

*Factors Influencing the Implementation of Formative Assessment as Perceived by  
Music Teachers: A Mixed Method Research in Macao*

Qi Zixiang, University of Saint Joseph, Macao SAR  
Serra Sofia, University of Alvaro, Portugal  
Tchiang Van Man, University of Saint Joseph, Macao SAR

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**Abstract**

This study explores the implementation and conception of formative assessment (FA) by middle school teachers in Macao (N = 57) and examines the factors influencing its implementation. A convergent mixed-method approach was applied to collect two types of data. Quantitative data were gathered through two questionnaires: 1) One questionnaire was adapted from Ramsey and Duffy (2016) to assess teachers' frequency of FA implementation, with content validity examined by three experts. 2) The other, Conceptions and Practices of FA Questionnaire (Yan and Cheng, 2015; Yan et al., 2022), assessed both personal and contextual variables of FA implementation. Qualitative data were collected through semi-structured interviews, and traditional inductive thematic analysis was applied for data analysis. The mixed-method results indicated that the following: a) Teachers had significantly positive instrumental attitudes, moderately positive affective attitudes and high self-efficacy towards implementing FA; b) Teachers had a limited understanding of FA, which might be attributed to inadequate professional training and overly theoretical content in such training; c) Variables such as affective attitude, instrumental attitude, self-efficacy and school environment showed a significantly positive correlation with the implementation of FA strategies. Variables such as environment environment, instructional environment, student characteristics and high-stakes assessments showed a highly positive correlation with some FA strategies. Only subjective norms were had a significant positive effect on FA implementation.

Keywords: Formative Assessment, Music, Factors, Macao

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## Introduction

The effectiveness of formative assessment (FA) on students' learning achievement has been confirmed in the literature (Black & Wiliam, 1998a; Hattie & Timperly, 2007; Shute, 2008). A theoretical framework of FA was proposed by William and Thompson (2008). This framework included five strategies: a) Clarifying and sharing learning intentions and success criteria, b) Eliciting evidence of students' learning, c) Providing feedback to advance the learners, d) Activating learners as owners of their own learning and e) Activating learners as learning resources for each other. In music education, some effective strategies of FA have been investigated (Green & Hale, 2009; Scott, 2012; Denis, 2018; Gallo, 2019; Martin, 2020; McPherson, 2022). In the educational context of Macao, FA has been introduced through documents released by DSEDJ, such as the *Music Guideline* (2017) and *Student Assessment System for Formal Education of Local Education System* (2020). Consequently, FA has played a significant role in the local music curriculum, known as 'the primary type of assessment'. Additionally, the factors influencing the implementation of FA by teachers have been explored in previous studies and can be divided into two types: personal and contextual. Thus, whether and how these factors affect FA implementation in the context of Macao is yet to be explored.

## Literature Review

### *Personal Factors That Influence FA*

According to Heritage (2007), even if teachers possess all the knowledge and skills required for FA, the implementation of FA may be hindered without the appropriate attitudes towards its role in teaching and learning. Conversely, teachers with a positive affective attitude towards FA are more likely to implement the method (Moss et al., 2013). Thus, an affective attitude towards FA is a factor that influences teachers' implementation of FA. Instrumental attitude has been defined as teachers' views on the value of FA in teaching and learning (Yan et al., 2021). Several studies have shown that the frequency of conducting FAs increases when teachers recognise the benefits of these assessments in tracking students' learning progress, informing instructional adjustments and promoting effective classroom activities (Brink & Bartz, 2017; Dixon and Haigh, 2009; Sezen-Barrie & Kelly, 2017). In contrast, a negative attitude towards the usefulness of FA may constrain teachers' practices to a superficial level, such as using rubrics only for a basic understanding of check-in classrooms but not analyzing the results further (Brown & Gao, 2015; Tebeje & Abiyu, 2015). Nevertheless, the relationship between instrumental attitude and practical implementation is not straightforward since other factors mediate the prediction of instrumental attitude on actual implementation. For instance, although many teachers conceptualize FA as an effective tool, its implementation remains random due to a lack of guidance (Crichton & McDaid, 2016). Professional learning programs can benefit teachers' FA practice by equipping them with the necessary skills and enhancing their positive instrumental attitude, thereby facilitating the implementation of FA (Crichton & McDaid, 2016; DeLuca et al., 2019; Ahmedi, 2019).

