Learning music theorising through inspiration and curiosity. Insights from emergent lesson design in an upper secondary school in Finland

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Abstract
This study examines the learning processes that take place when upper secondary students apply and generate theories while drawing on their preferred music and writing songs of their own. One music theory teacher and two researchers collaborated to design an emergent sequence of lessons focusing on students' interests, questions and creative work. Interpretive and musical analysis of students' progress suggests that learning to theorise through modes and sounds from popular music was experienced as motivating, involved similar difficulties as traditional major/minor-based approaches, and resulted in original songs that the students enjoyed and were proud to perform for their peers.

Introduction

Music theory is sometimes experienced as the least motivating aspect of music education: difficult, abstract, and disconnected from creativity and characteristic production modes in real-world music (Burnard, 2012; Johnson, 2014; Gutierrez, 2018). However, the ability to conceptualise music can be of great help as students learn how to 'act as musicians' (Wiggins, 2015, p. 29) and begin to understand, evaluate, and respond to detail in music. As defined by Pavlicevic and Ansdell (2009), musicianship is 'a cultivated facility of musicality-in-action within sociocultural contexts' which 'creates relationships between people, things and concepts' (p. 362). According to Wiggins (2015), processes of learning to understand and use musical concepts are best approached in context and within a social constructivist frame where learning is interactive and interrelational, with the intention to 'foster and support learners' and teachers' capacity to create and understand music in the most meaningful and productive ways' (p. 35).

In Western music education, teaching of musical concepts through creative activity has been recommended by music educators from classic traditions such as Orff, Kodály and Dalcroze or 1970s avant-garde pioneers such as John Paynter and Murray Schafer (Rainbow, 2006) as well as recent advocates for learning music through producing (e.g., Ojala, 2017; Kuhn & Hein, 2021). Many scholars have attended to the ways in which students develop conceptual understanding in and through processes of songwriting (e.g., Bamberger, 2013a; Muhonen, 2016) or improvisation (Sarath, 2010), using both conventional instruments and digital resources (Freedman, 2013; 2017;

Bandlien, 2020). In creative processes, theoretical knowledge of music can be immediately applied in practice – and practical experience can support further learning that enables musical agency and decision-making, whether individually or through negotiations between members of a group (e.g., Fautley, 2005; Kaschub & Smith, 2009; Hopkins, 2019).

Negative experiences of learning music theory may be attributed to a perceived disconnection between the music that is analysed and played during lessons and the music that students recognise and enjoy (e.g., Green, 2008, pp. 89–90). Ojala (2017) refers to this disconnection as the 'gap between the sound of the classroom and the sound of the real world' and points out that young learners are quick to recognise a lack of authenticity; in the words of one student, 'it decreases the credibility of the track' (p. 45). Hein (2016) argues that the tradition of opening beginner-level theory classes and resources with the major scale has the effect of immediately removing the musical sound from electronica, hip-hop, rock and pop, where the minor pentatonic scale and the Mixolydian mode are more predominant. Composing in major, one of Hein's (2016) students complains, 'makes everything sound like "Happy Birthday To You"'. In addition, the tonal idioms of many musics that are a part of students' daily lives cannot be adequately conceptualised in terms of functional harmony (Tagg, 2014–2020).

Students and teachers who have extensive access to websites and digital platforms can now listen to an enormous variety of musics from all over the world. This expansion reinforces the importance of developing not just the ability to understand music through a preconceived theoretical lens ('learning music theory') but also the ability to apply and generate theory through real-life experience. Following Wiggins (2015), we see educational and scholarly advantages in talking about how students learn to actively 'theorise' and 'conceptualise' music. For the purposes of this article, we define 'theorising' as the active processes of students developing their own ideas and theories about the structures, forms, and functions of music and testing them through active application and reflection. Following Green (2001, pp. 139–140; 2008, pp. 100–102), we presuppose that students will be more inspired to explore and learn about music of their own choice. We recognise that working in this way can be demanding for teachers, who will need to step out of the comfort zone of a predetermined, well-ordered syllabus of major/minor-based music theory with rules from the common practice era, and venture instead into an open world of exploration, ambiguity, curiosity and surprise (Davidson & Lupton, 2016; Björk et al., 2021). This study therefore aims to contribute to knowledge about processes of learning to actively theorise music within emergent and partly nonlinear educational designs in contexts where most students do not have a strong background in formal music education.

