, since education policies demand clear and measurable outcomes that are in line with the materialist mind-set. The product of improvisation is never predetermined; therefore, it is not easy to prove that learning has taken place, let alone to measure the amount of learning (Higgins and Mantie, 2013; Sarath, 2013). While improvisation is being reintroduced into curricula, it is rarely taught in praxis, especially in classical music (Biasutti, 2017), thus omitting opportunities for a rewarding experience.

Flow and music improvisation

Flow is described as a peak positive experience of great focus and intrinsic motivation that can sometimes occur during goal-directed activity.

It rests on a fragile dynamic balance between one's perceived abilities and the challenges of the task at hand (Nakamura and Csíkszentmihályi, 2009). Nine core dimensions define flow: challenge-skill balance, action-awareness merging, clear goals, clear feedback, concentration, sense of control, loss of self-consciousness, transformation of time, and autotelic experience (Jackson and Csíkszentmihályi, 1999). It has been argued, however, that some of these dimensions are actually antecedents of flow (i.e., goal clarity, challenge-skill balance, concentration, and feedback clarity), while others are its consequences (sense of control and autotelic experience) (Quinn, 2005). It is therefore important to keep these antecedents in mind when trying to support the occurrence of flow in music students. Flow is, after all, an important component of personal wellbeing (Csíkszentmihályi, 1990) and a highly rewarding and motivating experience that many artists strive to achieve (Nakamura and Csíkszentmihályi 2009). Flow experiences are identified in the literature as an important motivator for instrumentalists' prolonged engagement in jazz improvisation (Hytönen-Ng, 2013)

Flow is sometimes also mentioned as an integral part of improvisation. Bisutti and Frezza (2009), for example, divide improvisation into five empirically drawn dimensions: anticipation, use of repertoire, emotive communication, feedback, and flow. As such, flow provides a sense of fluency and spontaneity to improvisation and encompasses musicians' feelings of deep focus, control, and enjoyment (Biasutti, 2015). Flow was also proposed as part of Kenny and Gellrich's (2002) models of the distinct aspects of improvisation. According to this conceptualisation, flow is one of eight types of mental processes that occur during improvisation, the others being short-, medium-, and long-term anticipation; short-, medium-, and long-term recall; and feedback.

Evidence that flow might be an integral part of improvisation also comes from neuroscience. Interestingly, the brain region called the dorsolateral prefrontal cortex (DLPFC), which is central to cognitive control and located just behind the forehead, shows strong deactivation during improvisation. Furthermore, this deactivation becomes even more pronounced as improvisation becomes more complex and less restricted (Berkowitz and Ansari, 2008; De Manzano and Ullén, 2012; Limb and Braun, 2008; McPherson et al., 2016; Pinho et al., 2014).

These reductions in activity might be a neural correlate of flow, indicating a reduction in self-monitoring and top-down control, which may lead to a different state of consciousness, more immediately connected to music (Landau and Limb, 2017).

An additional shift in the area of processing, from the prefrontal cortex (PFC) to lower regions, especially the medial frontal cortex (MFC), indicates that as musicians become better at improvisation, they transition from a deliberate, thought-through approach to more automated, integrative processing. It is likely that this shift also represents a qualitative shift in musicians' subjective experience of improvisation. Recently, Belden and colleagues (2020) reported that heightened functional connectivity among musicians can be explained by higher within-network connectivity (more tight-knit cortical networks) in Classical musicians, as opposed to more disperse, globally-connected cortical networks in Improvisational musicians.

Connection between improvisation and flow by gender and genre

Although improvisation and flow seem to be integrally connected, simply improvising is far from sufficient to get into the flow state. A fine balance between one's perceived abilities and the demands of the activity is crucial, so the musician can feel challenged yet in control of what they are doing. Many factors can affect this balance, from one's attitudes toward the task or one's own abilities, to a distracting or unsupportive environment (Nakamura and Csíkszentmihályi, 2009).

When it comes to the experience and frequency of improvising, differences can be found between musicians in different genres, such as classical and jazz (Biasutti, 2017), as well as between male and female musicians (Wehr, 2016). While the experience of flow seems to be similar and just as likely in men and women (Bonaiuto et al., 2016; Csikszentmihalyi, 1990; Kee and Wang, 2008; Moreno et al., 2008), the experience of improvising is not. While there are improvisational components in many genres of music training, contemporary common-practice jazz music training places special emphasis on improvisation (e.g., Sawyer, 2011). In contrast, contemporary common-practice classical western music training places less emphasis on improvisation. Improvisation is an integral part of jazz, which has always been a male-dominated field (Caudwell, 2010; Forbes, 2020; Wehr, 2016).

