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***The older, the wiser?* Profiles of string instrument teachers with different experience according to their conceptions of teaching, learning and evaluation**

Abstract

Recent research on the teaching of music, as well as the curricula proposed in different countries, increasingly insist on moving towards teaching centered on the management of students' mental processes according to the assumptions of the constructivist approach. However, studies on conceptions and practices of teaching-learning show that they are still largely centered on the transmission of the musical and technical knowledge needed for producing the correct sound. Our main aim is to study the conceptions of teaching-learning held by 53 teachers of string instruments at elementary levels, and to test how they are affected by the variable *teaching experience* (in three groups: a) less than 7 years; b) 7 to 14 years, and c) more than 14 years). We also want to determine whether these conceptions give rise to consistent profiles in three different pedagogical dimensions: teaching, learning and evaluation. We collected data by means of a multiple choice questionnaire, and applied cluster analysis, correlations, ANOVA and *post hoc* tests. In agreement with prior research, we found three distinct profiles in the answers to the whole questionnaire: direct,

interpretative and constructive; although teachers' beliefs were more constructive regarding teaching and evaluation than regarding learning. In contrast to much research on *teaching expertise* in different domains, younger teachers tended to focus their teaching beliefs to a greater extent on their students, and therefore hold more complex positions regarding teaching and learning music.

Keywords

Conceptual change; conceptions of teaching, learning and evaluation; music conservatories, teaching experience; string instrument teachers

Introduction

The traditional approach to teaching a musical instrument is almost entirely based on the teacher's activity, through a model that transmits and preserves knowledge (Baker, 2006; Jørgensen, 2001; Schmidt, 1998). Thus, for example, in Spain, where this research was conducted, the teacher's role in the curriculum at music conservatories prior to recent educational reforms (Spanish Organic Law on Education [LOE], 2006) was to develop students' "talents" and the technical-expressive abilities they needed to tackle the previously established syllabus which was made up mainly of works from the classical repertoire for the instrument and upon which there was consensus, usually organized according to the technical skills to be developed. However, in the

current educational system, the curriculum takes a different approach to teaching an instrument, having moved from teacher-directed to more centered on the student, according to his/her interests, motivation and ability to construct knowledge, with the teacher guiding this process, which is the true driver of learning (LOE, 2006).

As happens in other educational areas and other types of knowledge (Bransford, Brown & Cocking, 2000; Swayer, 2006), these new models of musical instrument teaching require a major change in the focus of learning and teaching activities. In this new approach, which is largely supported by recent research on musical education (Bautista, Pérez Echeverría & Pozo, 2010, 2011; Burwell, 2005; Hallam, 1995; Hultberg, 2002; Hallam, Cross & Thout, 2009; Viladot, Gómez & Malagarriga, 2010), learning and selection of contents must be designed according to an 'integrating conception of means and ends' (Bautista & Pérez Echeverría, 2008, p. 30), where the means is the mastery of the musical instrument, the end is communication and transmission of feelings and emotions, and the main aim is to help the student develop learning strategies that will enable his/her self-regulation and autonomy.

But in the face of this demand for change, it is worth asking whether the teachers will accept and use these new curricular approaches deriving from recent research. More specifically, how do conservatory teachers conceive efficient musical instrument teaching practices, their students' learning and

more adequate ways of evaluating it? Are these conceptions consistent with the new ways of teaching required both by the new curricular approaches and by research?

To answer these questions, we started from the assumption that whenever knowledge is taught in any specific domain - in our case playing a musical instrument - the teacher, whether or not he/she has formal pedagogical knowledge, holds an often implicit representation, a prior pedagogical idea regarding what both he/she and the student should do to achieve that learning. According to Olson and Bruner (1996) and Strauss (2005), all teachers would therefore believe in “folk pedagogy”. Teaching would be a set of activities designed with the aim of producing learning in others, starting from the beliefs that the “others” do not possess certain knowledge or only possess it partially, i.e. there is intentionality (Strauss, 2005; Ziv & Frye, 2004; Ziv, Solomon, & Frye, 2008), which is evaluated to determine both whether the student has learned or attained the aims of the curriculum, and whether the quality of teaching is appropriate (Black & Wiliam, 1998; Crooks, 1988; Hill, 2000). Between the traditional teaching standpoint at conservatories, where the teacher is in charge of transmitting knowledge to the student (Hallam, 1998), and - in the words of Musumeci (2005) - the “more humanly compatible” position according to which the teaching of music is based on the student constructing his/her knowledge (Andrews, 2004; Eley, 2006), there is a wide range of conceptions regarding

what is taught, what is learned and how both the processes and the product of playing an instrument are evaluated.

Thus, knowing what conceptions teachers have of teaching and learning a musical instrument can help understand what factors are determining their classroom practices, since it is claimed that the organization and increasing complexity of teaching practices may be influenced by teachers' conceptions (Olafson & Schraw, 2006; Trumbull, Scarano & Bonney, 2006). However, the stability and internalization of these beliefs and their strong resistance to change (Atkinson & Claxton, 2000; Pozo, Scheuer, Pérez Echeverría, Mateos, Martín, & De la Cruz, 2006; Strauss & Shilony, 1994) do not facilitate the aim. We know that the conceptions that are held at conservatories and other educational spheres are organized according to principles that provide cohesion, and which give rise to different implicit theories on teaching and learning in different domains. According to recent studies conducted on different domains of knowledge (Scheuer, De la Cruz, Pozo, Huarte & Sola, 2006; Scheuer, De la Cruz, Pozo & Huarte, 2009; Strauss & Shilony, 1994) and specifically in the field of musical knowledge (Bautista, et al., 2010, 2011; Bautista, Pérez Echeverría, Pozo, & Brizuela, 2012; Marín, Pérez Echeverría & Hallam, in press), these theories seem to be based on assumptions of epistemological character (the relationship between the subject and the object of knowledge; the nature of knowledge), ontological assumptions (the kind of entity learning is; whether

learning is understood as a process, a result or a condition) and conceptual assumptions (how the components of the theories are related). Those studies have identified three implicit theories: direct, interpretative and constructive, which differ in the abovementioned assumptions (see Table 1).