The project we report on here was one attempt to take on the challenge of openness along with the other issues discussed so far: possible negative attitudes towards music theory among students, the reported gap between the sound of the classroom and the sound of the real world, and the equally well-documented need to make conceptual learning in music meaningful and interrelational. One experienced music theory teacher and two researchers collaborated to design an emergent sequence of lessons that would combine four elements: inspiration from any music that students were interested in, theoretical conceptualisation, practising, and creating music. In addition, we reserved significant amounts of time for students to ask questions. Studies from science education suggest that questions generated by students enhance learning and help teachers assess what, how and when they need to teach; however, this potential is rarely tapped as much as it could be (Chin & Brown, 2002; Chin & Osborne, 2008; Aflalo, 2021).

Purpose of the study

The aim of the study was to examine learning processes that take place when students are encouraged to apply, test and generate theory while drawing on music that they are interested in and writing songs of their own. More specifically, we asked:

1. How do upper secondary students experience learning to theorise music in the context of songwriting in modes that are used in their preferred songs?
2. What can teachers learn from the questions students ask about music theory in connection with songwriting?

Drawing on previous research, we made four decisions in advance: (1) to start from music that students liked and wanted to explore; (2) to actively encourage students to ask questions; (3) to adapt the content of the lessons to students' questions, the emergent learning process, and multi-level teaching in a potentially heterogeneous group, and (4) to be open about our intent to increase the students' interest in music theory.

Context of the study

The research was conducted in Finland, where national curricula for compulsory education (grades one to nine), general upper secondary education and publicly funded extracurricular music schools have all been reformed in recent years to reflect an increased emphasis on creative activity in music education. For several decades, critique has been voiced against the practice of teaching music theory separately from performing or creating music (Kuoppamäki 2015, pp. 28–29). The music theory teacher in the research team shared this worry, since many of his tertiary-level students did not seem to be able to fluently connect theoretical concepts with practical music-making at the start of their studies to become professional musicians.

The participants were 16 first-year students, all 16 to 17 years old, in an upper secondary school that is also the teacher training school affiliated with the Faculty of Education of the Åbo Akademi University in Finland. The nationwide network of Finnish teacher training schools (Finnish Teacher Training Schools [FTTS], n.d.) that are affiliated with universities play a central role in the research-based Finnish teacher education system. These schools follow the same national curricula as any other Finnish school, but they are also responsible for most of the guided practice during teacher education and expected to provide context for research conducted at faculties of education. Given the Finnish view of teacher professionalism as grounded in research-based knowledge, collective meaning-making and shared professional ethics (Välijärvi & Heikkinen, 2012, p. 40), teachers at teacher training schools hold master's degrees or doctoral degrees and are expected to collaborate regularly with researchers and/or conduct research of their own and to keep up with developments in their subjects, subject-matter didactics, and education in general (Pollari et al., 2018). For students, being taught by preservice teachers or participating in national and international research projects in an environment where innovative education practices are developed are therefore familiar and continual aspects of their life in school.

The class was selected from the school's specialisation programme which allows students to spend about 20% of their time learning music, a total of approximately 400 hours over 3 years. Some of the students in the programme take additional, extracurricular lessons at a local music school, where the subject *Basics of music* includes music theory, solfège, ear training and general music knowledge; this class is usually taught during designated group lessons once a week, separately from main instrument lessons or ensembles. By allowing the music theory teacher from the research team to teach one course module of 16 hours, the students' own teacher provided a space to conduct the study within the overall framework of the programme and in the rooms where classes normally took place, with the intention of enhancing learning for everyone involved: students, teacher and teacher-researcher team.

In preparation for the research and with the purpose of gaining a better understanding of Finnish upper secondary students' experiences of learning music theory, the team conducted another study (Björk et al., 2021) at the specialisation programme, generating data through workshops and interviews with students from a second-year group. The initial study confirmed

our presupposition that there would be substantial variation in students' previous knowledge of music theory. Moreover, two students told us that in mixed-ability groups, they sometimes felt too intimidated to ask questions, and that their instrument skills made others think they 'knew' more than they did. Going back to basic questions about keys and chords entailed the risk of losing face and courage, not just because other students were more advanced, but also because questions and answers might reveal major misunderstandings, or that 'you don't know things you should have learned ages ago'. These comments were in line with previous studies on students' questions as mentioned above, and they also resonated with research suggesting that finding a balance between theoretical and practical skills can support young musicians' musical creativity and help ensure that they 'are not limited in the future by an inability to participate in a musical experience that is either formal or informal' (Hess, 2020, p. 450). The dialogues with the students contributed to our decision to do our best to facilitate an open and safe atmosphere in the classroom and to communicate that we valued their questions highly both for the learning process and for the research.