Although there do not appear to be any gender differences concerning performance and ability, when it comes to psycho-social variables, gender does play an important role.

Women in jazz often report more anxiety and scepticism, lower confidence, and self-efficacy, as well as less positive attitudes and less perceived peer social support (Wehr-Flowers, 2006; Wehr-Flowers, 2007).

There is a significant drop in the numbers of women in jazz as expectations for improvisation increase (Steinberg, 2001). The same factors that cause attrition and negative experiences might also affect the occurrence of flow during improvisation.

The present study was conducted to better understand the connections between flow, attitudes toward improvisation, gender, and genre. We tried to fill the gap in exploring improvisation related to psychological flow by adding the moderating variables of gender and genre in the context of higher music education. There is a lack of empirical studies investigating the relationship between improvisation and flow, especially studies that emphasise the educational perspective.

The main aim of our study was to explore connections between attitudes toward improvisation and flow during improvisation in relation to gender and music genre. We focused on the following questions:

RQ1: Where do tertiary music students gain knowledge about improvisation, and do the sources differ according to their gender or the genre of music they play?

RQ2: Do male and female students differ regarding flow, attitudes, and feelings associated with improvisation?

RQ3: Do students who only play classical music differ from those who play other genres as well regarding flow, attitudes, and feelings associated with improvisation?

RQ4: Can flow be predicted by attitudes toward improvisation?

Method

Participants

Participants were students from the Ljubljana Academy of Music, Slovenia and the Zagreb Academy of Music, Croatia. The link to the online survey was clicked 337 times, and 283 students responded to the questions. Because of a considerable amount of missing data, we excluded 27 respondents.

We found four extreme outliers in age, which we decided not to include in further analyses, leaving us with 252 students in the final sample. Of these 252 respondents, 48% identified themselves as men (n = 121) and 52% as women (n = 131). Their average age was 21.21 years (SD = 2.23), with a range between 16 and 30 years.

The students' field of study was most commonly instrumental performance (68%), followed by music pedagogy (23%), singing (9%), composition (5%), and conducting (1%).

When asked whether they perform any other genres of music apart from classical music, 68% answered "yes". In addition to playing classical music, 42% of the whole sample played pop music, 30% played jazz, and 15% played popular folk music. Less than one percent of the respondents added the genres metal, rock, flamenco, electronic, marching-band, and sacred music.

Instruments

Inventory on Feelings Associated with Improvisation. This inventory asks musicians how they feel when they think about improvising. It consists of 17 pairs of adjectives (one positive and one negative, e.g., proud-ashamed) and a 5-point scale ranging between each pair. The participants were asked to indicate whether they felt closer to one adjective or the other. The questionnaire had good internal reliability (Cronbach alpha = 0.95).

Questionnaire on Attitudes to Music Improvisation. This questionnaire consists of 20 items measuring musicians' attitudes toward the act of improvising (e.g., "I believe improvising is difficult."). It is a Likert-type scale where answers can range from 1 (strongly disagree) to 5 (strongly agree). This study showed high internal reliability (Cronbach alpha = 0.92).

WOLF – Work-Related Flow Inventory (Bakker, 2008; adapted for music improvisation by the authors of the present study). This is a Likert-type scale with twelve items describing different aspects of flow (e.g., "When I am improvising, I think about nothing else."). Respondents state their agreement with a certain statement on a 7-point scale (1 – I completely disagree; 7 – I completely agree). This study showed high internal reliability (Cronbach alpha = 0.97).

Procedure

The participants were asked to complete the questionnaires during one of their lectures. The questionnaires were in digital form, openly accessible via a link. On average, it took them 15 minutes to complete the survey. Informed consent was obtained, and the students did not get extra credit points or any other reward for completing the questionnaires. The study was carried out in accordance with the recommendations of the Slovenian Psychological Society. In accordance with the Declaration of Helsinki, the consent obtained from all participants was both written and informed. Data was analysed using IBM SPSS Statistics 25.0 and R (R Core Team, 2016).

Results

Sum scores from all three questionnaires were distributed normally for all groups (men and women, as well as students who only played classical, and those who played other genres in addition to classical) as indicated by the skewness and kurtosis values and visual examination of normal q-q plots. No values of skewness and kurtosis were above the absolute value of 2.00 (as shown in Table 1 for men and women and in Table 2 for the classical group), which is recommended as a cut-off for considering data as normally distributed (Bandalos and Finney, 2010).