Self-efficacy is usually defined as teachers' confidence in their ability to implement and take control of FA (Yan & Cheng, 2015). Dixon and Haigh (2009) showed that self-efficacy mediates teachers' implementation, as teachers with strong self-efficacy about implementing FA would persistently try it even when encountering setbacks. As teachers perceive they have sufficient ability and skills to conduct FA, they implement it more frequently over time

(Brink & Bartz, 2017). Similarly, Karaman and Sahin (2017) revealed that teachers' implementation of FA was most strongly predicted by their level of self-efficacy based on their survey data. Overall, the higher the level of confidence they had about implementing FA, the more likely they were to implement it in teaching practice.

Support and encouragement from principals, school management teams and head teachers are also influential factors in promoting teachers' implementation of FA (Moss et al., 2013; Brink & Bartz, 2017). Moss et al. (2013) reported that when administrators had a deep understanding and appropriate attitude towards FA, their teachers were more inclined to take action. Additionally, administrators in schools can formulate policies that positively facilitate the implementation of FA (Crichton & McDaid, 2016). Prioritising FA in school-based policies allows teachers to better implement FA, as they can focus more on students' learning progress and support them in truly mastering the learning content rather than merely covering the curriculum (Brink & Bartz, 2017). Besides school leaders, policymakers and parents also have an impact on the implementation of FA.

### ***Contextual Factors That Influence FA***

Professional training promotes teachers' actual implementation of FA in classrooms (Wong, 2007). Numerous studies have shown that education and professional training can increase the frequency of FA practice by improving teachers' knowledge (e.g. assessment methods, subject content and teaching strategies) and understanding of FA (Crichton & McDaid, 2016; Hondrich et al., 2016; Koloi-Keaikitse, 2016; Saito & Inoi, 2017) or by guiding the integration of FA into curriculum design and classroom instruction (Wong, 2007). Although the effect of education and training is generally positive, the programme design is crucial (Yan, 2021). Deficient teaching and learning facilities in schools, such as computers, projectors, internet access, books, offices and printers, can also hinder the implementation of FA (Tebeje & Abiyu, 2015).

The instructional environment is related to working conditions, and these variables can impact teachers' FA implementation (Moss et al., 2013; Ahmedi, 2019). First, teachers have limited class time to elicit learning evidence and provide timely and specific feedback in their classes. Hence, some teachers may consider implementing FA to be consuming valuable class time that could be used for teaching curriculum content (Crichton and McDaid, 2016). Second, teachers working in larger classes are less inclined to practise FA due to the difficulties of class management and time (Brown & Gao, 2015). Third, external policies. As reported by Dixon and Haigh (2009), current international educational reforms promote FA, thereby increasing its implementation in schools.

Learner characteristics involve academic abilities, engagement in classroom activities, learning motivation, attitudes towards FA and student-teacher relationships that affect teachers' implementation of the method (Grob et al., 2017; Ahmedi, 2019). Student characteristics can determine the difficulty of implementing FA. Consequently, Yan et al. (2021) pointed out that students with higher levels of academic abilities, engagement, motivation and positive attitudes can simplify FA implementation for teachers.

The Chinese education system has long been dominated by the examination culture that considers assessment a tool of accountability and a standard of achievement (Brown & Gao, 2015). The underlying reason is that high-stakes examinations have been used to determine students' access to further education or employment opportunities. Consequently, the

widespread use of summative assessment (SA) impedes teachers' implementation of FA when various stakeholders (e.g. school leaders and parents) are more likely to agree with the goals of SA (Hamodi et al., 2017). Therefore, it is challenging for teachers to persist in implementing FA in classrooms if society does not endorse its goals and value (Deneen et al., 2019).

## **FA in Educational Contexts of Macao**

The concept of FA was first introduced in music education in Macao in 2017 following the release of the *Music Guideline* (2017) by DSEDJ. This document regulated FA as a prominent assessment type as opposed to SA. Although it defined FA, outlined its benefits and suggested several methods for its application, it left the implementation of FA to the discretion of teachers in different school contexts. In the latest regulation titled '*Student Assessment System for Formal Education of the Local Education System*' (2020), FA was defined as 'a type of continuous assessment that is carried out constantly in the course of learning and teaching and focuses on the learning process'. Importantly, this regulation stipulated that assessment should be a combination of FA and SA in Macao, with the former being the primary type of assessment (DSEDJ, 2020). Based on the evidence in Macao, the educational bureau has recognised the importance of FA in education and has, thus, published relevant documents and regulations.

