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Analysis of constructive practice in instrumental music education: Case study with an expert cello teacher

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Abstract

This article describes a constructive teaching model based on: (a) the student's learning processes, (b) fostering conditions that enable learning and (c) achieving long-lasting learning outcomes which are student-driven and applicable to other situations. A case study was conducted on an expert cello teacher and her 7-year-old student, to analyse the relationships between the teacher's constructive conceptions and instructional practices, by means of the *System for Analysing the Practice of Instrumental Lessons*. Results suggest that many of this teacher's practices reflect the constructive profile to which her conceptions are associated.

Keywords: case studies; constructivism; discourse analysis; instrumental music education; teaching and learning practices; teacher-student interaction

Highlights

-Constructive teaching conceptions are related to constructive teaching practices.
-Constructivist teaching involves dialogic interactions and student-centred practices.
-The teacher is more constructive in the learning conditions and processes.
-This teacher's student is intrinsically motivated and learns in a complex manner.
-This teacher's student is quite autonomous and has a good self-esteem.

1.1. Introduction

Research on instruction and teaching strategies over the past 20 years has shown two paradoxical results. Firstly, we have learnt that in order to achieve meaningful, relevant learning in different educational contexts, teaching strategies must be student-

centred, such that students will truly be the "engine of learning", e.g. through activities promoting metacognition and self-regulation. Teaching practices should include complex dialogical and cooperative learning strategies that consider student knowledge and capabilities. Excellent teaching which enhances student learning, makes schooling effective and improves teacher education and evaluation (Betoret & Artiga, 2004; Skamp & Mueller, 2001) would respond to the assumptions of the constructivist approach – which though acknowledged by educational and psychological researchers, has not been put into practice successfully in the music classroom. Secondly, although there is theoretical and empirical consensus on the advantages of constructivist teaching, several studies show that in many educational contexts, teaching practices are still close to a "system of delivery" (in words of Robinson, 2013) based essentially on direct transmission of knowledge to students. In fact, even if teachers would prefer to adopt more student-centred practices, they indeed recognise that they mostly use teaching strategies focusing on such transmission of knowledge (OECD, 2009, 2013; see also Aldama & Pozo, 2015). It seems that even though teachers are aware of the theoretical assumptions underlying constructivist models, they are unable to put them into practice. We believe that identifying the types of practice (activities, strategies, etc.) that characterise constructive teaching may help to extend its use among teachers.

In the case of instrumental music teaching, on which this research is based, the gap between theory and practice needs to be bridged by means of research involving thorough analysis of real constructive learning situations that could serve as examples for in-service and pre-service instrumental music teachers, and of models of constructivist and complex teaching practices which serve as sources for reflective teaching. In this paper we describe the general features of a complex, student-centred practice in instrumental music teaching-learning situations within the context of a case study of an experienced cello teacher who holds a constructive conception of teaching a musical instrument, and her 7-year-old beginner student, during four consecutive one-to-one lessons. Our aim is to determine whether this teacher's practices are consistent with the complexity expected from a constructive teacher of a musical instrument in comparison to more traditional or teacher-centred practices.

1.2. The difficulty of changing teaching conceptions and practices in the music classroom

The gap between educational theory and classroom practices was revealed not only in the latest Teaching and Learning International Surveys (OECD, 2009, 2013), but also in other studies showing that teachers' conceptions are often far from constructivist theories of teaching and learning (Bautista, Pérez Echeverría, & Pozo, 2010; López-Íñiguez, Pozo & de Dios, 2014).

In order to improve teaching practices it is essential to use training processes that aim to change teachers' conceptions or beliefs into more constructive ones. Thus, in recent years, there has been increasing interest in the study of what teachers and students think regarding how teaching and learning occurs in different educational contexts, in the understanding that these beliefs or conceptions may influence their classroom practices (Hermans, et al, 2008; Tikva, 2010), as a result of learning experiences in different social contexts (Olson & Bruner, 1996; Pérez Echeverría, Mateos, Pozo, & Scheuer, 2001), as well as the way in which their students conceive learning and focus on it (López-Íñiguez & Pozo, 2014a, 2014b; Pramling, 1996; Tikva, 2010) and even students' level of commitment to their lessons (Schroeder, et al, 2011).

In the field of music there has been much research on the conceptions of teaching and learning held by teachers and students (e.g., Bautista, et al., 2010; López-Íñiguez, et al., 2014; Marín, Scheuer & Pérez Echeverría, 2013). Detailed analysis of the evolution of these conceptions is beyond the scope of this article. For further detail, please see the work of Hofer and Pintrich (2002) or Pozo et al. (2006). According to Pozo et al. (2006), the main features underlying the constructive conception of teachers and learners would be organized according to the psychological assumptions. Thus, from the *epistemological principles,* knowledge would be a construction elaborated by the subject, who is in charge of building own and personal models to interpret the reality (which can be more or less appropriate); from the *ontological principles*, learning could be 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; and regarding the conceptual principles, there would be a complex and

interactive relation between learning conditions, learning processes and learning outcomes.

In empirical studies on music, Pratt (1992) analysed the relationships between perception and practice in 20 teachers during individual instrument lessons and singing lessons, and Gaunt (2008) analysed the perceptions of 20 teachers at a conservatoire regarding aims, context and processes in individual instrument lessons. Both studies found that although teachers said that they were very interested in teaching their students autonomy and self-confidence, their practice showed transmissive, non-student-centred teaching. Gaunt suggests that this may be partly explained by the professional isolation in which instrument teachers often find themselves at educational centres. Similarly, Mills and Smith (2003) assessed 134 instrument teachers whose aims were that students should have fun, participate and make progress during the lessons, whereas their students' perceptions were entirely different. This was also observed by Rife, Shnek, Lauby, and Lapidus (2001) in their study on children's satisfaction in private instrument lessons.

Although various case studies describe the general features of teaching practice in the field of instrumental music, we have not found any case study describing in depth the practices of teachers according to the conceptions they hold of teaching and learning. Thus, although we still know little about how teachers' conceptions influence their teaching practice, several studies have shown the decisive influence of teachers on the careers of young instrument players (Creech & Hallam, 2011; Howe & Sloboda, 1991; Manturzewska, 1990; Sosniak, 1990). Other studies have also shown that although teacher-learner relationships are very important and that in addition to being effective, they can be highly beneficial in the sense of generating pleasant, friendly communication (Creech & Hallam, 2003), they may also represent potential sources of psychological stress for music students (Persson, 1995).

Some studies suggest that there is an association between the teacher's oral production and the students' activity according to the task performed during the lesson (Albrecht, 1991; Heikinheimo, 2009). Other studies suggest that students' positive/negative development during lessons is associated to the degree of praise

(Schmidt, 1989), and that teacher's behaviour towards the students is perceived according to students' personal traits (Schmidt & Stephans, 1991).

These general studies look at superficial – though nonetheless important – features of instrument lessons. However, we are interested in focusing on studies which specifically describe teaching-learning practices that are either centred on students (which would approach the assumptions of the constructive conception) or centred on teachers and contents (which represent more traditional or transmissive approaches). The studies outlined below include descriptions of classroom practices which focus more on the figure of the teacher, and are more reproductive and further from the assumptions of the constructive conception and from all the ways of approaching the student's world in a "friendly" manner.

1.3. Studies on good (and not so good) teaching practices in music classrooms

As mentioned above, various studies have analysed teacher-student relationships in the music classroom from a wide range of standpoints. Most of them focus mainly on individual lessons, as we do in this study. Several of these studies report that the teacher speaks unidirectionally to the class about half the time (e.g. Kotska, 1984; Tait, 1992). In some cases, as shown by Rostvall and West (2003), teachers even make sarcastic remarks or mock students if they speak up. Their study on 4 teachers and 21 students of different ages and levels of guitar and brass instruments reports there was no dialogic interaction at all and one of the most frequently repeated phrases was, "Play it again from here". When these teachers asked a question during a lesson, they answered it themselves and gave no opportunity to the students. They used the same teaching method for all students, regardless of their individual differences, their actions were routine and focused on the symbolic, and they penalised student error.