Table 1: Mean, standard deviation, skewness and kurtosis of the sum scores for men and women

	Women (n = 131)				Men (n = 121)			
Question.	**M**	**SD**	**skewness**	**kurtosis**	**M**	**SD**	**skewness**	**kurtosis**
Attitudes	28.67	8.89	-.13	-.75	32.15	7.34	-.55	.20
Feelings	53.85	14.56	-.16	-.60	58.41	12.55	-.12	-.44
Flow	48.21	20.34	-.15	-.93	55.38	16.76	-.57	.42

Notes. Question. = questionnaire; M = mean; SD = standard deviation; Attitudes = attitudes towards improvisation; Feelings = feelings towards improvisation; Flow = flow during improvisation.

Table 2: Mean, standard deviation, skewness and kurtosis of the sum scores for the classical-only group and the group that plays other genres as well

	Classical only (n = 75)				Other genres (n = 15)			
Question.	**M**	**SD**	**skewness**	**kurtosis**	**M**	**SD**	**skewness**	**kurtosis**
Attitudes	25.31	7.02	.12	-.10	32.89	7.78	-.82	.56
Feelings	50.19	12.71	-.09	-.17	59.01	13.36	-.35	-.50
Flow	41.37	16.85	-.16	-.86	56.86	17.85	-.65	.13

Notes. Question. = questionnaire; M = mean SD = standard deviation; Attitudes = attitudes towards improvisation; Feelings = feelings towards improvisation; Flow = flow during improvisation;

Classical only = the group who only played classical music; Other genres = the group who played other genres in addition to classical music.

We asked tertiary music students where they had learned how to improvise. Their answers were compared according to their gender and preferred genre, and since we tested the same data twice, we used the Bonferroni correction of alpha value (0.05 / 2 = 0.025). P-values under 0.025 were deemed statistically significant. We used the Chi-Square test to determine the differences between the two groups and the Phi coefficient (φ) to determine effect sizes; the Phi shows the degree of association between two dichotomous variables, and its interpretation is comparable to other correlation coefficients.

Table 3 shows that a significantly larger proportion of the female students answered that they had no knowledge about improvisation. When asked where they had gained their knowledge of improvisation, they were less likely to report using books and recordings, or having experience of playing in a band (all effect sizes were small).

Table 3: Gender differences in sources of knowledge about improvisation

	Female (n = 131)	**Male (n = 121)**	***Pearson Chi-Square***	***φ***
No knowledge	48 (38)	28 (38)	.007*	-.18
Recordings	41 (54)	66 (53)	.001***	.23
Playing in a band	21 (35)	49 (35)	.001***	.27
Formal education	35 (34)	33 (34)	.839	-.01
Masterclasses	11 (10)	9 (10)	.669	-.03
Books	2 (10)	17 (9)	.001***	.24
Private lessons	6 (8)	10 (7)	.170	.09
Other sources	23 (30)	36 (29)	.041	.14

Note. φ = phi, effect size; *p < .025, **p < .005, ***p < .001; values in brackets show expected values; no cells had an expected value of less than 5.

When comparing the students who only play classical music with those who play other genres as well as classical music (see Table 4), we found that the classical-only group was less likely to report learning how to improvise from playing in a band, from masterclasses, or from recordings (effect sizes were moderate, with the exception of differences in attending masterclasses, which were small). These students reported not having any knowledge about improvisation more frequently than their peers who play other genres as well (the effect size was moderate).

Table 4: Genre differences in sources of knowledge about improvisation

	Classical-only (n = 84)	**Other genres (n = 172)**	***Pearson Chi-Square***	***φ***
No knowledge	45 (25)	31 (51)	.001***	-.40
Recordings	12 (35)	95 (72)	.001***	.43
Playing in a band	2 (23)	68 (47)	.001***	.43
Formal education	20 (22)	48 (46)	.446	.05
Masterclasses	2 (7)	18 (13)	.023*	.15
Books	3 (6)	16 (13)	.097	.10
Private lessons	3 (5)	12 (10)	.396 †	.07
Other sources	43 (19)	16 (40)	.001***	-.50

Note. Classical-only = students who only play classical music; Other genres = students who play classical music as well as some other genres; φ = phi, effect size; *p < .025, **p < .005, ***p < .001; † Fisher's test was used to compare attendance to private lessons, because one of the expected values was less than 5.

Table 5 presents means, standard deviations, and correlations between variables of interest, as well as reliability scores for each questionnaire. All the variables were significantly but mostly weakly correlated (using Pearson's correlation), with the exception of attitudes, feelings, and flow, which were all strongly correlated. The questionnaires all showed good internal reliability (> .90).

