

Innovative Assessment Methods for the French Horn: Increasing the Effectiveness of Education

Métodos Inovadores de Avaliação para a Trompa Francesa: Aumentando a Eficácia do Ensino

Ning Zhou¹



SCUT School of Arts, South China University of Technology, Guangzhou, China
ningzhou582@yahoo.com, ningzhou85@163.com

Abstract: The introduction of innovative assessment techniques for the French horn can improve the process of education. The objective is to examine the effectiveness of the proposed assessment methods for improving accuracy on the French horn. The research is based on the experimental design to evaluate the effectiveness of assessment methods using statistical data analysis and paired t-test. The research took place from January to June during the 2020-2021 academic year. The sample involved 183 students from three educational institutions in the People's Republic of China. A preliminary assessment found that the academic performance of students was low. Before the implementation of the proposed assessment methods, an average score was 20.63 points interpreted by the scholars as *Do not Meet Academic Expectations*. After the introduction of the assessment methods, the post-implementation scores of the academic performance increased by 41.3%. The findings were interpreted as a *Satisfactory* level of academic performance. The paired t-test revealed significant differences in student performance learning the French horn before and after the introduction of the new assessment methods. The average difference was 3.57 points. Thus,

¹ Ning Zhou, Associate Professor of French Horn, South China University of Technology School of Arts. Over the years, he has specialized in French horn playing and teaching research. Also developing the role of classic music in education at different levels, as well as how the French horn can be expressed in traditional Chinese music. His published works include "On the Basic Playing Methods of the French Horn", "Exploring the Strategies of French Horn Playing and Technique Training", and "Innovative Assessment Methods for the French Horn: Increasing The Effectiveness of Education", "The Addition and Subtraction of Music Teaching in Universities: The Inheritance and Innovation of Traditional Music in Higher Education", etc. Recent major research project: "Traditional Lingnan Music Performance in French Horn solos and ensembles". He elaborated his research direction from the aspects of elegant music, the development history and specific performance of the horn, which provided a good reference for related research.

the proposed assessment methods for the French horn playing include (1) playing by ear, (2) Instrumental Scheme Processing, (3) a range practice, and (4) an introductory exam. The research demonstrates that the assessment methods of performance can be used as a part of the standard assessment developed for teachers that include different elements of effective teaching tools and methods.

Keywords: Innovation. Learning the French horn. Music education. Performance assessment. Training systems. The French horn.

Resumo: A introdução de técnicas de avaliação inovadoras para a trompa pode melhorar o processo de educação. O objetivo é examinar a eficácia dos métodos de avaliação propostos para melhorar a precisão na trompa francesa. A pesquisa baseia-se no desenho experimental para avaliar a eficácia dos métodos de avaliação por meio de análise estatística de dados e *teste t pareado*. A investigação decorreu de janeiro a junho durante o ano letivo 2020-2021. A amostra envolveu 183 estudantes de três instituições educacionais da República Popular da China. Uma avaliação preliminar constatou que o desempenho acadêmico dos alunos era baixo. Antes da implementação dos métodos de avaliação propostos, a pontuação média era de 20,63 pontos interpretada pelos acadêmicos como Não Atende as Expectativas Acadêmicas. Após a introdução dos métodos de avaliação, as notas pós-implementação do desempenho acadêmico aumentaram 41,3%. Os achados foram interpretados como um nível satisfatório de desempenho acadêmico. O teste t pareado revelou diferenças significativas no desempenho dos alunos no aprendizado da trompa antes e após a introdução dos novos métodos de avaliação. A diferença média foi de 3,57 pontos. Assim, os métodos de avaliação propostos para a execução da trompa incluem (1) tocar de ouvido, (2) Processamento de Esquemas Instrumentais, (3) uma prática de alcance e (4) um exame introdutório. A pesquisa demonstra que os métodos de avaliação propostos podem ser usados como parte da avaliação padrão desenvolvida para professores que incluem diferentes elementos de ferramentas e métodos de ensino eficazes.

Palavras-chave: Inovação. Aprendendo a trompa francesa. Educação musical. Avaliação de desempenho. Sistemas de formação. A trompa francesa.