Table 1

The two first theories would thus share an intuitive epistemology of realist character, according to which knowledge is a copy of the reality perceived or received. The direct theory assumes that the student has a passive, reproductive role in his/her learning, while the interpretative theory assumes the reproductive character of learning as copying, but that cognitive activity is required on the part of the student (in terms of attention, motivation, management of cognitive resources, etc.), though subordinate, as in the direct theory, to obtaining outcomes or products which are the most faithful reflection possible of the musical knowledge received, whether through the sheet music or the teacher's or another model's musical production. This is why this model assumes that these two theories share a traditional conception of teaching and learning, though with different degrees of complexity. However, a true conceptual change from those two positions is needed for the constructive

theory to be adopted (Chi, 2008; Pozo et al., 2006; Vosniadou, Vamvakoussi & Skopeletti, 2009), representing a leap towards constructivist epistemology, in which the student's learning processes are the main driver or aim of teaching. Teaching would be conceived as a complex system of interactions among musical contents, instrument, teacher and student, the aim of which would no longer be to reproduce a certain kind of sound, but rather, to construct mental abilities enabling learners to manage their own mental activity to produce the sound appropriate to their communicative goals (Casas & Pozo, 2008; Marín, et al., in press; Torrado & Pozo, 2008; Bautista, et al., 2011).

Conceptions of teaching, learning and evaluation at music conservatories: the role of teaching experience

A study by Torrado (2003; Torrado & Pozo, 2008) on teachers of string instruments at Spanish conservatories identified the three implicit theories described (direct, interpretative and constructive), and found, as did other studies conducted in other domains (e.g. Martín, Pozo, Mateos, Martín & Pérez Echeverría, submitted; Olafson & Schraw, 2006; Tsai, 2002) that teachers do not hold the same conception regarding all the dimensions of their teaching practice (e.g. teaching, learning and evaluation), but rather, there is

representational plurality, with the interpretative conception being the most frequent.

In a later study, Bautista, Pérez Echeverría and Pozo (2010) designed a written questionnaire containing open questions regarding representations of teaching and learning, which was answered by teachers of elementary and professional piano at Spanish conservatories. In order to analyze the relationship among these diverse representations held by a single teacher, the organization of these conceptions in terms of teacher profiles was analyzed by cluster analysis, identifying the three teacher profiles, as shown in Table 2. Moreover, these profiles were found to be associated to the variable *teaching experience*, so that the most sophisticated conception, in this case the constructive conception, was more frequent in teachers with less *teaching experience*, while teachers with more extensive experience were mainly associated to the direct conception.

Table 2

This effect of *teaching experience* may seem paradoxical upon considering research conducted in completely different domains comparing experts and novices (Ericsson, Charness, Feltovich, & Hoffman, 2006), which

usually shows that experts have superior performance. Some studies show that more experienced teachers do in fact seem to have more sophisticated educational conceptions or practices regarding different dimensions of teaching (Fives & Bueh, 2010; Prosser, Ramsden, Trigwell & Martín, 2003; Rubie-Davis, Flint & McDonald, 2011).

Other studies find no difference among teachers' conceptions according to experience (Norton, Richardson, Hartley, Newstead & Mayes, 2005; Porlan & Martín del Pozo, 2004). Nevertheless, still others have found the opposite results, with more experienced teachers having more traditional conceptions than less experienced teachers (Bautista, et al., 2010, 2011; Castejón & Martinez, 2001; Martín et al., submitted; Tsai, 2002).

The influence of these differences in *teaching experience* on teaching practices and conceptions might be due to the diversity in methodologies, domains of knowledge and cultural contexts covered by these studies. We are interested in finding out whether the results found by Bautista, et al. (2010, 2011) for piano teachers can be replicated in teachers of other instruments, specifically string instruments, and in testing whether the profiles identified in those studies are useful for explaining their representations of the following dimensions: teaching, learning and evaluation. Lastly, we want to analyze whether, as the theoretical model presented assumes, the main obstacle to changing teaching conceptions lies in taking the step from direct and

interpretative conceptions - which share some common assumptions - to the constructive conception - which is based on different assumptions and has greater structural complexity. If so, we could expect a close relationship between the direct and interpretative conceptions, while they would both be opposed to the constructive position. We are also interested in finding out whether those conceptions differ according to the pedagogical dimension or educational domain, specifically, whether they vary among the contexts of teaching, learning and evaluation.

Aims

The first aim was to classify teachers according to their answers to the multiple choice questionnaire, allowing us to assign them to teaching profiles, which - according to other studies - would be related to the three implicit theories described in the introduction. We also wanted to analyze whether those profiles differed according to three didactic dimensions: teaching, learning and evaluation.

