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ARTÍCULOS

Mindfulness and music. Impact on academic performance and mindfulness in students of Music Teacher Training

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Abstract: Studies published in recent years have revealed interesting implications regarding the mindfulness-music relationship, which opens the doors to a relatively unexplored field of research in the particular subject of Music Education. This study analyzes the effect of a 9-week mindfulness training program on academic performance and mindfulness in a sample (N=25) of university students from the Mention in Music Teacher Training (Bachelor in Primary Education). The participants were distributed in two groups: an experimental group and a control group. The methodology used was mixed. The Five Facets Mindfulness Questionnaire (FMMQ) and the grades obtained in the different subjects that comprise the current Mention in MTT were used in the research as part of a pre-post design. Although the results showed no significant differences in the intergroup analysis for most of the variables considered, statistically significant differences were found at an intragroup level, within the intervention group. Regarding academic performance, the study shows how the practice of mindfulness was stimulating as well as beneficial in all subjects (and not only in the one where mindfulness training was implemented). This was particularly relevant for students who achieved the highest grades, something they likely would not have achieved without the intervention. On the other hand, significant improvements were identified in the evolution of the intervention group for the mindfulness characteristics. From a qualitative perspective, the evidence collected highlights the positive reactions of the participants regarding the evolution experienced within the experimental group, evolving from initial skepticism to an integration of mindfulness practice into student life over the course of more than one academic semester. In summary, the research provides evidence on the interest and usefulness of a mindfulness intervention as part of Music Teacher Training.
Keywords: Mindfulness; music teacher training; music education; academic performance; stress.

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1. Introduction

In response to the challenges imposed by contemporary society on a daily basis, recent years have witnessed an increased implementation of techniques and strategies aimed at enhancing individuals' physical, mental, and emotional self-regulation (Camuñas *et al.*, 2022; Kim *et al.*, 2022; Yang y Jiang, 2022; Xu, 2021). Among these, mindfulness has shown particular efficacy and applicability across a wide range of domains. The present study focuses specifically on this area, where a growing body of research supports the positive effects of mindfulness practice on emotional well-being and academic performance at different educational levels (Bartos *et al.*, 2022; Demirdogen *et al.*, 2022; Díaz, 2018; Galante *et al.*, 2018; Varner, 2022).

Grounded in the conceptualization of mindfulness as a metacognitive skill capable of regulating attentional processes, concentration, and awareness (Bishop *et al.*, 2004), this study seeks to explore the effects of a

mindfulness-based intervention on the academic performance of music students. In this context, students are assessed on skills such as auditory sensitivity, comprehension of musical structures and forms, vocal and instrumental performance, and coordinated movement (e.g., dance, choreography, body percussion), all of which are critical components in their academic evaluation and overall training as future musicians and music educators.

Accordingly, this research aims to evaluate the impact of a mindfulness intervention integrated into the official syllabus of a course within the Music Teacher Training (MTT), part of the Spanish university degree program leading to the Bachelor's Degree in Primary Education. In addition to academic performance, the study will examine mindfulness capacity, as operationalized through the five facets defined by Baer *et al.* (2006). The findings may provide a basis for the potential inclusion of mindfulness training in the initial education of Music teachers, who could then act as agents of dissemination, supporting younger generations in leading more fulfilling lives in an increasingly complex and demanding world.

2. Mindfulness and Music Education

Mindfulness has been described as "the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" (Kabat-Zinn, 2003, p. 145). Similarly, Baer (2003) defines it as "the nonjudgmental observation of the ongoing stream of internal and external stimuli as they arise" (p. 125).

In the specific context of music education for children and adolescents, available studies remain scarce. However, there is growing interest in incorporating mindfulness practice into music classrooms (Varner, 2022). The educational value of both mindfulness and music appears to be beyond dispute (Lawlor, 2016). Furthermore, participants in mindfulness training programs also affirm the usefulness of music as a component of their activities (Broderick & Metz, 2016).

Falter (2016), using music, investigated the benefits of mindfulness in early childhood education students, and proposed mindfulness as an underutilized tool that could deepen musical understanding. Likewise, Anderson (2012) examined the effect of mindfulness on the listening skills of fifth-grade students (N = 38), employing a randomized experimental design with a single post-test. The independent variable was the type of instruction prior to listening to music excerpts: mindfulness-based versus traditional. Two dependent variables were analyzed: novelty and enjoyment. Statistically significant differences were found between the mindful listening group and the control group in both variables, with the mindfulness-trained group reporting significantly higher levels of novelty and enjoyment. This study demonstrates that encouraging students to engage in mindful listening activities can enhance their ability to perceive and remember musical nuances and details, more effectively than traditional non-mindful methods.

Auerbach and Delport (2014) explored how musical sound could be used to foster mindfulness, develop integrity, and support the personal growth of South African primary school students in disadvantaged settings. Their findings suggest that the integration of musical experiences into daily education promotes moments of joy, spontaneity, unity, and well-being. The children's listening skills improved, and academic performance increased. In a subsequent study, the same authors implemented an informal music program delivered weekly over a 10-month period at a volunteer center in a socially disadvantaged district of Cape Town. The objective was to foster aspects of mindfulness among children aged 11 to 14 through active engagement in musical activities. The authors highlighted two key mindfulness-related outcomes: increased self- and other-awareness, and improved listening skills during mindfulness practice (Auerbach & Delport, 2018).

Fostering attention in music education is crucial, as Trives-Martínez *et al.* (2014) remind us: "the temporal linearity of sounds demands rigorous attention. Musical phrases flow, rhythmic patterns succeed one another, and the musical stream does not stop; thus, a synergy between movement and attention is essential" (p. 1071). Indeed, in the act of listening—so vital to all musicians—attention and awareness are fundamental components that define each stage of the auditory process and ultimately enhance pleasure and well-being.