Submetido em: 18 de janeiro de 2022

Aceito em: 27 de julho de 2022

Introduction

Performance assessment methods include a range of tools, techniques, strategies and activities that help to collect information on the learning process to improve the academic performance of students. The assessment methods are easy to develop, manage and analyse. Moreover, they motivate students and help educators to engage learners in self-learning. The proposed assessment methods include non-graded anonymous classes as a part of traditional classrooms (TABUENA, 2019). Assessment methods are divided into three categories: assessment methods to evaluate the course-related knowledge and skills, assessment methods to examine attitudes, values and self-awareness of students, assessment methods to analyse the effectiveness of the instruction (MILLER, 2016). Assessment methods have a simple structure, so teachers and students receive feedback on the teaching and learning process making the assessment *procedure anonymous*. Music teachers have good knowledge and skills on the important aspects of different assessment procedures, regardless of academic discipline (JABBARIFAR, 2009). In some cases, it creates confusion and contradicts existing views and ideas on assessment. It can be a waste of time and effort to develop ineffective assessment procedures that do not work (MCKAGAN *et al.*, 2017).

The music education philosophy is based on the importance of aesthetic education that helps students to develop an emotional background and understand the expressiveness of music. Moreover, musicians admit the key role of other values in music education such as social, ethical, psychological and physical values (MILLER, 2016). Qualitative assessment can help educators to collect information on student learning achievements and reveal the effectiveness of teaching practices. Wind instruments learning require special assessment methods. All of the mentioned above reflect challenges in learning to play wind instruments, that have a cultural and historical value for society but are not very popular because of their unique features. Learning to play wind instruments is a difficult task

for many students because educators do not pay attention to innovative methods of teaching based on scientific and pedagogical innovations. The French horn is one of the wind instruments that *need* to impose a *special assessment* (PRICE and WATSON, 2018).

The French horn is an orchestral and military wind instrument. In music, the use of the term '*the French horn*' dates back to the seventeenth century. Today's piano design was developed in the early nineteenth century when valves were added. It opened up more flexibility for playing in different keys (BRITANNICA, 2021). The current research aims to investigate the main problems and challenges faced by French horn performers. Playing this instrument, pressing the right keys and controlling the speed of air is not enough to ensure the pitch and create a subdued sound in different contexts (CAMPBELL, 2019). The keys can be played using the same valve key combinations, especially at the high end of the range. It means that the player should activate muscle memory and airflow for music delivery (HEILWEIL, 2019). Without the use of valves, the French horns sound best in a small number of keys and in overtones that blend with a small amount of spiral metal. The sounding of the French horn resembles the hunt horns and war bells. Music becomes more complex and technical demands for the musician also increase (KOZINN, 2008). It is easier to play a trumpet, trombone or tuba, but the keys on the French horn are much closer to each other, and the possibility of inaccurate playing increases (ROZWADOWSKA, 2020). The French horn plays in the higher range of the harmonic series and keys are played without the use of valves compared to other brass instruments. At higher ranges, the French horn is sensitive to small changes in the mouth position and air volume. This is one of the main causes of mistakes made by musicians while playing the instrument (HEILWEIL, 2019).

The research is based on the original and reflective investigation of the use of assessment methods to improve the teaching of French horn musicians. The research importance

is explained by the fact that the French horn musicians need innovative teaching methods to learn complex compositions written for this wind instrument. The research will provide recommendations for musicians on how to design the French horn teaching practices and help students to master the skills. The findings demonstrate the possibility of using the assessment methods to improve the effectiveness of music education. The collected data can be used to revise the traditional teaching methods of playing the French horn.

Literature review

Assessment in education

The 21st century created new learning and educational possibilities for both students and teachers, and educators have introduced changes to the music curriculum around the world so that musicians can learn effectively (TABUENA, 2019). The ways to innovate may vary and teachers have to employ a range of teaching strategies to meet the needs of individual learners (FRANCIS XAVIER ENGINEERING COLLEGE, 2017). Music educators have played a pivotal role in the learning process becoming a catalyst of change. A holistic approach to connect students' development with their natural environment is applied to teaching music based on different assessment methods. It helps to develop students' musical competence and artistic skills. Assessment methods help students to monitor their progress over time. It reveals that student feedback can influence knowledge acquisition and help students feel involved in the learning process as active participants (TABUENA, 2019).