Secondly, we analyzed whether there are relationships among those profiles, in order to determine whether they fit the theoretical model described in the introduction. Specifically, we were interested in testing whether - as the model predicts - the more traditional conceptions (direct and interpretative) are

closer in the ideas of the participants, differing from the constructive conception, which is more complex and harder to attain.

Our third aim was based on a quantitative analysis of whether the variable *teaching experience* has an influence on the conceptions held by teachers in Elementary Teaching. Following the work by Bautista, et al. (2010, 2011), we believe that there may be differences among teachers according to their *teaching experience*. Similarly, given that the sample selected contained a balanced number of participants according to gender, as well as different musical instruments, we analyzed the effect of both those variables (*gender* and *musical instrument*), although since there are no prior studies of their influence on teaching conceptions (though they do exist regarding teaching styles, see Lacey, Saleh, & Gorman, 1998; and Starbuck 2003; quoted in Nelson-Laird, Garver & Niskodé-Dosset, 2007), we had no specific hypothesis.

Method

Participants

Fifty-three active teachers of string instruments with official degrees (22 men and 31 women) took part in this study. Their ages ranged from 26 to 49 years ($M=36.94$, $SD=6.95$) and they taught at Elementary Level (children aged 8 to 12 years, approximately) at 27 music conservatories in 8 different regions of

Spain. They taught one of the four bowed string instruments in the four Elementary Level courses: violin (19 participants), viola (11 participants), violoncello (21 participants) and double bass (7 participants). We grouped teachers according to their years' *teaching experience*, so that there would be 3 homogenous groups, as follows:

Table 3

Tasks

The multiple choice questionnaire originally prepared by Bautista, et al. (2012) for piano students was adapted for use with typical situations of teaching, learning and evaluating string instruments at elementary music conservatories. The questionnaire presents 16 situations typical of dimensions such as teaching, learning and evaluating musical interpretation at conservatory classrooms (see examples in Table 4), followed by three different answer options based on the framework of implicit theories (direct, interpretative and constructive), according to their epistemological, ontological and conceptual assumptions. Participants were asked to accept the option they most agreed with (selection) and the one they least agreed with (rejection).

The *Teaching* dimension (7 questions) dealt with technical difficulties for the student and in the music, student involvement in class, features of the ideal teacher, homework assignment and how to teach fingering and bowing in a new piece. The *Learning* dimension (4 questions) enquired about aspects related to cooperative learning, memory, technical difficulties and approach to a new repertoire. The *Evaluation* dimension (5 questions) asked about topics such as performance, interest and student autonomy.

Table 4

Procedure

We distributed 310 hardcopy questionnaires among teachers of string instruments at 35 Spanish conservatories. Teacher participation (voluntary and unpaid) was 17.1%. They were asked to complete the questionnaire individually and deliver it to the head of studies or head of department within a month. Collection ended immediately before the end of the first quarter of the academic year.

Design

This was a simple prospective *ex post facto* study. The dependent variable *teacher profile* (direct, interpretative and constructive) was contrasted to the independent variables *didactic dimension* (with three levels: 1) *Teaching*, 2) *Learning* and 3) *Evaluation*) and *teacher experience* (also resulting in three levels of experience: a) less than 7 years, b) 7 to 14 years, and c) more than 14 years) (see Table 3).

Analysis

Data were analyzed in three stages, corresponding to the three aims. With regard to the first aim, teacher profiles were identified by means of cluster analysis, taking as units their answers in terms of preference and rejection to all items in the questionnaire, and subsequently, to each of the dimensions, which allowed patterns to be identified in cases in which their answer modes were similar. This was done using the K-means conglomerate classification method. A score was assigned to each participant for the whole questionnaire and for each dimension, by adding one point for every relevant choice and subtracting one point for rejections, so that the scores were 7 to -7 for the Teaching dimension, 4 to -4 for the Learning dimension, and 5 to -5 for the Evaluation dimension.

For the second aim, the analysis was based on Pearson's correlation test, to test the independence of each profile identified in the first analysis and whether those relationships fit the model's theoretical predictions.

For the third aim we used three variance analyses, 3 (*profile*) x 2 (*gender*); 3 (*profile*) x 4 (*instrument*); y 3 (*profile*) x 3 (*teaching experience*) to corroborate the three profiles according to *gender*, type of *instrument* and years' *teaching experience*, in order to examine the differences between them and consider the details per dimension, using the repeated means model.

These analyses were performed using SPSS statistical analysis software version 19.0.

Results

We will begin with a brief description of the global percentages of teachers' choices and rejections in the questionnaire, to exemplify the frequency with which each implicit theory appeared. Then we will describe the cluster analyses performed during the first stage of analysis to test the existence of different conceptions of teaching and learning among the teaching staff, both globally in the questionnaire and according to didactic dimension. In the second phase, correlations among the profiles obtained previously were analyzed in order to test consistency between those profiles and our theoretical model,

based on Pearson's test. The last phase was variance analysis to test the effect of *gender*, *instrument* and *teaching experience* on these profiles.

Globally, teachers seemed prefer the interpretative options (400 choices, 47.17% of the total), followed by the constructive options (368 choices, 43.4%) and lastly, direct options (80, 9.43%). Similarly, most rejected the direct option (463, 54.6%), followed by the interpretative (233, 27.48%) and constructive (152, 17.92%).