## **Research Questions**

- RQ 1: What is the implementation and conception of FA by music teachers in Macao?  
RQ 2: Which personal factors can influence the implementation of FA in music teaching as perceived by teachers?  
RQ 3: Which contextual factors can influence the implementation of FA in music teaching as perceived by teachers?

## **Methods**

Mixed methods research promotes the strengths of both qualitative and quantitative methodologies (Creswell, 2003; Tashakkori & Teddlie, 2017). Using the combination method, the researchers can mitigate the weaknesses of each approach and view the problem from multiple perspectives. This mixed study applied a convergent parallel design. The researcher applied concurrent timing to implement the quantitative and qualitative strands during the same phase of the research process, prioritised the methods equally and kept the strands independent during analysis before mixing the results during the overall interpretation (Creswell & Clark, 2007).

Quantitative data were collected through a survey using a questionnaire. Part A of the questionnaire (Appendix 1) was adapted from Ramsey and Duffy (2016), while Part B was adapted from Yan and Cheng (2015) and Yan et al. (2022) (Appendix 2). The content validity was checked by three music education experts. Then, a pilot study (N = 20) was conducted to investigate the reliability of the questionnaire. After revision, the questionnaire was published via an online survey software. Subsequently, a total of 57 questionnaires were completed and returned. During quantitative data analysis, a descriptive analysis examined the frequency of teachers' use of FA strategies in Part A of the questionnaire. The Pearson's correlation coefficient ( $r$ ) analysis was applied to measure the correlation between the frequency of implementation of FA (in Part A) and the variables in Part B of the questionnaire.

Subsequently, a regression analysis was conducted to estimate the impact of the variables in Part B on the frequency of FA implementation (in Part A).

Qualitative data were collected through semi-structured interviews. For this interview, a stratified, purposive sampling was applied to represent the experiences of certain sub-groups: years of teaching, undergraduate major, highest degree obtained and whether teaching a choir. Nine participants were selected for the interview (Table 1). The first author collected and transcribed the interview data before conducting a traditional deductive thematic analysis using Nvivo 14.

No.	Name	Gender	Years of teaching	Undergraduate Major	Highest degree obtained	Whether teaching choir
1	Ms. A	Female	7	Music Education	Bachelor's degree	Y
2	Mr. B	Male	5	Music Performance (Vocal)	Master's degree	Y
3	Ms. C	Female	7	Music Education	Bachelor's degree	Y
4	Mr. D	Male	7	Music Education	Master's degree	Y
5	Mr. E	Male	8	Music Education	Master's degree	Y
6	Ms. F	Female	6	Music Education	Bachelor's degree	Y
7	Ms. G	Female	13	Music Performance (Piano)	Master's degree	Y
8	Ms. H	Female	9	Music Administration	Master's degree	Y
9	Mr. I	Male	10	Music Education	Master's degree	Y

Table 1: Interview Participants' Demographic Information

## Results

### RQ 1: What Is the Implementation and Conception of FA by Music Teachers in Macao?

The quantitative results showed the frequency of implementation of different strategies for FA within the framework of Thompson and Wiliam (2007). Specifically, strategy two was most frequently applied by teachers, followed by strategies three and one. In contrast, teachers were less likely to use student-centred strategies such as four and five.

According to the qualitative data, teachers may have a limited understanding of FA. When discussing the definition of FA, most teachers lacked confidence and had difficulty providing a complete definition. Additionally, the teachers had some misconceptions about FA. The first was that they tended to mix the function of FA with other types of assessment, such as diagnostic or SA. For example, Mr. E believed that FA should be conducted before the lesson begins for lesson planning:

Teachers need to understand the characteristics of the group they are facing, their sound conditions, and their learning foundation before a teacher starts teaching. At this point, a teacher must develop your teaching plan based on their FA, right?

Ms. F misunderstood FA as SA:

FA is to give certain goals for students at each learning phase. As for singing, students need to undergo some singing tests so that they can be assessed whether they can meet certain requirements of learning tasks.