Generating data

Over a period of eight weeks, the music theory teacher (Granfors) from our team taught a sequence of 16 lessons, 70 min each, while one researcher (Björk) observed the lessons and took notes. The second, visiting researcher (Ruthmann) joined the team for one lesson, teaching part of the class and observing the rest of the time. The learning goals of the 8-week sequence focused specifically on use of scales, modes, basic chords and chord extensions. Researchers and students did not know each other before the project. The study was conducted in accordance with the national guidelines for research in the humanities and behavioural sciences in force at the time of the study (Finnish National Advisory Board on Research Ethics [TENK], 2009). Written permission to conduct the study in the school was obtained from the school principal. Prior to the course, one of the researchers (Björk) and the teacher visited the class to describe the project, its aims, and the principles of autonomy, privacy and data protection, and to give the students the opportunity to ask questions and take the time to decide whether they wanted to participate in the study. All students were over 15 years of age and therefore free to provide autonomous informed consent (TENK, 2009, p. 7) whether orally or in writing (TENK, 2009, p. 5). The students were assured that their grades for the course would be based on their active participation in the songwriting process (75%) and their scores in a final individual oral exam about theoretical concepts (25%), not on their activity as research participants. The researchers and teacher in the team continuously emphasised that they were there to learn how to teach better, and that the students' questions, frustrations, insights and comments were appreciated as valuable information on how the teaching and learning process was going, not on how individual students might expect to be assessed (Chin & Osborne, 2008; Burnard & Björk, 2010).

Whilst practising to theorise together with peers and with the teacher certainly contributed to the students' understandings of the course content, those lesson activities were not graded. It was possible to take the course without taking part in the study, since data from students who would prefer not to participate could have been excluded from analysis and their questions and comments not quoted in the report. However, all students provided verbal consent to take part, some of them actively expressing appreciation for the purpose of making music theory a more motivating part of music classes: 'Music theory is the dark side', 'not my favourite'.

The researcher approach combined features of collaborative lesson design, lesson study and action research (Hanfstingl et al., 2019), following the same pattern for each of the 16 lessons: planning, teaching and observing, reflecting, and deciding what to focus on in the following lesson. In line with the iterative, needs-based, emergent design, decisions about how to proceed were taken both during and between lessons, sometimes together with the students. On two occasions,

one in the middle and one at the end of the sequence, the students' own teacher observed the lessons and participated in the team discussions in order to stay informed about the progress of the study and contribute to the research team's evolving understanding of students' experiences and questions. However, he avoided constant presence in the classroom; this strategy was consciously chosen to maximise the chances that the students would feel comfortable asking questions and not worry about being assessed by him while they were in the process of learning. The researcher (Björk) who observed all lessons took handwritten notes, aiming for minimal intrusion, occasionally answered brief questions from students and acted as a critical friend for the teacher (Granfors).

Modes of working alternated between (1) whole-class instruction with questions and answers, using a piano, audio equipment, digital applications and a whiteboard; music recordings for examples and inspiration were selected both by the students and by the teacher, (2) collaborative songwriting in self-selected small groups (similar to the 'friendship groups' described by Green, 2008, pp. 121–122) with and without the teacher's help, and (3) group performances in front of the class, followed by comments and discussions with teacher and peers. The students also worked on their songs both individually and in their groups between lessons. Basic instructions for songwriting in different modes were given in the whole-class setting, where the teacher drew up scales, modes and degrees on the whiteboard and explained how to use the chords and characteristics of each scale or mode, progressing quickly from diatonic major to pentatonic scales, blues, the Dorian mode and the Mixolydian mode. In addition to written exercises, the lessons regularly included ear training through singing scales, modes and melodic motives over chord progressions played by the teacher, focusing on becoming familiar with different sounds and learning to hear the root.

The music programme had access to a main music classroom, a computer class, a studio and three practice rooms, allowing smaller groups to isolate and focus. The students created their songs using pianos, traditional rock band instruments and online digital resources (YouTube, Hookpad, aQWERTYon and Ultimate Circle of Fifths), and they frequently recorded their own playing and singing on their phones. Notation was not required for songwriting, but lead sheets with lyrics and chords were produced and the students rehearsed their songs in order to eventually be able to perform them from memory. In the exam, students were expected to know how to notate key signatures, scales, chords and chord extensions.

Data consisted of lesson plans, researcher field notes including a collection of 141 specific questions asked by the students, notes from the researcher team's reflections between lessons, recordings and lead sheets of songs that the students created, results from the oral exam, and responses to an anonymous online questionnaire given to the students at the end of the course.