Nevertheless, beyond these global data, which - like other studies - confirm the predominance of the interpretative theory, teachers tended to hold multiple representations. In this regard, considering our first aim, we performed a cluster analysis according to total participant selections and rejections, both for the full questionnaire and for each pedagogical dimension separately, as described below.

Existence of different teacher profiles

The analyses in the first phase allowed us to assign our participants to three well-differentiated theoretical profiles: direct, interpretative and constructive, according to their choices and rejections for each multiple choice question, which would correspond to the implicit theories described in the introduction.

As mentioned above, the interpretative profile represented the greatest number of participants ($n=24$; $M=3.92$; $SD=3.39$), related to the group of teachers with medium number of years' *teaching experience*, followed by the constructive profile ($n=18$; $M=2.24$; $SD=6.91$), mainly associated to new teachers, and the direct profile ($n=11$; $M=-6.16$; $SD=6.19$), represented mainly by the more experienced teachers.

We used the same data to study the characteristics of these profiles in greater depth according to the three didactic dimensions in the questionnaire, and thus describe the conceptions held by these teachers in more specific teaching-learning contexts: *Teaching*, *Learning* and *Evaluation*. As shown in Table 5, more teachers selected constructive options for *Learning* and *Evaluation*, although for the *Learning* dimension there are fewer teachers with direct profile. However, in the *Teaching* dimension, these teachers proved to be more traditional, with most of them corresponding to the interpretative profile, followed by the direct profile. In this regard, the constructive profile shows the greatest difference in the number of teachers assigned to it in the different dimensions.

Table 5

Teachers' conceptions of teaching, learning and evaluation

For our second aim we tested the relationships between the profiles assigned to each teacher using Pearson's test. This tested the theoretical consistency of the profiles with regard to the model described in the introduction.

No significant correlation was found, $r_{DF}=.02$, for the relationship between direct and interpretative profiles held by the 53 participants for the total questions in the multiple choice questionnaire, whereas the constructive profile correlated negatively with both direct profile, $r_{CD}=-.89$, $p<.001$, and interpretative profile, $r_{CF}=-.43$, $p<.01$, such that the higher the acceptance of one position, the higher the rejection of the other.

The same trend was found upon analyzing each dimension independently. Thus for the *Teaching* dimension, there was a significant negative correlation between the constructive and direct profiles, $r_{CD}=-.87$, $p<.001$, and to a lesser, though significant extent, between the constructive and interpretative profiles, $r_{CF}=-.44$, $p<.01$, while the direct conception did not correlate with the interpretative conception, $r_{DF}=-.05$.

In the *Learning* dimension, there were negative correlations similar to those of the full questionnaire, while the constructive profiles correlated negatively to the direct $r_{CD}=-.57$, and interpretative profiles, $r_{CF}=-.52$ (both

$p < .001$), and once again, there was no significant relationship between the latter two, $r_{DF} = .19$.

In the *Evaluation* dimension, the direct profile once again correlated negatively with the constructive profile, $r_{DC} = -.76$, $p < .001$, and there was also a negative correlation between the constructive and interpretative profiles, $r_{CF} = -.50$, $p < .001$, while, as in the previous analyses, there was no significant correlation between the direct and interpretative profiles, $r_{DF} = .11$.

We thus found high negative correlations between the direct and constructive profiles, and between the interpretative and constructive profiles (although the correlations are higher between direct and constructive profiles). These results would corroborate the theoretical assumptions of the model proposed by showing that the direct and interpretative theories would be based on the same epistemological assumptions, being a simpler and a more elaborate version, respectively, of the same traditional view of teaching, learning and evaluation. In turn, this traditional conception would be opposite to the constructive position in its beliefs regarding the three dimensions

What are the variables that influence the conceptions: the older, the wiser?

Based on these data, and with regard to the third aim of our study, we wanted to know which variables might influence the existence of the three profiles. As mentioned above, we are interested in testing the effect of *teaching experience* as well as other variables in the sample, namely *gender* and *musical instrument*, on these conceptions. We found that neither *gender* (*Teaching*, $p=.19$; *Learning*, $p=.44$; *Evaluation*, $p=.32$) nor *instrument* (*Teaching*, $p=.37$; *Learning*, $p=.06$; *Evaluation*, $p=.47$) produced any difference in the profiles assigned to each teachers.

In contrast, analysis of variance for each dimension showed that the conceptions held by new and more experienced teachers seem to be influenced by experience $F(4, 100)=45.45$, $p<.001$, $\eta^2=.476$, Direct $M=-6.16$ ($<7=-10.19$; $7-14=-6.71$; $>14=-2.5$), Interpretative $M=3.92$ ($<7=3.62$; $7-14=3.23$; $>14=4.75$), Constructive $M=2.24$ ($<7=6.75$; $7-14=3.59$; $>14=2.5$). The results for each dimension are detailed below.

Teaching Dimension. For the *Teaching* dimension, ANOVA showed that *teaching experience* has a significant effect on the profile, $F(4, 100)=25.68$, $p<.001$, $\eta^2=.249$, Direct $M=-2.15$ ($<7=-4.06$; $7-14=2.06$; $>14=.2$), Interpretative $M=2.13$ ($<7=2.06$; $7-14=1.7$; $>14=2.55$), Constructive $M=.056$ ($<7=2$; $7-14=1$; $>14=2.3$).