Similarly, in a case study on a teacher at a conservatoire, Persson (1996) found that students were overawed by the teacher and therefore did not participate in the classes, feeling that too much emphasis was placed on technique and error-free perfection. The teacher had a clearly dominating character and left no room for the students to express themselves or reflect, since the entire lesson was filled with the teacher's orders, advice and suggestions focusing on faithful reproduction of the score.

It was also noted that this teacher preferred to tell students what to do and show them how to do it by means of gestures.

This unidirectional conveyance of knowledge has been reported by many authors, who note that teachers are dominating and students are subordinate, with clear imbalance between their hierarchies. They suggest that a change to student-centred teaching would be highly favourable because it would involve greater enjoyment, interest, progress, motivation and positive attitude to learning (Durrant, 2003; Jørgensen, 2001; Mackworth-Young, 1990). Yarbrough and Price (1989) observed similar patterns in a study on 79 teachers of instruments, choir and musical education, where students basically responded to the teachers' demands by playing the instrument – not talking; the teacher gave orders and hardly ever asked questions, stopped the students immediately whenever a mistake was made, and activated student's attention by assigning tasks and positive/negative corrections of their performance.

There is evidence showing that teacher-student interaction episodes tend to be shorter in lessons with expert teachers than with novice teachers (Buckner, 1997; Goolsby, 1997; Siebenaler, 1997), and it appears that children studying with expert teachers talk more, while teachers undergoing training model more (Henninger, Flowers, & Councill, 2006).

With regard to learning objectives, Karlsson and Juslin (2008) used transcription, content analysis and encoding in feedback categories and language use in their recordings of the lessons of 5 music teachers with 12 students. They found that the teacher's main goal was focused on technique and playing the score. These lessons were dominated by the teacher talking all the time, while issues such as emotions or expression appeared only marginally or even implicitly.

In the light of such research, pedagogues of musical instruments appear to accept the transmissive teaching model. Siebenaler (1997) studied five piano pedagogues who watched 78 piano lessons with adults and children and then evaluated the teaching practices. The pedagogues considered that the most effective lessons were those in which the student played less and the teacher played much more; they judged the best teachers to be those who most frequently disapproved of students' actions and

results, and mainly used modelling, brief orders and demanded correct interpretation. Along the same lines, Duke and Henninger (2002) studied 51 external observers who watched the practice of one teacher with 50 different students. They judged it positive when the teacher corrected students' errors immediately, with the two most frequently repeated orders being to play a passage again or change something in the passage. Moreover, teachers who provide continuous feedback – whether positive or negative – on students' skills seem to be judged as the best by expert observers (Buckner, 1997; Carpenter, 1988; Duke, 2000; Siebenaler, 1997; Speer, 1994; Yarbrough & Price, 1989).

All these studies show traditional transmissive patterns of learning. Unfortunately, very few studies report "good practice" more in line with the ideas supported by the constructivist theoretical model described above. Several authors have found that children who learn the musical skills to play instruments satisfactorily usually associate their teachers – both in the early stages and at higher levels of learning – with friendly, talkative, relaxed people who are supportive of student autonomy (Davidson, More, Sloboda & Howe, 1998; Howe & Sloboda, 1991; Sloboda & Howe, 1991; Sosniak, 1985).

The article by Cheng and Durrant (2007) is another exception. It reports holistic violin practices in which, although there were some transmissive elements, the teachers focused mainly on the students' learning processes and not exclusively on the contents being learned. One of the students participating in Cheng and Durrant's study, during individual lessons initiated the discourse and learning activities most of the time, even though Thompson (1984) previously considered that this is not possible. With relation to and from the standpoint of the idea of "cold and warm" learning support postulated by De Sixte and Sánchez (2012), the above "good" studies would partly describe warm support from teachers who give their students closed tasks. (Cold support would be, for example, decoding symbols and understanding a score structurally and musically, while warm support would be related to motivational and emotional processes). Perry and Vandekamp (2000) believe that these studies do not represent teachers who help their students to learn complex tasks by self-regulating, even though the approach to learning is more "friendly".

Thus, this study looks more in-depth at the most outstanding features of constructive teaching practices in the music classroom by using a comprehensive system for analysis. We have followed Meyer and Turner's claim (2002) that practice has great capacity to inform theory, both through discourse analysis and by studying teacher-student interaction, in particular with teachers who support learners during the lessons and carry out scaffolding activities with them.

1.4. The System for Analysing the Practice of Instrumental Lessons

We developed the System for Analysing the Practice of Instrumental Lessons (hereinafter SAPIL) in collaboration with the Research Team on Acquisition of Musical Knowledge (GIACM, 2011). This system relates classroom episodes (analysis units) to what/how teaching/learning takes place (dimensions) during music lessons. In addition to specific content, music lessons involve distinctive features in comparison to other subjects: observable actions are easier to record and monitor, and learner-teacher interaction is often on-to-one. Given these specific conditions, the SAPIL provides a deductive system for analysing music learning/teaching practices.

The SAPIL contains categories for each musical practice or activity and indicates which practices correspond to each approach on the continuum explained in the Introduction, i.e., ranging from highly transmissive or traditional teaching practices to more constructive practices focusing on student learning and driving progressive change in music classrooms. In addition, the SAPIL assumes that a transmissive teacher will not take the learning processes of the student as much into consideration as a constructive teacher would. Teaching conditions are more monological when transmissive teaching practices are applied, whereas constructive teaching favours dialogical interaction. The SAPIL distinguishes between different types of practices. It includes specific criteria for defining units of analysis (related to subject, such as musical pieces or exercises, and related to time, such as the moment in the lesson) and for typical classroom activities (understood as the various parts into which time in a lesson is structured). It also includes specific criteria for the dimensions that should be observed, summed up in the answers to three main questions (Pozo, 2008):

- What is learned or what learning is intended? (learning outcomes)

- What processes and activities will enable the student achieve those outcomes, how is musical learning managed cognitively, emotionally and metacognitively and why? (learning processes)
- How are the activities or practices organised, i.e., what type of teacher-student interaction and what materials are used in the lessons? (learning conditions)

The SAPIL was adapted to string instruments for this specific study, and in view of its length, we encourage the reader to read the full description at the end of this article (see Appendix A) and in the doctoral dissertation of López-Íñiguez (2013).

2.1. Method

2.1.1. Design

This is a descriptive, simple cross-sectional, illustrative case study (León & Montero, 2002). We used the SAPIL, obtaining high Fleiss's Kappa inter-rater agreement (> .80). We used the software ATLAS.ti version 7 for qualitative data analysis by deductive encoding of teacher and student oral and musical-instrumental production. In addition to analysing text, this software version analyses video and audio, enabling identification of the temporality of some codes, frequency of use of each code and relationships between them, as well as the possibility of comparing the videos to other primary documents. This paper uses the information gathered from the multiple choice questionnaire completed by the teacher, practice and study diaries, post-lesson interviews with the teacher and interviews with the child to illustrate how the analysis relates to motivational and planning aspects of this teacher's lessons, and to her student's conceptions of teaching and learning. All the data collected, whether in writing or from participants' discourse through transcriptions of the lessons, have been translated from Finnish into English, to enable the first author to analyse them.

In the Results section, we will firstly describe the general features of all lessons, focusing specifically on their subject (type of episode). This section will illustrate the frequencies related to participants' oral production, time spent resting and playing, and number of interventions by teacher and student in total instrumental production. We will

also analyse inactive production time, i.e. time which cannot be encoded according to the SAPIL because it contains non-observable features that could be analysed *a priori* (e.g. time spent thinking). In addition, we will analyse the frequency of occurrence of the codes included in the learning outcomes, processes and conditions from the SAPIL in the discourse of both teacher and student, describing how they were used in each lesson, and calculating the total number of codes used over the four lessons. This description will help define the teacher's practices in the Discussion section.

2.1.2. Participants, procedure and tasks

In order to find a teacher who holds a constructive conception of teaching and learning and who displays "good" practice during her lessons, we used the multiple-choice questionnaire for piano teachers, which includes items on teaching, learning and evaluation (López-Íñiguez, Pozo & De Dios, 2014). Thirteen teachers of string instruments at elementary levels at a school of music in Helsinki answered the questionnaire. For each teacher, at least 8 lessons were observed and field notes were taken over 3 months during the first author's initial research stay.