Assessment in education plays an important role for teachers and help to influence students motivation (GIBBS, 1999). Learning assessment is the traditional function of assessment to provide a summary profile of what students have achieved as a result of their learning. Appropriate assessment methods are essential because

they encourage students to learn and teachers to adopt successful approaches to teaching (SMITH and WOOD, 2000). Similar research has been carried out on mathematics (ENGELBRECHT and HARDING, 2005). Assessment means the systematic collection of information on student learning using time, knowledge, experience and available resources to make decisions on how to improve the learning process (WALVOORD, 2010). Assessment is a process that involves setting goals for learning, collecting qualitative and quantitative data on how well students are achieving those goals, and using the information to improve learning. One of the main mistakes the teacher can make is to understand assessment as an additional tool to teaching (SHEPARD, 2000) or ignore it (SURGENOR, 2010). Students perceive assessment differently. For students, the main goal is to complete the course, so they learn only the assessed materials paying no attention to lessons or knowledge which will not be assessed at the end of the course (ENGELBRECHT and HARDING, 2005).

Assessment in music education

There is a large base of research on this phenomenon in the field of music education, so this study is complementary to current proneness. Student assessment is the basis of effective teaching (MILLER, 2016). Understanding student performance, analysing right and wrong decisions, and providing feedback to students can considerably improve the music curriculum. The assessments should be an important tool to improve any music programme as long as assessments meet learning outcomes and focus on the most important aspects of academic achievements. Classroom assessment plays a vital role in education helping teachers to control and evaluate the learning progress and, as a result, adapt learning to students needs (TABUENA, 2019). Assessment of academic performance is one of the main challenges for teachers. Innovative solutions can improve student performance, advise on how to adjust learning to specific needs, and help policymakers introduce advanced

methods to music education (DOS SANTOS, 2017). Based on the information mentioned above, it is evident that the use of formative assessment and the assessment methods (Classroom Assessment Techniques), can improve student performance. Music is a universal language and it becomes a part of the culture in all historical epochs and many regions of the world (GARCIA-ROMEU *et al.*, 2019). Music helps composers express feelings without words and guide individual behaviour patterns. The research proves that there are benefits and opportunities for individuals to learn music and practice playing. It improves intellectual, creative and emotional skills (CALEGARIO *et al.*, 2017).

Student assessment is an integral part of music teaching. Music teachers have a responsibility to provide accurate and reliable information about their student's performance with a wide variety of learning outcomes. When this information has a generalizing role, such as in grading, it is referred to as a learning assessment. Teachers are also responsible for providing feedback to help students expand their understanding of musical concepts and help all students improve their musical skills (SCOTT, 2012). When evaluation takes on the role of self-reflection, it becomes evaluation as learning. Current educational reforms are affecting how music teachers view the curriculum and how they plan music lessons for their students. Central to these reforms is the development of a constructivist learning environment. In this context, learning is student-centered. Evaluative discussions identify areas where education programs can be implemented to ensure a balanced program (PAYNE *et al.*, 2019). Through this process, teachers will see the drive to improve teaching and its impact on music programs.

The French horn

The French horn is a metal wind instrument consisting of a conical tube 3-5 m long, rolled into a scroll of a large diameter

of about 35 cm. In order to play, the musician vibrates his lips and generates notes depending on the position of the mouth and keystrokes that lengthen or shorten the tube. The usual way to play the French horn is to place the instrument in the right position of the centre of the French horn by holding it with the right hand and manipulating the valves with the left hand. A musician should keep a head and neck relaxed. Moreover, the player should keep the head as straight as possible and align it with the spine axis. If the performer is unable to maintain the correct posture to hold the heavy instrument, it can cause injury (ALBERT GARGALLO, 2017; LARGER and LEDOUX, 1996). For music teachers, teaching the French horn is a challenging task because playing methods, range, position, and other unique features of the instrument require time and effort of young learners and become a problem for many musicians during the first years of study. The French horns playing means the highest level of academic achievement. Nevertheless, it is difficult to motivate talented students to practice and play an instrument because it takes time and effort to train (BAKER, 2006).

Investigating the problem of French horn learning, one of the scholars identified two ways to learn this instrument (ERICSON, 2017). One method is to provide students with playing techniques and a list of technical tasks and skills that the student will have to master. This method is based on the progress from the traditional to the higher-level learning approach. A good low range is the core of the French horn playing, as well as good mouthpiece practice and control of the dynamics. The aim is to control the technique for playing sheet music. Thus, this approach does not allow to achieve a specific interpretation of music and ensure control of dynamics and articulation typical for orchestra music. In general, there is a narrow range of methods to play a piece of music correctly (ERICSON, 2017). The other method to learn to play the French horn is freestyle. Using this method, the teacher may not give a student any assignments, but propose students work on any skill important for students. This

method is used by teachers to motivate students and support the educational process (ERICSON, 2017).