Similarly, Ms. A echoed:

I believe that the purpose of FA is to enable students to review the content taught by the teacher within a certain stage, and meanwhile, the teacher can also understand whether the students have mastered it.

Additionally, teachers misunderstood the purpose of FA. For instance, Ms. A noted that implementing FA was to increase competition among the students. Such misunderstanding could make FA norm-referenced rather than criteria-referenced. Ms. G also believed that the purpose of FA was comprehensive:

FA can be self-referenced, norm-referenced or criteria-referenced. Through FA, students can be competitive with peers. Without peer comparison, students may misjudge whether their performance is good or poor. In addition, under equal learning conditions in the same class, can students surpass themselves?

Furthermore, some teachers mentioned the features of FA without completeness and specificity. For instance, Ms. G mentioned that FA should be implemented during the learning process. Ms. C described that the forms of FA were more diverse than traditional SA, allowing for a more comprehensive assessment of students' achievement and growth. However, this diversity was not specified further. Mr. D was one of the only two teachers who mentioned giving feedback to students in FA. Thus, we observed that most teachers ignored the provision of feedback as a crucial component in the complete loop of FA. Therefore, the so-called FA could only be conducted as several small SAs spread over time, according to Mr. I. The result is that such assessment still functions as an assessment of learning rather than an assessment for learning.

## **RQ 2: Which Personal Factors Can Influence the Implementation of FA in Music Teaching As Perceived by Teachers?**

The convergence of the quantitative and qualitative results showed that teachers had a positive affective attitude towards the implementation of FA. The descriptive data revealed that teachers had moderately high affective attitudes towards FA ( $M \pm SD: 4.79 \pm .978$ ). Specifically, teachers believed that FA is an enjoyable process that can create a better learning atmosphere. Furthermore, quantitative data revealed that affective attitudes have a significant positive correlation with all five strategies, with the highest positive correlation with the implementation of FA strategy two ( $r = .550, p = .000$ ). The qualitative data confirmed the quantitative findings, with most teachers indicating that they were more willing to conduct FA than SA.

The convergence of quantitative and qualitative results confirmed that teachers had a positive instrumental attitude towards the implementation of FA. Regarding the quantitative data, the descriptive statistics indicated that teachers had a significantly high instrumental attitude towards FA ( $4.93 \pm .866$ ). Thus, these assessments help teachers understand the students' strengths and weaknesses through feedback. Moreover, FA can promote the integration of learning and teaching with assessment, thereby enhancing teaching effectiveness. Notably, quantitative data showed that teachers' instrumental attitude showed a significantly positive correlation with all five strategies of FA, with the strongest correlation with strategy two ( $r = .578, p = .000$ ).

The qualitative results corroborated the quantitative data, indicating that teachers believed that FA implementation had numerous benefits in music classrooms. For example, Ms. H mentioned that conducting FA could help teachers better monitor student learning progress:

FA allows me to better capture the details of a student's practice so that I can monitor student learning. In day-to-day teaching, FA has a greater impact on student learning.

Mr. D further noted that implementing FA could help teachers utilise more effective teaching interventions:

The most powerful thing about FA is that students know in which areas they are good (or not good) and how they can improve their current work. Accordingly, teachers can analyse and adjust their learning strategy based on this assessment information. Otherwise, they might not capture students' current learning needs. If teachers only teach or rehearse repetitively, teaching efficiency will not increase.

Additionally, Ms. C mentioned that FA aligns well with the nature of the music subject:

I believe that FA is more suitable for the subject of music, especially for teaching singing. Such assessments can provide students with a better experience and are therefore welcome from a student's perspective.

In terms of self-efficacy, the quantitative descriptive data showed that teachers had moderately high self-efficacy regarding FA ( $4.75 \pm .903$ ). Nevertheless, teachers believed they could integrate FA into teaching ( $4.95 \pm .833$ ) and design appropriate assessment tasks ( $4.82 \pm .928$ ), while they lacked training in FA ( $4.49 \pm .947$ ). The correlation analysis revealed a significantly positive correlation between self-efficacy and all five FA strategies and the most positive correlation with the implementation of FA strategy five ( $r = .610, p = .000$ ). The qualitative data confirmed the quantitative findings, indicating that many teachers lack professional training in FA. Most teachers indicated that they had never participated in professional development on FA. Only a few teachers mentioned that FA had been briefly covered in some training courses they had attended previously. However, these courses only introduced the concepts or principles of FA. Although some of these concepts could be applied to other subjects, they may not be entirely suitable for music lessons. Therefore, the actual implementation of FA was still at the teachers' discretion:

In the earlier lectures I attended, FA was mentioned. Although it was explained, there were no specific instructions on how to implement it or practical guidance for teachers. Instruction in such lectures was given on concepts, frameworks or principles of implementing FA with limited explanations. Therefore, such lectures were always generalised with limited demonstrations related to music subjects. (Ms. C)

In the last training course I attended on FA, the lecturer introduced online assessment tools such as 'Kahoot', which usually use multiple-choice tasks that were more suitable for subjects such as Chinese, history or English, whereas skill-based activities such as singing in music lessons have very little place for such tasks. As a result, teachers are left to consider how to implement FA in singing classes. On the other hand, the workload of teachers in Macao is relatively heavy. So the problem is how much time teachers could invest in exploring the application of FA after the professional training is finished? (Mr. D).

According to quantitative data, subjective norms were the only variables that could positively affect teachers' frequency of implementing FA. Regarding qualitative data, teachers believed that parents strongly supported them in implementing FA in their teaching.

### **RQ 3: Which Contextual Factors Can Influence the Implementation of FA in Music Teaching As Perceived by Teachers?**

The quantitative data showed that the school environment has a significantly positive correlation with all five FA strategies and most positively with the implementation of FA strategy five ( $r = .545, p = .000$ ). The school environment included several variables such as professional training, materials, tools and technology that support FA. The pooled quantitative and qualitative results indicated that teachers lacked professional training in FA. The quantitative data indicated that teachers felt that the school did not provide adequate professional training on FA ( $3.88 \pm 1.211$ ). The qualitative data confirmed the quantitative findings while further indicating that almost all teachers showed a strong passion for participating in training courses on FA. Nevertheless, they had different needs when participating in such training courses. Mr. D hoped that the training courses on FA would include concrete examples from music or singing lessons. Some other teachers mentioned their confusion in implementing FA and hoped it could be addressed in further training courses. For example, Ms. F listed some of her questions, such as 'How can FA meet students' learning needs?', 'How can FA be better integrated into existing courses?' and 'How can the effectiveness of FA be improved within the current time frame of teaching?' Similarly, Mr. E mentioned that:

I am curious about the environment and conditions under which FA is implemented. Is it aimed at general music education in schools or extracurricular music education? Secondly, the effectiveness of its implementation.

Unlike other teachers, Ms. G reported that her interest was more about the cutting-edge academic development of FA:

I am more interested in the cutting-edge dynamics of FA because for the basic theories of FA, we can just buy a book to read. But for me, the direction for future academic development attracted me a lot.

The only contradictory convergence in this study was found to be related to materials, tools and technology. According to the quantitative data, teachers felt the school did not provide them adequate materials, tools and technology for FA ( $4.14 \pm 1.255$ ). In contrast, the qualitative data revealed that the teachers felt the inadequacies of the current technological support and resources for FA.

The quantitative data revealed that the instructional environment showed a significant positive correlated with the implementation of FA strategies two ( $r = .261, p = .050$ ), four ( $r = .533, p = .000$ ), and five ( $r = .545, p = .000$ ). The classroom environment included several variables, such as instructional time, class size and curriculum. The convergence of the quantitative and qualitative data suggested that teachers lack the time to implement FA. The quantitative data revealed that teachers reported insufficient time in each class to incorporate formative activities into lessons ( $3.88 \pm 1.255$ ), further confirmed by qualitative data. Mr. E commented:



A routine rehearsal lasts one and a half hours and should include a 15-minute break according to school regulations. Usually, the first half of the rehearsal may extend to an hour, so I have the problem of not having enough class time during rehearsals.

As a result, teachers had to spend extra time implementing FA due to the limitation of in-class instruction time, as mentioned by Ms. F. Such a phenomenon would inevitably increase teachers' workload. Ms. C echoed a similar idea:

I am used to using learning checklists in my FA. Therefore, in addition to preparing daily lessons, I also need to invest more time and energy in designing the learning checklists and even adapting them to the situation of different classes.