After reviewing the recordings of all these lessons, the researcher's field notes and the answers to the multiple choice questionnaires from all these teachers, we decided to analyse the practices of the teacher whose profile was determined to be the most constructive. The selected teacher has about 30 years' teaching experience at Finnish schools of music. She was trained in different courses in pedagogy and didactics for teachers of music, and holds post-graduate and master's degrees in teaching cello. For several years she has directed the department of string instrument teachers at her school, and she is active and confident in dealing with curricular matters with students' parents.

At the beginning of the second research stay we interviewed all the students at elementary level who were studying with this teacher (ages 7 to 12 years) using the structured interview on conceptions of learning and teaching string instruments published by López-Íñiguez and Pozo (2014a, 2014b), which includes tasks for learning music scores at different processing levels, and watching videos of typical instrument learning situations. The children were interviewed with the help of a simultaneous translator who mediated between the first author and the students, so that the interview

was conducted in their mother tongue, Finnish. All the materials for the interview were translated into Finnish prior to the interview. Parental authorization was obtained, and parents were assured that children's personal data would be treated with absolute confidentiality.

The children's answers in the interviews showed a constructive tendency similar to their teacher's, so it was agreed with the teacher that 4 individual lessons would be recorded (about 30 minutes in duration each) over 4 consecutive weeks with several of the students. The first author was present at these lessons, taking notes and using the video camera. The teacher was also asked to complete practice diaries to record the learning aims for each lesson, emotional and motivational issues, and planning items before and after each lesson. During a third research stay, three 2-3-hour sessions of post-lesson interviews with the teacher were audio-recorded in order to clarify the researchers' questions regarding times when verbal or gestural information was insufficient to establish what SAPIL codes the teacher was using or exactly what her aim was upon using certain teaching/learning strategies. In addition, a study diary was prepared for students to record their motivation and achievement before and after each home study session, and the learning aims and planning for their studies.

Out of all the recordings and materials collected, in this specific study we will focus on and analyse the lessons of this teacher with one girl aged 7 years. This student comes from a middle-class Finnish nuclear family with higher education, and has normal scholastic performance. She was at the beginning stage of learning with this teacher and had studied cello only with this teacher.

3.1. Results

3.1.1. Global description of the four lessons

Table 1 shows that all lessons are used for the student's musical production, with the student playing for longer and ten times more often than the teacher, who only made a few interventions or none, depending on the lesson. There is a lot of oral production by both teacher and student, with the teacher speaking 5 to 11 percent longer than the student. Distribution of coded time for active and inactive production is similar in all

lessons. There are numerous digressions and rests which structure the lessons into different episodes (see Appendix B), with the student starting the digressions – which are very long – and the teacher starting the rests – which are shorter – to enable the student to relax with regard to psychomotor aspects. Inactive time – during which they rest or nothing recorded in the SAPIL happens – deserves special mention because it takes up almost a third of the lesson time.

Table 1. Percentages of active and inactive production during the four lessons

	Lesson 1	**Lesson 2**	**Lesson 3**	**Lesson 4**
Teacher's verbal production	21% 1033 words	22% 1203 words	23% 1444 words	22% 1356 words
Student's verbal production	16% 786 words	15% 572 words	12% 471 words	14% 652 words
Teacher's musical production	0%	8%	1%	0%
Student's musical production	25%	23%	37%	28%
Digressions and rests	18% 6 times	16% 8 times	3% 2 times	15% 4 times
Inactivity	20% >5 minutes	16% >5 minutes	24% >7 minutes	21% >6 minutes
Duration of the lesson	27 minutes, 52 seconds	28 minutes, 34 seconds	31 minutes, 53 seconds	30 minutes, 54 seconds

All the types of *Musical Units* are worked on (Technical exercise 1 time; Musical piece 32 times; Creation 2 times; Others 8 times) during the four lessons. Table 2 shows that warm-up is not used in these lessons, whereas tuning is used in all of them – three times jointly and once by the teacher alone. The teacher does not usually interrupt the student while she is playing or speaking. In addition, more time is spent playing than talking (even though they speak more often than they play), in particular by the student, with the teacher playing very little. This clearly shows that the activities – whether speaking or, to an even greater extent, playing – are student-centred. There is no external correction and the student's activity is respected. Indeed, the lesson planning and aims section in the teacher's practice diaries refers to the student's musical production and not interrupting her while she plays as follows: *"It is important for the student to become familiar with the instrument: playing in different positions, for as long as possible during the lesson, because we do not know whether she will study at home. In addition, she should not be blocked by small things; everything should make*

musical sense even if it is out of tune; the concept of a piece cannot be worked on by playing it bar by bar".

Table 2. Frequency of appearance of the codes included in Typical Classroom Activities in the SAPIL

Code	Teacher	Student	Total
Tuning	4	3	7
Warm-up	0	0	0
Writing	1	4	5
Playing	12	127	139
Singing	14	13	27
Speaking	407	291	698
Extra production	2	2	4
Mixed production	12	25	37
Digression	1 (starts) / 7 (finishes)	9 (starts) / 3 (finishes)	10
Rest	8 (starts) / 6 (finishes)	2 (starts) / 4 (finishes)	10
Inactivity	-	-	-
'Out'	-	-	-

Even though oral production lasts for a shorter time than musical production, the teacher and student do talk a lot and often, and there is a certain balance between them as compared to the more traditional lessons described in the Introduction (Kotska, 1984; Persson, 1996; Rostvall & West, 2003; Tait, 1992; Yarbrough & Price, 1989). In her practice diaries, the teacher says about this: *"I had great fun in this lesson because the student spoke her thoughts out loud and concentrated. It was very easy for me to follow her thoughts and she followed me easily too. This student speaks so much and is so positive that is easy to get ideas based on what she says. I mean, for example, she sometimes invents the things we play in class. I know from experience that what she learns in these lessons will be forgotten at home, and we may have to go back to them often, but if we talk about them, she will probably remember them more easily".*

Not much writing is used in these lessons. The teacher writes down homework once, the student composes songs on paper four times, an activity that was suggested or proposed by the teacher every time. Rests, usually for relaxing the student's hands or changing posture if the body is tense, are mostly managed by the teacher, who starts them 8 times, while the student only starts them twice. The opposite is true of digressions, where the student suddenly starts talking about subjects completely unrelated to the lessons ("*Miss, do you know what happened to me today in the math lesson?", "It's my grandmother's birthday today."),* which are begun by the student on

all occasions but one. Digressions and rests are ended 13 times by the teacher and 7 times by the student.

In the next sub-sections, we will describe in depth what teacher and student talked about and played, in order to understand the logic behind this general structure. We will look in detail at the frequencies with which each code appears in the teacher's and student's practices during the video-recorded lessons.

3.1.1.1. First lesson

During the first lesson, in addition to musical, mixed and oral production, digressions and rests, teacher and student perform other typical classroom activities such as tuning the instrument at the beginning of the lesson, followed by cooperative work on aspects of bow distribution and coordination of right and left hands or analysing the rhythms of a piece. The student works on related solfège by singing and playing at the same time with rhythm and with relation to the physical map of the instrument (relationships between sounds and their exact place on the fingerboard) and composes her own musical piece while the teacher sings briefly to manage the student's attention. Time is also spent on aspects such as breathing or body position with relation to the instrument.

Both teacher and student use explaining, asking, suggesting and answering, while only the teacher uses informing, giving instructions and very rarely, modelling. The student corrects herself without the teacher using correction. Most of the processes included in the SAPIL appear in this lesson, except negative evaluation, negative attribution and intrinsic motivation. Both teacher and student use most of the actions, while rote learning, positive evaluation and extrinsic motivation are used only by the teacher.

The teacher's and student's classroom practices focus on outcomes of symbolic, syntactic and analytical aspects of scores, and psychomotor aspects with regard to body position and breathing. The teacher also focuses on the student's memory work to learn the score. No referential or holistic, expressive, sound and stage presence outcomes appear in this lesson.