Table 5: Means, standard deviations, reliability, and correlations between variables

		M	**SD**	**1**	**2**	**3**	**4**	**5**
1	Gender	.50	.50	/				
2	Genre	.67	.47	.13	/			
3	Attitudes toward improvisation	30.39	8.33	.21**	.43***	.94		
4	Feelings associated with improvisation	56.11	12.76	.17*	.30***	.74***	.95	
5	Flow during improvisation	51.76	18.95	.19**	.39***	.89***	.71***	.97

Note. M = mean; SD = Standard deviation; Alpha reliability coefficients of predictor and outcome measures are shown on the diagonal. Gender (1 = male, 0 = female); genre (0 = only classical; 1 = classical and other genres); we used Pearson's coefficient to calculate the strength of correlation. *p < .025, **p < .005, ***p < .001;

Since the data followed normal distribution (tested with the Kolmogorov-Smirnov test), an independent sample T-test was used for comparisons between female and male students as well as between the classical-only and different-genres groups. Female students had significantly less positive attitudes and feelings regarding improvisation as well as a lower occurrence of flow during improvisation (Table 6).

The effect sizes were small for feelings, medium for flow, and large for attitudes (Lovakov and Agadullina, 2017).

Table 6: Gender differences in attitudes, feelings, and flow

	Female (115)		Male (113)				
	M	SD	*M*	*SD*	*t(df)*	*M difference*	*Hedges g*
Attitudes toward improvisation	28.67	8.89	32.15	7.34	-3.23** (220)	-3.48 [-5.61, -1.35]	.43
Feelings associated with improvisation	53.85	14.56	58.41	12.55	-2.53* (222)	-4.56 [-8.10, -1.01]	.34
Flow during improvisation	48.21	20.34	55.38	16.76	-2.90** (219)	-7.17 [-12.04, -2.31]	.39

Note. M = Mean. SD = Standard Deviation; t(df) = t statistic for independent samples; M difference = difference in the means with confidence intervals. Number of female students = 138, number of male students = 122. *p < .025, **p < .005, ***p < .001

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The measured differences were even larger between students who played only classical music and those who played other genres as well (Table 7). Classical-only students had significantly more negative attitudes and feelings associated with improvisation as well as a lower occurrence of flow during improvisation. Effect sizes for each of the variables were large (Lovakov and Agadullina, 2017).

Table 7: Music genre differences in attitudes, feelings, and flow

	Classical only		**Classical and other genres**				
	M	**SD**	**M**	**SD**	**t(df)**	**M difference**	**Hedges g**
Attitudes toward improvisation	25.31	7.02	32.89	7.78	-7.13 (226)	-7.58 [-9.68, -5.49]	1.01
Feelings associated with improvisation	50.19	12.71	59.01	13.36	-4.76 (226)	-8.83 [-12.48, -5.17]	.67
Flow during improvisation	41.37	16.86	56.86	17.85	-6.27 (226)	-15.48 [-20.35, -10.61]	.88

Note. M = Mean. SD = Standard Deviation; t(df) = t statistic for independent samples; M difference = difference in the means with confidence intervals. Number of female students = 138, number of male students = 122. *p < .025, **p < .005, ***p < .001

We used hierarchical multiple regression analysis to test whether attitudes toward improvisation significantly predicted the participants' flow during improvisation (while controlling for gender and music genre). Using the enter method, it was found that the first model containing the variables *gender* and *genre* explained 16% (Adjusted R^2 = .163) of the variation in measured flow, while the model with the

added variable *attitudes* explained 79% of the variance (F (222,) = 287.93, $p < .001$, $R2 = .796$, $R^2_{adjusted} = .793$). Gender ($\beta < .001$, $p = .999$) and music genre ($\beta = -.001$, $p = .986$) were not significant predictors of flow, while attitudes were ($\beta = .892$, $p < .001$).

Discussion

Scholars from many different fields agree that improvisation is an important part of musicianship and should be better represented in formal music education +(Biasutti, 2017; Landau and Limb, 2017; Higgins and Mantie, 2013).

Improvisation is not only an important ability to learn, but also a valuable experience to have.

It seems to be integrally related to the flow experience (Biasutti and Frezza, 2009; Landau and Limb, 2017), which, as a highly rewarding and motivating experience, should be further encouraged in students. However, even students studying at the same music academy operate in different environments.