The quantitative data showed that teachers believe that students actively participate in FA ( $4.53 \pm .889$ ). The correlation analysis also showed a significantly positive correlation between students' character and the implementation of FA strategies one, two, four and five, with the most positive correlation with the implementation of FA strategy five ( $r = .633, p = .000$ ). Nevertheless, teachers also reported that students did not receive adequate training on FA ( $4.26 \pm 1.126$ ), which might explain why they cannot engage in FA activities ( $4.49 \pm .928$ ).

The qualitative data confirmed the quantitative findings that several student character traits (e.g. lack of autonomy, limited cognitive ability, obedience, attendance and student engagement) could hinder the implementation of FA. As commented by Ms. A:

Junior high school students have very little opportunity to practise on their own, so I usually apply a spoon-fed-only method to teach that focuses mainly on classroom practice.

Mr. D believed that the students' cognition was limited to effectively engage in the FA process:

I once guided students to reflect on their performance throughout a semester. When I reviewed the students' words, I found that students were very confused, for example, about how to practice effectively. The only option they suggested for further improvement was 'more'. Thus, it cannot be guaranteed that all students know what aspects of their own shortcomings they are aware of and that they use this feedback well and apply it to improve their future learning.

Mr. E mentioned students' obedience and attendance:

The state of the students is fluctuating and unstable. If students show a high level of cooperation, the effectiveness of FA will naturally increase. If, on the other hand, student attendance and regular practice cannot be guaranteed, this will also reduce effectiveness.

Additionally, Mr. B referred to students' engagement:

For students who are highly engaged in class and willing to collaborate with teachers, FA can be successfully implemented, and accordingly, their progress may be greater.

In contrast, for some students with low engagement in class, even if you give them feedback or suggestions, they may not be very pleased to hear or receive.

Additionally, the convergence of quantitative and qualitative results confirmed that teachers believed that preparing for public appearances and competitions could discourage teachers from implementing some FA strategies. Moreover, as teachers reported, students focused more on their grades than on the learning process.

## **Discussion and Implications**

In terms of personal factors, the combination of the quantitative and qualitative data revealed that teachers had strong positive affective attitudes, instrumental attitudes and self-efficacy towards the implementation of FA. First, teachers believed that FA is an enjoyable process that can create a better learning atmosphere. They also believed that FA improves the effectiveness of teaching and learning. While implementing FA, teachers believed they could effectively integrate the method into teaching and design appropriate assessment tasks. Nevertheless, they acknowledged their lack of professional training in FA. The quantitative data also showed that these variables showed a significant correlation with all FA strategies, as described previously (Moss et al., 2013; Brown & Gao, 2015; Brink & Bartz, 2019). The strongest correlation was found between instrumental attitude and FA implementation, followed by the correlation between affective attitude and self-efficacy and implementation. Subjective norms were the only variable that could positively affect teachers' frequency of implementing FA. The convergence of qualitative and quantitative data on contextual factors indicated that schools did not provide teachers with adequate training on FA. Teachers' willingness to participate in future training was high, but they had different learning needs (e.g. learning from concrete examples specifically in the context of music teaching, addressing current ambiguities or gaining information about the current academic development of FA). The convergence of qualitative and quantitative data also showed that teachers lacked instructional time to implement FA. Oversized class sizes significantly increased teachers' workloads and hindered the systematic implementation of FA. Such findings were consistent with Brown and Gao (2015) and Crichton and McDaid (2016). Regarding learning characteristics, although teachers reported that students can actively participate in FA, they mentioned that many students lack learning autonomy and cognitive skills; even obedience and attendance cannot be guaranteed for some students. Additionally, the combined qualitative and quantitative data revealed that the pressure of high-stakes performance or competition made it difficult for teachers to implement FA in the classroom.