Data analysis

In order to gain an understanding of the students' learning processes, we combined several interpretive strategies: continual observation of and discussion about what students did, said, played and sang during the course and the exams; musical analysis of the songs they created; and after the course had ended, thematic analysis of field notes including students' statements and questions. The interpretive work was sometimes rather straightforward (are the students using the flattened seventh in the Mixolydian mode?) but sometimes had a more hermeneutic dimension (what does this question tell us about how these students are attempting to make sense of a larger theoretical system?).

Researcher field notes were searched for student statements that described lived experiences of learning, theorising and songwriting. Notes from the researcher team's reflections were searched for instances of decision-making regarding lesson design based on students' questions and perceived progress during the previous lesson(s). The questions were categorised thematically on

Table 1. Prominent theoretical features (scales and modes) of songs chosen by students

Song	Artist	Prominent features
Pride And Joy	Stevie Ray Vaughan	12-measure major blues, Eb, Ab and Bb Mixolydian, dominant seventh chords with the flat 7th of each Mixolydian scale
Good Times Bad Times	Led Zeppelin	Mixolydian scale structures with several tonal centres, for example, E Mixolydian, F# Mixolydian
Heart Shaped Box	Nirvana	G# natural minor, G# Dorian
Be Alright	Dean Lewis	G# natural minor
Done For Me	Charlie Puth	B minor, minor pentatonic motives in the melody, occasionally A# from harmonic minor dominant
Natural	Imagine Dragons	D harmonic minor, elements of A Mixolydian b9b13 during long sections, nearly enough to establish it as another mode
Something I Need	OneRepublic	G major, traditional major/minor logic
Growing Pains	Alessia Cara	E major and C# pentatonic minor. B major chord (dominant in E major) avoided until the chorus
Mr Crowley	Ozzy Ozbourne	Dorian mode present in the intro. D natural minor, pentatonic motives. Occasional chromatic notes in the licks give Phrygian and Dorian flavours
Higher	Erik Grönwall	F# minor, A major 'four-chord song' (IV-I-V-vi) character in the chorus, frequent pentatonic motives using shared notes in F# minor and A major
I'll Be Fine Somehow	Benjamin Ingrosso	Tradition analysis would be based on F# major; however, a long sequence with Bmaj7 establishes a clear Lydian sound.
Bad Girls	MKTO	F Dorian. Fm Bb7 vamp establishes a Dorian sound in the verse and the chorus. Db chord from F natural minor appears in the bridge. C7 in the bridge might be heard as tending towards F melodic or harmonic minor.
Nancy Mulligan	Ed Sheeran	E Dorian and E natural minor. E Dorian intro, then E natural minor. Pentatonic motives. Inspiration from Irish folk music. VII in E minor has a dominant-like function. Chorus G major.
Eastside	Benny Blanco, Halsey & Khalid	F# natural minor, four-chord song but often no obvious tonal centre.

the basis of musical content and also compared to established classifications of student questions (Bloom et al., 1956; Scardamalia & Bereiter, 1992; Anderson et al., 2001). The songs that students produced were analysed for evidence of ability to use a variety of modes. The outcome of individual exams was used as part of our evaluation of how well the course aims had been accomplished. Finally, we checked students' written feedback from the online questionnaire.

Learning through inspiration and curiosity

The following themes illustrate how inspiration and curiosity became central to learning and teaching processes taking place on a continuum between what had been planned and what emerged during students' work with songs and theoretical concepts.

Beyond major and minor: students' musical world

Table 1 summarises features of the songs that students wanted to share in the beginning of the course when asked to select music that they liked. The music ranges from songs by legendary rock

Table 2. Student questions

Question theme	Examples
Tones and semitones	A tone is like you jump two steps…semitone, then it's right next to it?
	Is a whole tone when you go from line to line [on the staff]?
Sharps and flats	What is the difference between a sharp and a flat?
	Can there be both sharps and flats in the same scale?
	Isn't sharpened D the same as flattened E? Can I choose if I write it in one way or another?
Notation	What side [of the note] should the sharp be on?
	Are the staff lines the same as the guitar strings?
	Can we put [the sharps of the key signature] in random places?
Chords	Why do you write in the 7?
	What is the difference between 7 and Maj7?
	How do you know when you need the b5?
Keys	What is a flat key?
	Didn't you say [we could use] any scale? [Teacher: I said any key.]
Scales	In A major, did you put C sharp or D flat?
	So is that *always* how it is in a major scale?
	So there isn't Dorian minor or Dorian major, there's only Dorian?
Note names	If you use H [instead of B], does it work the same way?
Etymology	Does this have anything to do with Ionic and Doric columns?

bands such as Led Zeppelin and Nirvana to hits that were on top lists that autumn. Alternative descriptions are certainly possible, and our analysis does not do justice to all defining features of the songs, such as sound, groove or lyrics. The learning goals of the course were limited to keys, scales, modes and chords, but already here, we can see that with few exceptions, a traditional major/minor-based beginner's syllabus with dominant-tonic functional logic would have been insufficient in order for students to gain an understanding of how to create music that would sound like songs that were important to them.