3.1.1.2. Second lesson

The typical classroom activities that took place during this lesson are tuning at the beginning, extra and mixed productions to continue the work with relative solfège and rhythm – although this time, much of the work focuses on left hand finger pressure on the fingerboard and the natural harmonics to relax the tension in the student's hand at the end of the lesson –, and singing, for the association of songs having similar symbolic material, all of which are managed by both teacher and student. There is no annotation, and like in the previous and subsequent lessons, no warm-up. In contrast to the first lesson, only musical pieces are worked on. Practically all observable actions are used by both teacher and student, except giving instructions and the few modelling moments, which are used by the teacher.

Memory with transfer, comprehensive learning, planning, positive attributions and attention management are worked on, as in the first lesson, from the standpoint of both student and teacher. In addition, in this lesson, they both use positive evaluation and intrinsic motivation. As in the first lesson, no negative attribution is used. Extrinsic motivation or the study characteristics do not appear. Only the teacher uses reproductive memory, rote or repetitive learning, negative evaluation and mental representation.

With regard to teaching and learning outcomes, they both maintain interest in symbolic and psychomotor aspects, although in this lesson they work together on the referential rather than on the analytical or syntactic, and add memory work. Features such as stage presence, the expressive and the holistic are not worked on in this lesson, and sound is represented only in the student's discourse.

3.1.1.3. Third lesson

With regard to typical classroom activities, here again there is no warm-up, and both student and teacher use singing for the association between songs (once together with learning the song or solfège) and mixed production. The teacher focuses on tuning the instrument a few minutes after starting the lesson (in the post-lesson interviews, the teacher explained that they had both forgotten to tune the instrument at the beginning of the lesson, as they usually do, and as it was not too much out of tune, she preferred to

continue with the lesson after noticing the omission until she found a time to tune it and continue with the lesson), while the student makes notes on the score and makes extra production several times. As in the second lesson, most work here is on the musical pieces and other matters related to left-hand fingering (in up to six separate episodes) and tuning and the instrument's intrinsic sound. The observable actions are the same as in the second lesson.

In line with the two previous lessons, processes such as retrieval with transfer, rote learning, comprehensive learning, positive evaluations, positive attributions, and attention management appear in the discourse of both teacher and student. During this lesson they both assign importance to intrinsic motivation. The differences in this lesson are that neither teacher nor student uses reproductive memory, mental representation or negative attribution. The teacher deals briefly with the study characteristics, extrinsic motivation and lesson planning, while the only the student uses negative evaluation.

The teaching and learning outcomes of this lesson are nearly the same as those in the second lesson, except that in this case both teacher and student add work on expressive aspects of the musical piece and sound of the instrument, while memory appears only in the teacher's discourse.

3.1.1.4. Fourth lesson

As in the other lessons, no warm-up exercises are used in this lesson, which is structured along four digressions, through which various subjects emerge, such as finger pressure on the fingerboard, structural analysis of the parts of the piece, taking note of rhythms, different episodes about bow position and distribution, and work on fingering according to the positions and strings. Both teacher and student sing with a combination of aspects such as solfège and association of songs, make notes on the score and tune the instrument at the beginning, but there is no extra production and only the student uses mixed production. The musical pieces are worked on most of the time during this lesson, as in the two previous ones, although time is also allowed for the student to create short melodies with the material learned during the lesson. The observable actions are the same as in the second and third lessons, except that here, only the student corrects.

Again, the learning processes used by teacher and student are retrieval by transfer, comprehensive learning, positive evaluation, attention management, intrinsic motivation and mental representation. They also both use negative evaluation, while intrinsic motivation does not appear in the discourse of either. During this lesson, the teacher has greater control over the student than in any of the previous ones with regard to the use of reproductive memory, rote learning, task planning, positive and negative achievement attributions and study characteristics.

With regard to learning outcomes pursued by teacher and student, they both mention symbolic, analytical, referential and psychomotor aspects, but do not speak of stage presence or the syntactic and expressive parts of the scores. The teacher mentions memory work, while the student talks about sound production with the instrument.

3.1.2. Outcomes, Processes and Conditions: An overview

3.1.2.1. Procedural Learning Outcomes

Psychomotor aspects, usually related to the work of the right and left hands, as well as with breathing or positioning the body with relation to the instrument, are the most frequently used procedural outcomes, with similar frequency in both teacher and student. Expressive features, such as intention in phrasing or using the body to help express a musical idea, are used very few times in these lessons, and only by the student. For sound production features, the student shows greater interest, doing so on 5 occasions, usually in the episode during which she realises how the sound of the instrument is transmitted or expands through the f-holes and corpus.

Memory is managed seven times by the teacher, in a very basic way, by asking the student if the music stand and score can be removed and the piece played by heart. In the post-lesson interviews, the teacher said that the aim of this was not to get the student to learn to memorise, but because the student is sometimes more focused on and concerned with the symbolic aspects of the score she is playing than with other aspects that the teacher wants to work on such as flow of body movements without tension while she reads the score. This student is beginning to learn notation, but still tenses her body when she plays if she is not sure of the notes, rhythms or fingering in the songs.

Table 3. Frequency of appearance of the codes included in Procedural Learning Outcomes in the SAPIL

Code	Teacher	Student	Total
Psychomotricity	33	31	64
Expressiveness	4	1	5
Sound production	2	5	7
Memory	7	3	10

3.1.2.2. Conceptual Learning Outcomes

The symbolic level of the scores is what is worked on most during the lessons, perhaps because it is a beginner's level. It is usually represented by fingerings, bows and notes, and sometimes also related to dynamics. The second most important level in these lessons is the referential level, which is worked on in similar frequencies by teacher and student, as are the symbolic aspects. It is usually related to communicative and expressive aspects and the context for both. The somewhat more complex analytical relations contained in the analytical level are worked on, although to a lesser extent than the other levels. As for all the levels, the frequency is similar for teacher and student.

Table 4. Frequency of appearance of the codes included in Conceptual Learning Outcomes in the SAPIL

Code	Teacher	Student	Total
Notational	23	22	45
Analytical	5	5	10
Referential	9	10	19

3.1.2.3. Attitudinal Learning Outcomes

Neither teacher nor student performs activities related to stage appearance or talks about it in any of the four lessons.

3.1.2.4. Learning Processes

Extrinsic motivation only appears twice, managed by the teacher, whereas intrinsic motivation appears much more often, managed mostly by the teacher and only five times by the student. The teacher's practice diaries speak of intrinsic motivation several times: "*I like the student to feel happy with her skills. I don't like doing things that are too difficult. The students usually choose the order of the pieces we work on in class, and I choose novel tasks for them, something they like. I remember that this student showed me a picture of her cat at the beginning of the lesson, and I remembered*

the song "Cat's SOL-MI", which was perfect for the situation (…) if I let her play only open strings I think she would get bored, and I probably would too; I have to keep them motivated in what they are doing…" // "*The motor process with a beginner takes up a lot of time, so you need to provide a wide variety of short, parallel activities to ensure the student feels she is progressing easily on her own.*"

Table 5. Frequencies of appearance of the codes included in Learning Processes linked to motivation in the SAPIL

Code	Teacher	Student	Total
Extrinsic motivation	2	0	2
Intrinsic motivation	21	5	26
Positive attribution	17	6	23
Negative attribution	2	1	3
Positive evaluation	49	7	56
Negative evaluation	4	10	14

The student seems to be more critical and demanding than the teacher, as she evaluates negatively, while the teacher usually evaluates or attributes learning achievements positively. Moreover, the teacher does not seem to make too many negative judgments about the student's performance of the tasks, and focuses on the intrinsic part of the task as predicted by the constructive model described in the Introduction, such that each error the student makes serves as a learning tool and personal challenge rather than a penalty. This can have major effects on motivation.

For the four weeks of lessons, in answer to the practice diary question *"Did any of these thoughts come to mind during the lesson?",* the teacher never ticked any of the negative options provided ("*This piece is impossible for the student", "She is very out of tune", "The rhythm is not right", "How is it possible that she confuses the up and down bows so much?", "I'd like to be at home right now!")* On the contrary, she chose many of the positive options every time (*"You have played that very nicely", "We can do it", "We are enjoying this"*) and on several occasions, the rest of the positive options.