As professional training can influence teachers' capability of applying FA and influence their frequency and quality of implementing FA, delivering effective professional training to teachers seems significant. Thus, this study suggested several ways to maximize the effectiveness of teacher training. First, professional training should clearly inform the concept of FA. As explored in this study, teachers may confuse the concept of FA with other types of assessment (such as SA and diagnostic assessment). Professional training tutors could instruct teachers to identify FA from several examples and explain the reasons for their choice (William, 2018). Additionally, teachers should be aware of the purpose and characteristics of FA (e.g. criterion-referenced rather than norm-referenced or self-referenced, continuous use during the teaching process and diverse assessors, including teachers, learners and peers). Importantly, tutors should provide teachers with effective practices for FA, specifically in music. These effective practices could include strategies for aligning assessment with objectives and incorporating FA into instruction, designing assessment tools (such as rating

scales, checklists, rubrics, guided listening worksheets and observation sheets), criteria-referenced performance assessment and self and peer assessment. As mentioned by teachers in this study, they needed more practical examples of how to apply these strategies in the context of teaching music. Also, Wong (2007) suggested that professional training should be changed from a teacher-centred to a student-centred, interactive mode. By applying such methods, teachers may have the opportunity to learn according to their experience levels and receive constructive feedback, which could motivate them to make changes in actual practice.

## **Conclusion**

The present study demonstrated that music teachers had significantly positive instrumental attitudes, moderately positive affective attitudes and high self-efficacy towards the implementation of FA in Macau. Nevertheless, the teachers had a limited understanding of FA, which might be related to insufficient professional training and overly theoretical content in this training. This study also investigated the factors influencing teachers' implementation of FA. Personal variables, such as affective attitude, instrumental attitude, and self-efficacy showed a significantly positive correlation with the implementation of FA. Only subjective norms had a significant positive effect on the implementation of FA. Moreover, a highly positive correlation was established between the contextual variables such as school environment, instructional environment, students' characteristics, and high-stakes assessments and the implementation of FA strategies.

## Appendix 1

	N	Minimum	Maximum	Mean	SD
I share the learning goal before students start working in singing class.	57	2	5	3.89	.880
The learning goal for the singing lesson is connected to local academic standards.	57	2	5	3.77	.945
I refer to the learning goal multiple times in the singing lesson.	57	1	5	3.46	.965
I share with students the criteria that will be used to determine their success in the singing lesson.	57	1	5	3.72	.978
I have students participate in developing the criteria for success in the singing lesson.	57	1	5	3.18	1.182
I provide demonstrations, models or examples of singing when I articulate the criteria for success.	57	3	5	4.44	.732
I ask questions within the singing lesson to assess the singing knowledge of the whole group.	57	2	5	4.07	.863
I ask questions within the singing lesson to assess the singing knowledge of an individual student.	57	2	5	4.00	.926
I make adjustments to instruction within the singing lesson based on student responses.	57	1	5	3.93	.997
I ensure the pace of the singing lesson to provide adequate wait time for students to respond to questions.	57	2	5	4.00	.802
I use follow-up questions when engaging students in discourse.	57	2	5	4.26	.791
I assess the singing of the learners by utilising live and in-class singing exams.	57	2	5	3.82	.966
I assess the singing of the learners by observing and judging their in-class singing performance.	57	2	5	4.14	.833
I assess the technical accuracy (e.g. pitch accuracy, rhythm accuracy, pronunciation, and vocal technique) when I assess the singing of the learners.	57	2	5	4.32	.985
I assess the musical expression (e.g. dynamics, timbre, phrasing, articulation, composer/stylistic intent, etc.) when I assess the singing of the learners.	57	2	5	4.09	.931
I provide a grade to the learners in my feedback as a number or percentage.	57	1	5	3.26	1.094
I tell students what they have not achieved with specific reference to their learning.	57	1	5	3.72	1.114
I tell students what they have achieved with specific reference to their learning.	57	2	5	3.74	.936
I specify a better or different strategy of singing for improvement.	57	1	5	4.14	1.008
I point out the objects that need improvement, such as a person, a vocal part or a whole team.	57	2	5	4.25	.851
I provide praise related to singing performance or instead of the learners at the self-level (i.e. ability or effort).	57	1	5	3.30	1.401
I give immediate feedback that is provided directly during the process of a repertoire.	57	1	5	3.88	1.135
I give delayed feedback that is shared several minutes after the completion of a repertoire.	57	1	5	3.98	1.061
I provide corrective information (such as verifying 'right' or 'wrong', providing the correct response, error flagging, or 'try again') in the singing class through explanation or demonstration.	57	1	5	4.18	.869