Figure 1

The simple effects analysis showed that there were significant effects on direct profiles $F(2, 50)=8.59, p \leq .001$ and constructive profiles $F(2, 50)=10.32, p < .001$. Figure 1 shows that among teachers with less experience, the direct option is most often rejected and the constructive options are preferred, while the opposite is true of more experienced teachers.

Post Hoc multiple comparisons with *Scheffe* and *MSD* tests showed differences in the direct profile between teachers with more and less *teaching experience* ($p \leq .001$), as well as between more experienced teachers and those with intermediate experience ($p < .05$), since teachers with less and intermediate experience more often tend to reject the direct position. Moreover, there were significant differences in the constructive profile between more experienced teachers, who were less accepting of it than teachers with little experience ($p \leq .001$) or intermediate experience ($p < .01$) were.

Learning Dimension. In the *Learning* dimension, ANOVA showed that *teaching experience* has no significant effect on each teacher's profile, $F(4, 100)=16.36, p = .188$ NS, $\eta^2 = .059$, Direct $M = -1.39$ ($<7 = -1.87$; $7-14 = 1.64$; $>14 = .8$), Interpretative $M = .55$ ($<7 = 1.06$; $7-14 = .17$; $>14 = .45$), Constructive $M = .79$ ($<7 = .93$; $7-14 = 1.35$; $>14 = .2$).

Figure 2

The figure shows that participants with greater *teaching experience* selected the constructive option less often, more often preferring the direct response, compared to the rest of the participants. However, teachers with less *teaching experience* selected the constructive responses less often than those with intermediate teaching experience, although they did reject the direct options more often than the others.

Evaluation Dimension. In the *Evaluation* dimension, ANOVA showed that *teaching experience* also has a significant effect on profiles, $F(4, 100)=48.10$, $p<.001$, $\eta^2=.267$, Direct $M=-2.56$ ($<7=-4$; $7-14=-2.52$; $>14=-1.45$), Interpretative $M=1.28$ ($<7=.5$; $7-14=1.35$; $>14=1.85$), Constructive $M=1.32$ ($<7=3.56$; $7-14=1.23$; $>14=-.4$).

Figure 3

The simple effects analysis showed significant effects on the direct $F(2, 50)=6.36$, $p<.005$ and constructive $F(2, 50)=2.99$, $p<.001$ profiles. The figure shows that all participants, regardless of *teaching experience*, largely tend to reject the direct option, although the newer teachers reject it more often than the more experienced teachers do. However, the more experienced teachers do not

select constructive options, although they select them here more often than they do in the other dimensions. This would be consistent with the hypothesis of evaluation in general being conceived in a less traditional manner, which does not mean that it is more constructive, at least in more experienced teachers.

As happened in the *Teaching* dimension, the *Post Hoc* multiple comparisons showed no significant difference between participants with more and less *teaching experience* in the direct ($p < .005$) and constructive ($p < .001$) profiles. In the group with intermediate experience, only constructive profile showed differences between more experienced teachers ($p < .001$) and less experienced teachers ($p < .05$), showing that in this case, experience indeed makes a difference, although it does not necessarily show how advanced their conceptions may be (the greater the experience, the less acceptance of more complex conceptions).

Conclusions and Discussion

The aim of this article is to investigate the conceptions of teachers of string instruments at conservatories regarding learning, teaching and evaluation. As mentioned in the Introduction, these conceptions not only mediate in teaching practices, but are probably also an obstacle to change in the ways of teaching and learning music which, despite the conclusions of much research in

the field and increasingly of the suggested curricula, are still anchored in traditional practice. According to our theoretical framework, which we wanted to test in this study, the conceptions of music teachers - like those of teachers in other domains (e.g. Martín et al., submitted; Pozo et al., 2006) - can be grouped into three large implicit theories, which we have called direct, interpretative and constructive (Bautista, et al., 2010). With regard to our first aim, the data in this research show that although all the teachers - according to the hypothesis of representational plurality - hold ideas corresponding to different theories, these conceptions can in fact be grouped into three large clusters or profiles which correspond to the three theories identified, and are largely consistent with the data obtained by Bautista, et al. (2010) for piano teachers.

In addition to confirming these profiles, we found that the most frequent position is the intermediate one, which we have called interpretative, and which supposes a traditional conception of the outcome of learning, although it assumes that learning is mediated by the activation of cognitive processes which must be managed by the teacher. This confirms the data obtained in other studies, not only on music teachers (Bautista, et al., 2010; Torrado & Pozo, 2008) but also on teachers in different domains and by means of other tasks (e.g. Martín et al., submitted; Strauss & Shilony, 1994; Tsai, 2002).

Along with these general profiles, our data have shown that regarding the first aim, the highest number of teachers with constructive conceptions is found

in the *Evaluation* dimension, and the highest number of teachers with direct conceptions is found in the *Teaching* dimension. This may be evidence of a disturbing mismatch between two essential dimensions of teaching practice, with a trend towards the prevalence of realist, teacher-centered epistemology in teaching activities, and greater focus on the student and his/her skills in evaluation, even though they appear not to have been sufficiently considered during the teaching process.

Why do teachers of string instruments hold these traditional concepts regarding teaching music? The results of the next two aims of the study helped us to approach an explanation. The second aim focused on analyzing the relationships among those profiles in order to test whether - as our model assumes - the real conceptual change in this domain lies in the transition from a realist conception to a constructivist conception. The realist conception focuses on musical products, and therefore on the teacher, and is shared by the direct and interpretative conceptions, although with different degrees of complexity, since the interpretative conception assumes the mediation of cognitive processes and encourages active - though repetitive - learning. As mentioned, the data from the study show that constructive profiles in fact correlate negatively to both the direct and the interpretative profiles for all the dimensions studied, although the negative correlation with the interpretative profile is lower, supporting the assumption of incompatibility between the constructive and

realist (both direct and interpretative) positions, and compatibility between the direct and interpretative positions, in spite of their notable conceptual differences.