Methods and materials

The research aim is to analyse the effectiveness of the assessment methods introduced to increase the effectiveness of teaching the French horn. The results can influence the implementation of such methods in the classical university curriculum. It will result in the learning process improvements and strengthen playing the French horn. The research used the following questions to analyse the problem:

1. What is the academic performance of students before and after the introduction of the assessment techniques for the French horn playing?
3. How is the student performance improved after the implementation of the assessment methods to the French horn learning?

The research is based on the experimental research design used to evaluate the effectiveness of assessment techniques in teaching the French horn. The research integrates statistical data analysis and paired t-test. The pre-assessment and post-assessment scores were compared to examine the impact of the assessment methods on academic performance. The scholars calculated the difference between the pre-assessment and post-assessment results. For the research validity, the test on the differences between two means taken from the same group (t-test for a dependent sample) was used.

Participants

The research took place from January to June during the 2020-2021 academic year. The sample involved 189 students

from three educational establishments of the People's Republic of China: [BLINDED] University, Jiangxi Science and Technology Normal University, The Central Academy of Drama, China Conservatory of Music. The selected participants learnt to play the French horn. Their academic performance for the first half of the academic year was identified as *Fairly Satisfactory* and *Satisfactory*. Table 1 shows the students performed for the first half of the year. The average value of academic performance was 76.42 points.

Table 1 - Students progress on the French horn learning for the first half of the academic year 2020-2021

Academic Progress	Description	Frequency	Percentage
90-100	Outstanding	0	0
85-89	Very Satisfactory	0	0
80-54	Satisfactory	74	40.4
75-79	Fairly Satisfactory	109	59.6
Below 75	Do not meet academic expectations	0	0
TOTAL	X	183	100
Academic Average	X	X	76.42
Interpretation	X	X	Fairly Satisfactory

The respondents were selected on a voluntary basis making a verbal invitation during a lesson. A student interested in the research was automatically included in the sample. The age of participants was 19 - 22 years. The average age of the respondents was 20.4 years, 54% of the participants were females and 46% were males. Out of 189 participants, 6 (2 females and 4 males) individuals terminated their participation. Their results were not considered analysing the data. The final number of participants was 183 individuals.

Assessment validation

Developing tests for playing the French horn, the final exam (preliminary and post-assessment) was conducted by the teacher in each educational institution. To determine how well the teachers used the developed assessment methods, the students were assigned roles of instructors aware of the key issues of the course. The development of assessment procedures from scratch considered valid and reliable student performance was a challenge for every music teacher. The research provided the French horn teachers with recommendations on how to evaluate students more effectively and give them feedback. Validations were carried out by four experts and experienced teachers assessing the course content and validity of the test before the beginning of the research. The validation tool consisted of fourteen items grouped by format, design, purpose, content and language. Table 2 shows the rating scale used for validation purposes.

Table 2 - Validation scale

Scale	Range	Interpretation
5	4.21 - 5.00	Highly Acceptable
4	3.41 - 4.20	Acceptable
3	2.61 - 3.40	Moderately Acceptable
2	1.81 - 2.60	Fairly Acceptable
1	1.00 - 1.80	Not Acceptable

Considering the format and design of the developed scoring tool, the average score of the four indicators was 4.52 points. According to the interpretation of the results, it is identified as *Very Acceptable*. Thus, the findings proved that the assessment tool was acceptable and valid.

Research design

The *research stages* were as follows: *Stage I* was the planning stage, *Stage II* was the development stage, *Stage III* was the implementation, and *Stage IV* was the evaluation. During the planning stage, the French horn curriculum manual was used as the basis for the programme content and standard of academic achievements aimed to ensure the validity of the assessment. Reference materials enriched the content and teaching practices. The assessment methods included the following techniques: (1) playing by ear, (2) Instrumental Scheme Processing, (3) range practice, and (4) introductory exam.