I offer commentary (such as hints, cues or prompts) that guides students to make independent observations and choices.	57	1	5	4.19	.811
I provide my feedback to the learners verbally.	57	1	5	4.39	.840
I provide my feedback to the learners in writing.	57	1	5	2.68	1.242
I show students what they need to do in order to improve their learning based on assessment results.	57	1	5	3.91	1.005
I guide students in acting on assessment feedback information to improve their learning.	57	1	5	3.93	.961
I use student self-assessment in singing lessons.	57	1	5	3.25	1.138
I guide students to identify strengths and weaknesses in their own singing performance.	57	1	5	3.79	.940
I guide the learners in indicating the location and dimensions of their weaknesses in their singing performance.	57	1	5	3.70	.906
I ask the learners to record themselves and then listen to these recordings to identify, articulate and correct mistakes.	57	1	5	3.42	1.253
I guide students to identify strategies that will improve their work.	57	1	5	3.37	1.096
I use evidence generated through student self-assessments to inform future teaching and learning.	57	1	5	3.42	1.133
I help students to develop self-assessment skills.	57	1	5	3.49	.984
I use student peer assessment in singing lessons.	57	1	5	3.35	1.142
I guide students to provide feedback to help peers improve.	57	1	5	3.54	1.103
I use evidence generated through student peer-assessments to inform future teaching and learning.	57	1	5	3.25	1.184
I provide the learners with sentence starters (e.g. 'I like the way you...', 'You did an excellent job of ...', 'I was surprised that...', and 'I do not understand') to prompt them.	57	1	5	3.68	1.198
I monitor the peer assessment process by circulating among the pairs, giving feedback, coaching and sequencing activities as necessary.	57	1	5	3.58	.999
I teach students to engage in peer feedback processes.	57	1	5	3.46	.946
Valid N (listwise)	57				

## Appendix 2

	N	Minimum	Maximum	Mean	SD
I like to apply FA.	57	2	6	4.82	1.002
FA is an enjoyable process.	57	2	6	4.68	.985
FA facilitates a better learning atmosphere.	57	3	6	4.88	.946
FA can offer an accurate appraisal of students' performance.	57	3	6	4.79	.840
FA can integrate learning and teaching with assessment.	57	3	6	5.00	.824
FA assessment helps students to understand their strengths and weaknesses through teachers' feedback.	57	2	6	4.95	.934
FA can improve the quality of teaching and learning.	57	3	6	5.05	.875
As far as I know, the following stakeholders believe that FA should be implemented: Officials of the Education Bureau.	57	3	6	4.93	.842
As far as I know, the following stakeholders believe that FA should be implemented: The principal of my school.	57	3	6	4.89	.838
As far as I know, the following stakeholders believe that FA should be implemented: Parents of my students.	57	3	6	4.70	.865
As far as I know, the following stakeholders believe that FA should be implemented: My colleagues.	57	3	6	4.81	.766
I can integrate FA into the teaching and learning process.	57	3	6	4.95	.833
I have received sufficient training to implement FA	57	2	6	4.49	.947
I can design appropriate assessment tasks for FA.	57	2	6	4.82	.928
My administrator supports and encourages the use of FA.	57	2	6	4.72	.940
My school provides me with materials/tools to support FA.	57	1	6	4.14	1.125
My school provides me with technology to support FA.	57	1	6	4.07	1.208
My school provides me with adequate training in FA practices.	57	1	6	3.88	1.211
The curriculum allows me to implement FA.	57	1	6	4.63	1.159
My class sizes allow me to customise instruction for all students.	57	1	6	4.02	1.369
The instruction time of each class is sufficient for integrating FA activities.	57	1	6	3.88	1.255
My students' attitudes towards FA support my implementation of FA.	57	1	6	4.42	.999
My students are engaged during my implementation of FA.	57	2	6	4.53	.889
My students have sufficient ability to participate in FA.	57	2	6	4.49	.928
My students have appropriate training to participate in FA.	57	1	6	4.26	1.126
High-stakes music competitions or performance preparation makes doing FA challenging.	57	1	6	4.40	1.116
How my teaching is judged makes implementing FA difficult.	57	1	6	3.82	1.338

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Students care more about examination scores than learning through FA.	57	1	6	4.67	1.107</td>
To me, helping students get high scores on examinations is more important than FA.	57	1	6	3.56	1.376
Parents' expectations regarding examination scores make FA implementation difficult.	57	1	6	4.14	1.217
Valid N (listwise)	57				

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