Similarly, the girl chose positive options such as having played well, being able to play, and considering the study material nice (9 times), followed by having played in tune (8 times), that the bows were simple (6 times) and that the rhythms were easy (4 times). In the blank space provided in the study diary for "*Other thoughts?*", her

comments were: "*Very good!!"*, "*I love it!*", "*Nice!!!*", "*It's nice*", or "*Wonderful!!!!!*", as shown in Figure 1. The translation of the options given in the study diary as it appears in Figure 1 are as follows (same order as in the image from top left to down right): "*Here, the teacher would ask…*", "*Here the teacher would show…*", "*Here the teacher would explain…*", "*I played it very nicely*", "*This passage is impossible*", "*I can do it!*", "*It takes a lot of effort from me*", "*How boring!*", "*What fun!*", "*I play quite a bit out of tune*", "*I play quite well in tune*", "*I can play these rhythms*", "*Rhythms are easy*", "*Bowings are logical*", "*I get confused with the bowings*", "*Other thoughts?*".

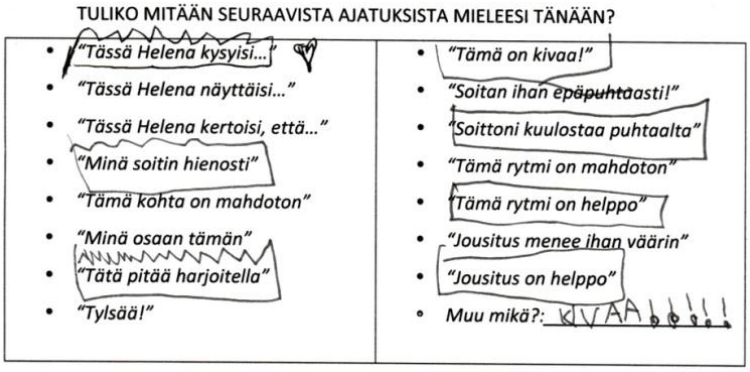

Figure 1. Example of student's answers in the study diary

Table 6. Frequencies of appearance of the codes included in Learning Processes linked to cognition in the SAPIL

Code	Teacher	Student	Total
Reproductive memory	5	2	7
Memory with transfer	19	19	38
Repetitive-rehearsal	8	1	9
Meaningful learning	24	25	49
Planning	21	5	26
Attention management	36	18	54
Rehearsal characteristics	5	2	7
Mental representation	17	6	23

For both comprehensive learning and memory with transfer, the frequencies for teacher and student are high and similar, indicating interest in understanding the tasks being performed in order to learn deeply and comprehensively, as described for the constructive model in the Introduction, rather than being focused on mechanical repetition and personal rehearsal without reflection. In contrast, rote learning or literal memory are worked on much less, and are less complex processes than the others. As an indicator of what we have just seen with regard to these learning processes, during the interview with the student, in response to the questions *"Do you think that some*

teachers are better than others?" and "What are these teachers like?", she answered that her teacher is "*(...) one of the best teachers. She understands what I am thinking. She helps me if there is something I don't know how to do yet. And during the lesson I play better and better because I understand things."* It is not surprising that in the multiple choice videos she chose the constructive options as her favourite, rejecting all phases in the transmissive videos (planning, supervision and evaluation), or that she associates her teacher to the constructive practices shown in the videos.

The teacher plans a lot during these lessons, while the student does so very little. Similarly, mental representation is mainly managed by the teacher, and very little by the student. Attention management is the process that is most used overall, with the teacher managing it two thirds of the times. The second most frequently used process is comprehensive learning. In these lessons, there is not much stress on how or how much the student studies. On five occasions, the teacher simply briefly suggests tasks that the student could do at home if she is interested. However, the student's study diaries record that she studied on 13 out of 24 possible study days, said that she enjoyed studying very much 11 times and enjoyed studying much another 2 times.

3.1.2.5. Learning Conditions

In the types of action that appear, although the teacher gives a large number of instructions, there is quite a lot of emphasis on asking questions, both by the teacher and the student. This implies that there is a dialogical structure, which can also be observed in the use of actions such as answering, explaining or informing, which they both work on frequently.

Table 7. Frequencies of appearance of the codes included in Types of Action in the SAPIL

Code	Teacher	Student	Total
Informing / Knowledge transfer	14	21	36
Responding	32	47	79
Explaining / Arguing	27	32	58
Correcting	13	5	17
Giving instructions / Orders	65	1	66
Modelling / Demonstrating	6	0	6
Asking / Doubting	167	105	272
Proposing / Suggesting	63	7	70

The teacher corrects more than the student does, although they both do so infrequently and there is very little modelling by the teacher. The teacher often proposes tasks or exercises, while the student seldom does so.

Finally, cycle types 'Teacher open', 'Student open' and 'Student evaluation' do not appear in these lessons. The most frequent cycles are 'Teacher+Student evaluation' cycles and 'Teacher+Student answer' cycles, indicating that many of the processes and outcomes of these lessons are managed jointly. There is also a considerable number of 'Teacher evaluation' cycles, where the teacher closes the activity and evaluates, and of 'Teacher answer' cycles, where the teacher answers in order to close a cycle, with the student making a small, though real intervention.

Table 8. Frequencies of appearance of the codes included in Types of Cycle in the SAPIL

	Evaluation cycle	**Response cycle**	**Open cycle**
Teacher	11	4	0
Teacher + student	10	16	3
Teacher + Student	25	30	3
Student	0	2	0

To sum up, some of the more important features are that scenic presence is not worked on, and that the student is not instructed to study at home or to study by rote, although this does not seem to affect her studying at home and feeling motivated to do so, according to her study diaries. Extrinsic motivation appears little, and the teacher does not usually model or correct, nor does she evaluate negatively or attribute the student's mistakes to negative issues. The student, in contrast, is self-critical, though as a driver for learning and achievement rather than as a penalty.

The simpler cognitive processes such as rote learning or literal memory appear less often than the more complex processes related to deep understanding of the music being learned, such as memory with transfer or comprehensive learning, which are usually managed jointly. Attention management, mental representation and planning also appear frequently, usually regulated by the teacher. Student and teacher ask a lot of questions, but also explain, argue, answer or inform cooperatively, so that many of the conditions are managed jointly, even though the teacher uses instructions more often (though not necessarily with relation to playing the score, but rather to aspects of the student's understanding of what she is doing).

4.1. Discussion

Our first aim was to describe in depth this constructive teacher's practices with her student according to the SAPIL. We also wanted to assess whether those practices identified with her conceptions, in which case they would be sufficiently complex to represent the different features of the assumptions described in the Introduction: in the transmisive approach, the student would have a passive, reproductive role in her approach to learning, whereas in the constructive approach, the cognitive processes performed by the student would be the main object of learning.

In the first stage of analysis we looked at general features of the four lessons. We found that the duration and structure of lessons regarding talking, playing the instrument and inactivity, for both teacher and student, was similar in all four. The student played much more than the teacher, and they both talked a lot, which could be connected to the study about expert teaching by Henninger, et al. (2006). All the lessons were organised around several long rests (initiated by the teacher and related to psychomotor relaxation) and digressions (initiated by the student with regard to her own personal experiences), in addition to quite a lot of inactivity. This contrasts clearly with the typical patterns of traditional lessons described in the Introduction, which show lessons during which students hardly participate or talk (Kotska, 1984; Persson, 1996; Rostvall & West, 2003; Tait, 1992; Yarbrough & Price, 1989), and resting or inactivity are frowned upon because it is believed that maximum use should be made of lesson time and therefore teachers should correct and interrupt constantly whenever the student plays anything badly in order to have action going on during the lessons (Duke & Henninger, 2002; Siebenaler 1997).

Another phase of analysis studied total frequencies of appearance of each code contained in the SAPIL and the frequencies of those codes used by the teacher and the student separately. In the musical units section, most work was done on musical works appropriate to the student's level, while work on technical exercises was practically non-existent (in contrast to the findings in Karlsson & Juslin, 2008). Similarly, regarding typical classroom activities, both student and teacher sing a lot, do not warm up, tune up in every lesson and rarely write (except for a couple of times when the student composes).