During the development and implementation stage, the scholars developed a strategy to assess how well students understand the key issues of the course. The developed assessment methods for the French horn lessons were applied after the introductory assessment. The following methods were used to evaluate the French horn playing:

1. **Playing by ear.** Students should not have a perfect pitch for playing the French horn, but the ability to develop the playing by ear technique is one the most important. This assessment method is designed to test whether the student can sing a simple, well-known melody and stay in the correct key. This method means that after a short listening exercise, objective test items follow the procedure: short answers, true-false or alternative-answer questions, tone selection exercises, multiple-choice assignments and interpretation of familiar pieces of music.

2. **Instrumental Scheme Processing.** Instrumental Scheme Processing is a lesson-based assessment method: certain musical instruments are classified based on the musical classification, and a musical stage is analysed according to the basic knowledge. In this case, basic knowledge can be used as a cognitive shortcut, allowing the most common explanation to be chosen for new information that relates to the French horn playing. For example, this method

can be used to assess the correctness of the embouchure, location of the mouthpiece rim, the appropriate diaphragm size, the chin location that affects the range and quality of the tone.

3. **Ranges Practice.** The assessment methodology assumes that students use a C, E, or G average (the French horn average = F below piano average C) within the exact 5th range. The closeness of the French horn partials forces musicians to practice a series of overtones. As students recognize the differences in pitches between C, E, and G, they should link these different pitches to help them with accuracy.

4. **Introductory exam.** The introductory exam is an assessment method aimed to assess playing on the French horn. The student must play from the notes an unprepared but well-known melody with the correct position of the legs, mouth, chin, fingers, and rim of the mouthpiece (Figure 1).

Figure 1 - A piece of music for the introductory exam.

ALL I WANT FOR CHRISTMAS IS YOU

HORN Words and Music by MARIAH CAREY
and WALTER AFANASIEFF

Moderately fast (♩ = $\frac{3}{4}$)

The image shows a musical score for French Horn. It consists of two staves of music in 4/4 time, with a key signature of one flat (B-flat). The tempo is marked 'Moderately fast' with a note equal to 3/4. The melody is written in a single line on a treble clef staff. The first staff contains the first eight measures, and the second staff contains the next eight measures. The music features a mix of quarter, eighth, and sixteenth notes, with some triplets indicated by a '3' over a group of notes.

In the final assessment stage, the paired sampling t-tests were used to examine the effectiveness of classroom assessments. The Hake factor was used to evaluate and analyse the scores of student performance playing the French horn. The following statistical tools were used to analyse and interpret the data: mean score, percentage, paired sample t-test, and Hake factor developed to analyse the mean value for improvement in scores in musical disciplines.

Restrictions

The research was conducted on the territory of three high educational establishments of the People's Republic of China, therefore the results cannot reflect the influence of the developed assessment methods on the innovative approaches in teaching the French horn. It should be noted that the assessment methods and criteria were the same in the research, but instructors who carried out the assessment varied depending on the high education institutions.

Results

Tables 3-5 demonstrated that students showed poor academic performance in the preliminary assessment before the implementation of the developed assessment methods with an average score of 20.63 points. The description of scores interpreted the average performance as *Do not Meet Academic Expectations* and has a standard deviation of 3.48 points. The pre-assessment results showed that out of 183 participants, 6.5% was ranked as *Satisfactory*, 27.9% were ranked as *Fairly Satisfactory*, 65.6% was identified as *Do not meet expectations*.

Table 3 - Preliminary assessment of the French horn playing.

Academic Performance	Description	Frequency	Percentage
90-100	Outstanding	0	0
85-89	Very Satisfactory	0	0
80-54	Satisfactory	12	6.5
75-79	Fairly Satisfactory	51	27.9
Below 75	Do not meet academic expectations	120	65.6
TOTAL	X	183	100
Average (value of test scores)	X	20.63	X

Average of Academic Performance	X	X	64.28
Interpretation	X	X	Do not meet academic expectations

Table 4 - Post-assessment of the French horn playing.

Academic Performance	Description	Frequency	Percentage
90-100	Outstanding	0	0
85-89	Very Satisfactory	6	3.3
80-54	Satisfactory	24	13.1
75-79	Fairly Satisfactory	89	48.6
Below 75	Do not meet academic expectations	64	35.0
TOTAL	X	183	100
Average (value of test scores)	X	35.12	X
Average of Academic Performance	X	X	82.36
Interpretation	X	X	Satisfactory

Table 5 - Pre-assessment and post-assessment of academic performance.