Students' questions as educational potential and challenge

The questions students asked ranged from confirmation and basic knowledge questions ('Is this a G?') to application and analysis questions ('Is the seventh degree always flat, compared to a major scale?') and could have been classified according to a hierarchy of 'higher' and 'lower' order of thinking. However, we had decided to treat all questions as important and necessary in class and preferred to hold on to this mindset also during analysis. Musical classification also seemed like a more adequate and helpful way of categorising the questions than a generalising taxonomy and more holistic than breaking them up into distinct cognitive processes. Aside from procedural questions ('Is this material included in the exam?'), we identified the categories described with examples in Table 2; some of the questions about notation might fit more than one category.

Seemingly basic discussions such as 'What is a flat key?' sometimes opened doors to entire systems of understanding. The teacher remarked after one class that he had felt 'like a clay pigeon for target shooting', an experience that illustrates the challenge for teachers who adopt an

approach that is at least partly nonlinear and emergent and builds on students' curiosity. Any question could potentially trigger a need for further, elaborate explanations, requiring the teacher to improvise and draw on broad and substantial subject-matter knowledge. 'What is a diatonic scale?' constitutes one such example. After attempting to provide a simplified explanation and answering a blare of follow-up questions from students ('Can diatonic have both black and white keys?', 'What is *not* a diatonic scale?'), the teacher-researcher team was able to look at a formal definition with beginners' eyes, realising its stunning complexity with knowledge nested inside knowledge:

> Based on or derivable from an octave of seven notes in a particular configuration, as opposed to chromatic and other forms of scale. A seven-note scale is said to be diatonic when its octave span is filled by five tones and two semitones, with the semitones maximally separated, for example, the major scale (T–T–S–T–T–T–S) (Drabkin, 2001).

Access to understanding could be blocked if the student lacked just one necessary element, much as a key will only fit a lock if all pins are right. Taking heterogeneity in the group into account was therefore crucial:

> Teacher: These students have different backgrounds. One has taken graded music theory exams. One understands things on the instrument, but not on the paper. One knows nothing at all. The curtain will go down for those who don't understand if I don't meet them [where they are] when I am teaching.

The team made a decision not to require conventional terminology immediately: students' references to *dots*, *blobs*, *eggs* and *hashtags* were welcomed as we moved together towards conceptual understanding (see e.g., Bamberger, 2013b, pp. 96–97; Wallerstedt, 2013). Multi-level teaching was possible because questions were sometimes answered by the teacher, sometimes by other students who were able to find a helpful way of explaining in the moment: '[See, in a scale], you have seven keys that you are allowed to press . . .'. The goodwill among peers in a distinctly heterogeneous group became quite tangible as they shared knowledge, insights, parallel examples from other disciplines and expressions of emotional support:

> Student 1: Are flats always on the left side and sharps always on the right side?

> Teacher: No, they are always both on the left side.

> S1: But you said . . .

> T: But that was about the note stem.

> S2: An accidental is valid as long as it is in the same measure. But if it's a key signature there can be a natural.

> *Explanation by the teacher.*

> S3: These are like those . . . exponent rules [in algebra].

> S1: Do we have to know this? Why can't you just flatten . . .

> S2: The flat sign is valid for the whole measure.

S1: S2, you are a genius.

S2: S4 taught me this.

S3: That square [the natural sign] works like 'reverse'.

Learning to exist in tension with partial and preliminary understanding

Exploring the world of scales, modes and degrees, how they are notated and how they can be used may seem quite overwhelming to a beginner. We learnt that it was important to find ways of answering students' questions without creating cognitive overload: not feel obliged to provide something like 'the whole truth', but to teach enough for something to work in a particular context, and to complement later as needed. This approach also encouraged an epistemological stance where 'music theory' could be experienced not just as something predefined, delineated and well structured to be mastered, but as an open area where new understandings and theorisations could emerge. The key was to create a pedagogical space where students and teachers could live in dialogue with a complex phenomenon involving tensions, questions and ambiguities (Biesta, 2012, p. 96; 2017, pp. 64–65). Being able to tolerate that there would not be an objective, complete picture to be grasped at once required patience and mutual encouragement from students and teacher:

Student: I will get this later.