One of the main teaching outcomes pursued is not change in the student's actions, but how the student actually interacts with the instrument or how she represents her relationship with the instrument, therefore the teacher focuses on the student's mental representation, which connects to her intrinsic motivation, as well as with the use of musical scores or the processes involved in learning. Symbolic and referential aspects are worked on together and analytical aspects are worked out to a lesser extent. Stage presence is never worked on and there is far more psychomotor work than aspects of expression or sound. There is work on memorization, but with relation to bodily concentration, not reproduction of musical scores. Even if the outcomes pursued during these lessons are more traditional and simple than we would like, the conditions and processes the teacher uses to manage them are highly complex and the teacher focuses on the deeper ways of the student learning sheet music – as partly found in the study by Cheng and Durrant (2007). Further studies could analyse whether this type of complex management is internalised in the student's practices with its consequent transfer of control.

This teacher wants her student to play well, which is connected to how she manages the student's learning processes. With regard to the processes in the SAPIL, it is noticeable that intrinsic motivation appears on several occasions while extrinsic motivation never does. No emphasis is placed on studying; nevertheless the student does often study at home, as shown in the study journals. The teacher issues several positive evaluations and attributions and a few negative ones, because she is interested in the student's self-esteem and self-confidence, in contrast to teaching styles that focus on technical mastery as described in the Introduction (Karlsson & Juslin, 2008). The child makes more negative evaluation, displaying a critical spirit and showing the desire to continue working in order to improve. They work together on more complex processes such as comprehensive learning and recovery by transfer, which influences the child's choice of constructive teaching videos as her favourites in the structured interview, associating her teacher with the features typical of constructive, friendly and well-prepared teachers. However, it is mainly the teacher who manages the aspects involving planning and managing the student's attention and mental representation.

With regard to learning and teaching conditions, there is a clear dialogical structure, because both teacher and student constantly ask questions, but also answer,

explain or inform. The teacher encourages the student's thinking and verbal participation whenever possible. However, there are other aspects, which are again represented mostly in the teacher's practices, such as giving instructions, suggesting tasks or correcting (though not too often). This teacher uses modelling on a few occasions. The most frequent interaction cycles are joint (Teacher + Student) evaluation and answering.

In general, we observed that the SAPIL is a very powerful tool for encoding this type of individual instrument lesson, regarding both practice and discourse. Even though we did not analyse in depth the teacher's practice journal and the student's study journal, or the interview with the child and the post-lesson interviews with the teacher, they were very useful in providing examples of some of the most relevant aspects found in the encoding. An in-depth analysis of the rest of the materials, which have only been used as a basis for the description of the results in the case study, is pending.

4.1.1. Conclusions

This study analysed in depth whether a teacher who holds a constructive conception of teaching and learning is able to carry out constructive practices, and if so, to analyse how that goal is attained. Many features in these lessons differ noticeably from those in studies that analyse more traditional lessons, described in the Introduction, in the following basic aspects: there is dialog (e.g. Alexander 2008; Mercer, 2008), the teacher does not stop the student and correct her immediately (Goolsby, 1996), a lot of work is done on the symbolic, but also partly on the analytical (Mayer, 1999) and the referential levels of the score, also consistent with other studies (López-Íñiguez & Pozo, 2014b, Marín, Pérez Echeverría & Hallam, 2012). This teacher clearly seeks to achieve reflective learners who are active during the lessons. Indeed, following Perry, et al. (2002), when teachers perform self-regulating activities and get their students to view errors as opportunities for learning, children begin to use more complex cognitive processes related to concentrating on their personal progress and progress in the task, or evaluating themselves and selecting what and how to study.

Although we have found a solid relationship between what this teacher thinks and what she does during lessons, which has enabled us to understand a little better

whether the old adage "easier said than done" is true, there is still a relatively small gap between her conceptions and practices, according to the model proposed by Pozo (2008) on conditions, processes and outcomes of learning. It is worth enquiring whether this gap is due to the existence of hierarchical integration in her practices, since although the general approach in her lessons is constructive, she may be integrating some of the features of the most teacher-centred practices on certain occasions or phases of the instruction, such as managing certain processes, which may also be due to the student's young age, since joint process management could be expected with older students. We believe that in the light of the data from this case study, as claimed by Meyer and Turner (2002), practice has great capacity to inform theory, or in our case, conceptions.

This connects directly to initial training for instrumental music teachers. Although the official discourse of teacher training courses adopts an approach to teaching and learning based on constructivist assumptions, these assumptions do not appear to maintain a similar influence on teachers' conceptions once they are actually working (Martín, et al., 2014). It is important to take this into consideration, in order to encourage processes of connection between theory and practice in course curricula, going beyond technical rationality (Schön, 1987). In that respect, the development of music teaching in Finnish higher music education, where this paper is contextualised, is understood by teachers as a connection between theory and practical application (Juntunen, 2014).

Lastly, some of the features we consider particularly positive are the atmosphere of relaxation and enjoyment that this teacher creates in her lessons, and the importance she attaches to the student's intrinsic motivation which, as we have seen, is essential in order to be able to play an instrument satisfactorily (Maehr, Pintrich, et al., 2002). This is important because children who succeed in learning musical skills to play an instrument usually describe their teachers – both in the early stages and at their current level – as friendly, talkative, relaxed and supportive (Davidson, Moore, Sloboda, & Howe, 1998; Howe & Sloboda, 1991; Sloboda & Howe, 1991; Sosniak, 1985). Schenck (1989), for example, makes this very clear, and adopts the stance that learning an instrument should above all be fun. In this regard, Hallam (2011) claims that what predicts students' future musical aspirations is also related to the enjoyment of musical

activities, their attitude towards the instrument, the value of music to them, their self-beliefs and study strategies.

We need to conduct research from other methodological standpoints on teachers representing different conceptions and different levels of expertise, and in other instruments or learning cultures, in order to continue narrowing the gap between conceptions and practices and to help clarify, generalise or contradict the data. Longitudinal case studies to analyse the effect of instructional level, age or timing in different approaches to teaching and learning to play an instrument would help achieve better understanding of the relationship between conceptions and practices, beyond all of what has been presented herein. In addition to the case study on the 7-year-old, we have collected similar data from the lessons taken by a 12-year-old with the same constructive teacher, in order to compare the effects and characteristics of constructive teaching at various levels. We are currently preparing manuscripts reporting the data from the different stages of analysis of both case studies. In addition, the capacity of the SAPIL for adaptation to other types of interaction should be studied, such as chamber music or orchestral rehearsals without a teacher or a conductor, or even solo rehearsals, as the main author aims to do in a new autoethnographic project.

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Appendix A

Description of the units of analysis in teaching/learning music included in the SAPIL

Just as studies in school scenarios take a curricular unit (topic) as the largest unit of analysis, studies of teaching/learning music might consider a musical unit (piece, song, work, etc.) being worked on. However, since several musical units are often worked on (partly or wholly) in a single session, the analysis could consider a thematic unit (the musical unit which will continue through the work sessions) or a time unit (the teaching/learning session), whether one lesson, one rehearsal, etc. Whatever the case may be, musical material is taken as the unit of analysis. The units of analysis may differ between studies. A very general approach (e.g., Patrick & Middleton, 2002; or Perry et al., 2002) or a very thorough, detailed approach, (e.g. the cycles of Sánchez et al., 2008a, 2008b; or Coll, Onrubia & Mauri, 2008) may be useful for analysing certain patterns of teacher-student interaction, or even more so for analysing cooperative structures.

Our studies generally take the session as the basic unit. It can be broken down into sequences of playing and/or speaking episodes, which may occasionally be analyzed in terms of cycles. Musical units may be distinguished according to their nature and musical content, at least in technical exercises, works, creations, etc., following the criteria shown in Table A.1:

Table A.1. Musical units in one-to-one instrumental music lessons

Musical unit	Definition
Technical exercise	Not necessarily written musical pattern, usually repetitive and based on one or several technical contents.
Musical piece	Musical composition not created by the student.
Creation	Improvisation (invention while playing) and any musical fragment composed by the learner and included in the lesson content.
Others	Any musical or verbal product related to the content of a lesson, study session or rehearsal not clearly included in any of the above.