The social roles connected to gender seem to play an important role in how one perceives improvisation (Wehr-Flowers, 2006, 2007). This was also evident in our study, where female musicians more often reported having no knowledge about improvisation and had more negative attitudes and feelings associated with improvisation. The latter may be connected to the fact that female music students are rarely involved in bands performing non-classical music, something which is common among male students. There are also more male music students studying classical music, who are interested and actively involved in jazz music. Furthermore, female students did not experience flow while improvising to the same extent as their male peers. These findings are largely in line with the literature showing that women and girls often avoid improvising (Rowe, 1995). Wehr (2016) offers an explanation of this kind of behaviour in her empirically developed model of jazz avoidance, arguing that since there are few women in jazz, they are often given token roles that fit the patriarchal view of women. By being the sole representative of a certain group, women in jazz are likely to feel a stereotype threat, that is, a fear of confirming a negative stereotype about the group to which one belongs.

Certain aspects of improvisation, for example, can be seen as aggressive and therefore not "feminine," causing a female musician to stick out in a negative way. If they play in a "masculine" manner, they are marked as aggressive, but if they do not, they are marked as too effeminate to be taken seriously. These judgements take a toll on one's self-efficacy and motivation, making female musicians less likely to pursue a career in this area (Wehr, 2016).

Although flow as a concept is not related to gender (Bonaiuto et al., 2016; Csikszentmihalyi, 1990; Kee and Wang, 2008; Moreno et al., 2008; Russell, 2001), the contexts that either facilitate or prevent flow are closely related. In the present study and in accordance with our hypothesis, attitudes toward improvisation did accurately predict students' experience of flow. If girls and women do not see improvisation as something rewarding for them, they may develop more negative attitudes towards it (Wehr-Flower, 2006), thus hindering the occurrence of flow.

Flow during improvisation was also less salient among students who only played classical music.

They, too, had significantly more negative attitudes and feelings associated with improvisation, and a greater proportion of them (almost two-thirds) reported not having any knowledge about improvisation when compared to students who played other genres besides classical. Their diverging views might be rooted in the values present in their environment.

The values in Western classical music education remain primarily aesthetic at their core, often placing interpretational and technical mastery above all else and striving for perfection (Regelski, 2003; Skoogh and Frisk, 2019). Skoogh and Frisk (2019, p. 2) explain that "what is sought after in Western classical music are original interpretations, but with utmost respect for the text". In other words, musicians have to be creatively unique, while at the same time being completely in line with how the composer envisioned the music. It is thus not surprising that classical musicians show more performance anxiety, which is negatively correlated to the flow state (Fullagar et al., 2013; Kirchner et al., 2008; Mao et al., 2020), than musicians in other genres (Papageorgi et al., 2011). Not only do music students fail to get enough experience to feel confident in more creative activities such as improvisation (Bačlija Sušić et al., 2019), they also face the daunting task of achieving an abstract aesthetic ideal.

Our study has several strengths compared to previous studies: it highlights the importance of improvisation in contemporary music education at the tertiary level, and it emphasizes the educational implications of music improvisation.

In addition, it gives insight into the mediating role of gender and genre in predicting flow during improvisation. However, we have to point out some limitations of our study: As participants' experiences with improvisation is assumed to be mainly outside the music academy environment, this fact suggests that those experiences are related to voluntary activities. Presumably, such experiences are more pleasurable than obligatory music activities and therefore elicit more flow. Furthermore, such music experiences are not so exposed to evaluation by music professors and music colleagues. All these factors could trigger flow experiences, so we should be careful in interpreting the link between improvisation attitudes and flow reported in our study. The other hindrance concerns interpreting gender differences; female participants are more likely to have fewer experiences with improvisation because there are more classical-only female musicians.

Therefore, it is obvious that they would experience less flow in music improvisation because they are not exposed to situations where that would be possible.

Improvisation seems to be experienced less positively by female musicians and even less by musicians who play only classical music. Both groups report having less knowledge about improvisation when compared to their peers. The present study illustrates the need to incorporate improvisation in tertiary classical music education and to do so in a manner that takes into account the perspectives and needs of different groups of students.

Improvisation in Western classical music has been addressed and researched more frequently recently (Després et al., 2017; Dolan et al., 2018), and there is increased discussion on alternative approaches to teaching and supporting improvisation (Biasutti, 2017; Costa and Creech, 2020; Higgins and Mantie, 2013; Hickey, 2009; Hong, 2019; Kratus, 1995). Inventive ways are emerging to bridge the gap between classical and jazz music education (e.g., James, 2019) as well as between Western music and other traditions (Kohfeld et al., 2020). Research calls for a shift in the pedagogical perspective from one grounded on imitation and repetition, to one based on reflection and collaboration (Costa and Creech, 2020).

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