Teacher: You need to do it in order to get it. We are going to write songs.

Students seemed to realise that they had to start somewhere and trust that temporary and preliminary understanding would suffice for creative musical activity. They coped using encouraging, comforting self-talk and long-term perspective ('I don't have to understand everything now'), often involving philosophy and wry humour ('Maybe I will understand this later, when I'm older', 'I'm pretty sure Shawn Mendes didn't think: well this has to be Dorian!') and energetic banter in moments of success ('Shit, A, we are nearly geniuses!').

Teaching beyond a traditional major/minor-based syllabus: how to create a sound

From the beginning, we worked with learning and experiencing what a mode can express, comparing sounds with colours that artists use and combine on a canvas. Knowing what would bring out the particular character of each mode was key to subsequent independent group work where students could make decisions of their own, work with and verbalise emotional qualities in their music, as illustrated in this dialogue between students and the visiting researcher (Ruthmann) about writing in E Dorian:

Researcher: How would you explain Dorian?

Discussion about tones and semitones.

Student: It's happy minor.

R: It's minor but it has a little bit of happiness. Where?

S: Don't know.

S: We just took the chords that were on the board.

R: Where do you start to hear the happy? [Playing] I'll switch to natural minor. Sad and sad.

Bring out the sixth note if you want to bring out the Dorian. Which of these chords has a C#
in it? Let's build it. [. . .] You can bring out A and F# minor to bring out the Dorian. Or play
around with C# in the melody. Did you notice what I am doing now?

S: You're skipping the C#.

R: And what happened?

S: It sounds sad.

R: It sounded sad. [In the E Dorian mode], make sure your melody has the C#. It's an
interesting technique, or another kind of shading.

S: Kind of 'happy-sad'.

R: That's the beauty of theory.

Once the students were comfortable writing scale degrees, they quickly understood how to use
them in a new mode. Instructions for composing in the Mixolydian mode took less than ten
minutes:

Teacher: We are going to write one last song.

Student: Mixolydian, what's that?

S: You'll have to teach us!

*The teacher writes a Mixolydian scale from C on the whiteboard, points out the flat seventh
note, highlights I-IV-v and reminds students that v is minor.*

T: Now, how can you find out what chords you have in Mixolydian in any key? You can go to
Hooktheory.

S: You can go to aQWERTYon.

T: Where can you find Mixolydian music for inspiration?

S: Online.

T: So, are we all set to go then? I'm here and I can answer questions.

An example (Figure 1) from one of the songs created by a student group during this session
features a four-note chorus melody over a C Mixolydian baseline.
   This and other examples of songwriting in the Mixolydian and Dorian modes suggest that the
process was not experienced as inherently more difficult than writing in a major key. The central
skill for the students was to be able to use scales and scale degrees to create the sound they wanted.
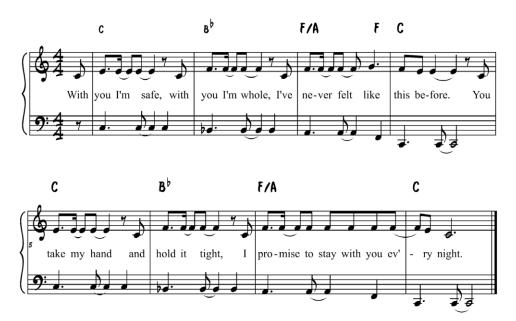
Figure 1. Excerpt from song in the Mixolydian mode composed by a student group.

'We learnt that it's actually possible'

There were moments of hesitation and frustration during the learning process. However, the fast-paced, creative, collaborative activity in the student groups seemed to override anxiety. Songwriting could begin with a chord progression, improvisation, a melodic motive first hummed or played, or a lyric line, '[enabling] the learner to enter from a variety of starting points' (Wiggins, 2015, p. 21) and giving each group member the possibility to contribute. Again, peer support and humour turned out to be crucial in teacher-led sessions at the whiteboard and during subsequent writing exercises:

> Teacher: Listen up everyone, important information! Do you have your circles of fifths? So you know if you should use sharps or flats?
>
> Student: But is there any difference?
>
> T: This is how you can see what family it belongs to.
>
> S: I need mental and psychological help.
>
> S: The songwriting stuff, I get that. But this . . .

Students motivated each other to stay with the tasks and helped each other believe that the concepts were learnable:

> S: I'm not going to learn these 'whole whole half' [for all the modes].
>
> S: If you keep going, if you start in another place, you count in the same way.
>
> S: A-haa! The penny is dropping.