Other research has focused on mindfulness as a means to improve musical performance. The literature suggests that mindfulness positively influences auditory perception and musical sensitivity, facilitating an increased sense of pleasure and the emergence of flow states (Díaz, 2011; Todd, 2016; Auerbach & Delport, 2018). Particularly, mindfulness practice has considerable effects on singers by enhancing micro-muscular and respiratory awareness, which, among other benefits, contributes to improved tuning. This also promotes greater focus and concentration during classes and musical practice, while supporting personal well-being (Czajkowski & Greasley, 2015; Lynch & Wilson, 2018).

Parallel to this, mindfulness has been shown to influence musical creativity by fostering greater expressivity. This leads to a more intuitive and open process in musical improvisation and composition (Newton, 2015). The act of making music requires a high level of cognitive effort, which often results in internal disruptions that interfere with the real-time retrieval of necessary information (e.g., during performance or coordination). In more extreme cases, as Luoma and Hayes (2003) note, experiential avoidance may occur, leading to internal distress and defensive behavior aimed at evading perceived negative experiences.

The studies mentioned so far shows the importance of this type of intervention in the music classroom and the need for further research in this new area.

3. Research questions and initial hypotheses

1. Does a mindfulness intervention contribute to improve the academic performance of Music Teacher Training students?

2. Does a mindfulness intervention help to improve the levels of mindfulness of these students?
3. What is the opinion of university students in Music Teacher Training about the practice of mindfulness as part of their initial training?

In response to these questions, the following three hypotheses are proposed:

- H1: A 9-week mindfulness intervention will contribute to improve the mindfulness facets (observing, describing, acting, non-judging, non-reacting) of university MTT students.
- H2: A 9-week mindfulness intervention will favor an increase in the academic performance of university students of MTT.
- H3: Students involved in a mindfulness intervention will have, in general, a positive opinion about its usefulness as part of the initial training of music teachers.

4. Methodology

This is a mixed research methodology. Following the classification of Creswell and Piano-Clark (2011), the timing of the work has been sequential (none of the parts of data collection has been carried out at the same time); the relationship between the quantitative and qualitative parts is independent, as their mixture occurs at the end; the design shows a priority for quantitative research, with the qualitative part serving to complete the results; finally, the integration of both parts takes place in the interpretation of the results.

The sample consisted of 25 students of the MTT course (Bachelor in Primary Education, 4th year, 1st semester), all of whom signed an informed consent form to participate in the research. Of these, 7 (28%) were male and 18 (72%) were female. The mean age was 22.5 years (SD= 5.5), ranging from 21 to 24 years, with the exception of one man aged 49 years. Six of the participants reported having had some contact with mindfulness, yoga or meditation techniques in the past, ranging in duration from several weeks to one year. All participants had previous musical experience, although the caseload varied: *Elementary Conservatory Studies* (n=2, 8%), *Middle Conservatory Studies* (n=8, 32%), *Advanced Conservatory Studies* (n=4, 16%), *Music Bands* (n=4, 16%), *Amateurs* (n=7, 28%).

The experimental group consisted of the 17 subjects who were enrolled in both of the following two optional subjects: *Practice with Musical Instruments* and *Vocal Training and Choral Practice*. Of the 25 students in the sample, 8 (32%) were enrolled in the elective *Vocal Training and Choral Practice* but not in the subject *Practice with Musical Instruments*. These 8 students were offered the opportunity to participate as a control group, given that, of the remaining 17 students, all of them were very interested in participating in the study.

The duration of the intervention was 9 weeks, with a total of 12 sessions. Breathing attention and body scan practices were presented. In both the pre-intervention and post-intervention assessments, the *Five Facet Mindfulness Questionnaire* (Baer *et al.*, 2006) was administered in its Spanish version (Cebolla *et al.*, 2012). This questionnaire is composed of 39 items, which through a Likert-type scale with five alternatives ordered from 1 to 5 points, measure the general tendency to proceed with Mindfulness from five skills: Observation, Description, Acting with Awareness, Absence of Judgment and Absence of Reactivity. As a consequence of the COVID-19 pandemic, the University of Granada (UGR) offered all classes telematically during that semester.

Socio-demographic data were described using descriptive statistics of frequencies and percentages for qualitative variables, and means and standard deviation for quantitative variables. Visual inspection was carried out to check the distribution between groups, and analyses were performed with the chi-square test, or the corresponding statistics in each case, when possible differences in the distributions between groups were suspected. In addition, the distribution of the sample at baseline was analysed and followed a normal distribution.

An intention-to-treat approach was used to assess the effectiveness of the intervention compared to the control condition, as recommended in major guidelines or standards, such as CONSORT (Calvert *et al.*, 2013). The analysis included description and head-to-head comparison between the two groups. To confirm the main hypothesis, all variables of interest at both time points (t0-t1) were compared using an analysis of covariance (ANCOVA). After that, Student's t-test for related samples was performed on the variables of interest in order to make intra-group comparisons in the experimental and control conditions. Finally, a descriptive analysis of the evolution of the assessment variable throughout the intervention was carried out.

Regarding effect size measures, partial eta squared (η^2) was used for ANCOVA analyses and Cohen's d for Student's t analyses. In addition, an alpha level of 0.05 was established, using a two-tailed test. SPSS-25 software was used to perform these statistical analyses. For the qualitative part, semi-structured interviews were used, which were transcribed and analysed using NVivo(12Plus). In addition to the researchers, an external expert was used to interpret the texts resulting from the transcriptions.