Description of the typical classroom activities included in the SAPIL

Musical units are developed over one or several time units or practice sessions. Different typical activities can be identified within each time unit, following Sánchez et al. (2008a, 2008b), understood as the various parts into which time at a practice session is structured. For example, Chaffin and Imreh (2001) divide each session into two typical activities (runs, works, etc.). Zhukov (2004) speaks of a typical three-part structure: warm-up (tuning, exercises to place sound, start up fingers, etc.), main body of the lesson (technical work and repertoire) and closing (assigning homework and how long the student should spend on each homework item). Most time is spent on the second part, where there is most teacher-student interaction.

In some of our group's previous studies, these typical activities were identified in a way similar to Zhukov (2004), in terms of practice phases (initial, intermediate, final) (Author & Author, 2010; Marín, Pérez Echeverría & Hallam, 2012). Other studies distinguished activities according to the phases of metacognitive management of learning, in terms of planning, supervision or evaluation of tasks (Author & Author, 2014b; Author et al, 2008b). In contrast to these proposals, the SAPIL proposes a thorough classification of the type of activities that take place during teaching and learning instrumental music, as distinguished according to the significance or function of these activities for playing music. Table A.2 shows all the possible activities that may be observed according to these criteria.

Table A.2. Typical classroom activities in one-to-one instrumental music lessons

Activity	Definition
Tuning	String-tuning activity, usually before starting to play, but also during practice.
Warm-up	Any activities preparing and activating the body and the instrument for class work.
Writing	Use of any kind of pen, pencil, post-it note or marker for any kind of written or visual marking of the score, computer programme or blank page. Includes erasing and deleting using eraser or correction fluid.
Playing	Production by teacher or student using an instrument as main mediator of a given part of the lesson, with musical purpose.
Singing	Production by teacher or student using voice as main mediator of a given part of the lesson and with musical purpose.
Speaking	Oral linguistic production by teacher or student.
Extra production	Production by teacher or student of which the goal is not to produce sound from the instrument, but from any other sound mediator, or simply as a psycho-motor control.
Mixed production	Simultaneous or consecutive production for less than 10 seconds each of any of the above by student or teacher.

Digression	Activity (musical or verbal) that interrupts the thread of the discourse or practice by talking or playing anything not closely related to the topic being dealt with.
Rest	Change in activity or non-musical interruption that cannot be classified as digressions, but rather as periods to rest from the activity underway.
Inactivity	Observable situations which are none of the above.
'Out'	Situations impossible to observe due to momentary loss of video and/or audio.

Description of the learning outcomes included in the SAPIL

Our classification of these outcomes is based on the classical distinction among verbal, procedural and attitudinal learning (Author, 2008), adapted to the domain of teaching instruments and which can be observed in both speaking and playing episodes. In symbolic learning, we distinguish among the three levels of processing musical scores established in previous research (Author et al, 2009; Author et al, 2008a; Author & Author, 2014a) based on the differences among explicit, implicit and conceptual processing of external representations (Author et al, 2010b; Author et al, 2004). In procedural learning, the essential point is to distinguish between motor procedures and cognitive procedures (which therefore imply a reference to processes, which are dealt with below), as well as between procedures linked to technical control of the instrument and more strategic procedures related to producing the sound under different conditions and with different aims. Finally, attitudinal learning relates to acquiring attitudes and values associated to the control of playing music, both onstage and in teaching and learning contexts.

A transmissive teacher would focus on notational and sometimes analytical levels of the score, as well as psychomotor factors (e.g. Karlsson & Juslin, 2008; Mayer, 1999); whereas a constructive teacher would pay more attention to referential aspects of the score (e.g. Author & Author, 2014b, Marín, Pérez Echeverría & Hallam, 2012) in connection to expressiveness and memory aspects. Both types of teachers would work on stage appearance and sound production, but in relation to more or fewer conditions and processes of learning.

Table A.3. Learning outcomes in one-to-one instrumental music lessons

	Dimension	**Definition**
Conceptual	Notational	Speaking by teacher or student with the main goal of learning, decoding or practising the symbols or explicit graphic marks on the score (such as notes, rhythms, fingering, etc.) and adding other basic marks.
	Analytical	Speaking and activities by teacher or student with regard to any implicit

		term or information in the score which requires syntactic processing (melody, accompaniment, modality, tonality, cell, motif, theme, phrase, voices, etc.), entailing several notational and/or syntactic elements in the score, which result in a new element with its own entity. Also refers to the general structural, melodic and harmonic analysis of the piece.
	Referential	Conceptually relating the elements of the work from the previous levels to its context of production and interpretation, considering communicative, aesthetic, stylistic, expressive, semantic, perceptive and psychological elements.
Procedural	Psychomotricity	Motor contents required for learning a scores or specific instrumental technique.
	Expressiveness	Contents of interpretative-intuitive nature in which notational or psychomotor elements which should be learned to acquire them are not made explicit, but which help to enhance the beauty of those symbols, and in which holistic understanding or referential understanding of the composer or music being learned are mentioned.
	Sound production	Specific work seeking adequate sound(s) which can be produced by the instrument to adapt to the musical-technical idea of the work.
	Memory	All procedures (mechanical and strategic) related to the faithful reproduction of a work or a passage of a work without using external memory tools, paper or audio.
Attitudinal	Stage appearance	Contents to prepare for a public performance, such as action sequences, speaking and self-instructions in anticipation of the performance.

Description of the learning processes included in the SAPIL

We will consider psychological processes related to motivation and cognitive processes which are explicitly managed in the practices analyzed. We will consider that a process is being managed (whether by the teacher, the learner or both) when it is explicitly mentioned, but not when it can be inferred that it is being worked on without being made explicit. They will thus be identified essentially through speaking episodes, even though they could be traced during playing episodes. Both constructive and transmissive teaching models would consider all types of evaluation and attribution, and would work on planning, attention management and rehearsal characteristics, being different in the way they use those processes and whether they are used by the student or the teacher. Constructive teaching would favour the use of memory with transfer, meaningful learning, mental representation and intrinsic motivation, and the simplest processes would be part of the transmissive practices (e.g. Karlsson & Juslin, 2008). The following processes, which are described in detail in Tables A.4 and A.5, could be analyzed.

Table A.4. Learning processes connected to cognition in one-to-one instrumental music lessons

Dimension	Definition
Reproductive memory	Speaking or gestures by teacher or student asking for or referring to previously learned knowledge (literal retrieval).
Memory with transfer	Speaking or gestures by teacher or student asking for or referring to acquired knowledge (in the past) to use as an anchor for new learning (may be shallower or deeper, generalizing or discriminative).
Repetitive-rehearsal	Speaking or gestures by teacher or student which refer to repetition of a musical fragment or motor action with or without the instrument, with the aim of fixing the learning.
Meaningful learning	Speaking or gestures by teacher or student to promote the comprehensive development of knowledge which cannot be included in any other category, e.g. ranking, relating, comparing or selecting information.
Planning	Speaking by teacher or student to plan how a learning item will be acquired.
Attention management	Speaking or gestures by teacher and student involving managing, distributing and maintaining the focus of attention on present and immediate actions.
Rehearsal characteristics	Explicit references to quality and quantity of study, and level of concentration and student's personal study habits. Explicit references to quality and quantity of study, and level required for student's personal concentration and study habits.
Mental representation	Speaking by teacher or student through which activities are proposed with the aim of working or generating a mental, sound, tactile representation, regardless of whether it is related to a concrete piece or sound.