The idea that the direct and interpretative positions are incompatible with the constructive conception would support the idea that accepting new, student-centered teaching conceptions [reflected in new curricula and recent research on music teaching (Hallam, et al., 2009; Hultberg, 2002) and general learning (Bransford, et al., 2000; Swayer, 2006)], requires a real change in the conceptions of learning, teaching and evaluation, similar to that which is taking place in many domains of knowledge regarding the transition from intuitive knowledge to scientific knowledge. If so, changing ways of teaching music would require an in-depth review of the models of teacher training, which should be designed to promote those complex processes of conceptual change (e.g. Vosniadou, 2009) so that teachers would move from the more traditional conceptions towards others focusing on the learner's cognitive activity, not only as a driver but also as the goal of teaching. We understand and accept that conceptual change would make it possible to implement progressive changes in teaching practice, approaching constructivism, moving from traditional regular, repetitive activities towards the abovementioned student-centered learning and its processes. It seems clear that both teachers and students experience difficulty in consciously accessing their cognitive and metacognitive processes.

The idea of the need for teacher training directed towards a change in the conceptions of teaching and learning is reinforced by the data from our third aim, which focuses on certain variables that may influence these conceptions. Having dismissed the effect of *gender* or type of string *instrument*, our data nevertheless reflect a significant effect of years' *teaching experience* on conceptions. However, instead of showing that more experienced teachers have more complex conceptions, the opposite was found: teachers with the least *teaching experience* most often adopt constructive profiles. This apparently paradoxical situation, which is at least contrary to data from traditional studies on the effect of expertise (Ericsson, et al., 2006) and data from different studies on teaching conceptions and practices (e.g. Fives & Bueh, 2010; Rubie-Davis, et al., 2011), confirms not only the data obtained in other studies performed on samples in Spain, both in the field of music (Bautista, et al., 2010) and in other domains (Castejón & Martinez, 2001; Martín et al., submitted), but also those found in very different cultural contexts (e.g. Tsai, 2002).

It is difficult to find a single interpretation for these data because the *teaching experience* variable in fact masks two variables which are very difficult to separate in practical terms, namely years' *teaching experience per se* and chronological age of participants (Bautista, et al., 2010). Is the effect due to years' teaching practice or is it rather a generational effect responding to changes that have taken place in educational culture during those years of

teaching experience? Or might it even, more concretely, arise from curricular and institutional changes that have taken place in the Educational Reform in Spain over the last decades? In short, is it a change produced by the effect of years' teaching experience or by the effect of different training or professional standing received by different generations of teachers?

There are several alternative explanations for these data. They cannot be distinguished due to the design of this study, which deals with a single cultural context and does not distinguish between years' experience and generation. However, they could be broadly summarized in two ways.

According to an *optimistic* interpretation, a real generational change would be taking place, so that new teachers, trained in constructivist principles and sometimes even constructivist practice as a result of the processes of the Educational Reform, would more easily accept the new conceptions, in contrast to the more experienced teachers who developed and acquired their conceptions of teaching and learning within curricular frameworks which, although no longer in use, continue to have a place in their *minds*. Finally, although it is true that all of us *teach as we were taught*, the *learning cultures* (Bruner, 1996) in which teachers were trained played an essential part in the development of their teaching conceptions. This interpretation would be optimistic in the extent to which it would imply that although it takes time to change conceptions, change is already taking place as the new generation of

younger teachers joins music classrooms.

However, the supposed change in conceptions and ultimately in teaching practice may also be interpreted more *pessimistically*. It could be assumed that *time does not pass in vain*, so that over the years, innovative ideas and approaches eventually wear out and end up becoming routine. Change is resisted at educational institutions, and all the more so at conservatories, which - honoring their name - tend to be conservative in their practices and organization. Thus, the innovative conceptions of the younger teachers, simply by coming up against this resistance, eventually wear out. According to this pessimistic interpretation, as these new teachers acquire experience, they ultimately adapt their ideas to those of the more experienced teachers, who tend to hold more institutional power and therefore have greater influence in defining the educational culture at conservatories.

Which of the explanations - the optimistic or the pessimistic - best interprets our data? Leaving aside our hopes, what is true is that because the design of this study is transversal rather than longitudinal, it cannot distinguish between these two alternatives because it cannot separate the generational effect from the years' teaching practice. However, if we consider our data with relation to other studies, some additional light can be shed on their interpretation. Most of the studies that have found a positive effect of age on complexity of conceptions (e.g. Fives & Bueh, 2010; Rubie-Davis, et al., 2011),

have been based on case studies performed on very small, unrepresentative samples, and have focused more on the analysis of teaching practice. In contrast, the studies that have found the opposite effect (newer teachers have more sophisticated conceptions) have used larger, more representative samples (e.g. Bautista, et al. Rubie-Davis, 2010; Martín et al., submitted; Tsai, 2002), and were forced to use, as in our study, verbal questionnaires to reflect teaching practice itself as well as the conceptions held regarding it.