5. Results

5.1 Quantitative analysis

5.1.1. Demographic and outcome variables descriptions

The socio-demographic characteristics of the total sample and of each experimental condition are presented below. Most of these variables are categorical, so percentages are used. Only in the case of the continuous variable age, mean and standard deviation were used. Descriptive analysis of the socio-demographic variables at baseline suggests that the two component experimental conditions were similar to each other before the intervention (see Table 1). Statistically significant differences between the experimental and control groups are only observed at baseline for the variable *Musical Level* (χ^2 = 9.654; p=.022), so that there is a higher

proportion of pupils with *Amateur level* in the control group than in the experimental group. However, the experimental group also has a lower proportion of students at the *Advanced Level* than the control group, so these differences are not expected to affect the results of the study (in particular, the *Average grade* variable) to any great extent.

Table 1. Participants' baseline socio-demographic characteristics in the total sample and according to the experimental conditions

	Total	**Intervention**	**Control**
	(n=25)	(n=17)	(n=8)
Sex, n(%)			
Women	18 (72%)	12 (70.6%)	6 (75%)
Men	7 (28%)	5 (29.4%)	2 (25%)
Age, M(SD)	22.5 (5.5)	23 (6.6)	21.3 (1.11)
Musical Level, n (%)			
Amateur	7 (28%)	3 (17.7%)	4 (50%)
Band	4 (16%)	4 (23.5%)	0 (0%)
Elementary	2 (8%)	2 (11.8%)	0 (0%)
Intermediate	8 (32%)	7 (41.2%)	1 (12.5%)
Advanced	4 (16%)	1 (5.8%)	3 (37.5%)
Mindfulness Experience, n (%)			
Yes	7 (28%)	3 (17.6%)	4 (50%)
No	18 (72%)	14 (82.4%)	4 (50%)

Note: M: mean; SD: Standard deviation. Table of our own elaboration

Finally, and before proceeding to analyse the results obtained for each of the variables and evaluation times, compared between the groups (intergroup analysis) and within each group (intragroup analysis), the main differences found at the intergroup level at baseline are discussed (see Table 2). After applying the Student's t-test for independent samples, statistically significant differences were only observed between the experimental group and the control group for the factor or subscale *Observing* of the FFMQ (t=2.744; p=.013), obtaining on average a better score or greater observing ability in the control group compared to the experimental group, which is important and should be taken into account in the interpretation of our analyses.

Table 2. Outcome variables baseline characteristics

	Total	**Intervention**	**Control**
	M(SD)	M(SD)	M(SD)
Average grade	8,02 (0.54)	8.00 (0.52)	8.07 (0.63)
FFMQ subscales			
Observing	27.40 (4.58)	26.00 (4.44)	31.60 (1.14)
Describing	27.95 (7.28)	26.20 (7.17)	33.20 (5.07)
Acting with awareness	22.15 (7.18)	21.93 (7.29)	22.80 (7.66)
Non-judgement	24.90 (7.52)	23.60 (8.25)	28.80 (2.17)
Non-reactivity	21.60 (3.38)	20.93 (3.08)	23.60 (3.78)

Note: M: mean; SD: Standard deviation.

5.1.2. Inter-group effectiveness

The evolution of the results in each of the experimental conditions, according to the different evaluation moments, is developed below. No statistically significant differences are observed between the two groups in any of the outcome variables analysed, although there seems to be a certain tendency towards improvement in the intervention group compared to the control, which we will analyse in detail in the following section on intra-group efficacy.

Table 3 shows the data resulting from the comparisons between groups at each measurement point, following the ANCOVA analysis. Specifically, descriptive statistics and between-group analyses are shown in detail for the outcome variables FFMQ and mean score, including effect sizes (represented by partial eta squared).

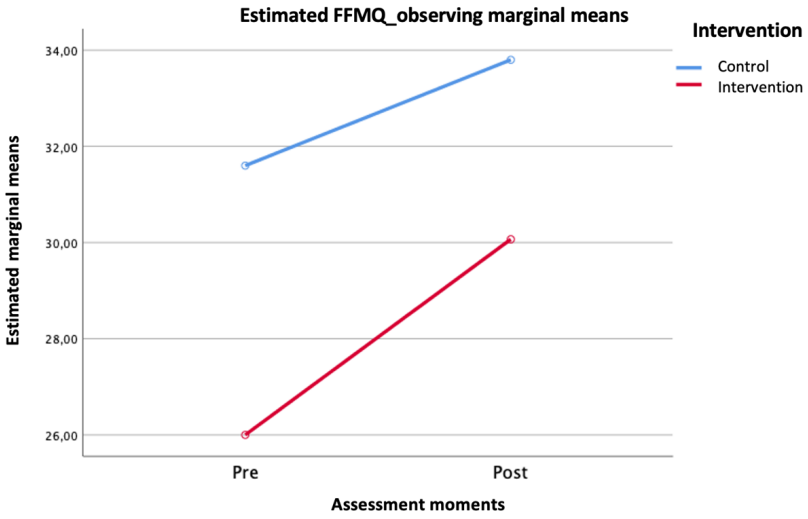
Table 3. Outcome variables pre-test/post-test inter-group analysis (ITT approach)