Triumphs were shared between students working together:

> S: I'm getting it!

> S: Me too, it's totally insane!

Behind the joking tone in this exchange, there is possibly a reference to previous experiences of music theory as hopelessly opaque and only accessible to 'geniuses', and sincere surprise at the moment of insight. Students with more experience highlighted creative agency when they encouraged their peers, motivating each other to understand not only the concepts but also their usefulness: 'It depends how you want it to sound'. As the students in one group performed one of their first songs in the Dorian mode in front of the whole class, they were met with cheers and impressed comments: 'You should *record* that song!' and quipped back, 'We are now a two-hit band'. In this moment as well, behind the wisecrack and self-deprecation, there seemed to be a shift in the students' musical self-image and confidence.

> Teacher: Wow! Wow. So, what did you learn?

> Student: That we are really good [laughter].

> S: It was stressful, but it worked out well. We wrote some of it during the night.

> S: We learnt that it's actually possible [to make our own songs].

Pride and joy

At the end of the course, there were graded individual oral exams, administered only by the music theory teacher (Granfors), and non-graded band performances which the teacher and one researcher (Björk) attended. In the oral exam, each student was asked to write and explain a key signature, a triad, a seventh chord and a mode. According to the teacher, the students expressed excitement rather than anxiety as they waited for their turn:

> Teacher: Is this like waiting at the dentist's?

> Student: No, it's like waiting for Santa Claus.

The teacher reported that everyone had passed easily, receiving grades between 8 and 10 on a scale of 4 to 10. For the band performances, the students asked to bring in friends to listen; a reminder for the researcher team that validation from peers (McPherson et al., 2012, pp. 199–200) was probably at least, or more important than the exam grade, as illustrated by researcher notes:

> *Performance day. 30 minutes preparation. Students go and get their friends from other classrooms and from the visual arts programme.*

> Student: Is this all the audience we got?

> *Pride And Joy by Stevie Ray Vaughan opens the set. Then a song in E Dorian. Three students at the mics. One is wearing a leather skirt and a blonde wig. One student is at the piano. Chorus: one student is harmonising above the melody. High-quality performance.*

S: So what do you think?

Students in the audience: Really good. Damn good.

S: You can listen to our development. We wrote three songs and one was not supposed to be about love.

Student in the audience: That was so good!

Student in the audience: [Like] Spotify.

The exuberant atmosphere during performances suggested that 'pride and joy' was indeed a suitable opening theme. Malloch and Trevarthen (2009, pp. 6–7) describe dynamics along a 'pride-shame continuum' and a 'separation-interconnection continuum' as characteristic of human musical communication. Students had moved from possibly feeling embarrassed about their knowledge gaps, hiding them from the teacher and the group, to collaborative learning, daring to ask questions in a whole-class setting, using their knowledge to create music of their own, and performing their songs in front of cheering, appreciative friends. One student told the teacher that until the course, he had felt like an outsider in the class because of his lack of theoretical knowledge. At the end of their eight weeks together, he said that he now felt both comfortable and included.

Student response

Ten of 16 students completed an anonymous electronic questionnaire sent to the whole class after the course had ended and grades were given. All respondents reported increased knowledge and an increased interest in music theory (between one and three points for both on five-point 'before and after' scales). The number of responses is too small to draw conclusions; however, more evidence pointed in the same direction, including feedback that students had shared with their main teacher. 'They really liked [the course]', the teacher said, adding that the most advanced student in the class had remarked that 'this is how it should be'. Learning motivation was also illustrated by students working on their music between lessons ('we don't need a break'), during evenings and weekends, and during autumn recess. Written response (Table 3) highlighted positive experiences of creative work connecting theory and practice, satisfaction from learning and understanding, and pleasure from being able to use new theoretical knowledge and skill.

Conclusions

In this study, we examined learning processes that take place when students are encouraged to apply, test and generate theory while drawing on music that they are interested in and writing songs of their own.

1. How do upper secondary students experience learning to theorise music in the context of songwriting in modes that are used in their preferred songs?