Table A.5. Learning processes connected to motivation in one-to-one instrumental music lessons

	Dimension	Definition
Connected to motivation	Extrinsic motivation management	Speaking or gestures by which the teacher, parents, classmates (external agents) or the student (internal agent) manage elements external to the learning process itself, which are used or serve to drive the development of the task.
	Intrinsic motivation management	Speaking or gestures by which the teacher, parents, classmates (external agents) or student (internal agent) manage elements internal to the learning process itself, which are used or serve to drive the task.
	Attributions (positive and negative)	Spoken utterance of the reasons to which the teacher or student attribute the learner's success or failure at the activity performed (past), and which may be either positive or negative on the individual (internal) or on learning results, processes or conditions (external).
Connected to cognition	Evaluation (positive and negative)	Speaking by teacher or student to judge an action performed, which may or may not refer to whether or not the aim was achieved at that time.
	Informing / Knowledge transfer	Speaking by teacher or student in which basic knowledge is stated.
	Responding	Speaking or playing music by teacher or students in positive or negative response to a question.
	Explaining / Arguing	Speaking by teacher or student to justify an idea.
	Correcting	Speaking by teacher or student expressing that a performance or action is not adequate. It may or may not provide an alternative.
	Giving instructions / Orders	Speaking by teacher or student expressing the steps to follow to carry out an action.
	Modelling / Demonstrating	Action or speaking by teacher or student showing an action that should be imitated.
	Asking / Doubting	Speaking by teacher or student which may or may not produce a response from the interlocutor, although the aim is that the interlocutor should respond.
	Proposing / Suggesting	Speaking by teacher or student expressing a tentative or alternative possible action.

Description of the learning conditions included in the SAPIL

In the SAPIL, the conditions refer to the type of teaching/learning activities that take place and the participation of the different agents (teachers and students) in these activities (i.e. who takes part and how they take part). The point is to identify the different actions performed by music teachers to manage their students' learning and how they interact with them, giving rise to different participation structures or cycles. As happens with learning outcomes and processes, differences would be observed between traditional and constructive teaching practices. As an example, a constructive teacher would transfer knowledge to the student by encouraging dialogue (e.g. Alexander 2008; Mercer, 2008) to guide the student through questions or suggestions in order to find the best processes to learn something. A transmissive teacher, on the other hand, would control the tasks the student should undertake by means of modelling, correcting or giving instructions (i.e. Duke & Henninger, 2002; Goolsby, 1996; Siebenaler 1997). Based on the different studies that identify typical teaching activities (e.g. Coll & Solé, 1990; Viladot, Gómez, & Malagarriga, 2010, Zhukov, 2004), we distinguish the following types of actions:

Table A.6. Types of actions in one-to-one instrumental music lessons

Action	Definition
Informing / Knowledge transfer	Speaking by teacher or student in which basic knowledge is stated.
Responding	Speaking or playing music by teacher or students in positive or negative response to a question.
Explaining / Arguing	Speaking by teacher or student to justify an idea.
Correcting	Speaking by teacher or student expressing that a performance or action is not adequate. It may or may not provide an alternative.
Giving instructions / Orders	Speaking by teacher or student expressing the steps to follow to carry out an action.
Modelling / Demonstrating	Action or speaking by teacher or student showing an action that should be imitated.
Asking / Doubting	Speaking by teacher or student which may or may not produce a response from the interlocutor, although the aim is that the interlocutor should respond.
Proposing / Suggesting	Speaking by teacher or student expressing a tentative or alternative possible action.

But in addition to observing actions and their sequence, we are interested in identifying the agents who perform them and their purpose in those didactic sequences. Sánchez et al. (2008a, 2008b) took the cycles of which the episodes are made up as analysis units and identified three components: a teacher asks about something that the student should know (I= Inquiry), a student responds (R= response) and the teacher

evaluates what happened (E= evaluation). This structure is known as IRE (Inquiry + Response + Evaluation). There are also more open patterns of activity such as IRF (F= feedback), or more symmetrical patterns in which both student and teacher can initiate the cycle, respond or evaluate. Based on these patterns, as shown in Table A.7, we have identified three types of cycles in each episode observed, which would correspond to the response or evaluation cycles mentioned above. However, we also found a type of open cycle which is not necessarily followed by any kind of closure or feedback, and which may be performed by either the teacher or the student, as follows:

Table A.7. Types of cycles in one-to-one instrumental music lessons

Open cycle	The teacher or student suggests a task which serves as a closure for a certain cycle within an episode, without evaluating or providing a response. A question left hanging would also form part of the closure in this type of cycle.
Response cycle	The teacher or student responds through a verbal response such as informing, responding, singing or playing, to one of the actions proposed by the other (asking, ordering, suggesting…) without evaluation, and serving as closure for a given cycle.
Evaluation cycle	The teacher or student evaluates (positively or negatively) the success or failure of the task performed in a given cycle.

Relating to the type of support provided and the way in which these practices are structured to the implicit theories identified in previous papers (Author et al, 2006, see Table 1 in the Introduction to this article) and more specifically in studies on learning to play an instrument (Author et al, 2009; Author et al, 2014a; Author & Author, 2014a, 2014b; Author et al, 2008b, among others), these cycles would correspond to different teaching practices, as follows:

- Direct Teaching Practice: the teacher tells the student what to do, evaluates the response (closed) to the need or problem posed [corresponding to something like an (I) RE) where the teacher performs RE). The prevailing actions in this pattern are conveying knowledge, giving instructions, ordering, modelling, correcting.
- Interpretative Teaching Practices: the teacher provides support, suggestions, proposals, but closes the cycle with an evaluation or response (IRE). In this pattern, together with some of the previous categories, prevailing actions are those such as explaining, suggesting.
- Constructive Teaching Practices: rather than providing answers, the teacher guides and supports the student in finding his/her own responses and evaluating him/herself, or leaves the cycle open. The teacher asks more often than answers

(this would be closer to IRF or open participation structures or those in which the closure, in the case of IRE, is done by the student). Here, the pattern should be different, the teacher's actions would be mainly suggesting or asking, and possibly even explaining, but above all, the student participates more by arguing, doubting and correcting his/her own actions.

We divide interaction into different sections according to who the participants are. Firstly we identify the prevailing actions in teaching to play a musical instrument in one-to-one classroom formats. In this kind of interaction we can identify certain shades in the weight of participation and management of processes, results and learning conditions, establishing the structures Teacher, Teacher + student and Teacher + student as described in Table A.8 (the prevailing structure of Student only is much less frequent in ruled teaching of music, nevertheless we consider it herein in order to identify exceptional cases).

Table A.8. Types of interaction in one-to-one instrumental music lessons

Interaction	Definition
Teacher	The teacher tells the student what to do, provides the response (closed) to the need or problem [corresponding to something like (I) RE) in the terms of Sánchez et al., where the teacher performs REs). The teacher exercises strong control, tells, orders, conveys…
Teacher+student	The teacher provides support, suggestions, proposals, but is the one who closes the cycle (IRE). The teacher suggests, proposes…
Teacher+Student	Rather than providing responses, the teacher guides and helps the student to find his/her own responses: the teacher asks more often than responds (more like IRF or open participation structures in which the closure, in the case of IRE, is performed by the student). The teacher suggests and guides; control is shared…
Student	The teacher allows the student to act, the teacher supports, at the most asks, does not suggest, does not provide responses. It might be relevant in the case of symmetrical structures. The teacher allows the student to act…

Appendix B

Table B.1. Outline of episodes organised according to order of appearance in each class

Lesson 1	**Lesson 2**	**Lesson 3**	**Lesson 4**
Tuning	Tuning	Songs' association	Tuning
Bow distribution	Relative solfège	Songs' association	Digression
Rhythm analysis	Break	Combination: Discovery learning + Singing + Songs' association	Pressure with fingers
Digression	Relative solfège (cont.)	Tuning	Analysis of the parts
Combination: left hand + right hand (coordination)	Songs' association	Break	Bow position
Break	Pressure with fingers	Sound of the instrument	Digression
Body position	Break	Fingerings	Bow position
Relative solfège	Pressure with fingers (cont.)	Bow position	Combination: Discovery learning + Singing + Songs' association
Combination: Bow distribution + Analysis of the parts + Rhythm	Break	Fingerings	Digression
Break	Pressure with fingers (cont.)	Fingerings	Rhythm (annotating)
Combination: Rhythm + Relative solfège	Break	Bow position	Combination: Fingerings + Hand positions + String crossing
Digression	Songs' association	Fingerings	Bow distribution
Breathing	Digression	Break	Digression
Digression	Rhythm (clapping)	Fingerings	
Breathing (cont.)	Digression	Fingerings	
Break	Combination: Songs' association + Pressure with fingers + Natural harmonics +Rhythm		
	Break		
	Combination (cont.)		
	Digression		