		Pre-test	**Post-test (9 weeks)**			
	n	M (SD)	M (SD)	η^2	F (g.l.)	p
Escalas FFMQ *Observing*						
Intervention	15	26.0 (4.44)	30.07 (4.71)			
Control	5	31.6 (1.14)	33.8 (2.59)	0.07	.119 (1, 20)	.734
Describing						
Intervention	15	26.20 (7.17)	30.53 (5.82)			
Control	5	33.20 (5.06)	35.00 (5.00)	.005	.092 (1, 20)	.765
Acting with awareness						
Intervention	15	21.93 (7.28)	26.53 (9.05)			
Control	5	22.80 (7.66)	25.20 (6.61)	.018	.319 (1, 20)	.580
Non-judgement						
Intervention	15	21.93 (7.28)	28.67 (9.85)			
Control	5	28.80 (2.10)	31.60 (6.11)	.013	.231 (1, 20)	.637
Non-reactivity						
Intervention	15	20.93 (3.08)	24.80 (3.82)			
Control	5	23.60 (3.78)	25.40 (3.78)	.002	.042 (1, 20)	.840
Average grade						
Intervention	17	8.00 (0.52)	8.12 (.46)			
Control	8	8.07 (0.64)	8.13 (.60)	.053	1.223 (1, 25)	.281

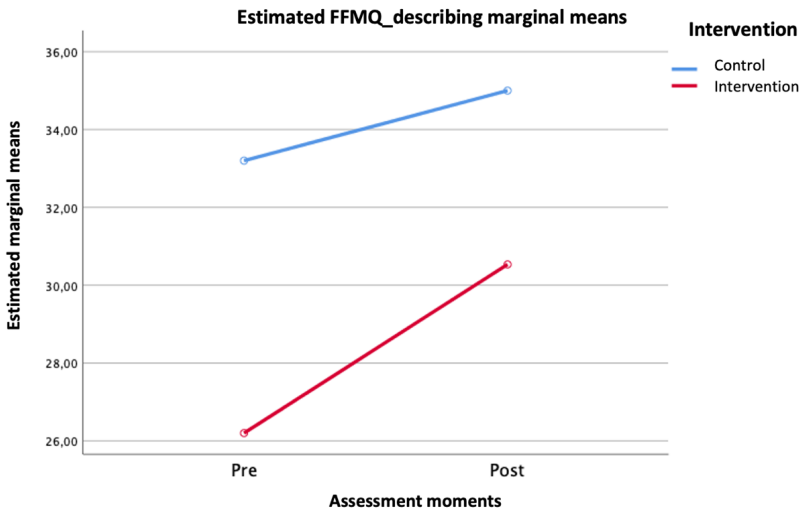
Note: M: mean; SD: Standard deviation.

The evolution of the results, in each condition, of the different categories of the FFMQ (observing, describing, acting, non-judging and non-reactivity) and the evolution of the average mark of the students' records are presented below:

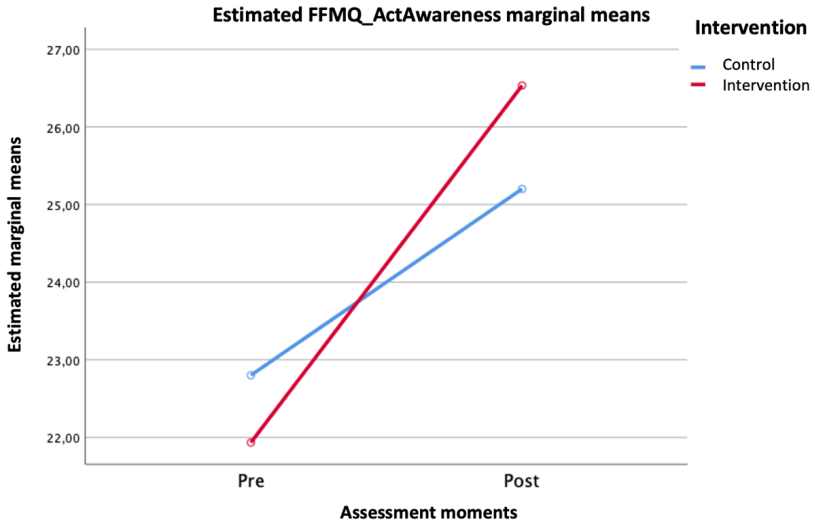
(fig. 1) Evolution of the result of FFMQ_Observing in each condition



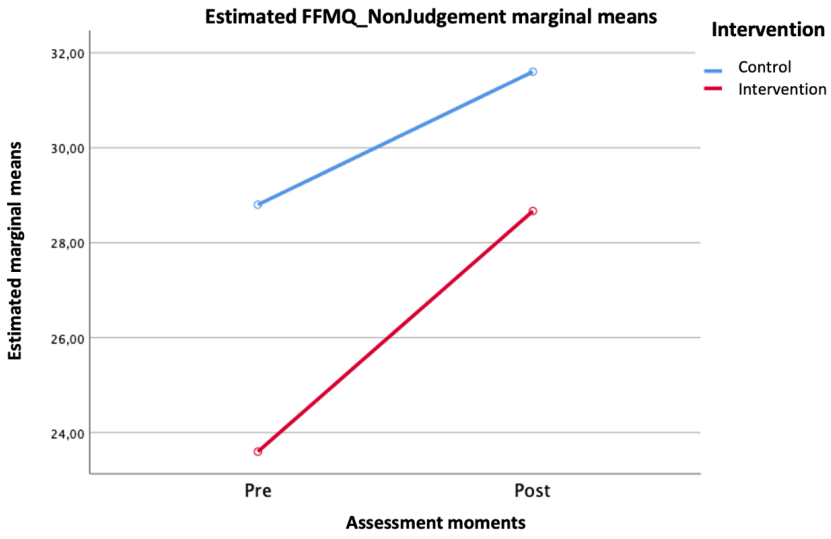
(fig. 2) Evolution of the result of FFMQ_Describing in each condition