Newer teachers may have newer, more complex conceptions, but they also have little experience in putting them into practice. To the extent in which putting these new conceptions into practice also requires institutional changes (in curriculum organization, evaluation, etc.), the mismatch between what these teachers believe and what they can actually do might ultimately alter their beliefs. It is well known that *there is a gap between theory and practice* (Torrado & Pozo, 2008), and new teachers might need support in order to bridge that gap. Part of this help may come from new research going beyond this study and overcoming some of its limitations. Longitudinal studies, such as the one conducted by Alger (2009), which showed that teachers' conceptions become more complex as their experience increases, might help clarify the effect of *teaching experience*. But a more detailed analysis of the relationship between teaching conceptions and practices might also help to understand whether the generational changes in the culture of learning affect only teachers' conceptions

or also their practices. One particularly relevant way to do it, in the light of these results, may be to ask, with Tikva (2010), to what extent teachers' conceptions have an influence on students. Studying the learning conceptions and practices of students trained by teachers with differing cultures and/or conceptions of learning may help us to better understand not only the effect of these conceptions on practice but also the effect of *teaching experience* on teaching conceptions and practices.

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Table 1- *Assumptions of the different theories about learning and instruction (from Bautista, Pérez Echeverría & Pozo, 2010)*

	Direct Theory	Interpretative Theory	Constructive Theory
Epistemologic	<i>Ingenuous Realism</i> Knowledge reflects reality in an evident and objective way.	<i>Interpretative Realism</i> Knowledge reflects reality in an evident and objective way. However, subject has an important and active role in the knowing process.	<i>Constructivism</i> Knowledge is a construction elaborated by the subject, who builds own and personal models to interpret the (which can be more or less appropriate).
	<i>States-Products</i> Learning is conceived in terms of states or static products (e.g. academic contents).	<i>Actions and Processes</i> Learning is conceived in terms of actions and processes (e.g. cognitive, motivational, etc.), which are externally managed.	<i>Complex systems</i> Learning is conceived in terms of complex systems (e.g. self-regulation processes), internally managed by the learner in order to build and develop abilities or strategies.
Conceptual	<i>Simple Casuality</i> A direct and lineal relation is established between learning conditions and learning outcomes.	<i>Lineal Multiple Casuality</i> A direct and lineal relation is established between learning conditions, learning processes, and learning outcomes.	<i>Interactive Casuality</i> A complex and interactive relation is established between learning conditions, learning processes and learning outcomes.

Table 2- *Description of the different consistent implicit theories found in music teachers with different teaching expertise (adapted from Bautista, Pérez Echeverría & Pozo, 2010)*

<p><i>Direct profile</i> (Highly experienced teachers)</p>	<p>Music is conceived of from very realistic epistemological assumptions, since only one interpretation of the scores is considered to be correct. Learning outcomes of a technical/basic nature are understood as meaningful in themselves. Applying instructional strategies in order to improve students' performance is conceived of as unnecessary, because learning is essentially viewed as the result of their innate/natural predispositions and personal effort. In addition, learning is conceived of in terms of 'contents' (states or final products) and, hence, evaluation is interpreted as a 'judgement' or assessment about the reproduction of these contents. Therefore, the conceptions of these teachers are focused on the final outcomes of learning, and the students' role is conceived as <i>passive</i> and <i>reproductive</i>.</p>
<p><i>Interpretative profile</i> (Experienced teachers)</p>	<p>Music interpretation is understood in terms of the 'correct vs incorrect' dichotomy, although the students' transforming role in the acquisition of the musical scores is recognized. Consequently, it seems that music is conceived of from an advanced realistic epistemological perspective. Since from this assumption there is no room for students' self-expression or creativity, learning outcomes of a technical/basic and analytic nature are considered enough. Learning is understood in terms of actions and externally managed processes, and consequently instructional strategies</p>

are based on the notion of teachers' hetero-regulation of the students (by means of instructions, direct explanations, modelling, etc.). Finally, evaluation is attributed a 'corrective' function in which the students' self-evaluation is not promoted. In short, these teachers' conceptions are focused on the student, whose role is conceived as *active* but *reproductive*.

Constructive profile
(Novice teachers) Creative and personal interpretations of the scores are allowed and the students are encouraged to explore them, since music itself is conceived in constructivist epistemological terms. Learning outcomes are understood as a way to promote a comprehensive whole of artistic, interpretative and technical/basic musical capacities. From sophisticated ontological and conceptual assumptions, instructional strategies look for the continuous promotion of students' reflection and meta-cognitive processes, self-regulation and autonomy. Situations of evaluation are also understood as a learning context, working fundamentally with a 'formative' function. In conclusion, the conceptions of these teachers are focused on the students, whose role is conceived as *active* and *constructive*.