Variables	Average (test scores)	Participants	Standard deviation
Preliminary assessment	20.63	183	3.48
Post-assessment	35.12	183	3.12

The performance indicators on post-assessment increased after the implementation of the developed assessment methods from an average score of 20.63 points to 35.12 points. It suggests that the change of instructional methods affected the results. The increase was about 41.3%. The post-assessment results

showed that out of 183 participants, 3.3% were assessed as *Very Satisfactory*, 13.1% were assessed as *Satisfactory*, 48.6% were assessed *Fairly Satisfactory*, 35.0% were assessed as *Do not Meet Academic Expectations*. The interpretation of the average performance score is *Satisfactory* with a standard deviation of 3.12 points.

Table 6 - Paired t-test in the French horn course

Variables	Average Value	t-value	Significant Value
Pre-assessment and post-assessment	3.57	6.874	2.324

Note: N = 183; p <0.01

Table 6 shows a t-value is 6.874 points. The result is significant at p <0.01. The findings revealed that there was a significant difference in student performance in the French horn programme before and after the introduction of the assessment methods. The average difference in the average score was 3.57 points. The t-value in the case of a paired value was greater than the t-value from Tables 3, 4. The hypothesis that there were no differences in mean scores before and after the introduction of assessment methods was declined.

Table 7 - The Value of Hake Factor Increase

Range	Result
0.000 - 0.230	Low Increase
0.231 - 0.519	Average Increase
0.520	High Increase

Table 5 shows that the increase in the teaching effectiveness analysed using the Hake factor was 0.286. The percentage of the preliminary and post-assessment results corresponds with a moderate increase in academic achievements as a result of teaching the French horn using the proposed assessment

methods. Table 7 shows the range and average increase rates (HAKE, 1998).

The proposed assessment methods for the French horn such as (1) playing by ear, (2) Instrumental Scheme Processing, (3) range practice, and (4) introductory exam help teachers to evaluate academic performance. The above assessment methods can also be used as part of the standard assessment developed for educators to ensure effective teaching. The assessment base in teaching the French horn plays a vital role in the effective systematic learning process that uses analysis and interpretation of data. The interventions are required to provide guidelines for the learning process.

Discussion

The literature review unveiled that some articles highlighted the specifics of learning the French horn (ERICSON, 2017; HEILWEIL, 2019; KOZINN, 2008; MARQUES, 2015; ROZWADOWSKA, 2020). Nevertheless, no research was made on the effectiveness of the assessment methods developed for French horn teaching. At the same time, the effectiveness of Classroom Assessment Techniques for other musical instruments and piano has been confirmed (TABUENA, 2019). The proposed assessment methods can help teachers to choose the most effective strategies and avoid outdated teaching approaches (MILLER, 2016). For example, this study found that before the introduction of the proposed assessment methods, students showed low academic performance with an average score of 20.63 points. Post-assessment of progress has increased after the introduction of the proposed assessment methods. Results improved from an average score of 20.63 to 35.12. The advantages of assessment methods include flexibility and timeliness (WALVOORD, 2010). The proposed methods can be introduced in different educational settings. They can be adapted for large or small groups or modified

depending on the discipline. They can be used to evaluate the memorisation process and critical thinking skills (MILLER, 2016).

A large amount of research has been done in the field of music education. The research of BAKER (2006) recommended teachers and students broaden their understanding of the French horn playing techniques. The results collected from the instrumental music teachers across Missouri were used to evaluate the difficulties experienced by young horn players. The research provided recommendations on how to improve learning and develop playing techniques. The literature reviews and assessment methods accepted by musicians on national and international levels have been used to supplement, support and refute techniques and methods offered by the experienced French horn teachers. The results of BAKER (2006) confirmed the importance of student feedback and communication with teachers while learning to play the French horn.

The results (CARDASSI, 2012; GYNNILD, 2015; JUCHNIEWICZ, 2010; LEONG, 2014; NAPOLES and MACLEOD, 2013; SICHERL KAFOL *et al.*, 2015) prove the benefits of implementing the proposed methods. Assessment methods help educators focus on student learning. The scholars admit that it is important to identify what students learn from the course and knowledge gaps. In this case, educators can more effectively instruct students to meet their learning needs. Educators spend less time on themes students have already known well.