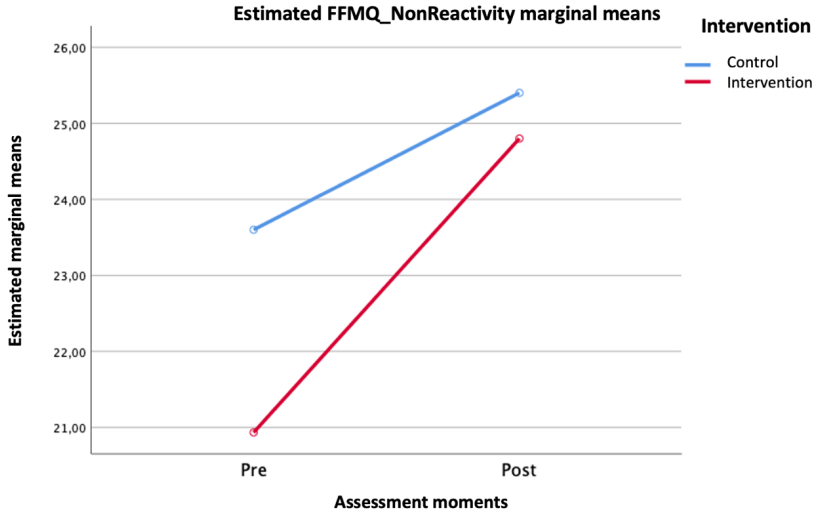
(fig. 3) Evolution of the result of FFMQ_ActAwareness in each condition



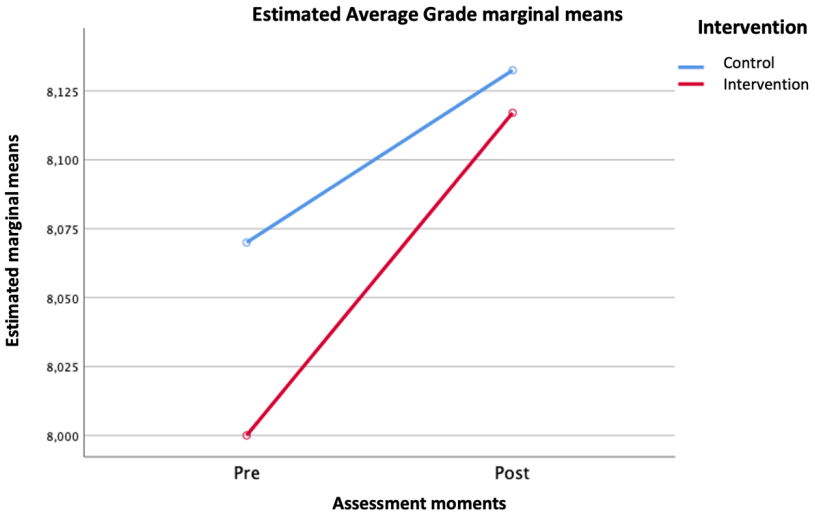
(fig. 4) Evolution of the result of FFMQ_NonJudgement in each condition



(fig. 5) Evolution of the result of FFMQ_NonReactivity in each condition



(fig. 6) Evolution of the result of Average Grade in each condition



5.1.3. Intra-group effectiveness

Table 4 shows the main changes found in the different variables between the two measurement points within the experimental group and within the control group, respectively. As can be seen, there are no statistically significant results in the variables referring to the FFMQ subscales and mean score for the control group, so that there were no improvements in these variables in the control group from one measurement point to the other. However, statistically significant improvements are observed in the experimental group for all the subscales of the FFMQ and for the mean score.

Table 4. Outcome variables intra-group evolution of intervention and control conditions

	Pre–Post. 9 weeks		
	n	t	p
Intervention group			
FFMQ_Observing	15	-3.420	**.004**
FFMQ_Describing	15	-2.833	**.013**
FFMQ_ActAwareness	15	-2.557	**.023**
FFMQ_NonJudgement	15	-2.830	**.013**
FFMQ_NonReactivity	15	-3.303	**.005**
Average grade	17	-5.244	**< .001**

Control group			
FFMQ_Observing	5	-1.773	.151
FFMQ_Describing	5	-1.292	.266
FFMQ_ActAwareness	5	-.835	.451
FFMQ_NonJudgement	5	-1.510	.206
FFMQ_NonReactivity	5	-1.857	.137
Average grade	8	-1.174	.279

Descriptive analysis of student grades

We analysed and compared the results obtained by the students in the four subjects that make up the Mention in Music Teacher Training, of which one of the authors of this study taught the subject *Practice with Musical Instruments*, in which the mindfulness training took place. In the four subjects considered, there were no failing grades. There were only two Honours in two of the subjects, both of which were achieved by students in the experimental group.

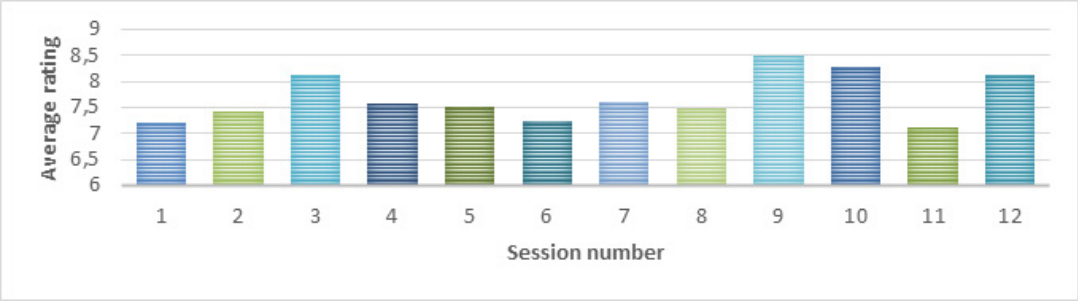
Particularly significant is the high percentage of students (94.43%) who obtained an Outstanding grade in the subject *Musical Listening*. One could infer from this data the possible usefulness of mindfulness practice in a subject that requires a high degree of attention and concentration. The students enrolled in this subject were the same as those enrolled in the subject *Practicing with Musical Instruments*; that is, they all belonged to the experimental group and followed the mindfulness programme in this second subject without any transfer of information during the academic semester between the teachers of both subjects.