Table 3 - *Sample composition*

<i>Teaching Experience</i>	Participants
< 7 years	16
7 - 14 years	17
> 14 years	20

Table 4. *Examples of the didactic dimensions in the multiple choice questionnaire. The options correspond to the implicit theories: a) direct; b) interpretative and c) constructive.*

Teaching Dimension	<p>In a normal one-to-one lesson, a student taught by one of your colleagues cannot play a piece because is technically highly demanding. In your opinion, what could the teacher do to help her improve the piece?</p> <p>a) <i>Play the passage slowly for the student, so that she can observe how it should be played, and then assign technical exercises for homework.</i></p> <p>b) <i>Explain what the difficulties are and give instructions for solving them, making sure that she understands what to do.</i></p> <p>c) <i>Ask different questions in order to help her think and reason about the reasons for the mistakes and how to work them out.</i></p>
Learning Dimension	<p>One of your students has been practicing the same repertoire for several months. However, because of her technical difficulties, most of the pieces could still be improved on. Why this is happening?</p> <p><i>Most likely, the student is...</i></p> <p>a) <i>...not practicing enough. I would recommend that she practice more. It takes perseverance to solve technical difficulties.</i></p> <p>b) <i>...studying wrongly. I would recommend that she solve the technical problems by following my instructions.</i></p> <p>c) <i>...studying without considering specific musical outcomes. I would recommend that she think first about the musical idea, and then about the technical skills.</i></p>
Evaluation Dimension	<p>In your opinion, the evaluation of the instrumental lessons is good above all for...</p> <p>a) <i>...teachers to check the students' musical knowledge and grade their playing at the end of each academic term.</i></p> <p>b) <i>...teachers to grade the performance of the students and analyze which aspects should be corrected during subsequent lessons or academic years.</i></p> <p>c) <i>...students, so that after talking with their teachers, they can reflect upon their own learning and realize which their strong and weak points are.</i></p>

Table 5. Number of participants associated to each profile in each dimensions

	Direct Profile	Interpretative Profile	Constructive profile
Teaching Dimension	18 <i>M</i> = -2.15 <i>SD</i> = 3.23	22 <i>M</i> = 2.13 <i>SD</i> = 1.72	13 <i>M</i> = .056 <i>SD</i> = 3.51
Learning Dimension	10 <i>M</i> = -1.39 <i>SD</i> = 1.86	20 <i>M</i> = .55 <i>SD</i> = 1.7	23 <i>M</i> = .79 <i>SD</i> = 2.04
Evaluation Dimension	14 <i>M</i> = -2.56 <i>SD</i> = 2.34	15 <i>M</i> = 1.28 <i>SD</i> = 1.71	24 <i>M</i> = 1.32 <i>SD</i> = 2.67

Figure 1. ANOVA means for the Teaching dimension, according to profile and teaching experience

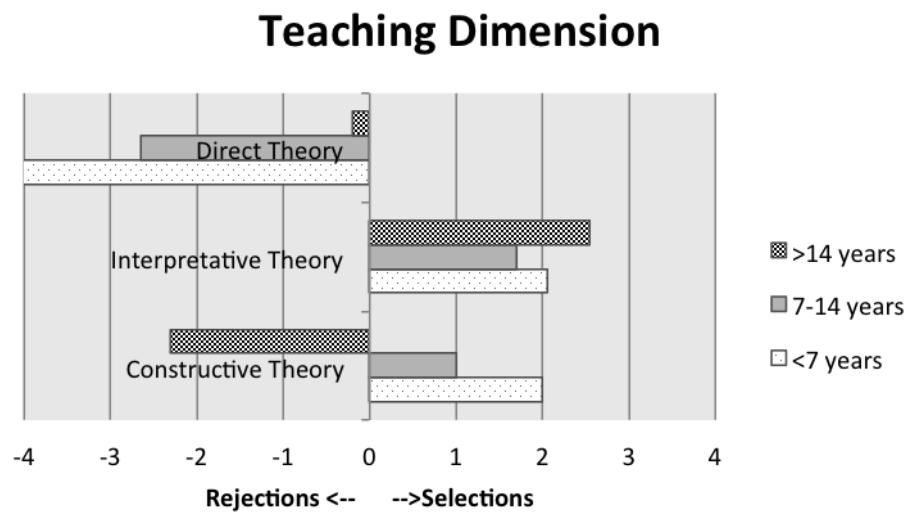


Figure 2. ANOVA means for the Learning dimension, according to profile and teaching experience.

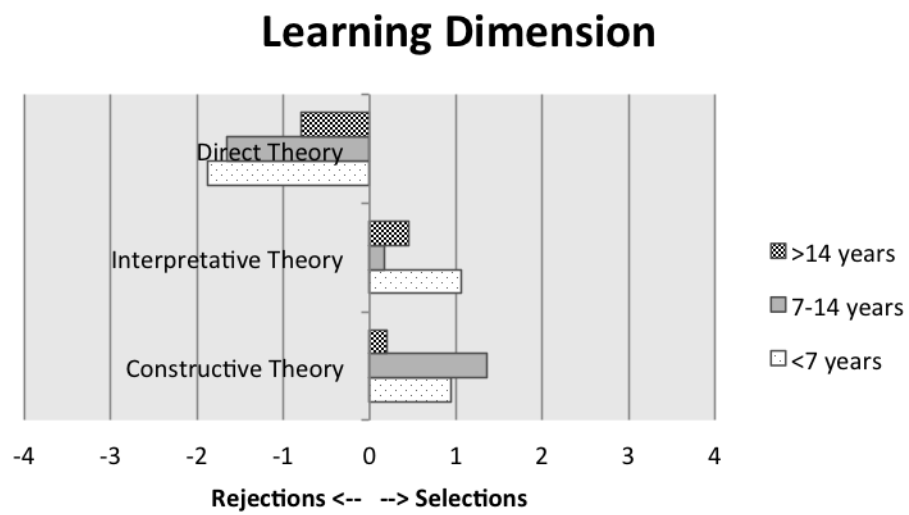


Figure 3. ANOVA means for the Evaluation dimension according to profile and teaching experience