Analysis of the list of favourite songs compiled by the students during their first lesson confirmed that the tonal characteristics of the students' preferred repertoire expanded beyond traditional major and minor. As the course progressed quickly to other modes, by the third lesson, students with very limited background in music theory were able to apply theoretical knowledge in

Table 3. Student response

What was most inspiring to you?	Free reflections about the course
– Getting to use it in practice!! – Songwriting – Getting to put down music theory in practice – Exploring the scales in practice – Seeing what you can use music theory for in practice – All the new chords I learnt – That it's so cool to learn the basic systems for music – Listening to and making songs, learning how you change keys and make chords – To create own songs – To write songs and use theory in practice	– Very good course. A little vague at times but especially in the end when we had the papers and really practised, I understood everything. Finished the course with the feeling I had understood what we did. – It was a new and fun way of learning music theory. The 'Aha!' moments were the best. :) – It was quite fun to get to write songs and learn what music theory can be used for. – Super good course where you learnt a lot! Clearly more fun than sitting in front of a computer/paper and write all the time. – The course was very good, I liked what we did – More fun than expected – More fun than I thought it would be :)

order to compose songs that they and their peers liked: 'If this was on Spotify, I would listen to it'. There were struggles, but with support from the teacher and from the other students, all participants acquired the theoretical skills they needed. There was pride and joy in performances for peers as well as during exams. Students' response during lessons and in a feedback questionnaire indicated that they had experienced learning and songwriting as relevant and enjoyable, and that their interest in theorising music had increased. In addition, students who had previously found music theory difficult said that they now felt surprisingly confident. One participant mentioned that he also felt more integrated in the group. For the students, moving their understanding into the social world through performance (Pavlicevic & Andsdell, 2009, p. 386) also seemed to move the music outside of the school context into the real world, with widely used streaming platforms as benchmarks.

2. What can teachers learn from the questions students ask about music theory in connection with songwriting?

The wide array of questions revealed that there were major gaps in knowledge that students had not identified as important or had been hiding from teachers and peers, perhaps out of embarrassment, 'we should have learnt this a long time ago'. In line with previous research (Chin & Brown, 2002; Chin & Osborne, 2008), establishing a classroom atmosphere where asking was actively encouraged helped teachers open a dialogue around students' knowledge, clear up misunderstandings and plan the sequence of lessons. As educators, we increased our empathy and understanding of how complex and intimidating music theory can seem and saw the importance of giving concise explanations that did not overwhelm the students. Learning to use and name concepts took time for most participants, and the challenge for the teacher was to provide a structure that helped the students see patterns while also answering questions off the cuff as they arose. Students had no trouble using a (supposedly) more 'sophisticated' mode once basic knowledge about tones and semitones was firmly in place. Questions that emerged during songwriting had immediate, subjective use-value for the students, and the teacher knew that answers were satisfying when they unblocked the writing process; such answers also seemed to increase the sense of trust between students and teacher. These observations correspond well with theories of generic teaching quality connecting student motivation to experiences of competence, autonomy and social relatedness (Praetorius et al., 2020, pp. 20–21). For the participants in our study, getting their questions answered and then being able to use music theory in practice seemed indeed to generate motivation and confidence along with the ability to make autonomous musical decisions.

Discussion

Drawing implications from a small-scale qualitative study is always risky, and in this case, the teacher-researcher team had access to an exceptionally resourceful learning environment in terms of classroom space, equipment, and an ethos of helpfulness already established among students. However, we would like to highlight some issues based on our findings. First, we suggest that for music educators, buying into the idea that music theory is too abstract and boring for students and that theoretical skill can safely be neglected is a high-stakes decision. During breaks, we noticed that students reverted to playing familiar guitar riffs over and over again, potentially getting stuck in what they already knew instead of learning to create a wide variety of sounds. Second, habit may have convinced many teachers that starting theory classes with the diatonic C major scale (as we also did) is the logical and easy way: no sharps or flats, easy connections to simple melodies. In this study, we saw that scale or mode mattered less than acquiring an understanding of how scales and scale degrees can be used in practice. An introductory class could just as well build on, for instance, G Mixolydian or D Dorian and pentatonic scales with the same roots, all of which can be written without accidentals and generate sounds that come closer to popular music. Beyond existing contemporary real-world connections, we also argue that as music shifts and changes, this requires new theories and ways of theorising to make sense of the now and the future.

Finally, for the 16–17-year-old participants in this study, the proof was clearly in the proverbial pudding: passing their exam with flying colours was one thing, but being able to create music that felt enjoyable and relevant to them and (importantly) their peers was the real indication that their learning had been fruitful. Subjective experiences of clear understanding were crucial and seemed indeed to grow from teaching and learning that Bamberger (2013b, p. 97) describes as 'a collaborative and creative process rather than merely a process of initiation'. Taken together, the insights from this study suggest that a focus on inspiration and curiosity as driving forces for theoretical exploration of music can support students in their learning as they move towards creative music-making and performances that are socially shared and characterised by joy, evident proficiency and well-founded confidence.

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