The highest percentage corresponding to the grade of Pass was precisely in the subject *Instrumental Practice* (27.77%), with a great difference with respect to the other three subjects of the Mention. This may have to do with the specific difficulty involved in the direct application of theory both in instrumental practice and in composition and musical arrangement tasks, together with the technical mastery of pitched percussion instruments that students must acquire throughout the semester, which is especially difficult for those who enter these studies with little musical preparation. In the other three subjects of the MTT Mention, the percentage of students obtaining the lowest grade was insignificant (*Vocal Training and Choral Practice*, 4%; *Musical Resources for the School*, 5.55%; *Musical Listening*, 0%), with the highest percentages being concentrated in the *Very Good* grade (*"Notable"*, 7–8.9 out of 10; *Vocal Training and Choral Practice*, 64% and *Musical Resources for the School*, 66.66%).

5.1.5. Changes over the course of the intervention in the assessment variable

Figure 8 shows how the intervention carried out in 12 sessions over 9 weeks has three clearly differentiated parts: Sessions 1 to 3; Sessions 4 to 8; Sessions 9 to 12. In order to understand this evolution, it is necessary to refer to the statements of the students themselves (see section 5.2.2.).

(fig. 8) Evolution of students' evaluation throughout the intervention



5.2. Qualitative analysis

5.2.1. Interviews: Category analysis

Following the hypothetic-inductive model referred to above, the interview was organised around three general topics that were of particular interest and which took the form of the following questions:

1. What have been your main difficulties in mindfulness practice?
2. How do you evaluate your personal evolution in mindfulness practice in the last few months?
3. After your experience so far, do you consider that mindfulness can be of any use to the person who practices it?

From these three initial categories (*Practice difficulties, Evolution, Usefulness of mindfulness*) other emerging categories emerged during the conversations with the students (see Table 5).

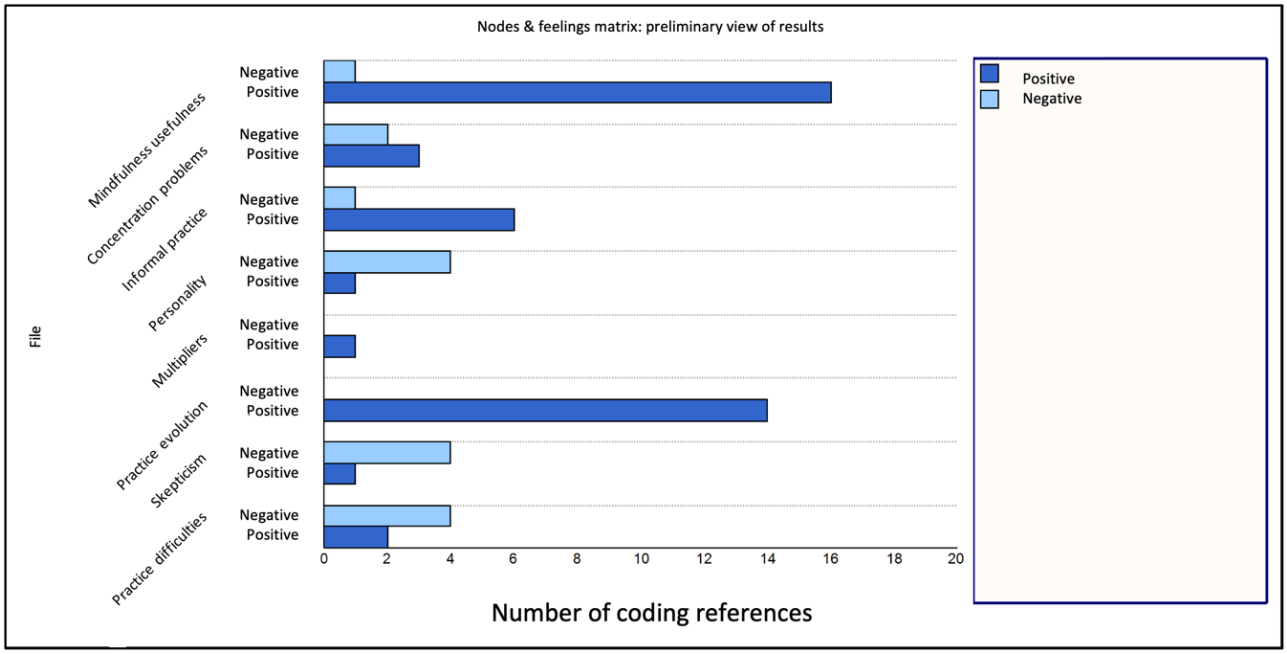
Table 5. Emerging categories

Name	Description
Practice difficulties	The students' responses on the difficulties they have encountered during mindfulness practice, both in class and at home, are collected
Skepticism	Expression of skepticism by students about the effectiveness and usefulness of mindfulness
Practice evolution	Students' perceptions of the evolution encountered over time of mindfulness practice
Mindfulness for musicians	Introduction of mindfulness in the subject Practice with Musical Instruments for students of Music Teacher Training
Multipliers	Situations in which students have encouraged others around them to practice mindfulness
Personality	Personality traits by which pupils define themselves (without having been asked about it)
Informal practice	Comments on informal practices outside the classroom
Concentration problems	Comments on problems you encounter in concentrating in your daily life
Mindfulness usefulness	Opinions on the perceived usefulness of mindfulness after starting the practice and over the time of the research

Table of our own elaboration

NVivo generates a coding called *feelings* (very positive, positive, positive, negative and very negative aspects) derived from the analysis of the interviews. Taking advantage of this resource, a first cross-check was carried out to find the relationships between these feelings and the different categories or nodes that had previously been identified (Figure 9).