The research shows that formative assessment has a significant impact on academic performance (MILLER, 2016). These results prove complete solidarity with the results of the study. Several researchers (MCKAGAN *et al.*, 2017) examine the role of improved assessment methods in learning and knowledge acquisition. They found that informative assessment has a positive impact on student achievement. Specifically, they found that formative assessment is more effective for low-performing students narrowing the gaps while increasing overall

performance. These findings contradict the results of the current research.

Some scholars highlighted a decrease in the research on new methods of assessment and learning quality (PRICE and WATSON, 2018). A teacher is considered one of the main stakeholders in education. The balanced approach helps to learn to continue education despite some disadvantages in the curriculum, outdated technology in classrooms, and low quality of teaching materials (tests, modules, workbooks). Many empirical investigations have revealed the relationship between academic achievements and skills development and the knowledge and mastery of teachers (TABUENA, 2019). The tests and assessments development require teachers to define what is to be measured and specify learning tasks. They identify the anticipated knowledge, skills, and an expected level of understanding to develop tests. These results reflected the findings of the current research. The proposed assessment methods meet the learning demands and prove the learning effectiveness.

One of the research of Dos Santos (2017) examines the planning and implementation of new methods into the educational process to meet individual students or group needs and to understand the factors that affect academic performance. The musical instruments such as the French horn require a musician to follow the correct position of the legs, mouth, chin, fingers, the rim of the mouthpiece, the ability to perform melodies in different ranges and play by ear (HEILWEIL, 2019). The proposed assessment methods considered all these factors and confirmed their effectiveness. The research revealed that the complexity of the discipline should be considered in assessment development (DOS SANTOS, 2017).

The other research (CALEGARIO *et al.*, 2017) analyses that teachers need to assess their teaching practices based on response, interest, motivation, preparation, participation, persistence and academic achievement. The results of such an assessment can be used to measure the effectiveness of the

educational activity. The current research obtained the same results.

Conclusions

The research found that the students showed low performance before the introduction of the proposed assessment methods with an average score of 20.63 points. The findings were interpreted as the average performance *Do not Meet Academic Expectation* with a standard deviation of 3.48 points. The pre-assessment results showed that out of 183 participants, 6.5% were ranked as *Satisfactory*, 27.9% were ranked as *Fairly Satisfactory*, 65.6% were ranked as *Do not Meet Academic Expectation*.

The post-assessment of academic performance increased after the implementation of the proposed assessment methods. The results improved from an average score of 20.63 points to 35.12. The academic performance was improved by 41.3%. The post-assessment findings showed that out of 183 participants, 3.3% were rated as *Very Good*, 13.1% were rated as *Satisfactory*, 48.6% were ranked as *Fairly Satisfactory*, 35.0% were interpreted as *Do not Meet Academic Expectation*. The average performance score was *Satisfactory* with a standard deviation of 3.12 points.

The paired t-test showed that after the introduction of the assessment methods into the educational process academic achievements of the French horn players improved significantly. The average score difference was 3.57 points between the pre-assessment and post-assessment results. The increase in the teaching effectiveness analysed using the Hake factor was 0.286. The result was consistent with a moderate increase in assessments of learning to play the French horn.

The proposed assessment methods helped teachers to evaluate the French horn techniques including (1) playing by ear, (2) Instrumental Scheme Processing, (3) range practice, and (4) introductory exam. The assessment methods can also be used as part of the standard assessment developed to familiarize

teachers with assessment procedures used for effective teaching. The assessment and teaching practices play a pivotal role in an effective learning process. The educators use the analysis and interpretation of the data to advise students and ensure an effective learning process.

The research can be used by educators to develop a learning framework and introduce the proposed assessment methods to the French horn learning classrooms. The findings prove the effectiveness of the developed assessment methods for the French horn players and demonstrate the positive impact on academic performance. The current research highlights the importance of a learning environment for musicians who play the French horn. Further research is needed to investigate this issue. The proposed assessment methods can be successfully implemented as part of educational programmes in the People's Republic of China and other countries. The proposed assessment methods should be introduced by an educational establishment to improve the assessment process. The French horn is not a popular musical instrument and its assessment methods are under investigation. The French horn is considered a complex musical instrument difficult to master. There is a need for further research in this field.

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Publisher

Federal University of Goiás. School of Music and Performing Arts. Graduate Program in Music. Publication in the Portal of Periodicals UFG.

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