(fig. 9) Coding Matrix: Nodes and Feelings



As can be seen, a higher coding density is obtained in those categories related to the *practice evolution* and the *mindfulness usefulness* in educational contexts. That is, it is on these two aspects that students place the greatest emphasis in their statements. The content of these statements will be investigated below to check their actual relevance in the context of the work.

Although 4 of the students interviewed (3 females and 1 male) do not explicitly mention attention problems, it is clear that –in general terms– the issue of attention and concentration is a fundamental pillar, increasingly fragile among students, and therefore cannot be ignored in an educational context. On the other hand, it is not surprising that both positive and negative feelings appear in the coding of these two categories (*mindfulness practice evolution* and *mindfulness usefulness*), which reflects the individuality of mindfulness practice in beginners, as well as the evolution over time. More interesting, however, is that in the category *Informal Practice* there are no codings directly related to mindfulness/concentration problems. Obviously, we cannot infer from this that there are no such difficulties during informal practice, but we can infer that students are actually more aware of the loss of attention during formal practice (both in class and at home). The interviews also inform us that the attentional problems were related –especially at the beginning– to the initial skepticism that the idea of introducing mindfulness practice into the programme of a degree subject provoked in the students:

> At first it was very difficult for me and I would reject [the practice]. I would have thoughts like: What nonsense. I'm wasting my time. Nothing is coming out of it and I just had thoughts... I was rejecting it all the time (M09).

The main reason behind this initial opinion on the practice of mindfulness has to do with the attentional problems that, as is well known, so many young people suffer from nowadays. It is positive, however, that they themselves were able to become aware of this fact and were able to verbalise it:

> I find it very difficult to focus my attention on what I am doing because I am always thinking about other things, whether they are good or bad, and I don't feel myself in the present moment itself. And this makes me desperate because I want the practice to be over now (M04).

Informal practice has been very helpful for students to report –in general– a positive evolution throughout the class period:

> Little by little, I think I have evolved. Now, although thoughts still come to me [during practice], but I can control them from the observer's point of view that we have learned (H06).

It has also been valuable to hear directly from the students how their progress in mindfulness practice led them to become multipliers, sharing their discoveries with members of their social circle:

> I have done some practices with my mother. For example, attention to sounds or breathing. And she still does them. She still does the [practice] of the breaths (M17).

5.2.2. Practice evolution according to informants

Figure 8 shows how the intervention carried out in 12 sessions over 9 weeks has three clearly differentiated parts. The first corresponds to the initial approaches to mindfulness (sessions 1 to 3), where we move from the initial uncertainty...

> The practice was very long (H02, Session 1).

> There was a moment when I got desperate because the practice did not finish (M04, Session 1).

...to a clear improvement in the third intervention:

> Better and better every day. I am connecting my mind and body better (M02, Session 3).

> When we do this body scan practice, I feel better and better and it helps me to channel my emotions (M02, Session 3).

The second part comprises sessions 4 to 8. Here we observe a stabilization of the practice, with a slight decrease in the sixth intervention, due to external factors that, as is logical, are difficult to manage for novice practitioners:

> I have not concentrated at all because there is a construction work in my street and it is really noisy (M15, Session 6).

> Today I have not been able to concentrate because I had been trying to access the [online] class since 8:20 a.m. and the Internet was not working (M02, Session 6).

Finally, a third block of interventions is recognized (Sessions 9 to 12). In these last sessions, the students declared that they felt an improvement in their practice. A notable exception was the penultimate session. Analyzing the students' statements for that day, it is again observed that the causes are related to external factors:

> I was really focused until my mother opened the door to my room, and I lost concentration. From that moment on, I disconnected and wasn't able to return to the same state I was in before the interruption (M13, Session 11).

Students' comments regarding the final session also offer valuable insights. Through their reflections, it becomes evident that they have grasped the meaning and importance of maintaining a regular mindfulness practice:

> I keep noticing more progress each time. Today, I was able to stay focused for a long time on the sensation of air entering and leaving, mainly through the nostrils. It also helped me release tension and face the day differently. Something that distracted me a couple of times was the cold I felt, especially in my hands." (H06, Session 12)

6. Discussion

6.1. Academic performance

At the intragroup level, —and unlike what was observed in the intervention group—, the present study does not yield statistically significant results for the variable average grade in the control group. However, in all four subjects within the MTT Mention, students demonstrated positive academic performance in the first examination session, which is a noteworthy finding from an academic perspective.

Due to its particular idiosyncrasy, which requires a high degree of attention and concentration, the subject *Musical Listening* stands out as especially relevant, as it showed the highest grades. This may suggest the potential usefulness of mindfulness training, particularly in this area. The positive effect of mindfulness on ear training aligns with previous research, which indicates that mindfulness training can enhance students' attention skills (Anderson, 2012; Czajkowski & Greasley, 2015; Auerbach & Delport, 2014, 2018; Díaz, 2011; Lynch & Wilson, 2018).

Regarding the overall average grade, an increase of 0.12 points was observed in the intervention group and 0.06 in the control group. While this increase may seem modest, it should not be underestimated, considering it reflects the impact of just one academic semester out of a total of seven in the students' program[1]. Furthermore, it is worth noting that students with less prior musical training benefited the most from this improvement in academic performance.

Beyond the numerical data, the study therefore underscores the value of implementing mindfulness interventions in the initial training of future music teachers. Although previous studies have supported academic performance improvements following mindfulness programs (Beauchemin *et al.*, 2008; Hjeltnes *et al.*, 2015), no research to date has specifically addressed the academic performance of university students in Music Teacher Training. It is thus noteworthy that this study found statistically significant intragroup differences within the intervention group ($p < .001$)[2].

6.2. Mindfulness capacity

Applying the Student's t-test at baseline for independent samples, statistically significant differences between the experimental and control groups were observed only for the *Observing* subscale of the FFMQ ($t=2.744$; $p=.013$). On average, the control group scored higher—indicating greater observational ability—than the experimental group. This result may be explained by the fact that the control group included all students with some prior experience in mindfulness (17.6%). These were students not enrolled in the course in which the intervention was implemented, but who, as students of the Higher Conservatory of Music, had previously completed a year-long course related to yoga and mindfulness at the same institution. However, this alone does not account for why the control group did not also show significant differences compared to the intervention group on the other FFMQ dimensions.

It is possible that the observed difference is not solely due to previous mindfulness practice, but also to the fact that these students had extensive musical training. In other words, it may be hypothesized that musical training itself contributes to the development of observational capacity, in the sense proposed by Baer and colleagues. This interpretation is consistent with Sridharan *et al.* (2007), who found that musical engagement activates brain areas involved in attention, prediction, and memory updating.

Over the course of the intervention, no statistically significant differences between the two groups were found for any of the FFMQ outcome variables. However, a trend toward improvement was observed in the intervention group compared to the control group. From a pedagogical perspective, this within-group progression in the intervention group appears more relevant, as participants showed significant improvement in all five FFMQ facets.

Among these, the *Observing* facet ($p=.004$ in the intervention group) is closely related to states such as noticing, paying attention, focusing, or attending—all of which are crucial in educational contexts, both for students and teachers. In the field of musical practice, these skills are particularly vital for vocal and instrumental performance, whether solo or in ensemble settings.

The same applies to the *Describing* facet ($p=.013$ in the intervention group), which involves the ability to find words to express observed attentional content—including the externalization of emotions, feelings, mood states, or sensory stimuli. These elements are especially relevant in an artistic domain, such as the one addressed in this study, and contribute to the development of creativity, as suggested by Baas *et al.* (2014), Franco & Justo (2009), and Newton (2015).

The *Acting with awareness* facet ($p=.013$ for the intervention group) refers to performing actions with conscious attention, such as staying focused during musical interpretation, or becoming aware of specific aspects of performance quality—in line with the findings of Tanner (2019).

Lastly, the *Non-judgement* facet ($p=.013$ in the intervention group) reflects an equanimous attitude toward thoughts, sensations, or emotions. This quality is especially relevant in group musical activities (e.g., performance, improvisation, or composition), but also in teaching practice. It includes both not clinging to success and being able to remain balanced in the face of mistakes. For performers, such emotional regulation

1 It should also be noted that in the competitive examinations for entry into the Primary and Secondary Education teaching profession, candidates' scores are calculated to the thousandth decimal place, meaning that a difference of just one tenth can be decisive in securing a position as a music teacher.

2 This is not the case in the control group ($p=.279$).

(Baer, 2003; De la Fuente *et al.*, 2010) is particularly important in collaborative artistic contexts that require group negotiation to function effectively.

Finally, the *Non-reactivity* facet (p = .005 in the intervention group) involves creating distance from what arises in the attentional field and emphasizes a temporal gap during which one refrains from acting or reacting to a stimulus. Through mindfulness training, students learn to observe events as they are, particularly those related to their own learning process. They come to understand the importance of not denying, justifying, or rejecting situations or events that arise—for instance, during the rehearsal process of musical works or in final performances.

6.3. Student's opinion

Regarding the qualitative study and the starting hypothesis (H3), the analysis of the interviews shows the usefulness that, according to the informants, an intervention in mindfulness offers as part of their university training, which is in line with the work of Bartos *et al.* (2021) and Bartos *et al.* (2022).

6.4. Limitations and prospects

The sample considered has been the one determined by the reality of the situation. Future studies should consider increasing the number of students in the sample and randomizing the assignment of the sample to each group. On the other hand, in future research it would be interesting to overcome an exclusively instrumental conception of mindfulness to adopt a more holistic approach, following proposals such as those put forward by Kabat-Zinn (2015) or Brito *et al.* (2022).

Another aspect to consider in the future has to do with the fact of proposing and evaluating a maintenance program in mindfulness with students. Finally, replication of the research in a post-pandemic context and in a face-to-face classroom setting would be desirable.

7. Conclusions

Regarding the first research question, it is concluded that the practice of mindfulness has been stimulating and beneficial in all the subjects of the MTT Mention (and not only in the one where mindfulness training was implemented); in particular, when it comes to achieving the maximum grade, students who otherwise very possibly would not have been able to do so.

With respect to the average grades (pre and post) of the academic records, it is not surprising that the changes detected (although positive) were small, given the scant weight of a single academic semester in relation to the six previous semesters already taken by the participants, evaluated and reflected in their records, when calculating the average grades. Hence the importance of not limiting ourselves exclusively to these final average grades, but also considering the grades of the subjects of the seventh semester, as analyzed in section 5.1. In any case, these results suggest the suggestive idea of how positive for the academic performance of MTT students could be an intervention in mindfulness that would begin in the first semester of the degree and continue throughout the degree.

In relation to the second research question, the study shows that there are statistically significant improvements in the evolution of the intervention group for the mindfulness characteristics.

As for the third research question, the gathered evidence highlights the positive reactions of the participants regarding their experiences in the experimental group. These reactions reflect a progression from initial skepticism to the eventual integration of mindfulness practice into their academic life over the course of one academic semester.

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