SKILL LEARNING DURING AN ASYNCHRONOUS MUSIC E-LEARNING MODULE

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Abstract
Learning musical skills is often associated with face-to-face teaching. Few studies on musical skill learning through asynchronous e-learning have been conducted; however, the demand for e-learning has increased due to multiform learning and individual education paths, unrestricted by time and place. This demand is the basis of this research. The focus of this study is Finnish classroom teacher students' skill learning, learning processes, and learning experiences, while studying music independently through e-learning. The research method is an intensive case study with six students. Their learning diaries were analysed using a data-driven content analysis.
Background factors were musical interest, skill, education, and attitude. During the research, a hypothetical cyclical model of the skill-learning process was created. The assumptions are: Knowledge of music theory improved singing and playing skills. E-learning supported the pedagogical readiness for teaching music. Joy of learning, positive experiences and impacting the learning of oneself reinforced the students' self-esteem, belief in their abilities and excitement for lifelong learning. The knowledge gained can be applied for developing similar study modules, recognising processes guiding skill learning, creating strategies for guiding learning, and for developing methods for skill creating.
Keywords: *Classroom teacher education, e-learning, music education, self-regulation, skill learning*

Introduction

The number of students enrolling in online modules has increased (Seaman, Allen & Seaman, 2018), indicating a need for interest in e-learning. E-learning has been studied, for example. In relation to adult pedagogy (Ikävalko & Raiskio, 2019; Immonen & Veinio, 2019; Rautiainen at al., 2021), it has particularly been utilised in blended learning, along with face-to-face teaching (Hubackova & Semradova, 2016; Dziuban et al., 2018). The demand for e-learning increased during the COVID-19 pandemic, creating challenges in organising and implementing university teaching.

During this time, students experienced great changes in their lives and learning structure. The ensuing restrictions resulted in teaching and encounters becoming increasingly web-based (Daubney & Fautley, 2020). The restrictions, the increase in distance teaching and the hybrid methods enhanced the challenges related to organising instruction, and were damaging to the welfare of teachers (Holzer et al., 2021; Mäkikangas et al., 2021; Thorgersen & Mars, 2021).

Guiding music learning processes via e-learning are challenging (Daubney & Fautley, 2020; Shaw & Mayo, 2021). The learning of skill occurs through the experiences and learning processes related to the different phases and repetitions of practicing (Ahonen, 2004). In addition, creating music is often associated with communal activity and interaction (Pääkkönen, 2013). The pedagogical skills of a music teacher impact the students' learning results and development of social relations (Bastian, 2000). Similarly, motivational teaching methods improve students' commitment and success (Cents-Boonstra et al., 2021). Therefore, new pedagogical modelling is also needed in areas that seldom engage in e-learning. In this study, a novel way of evaluation skill learning has been created in which the guide of the learning process was also a learner using the e-learning material for music.

This study examined the experiences reported by students while using a newly developed music e-learning module. The study's focus was restructuring a music class based on face-to-face teaching (2 ECTS = European credit transfer and accumulation system) into an asynchronous (100% independent) music e-learning module. For *asynchronous* e-learning modules, it is distinctive that the learners work in a self-regulated manner, discovering and analysing information. The studying can be done anywhere, and learners and teachers may never encounter one another in real life (Belanger & Jordan, 2000; Haavisto, Kivipensas & Tervo, 2012; Allen & Seaman, 2014). According to Ruippo, (2003, 2006), asynchronous learning is seldom utilised in music because creating music is naturally done in communities, and improving skill learning is generally socially guided. Contrarily, during *synchronous* e-learning, the teacher and students can model and imitate each other, share videos and other materials and discuss current issues in real-time (Belanger & Jordan, 2000).

The goal of the e-learning module was to improve the students' knowledge of music theory and instrumental playing, such as using the piano, the ukulele, the guitar, the bass, the drums, and vocals. Because this is the first time an e-learning module has been implemented in the Department of Teacher Education, there was no prior material available. Thus, the e-learning material, containing video samples, texts, pictures, and web links, guiding the learning process, was created with Moodle chosen as the learning platform.

The module was implemented for the first time during the summer term of 2021 and after completing the module; students uploaded video samples of their singing and instrumental playing, and completed a test on music theory administered via Moodle. Six classroom teacher students were chosen as the study sample and they provided informed consent to participate in this study.

The objective of this study was to gain knowledge of Finnish classroom teacher students' experiences in related to skill learning, learning processes and learning outcomes while completing a music e-learning module. The research questions are based on the constructivist learning phases outlined by Tynjälä (2004): a) *background*

factors, b) *learning processes*, and c) *results*. From this perspective learning is an all-encompassing process during which these phases merge with one another to impact learning (Tynjälä, 2004). Learning processes describe learners' actions and learning. This process is influenced by the learner's background factors and the interpretations made based on the learning environment. The third phase involves evaluating the knowledge and skills acquired through the learning process. Learning results vary from shallow memorisation to deep understanding and creating something new. Learning can be tested by evaluating, the students' performances and learning portfolios (Tynjälä, 2004). The main research questions and sub-questions were narrowed down while analysing inductively the material as is typical for an intensive case study (Stake, 1994).

During the first phase, the research question focused on the *background factors* of skill learning.

1. How well-acquainted with music are the students and what are their attitudes like before the module?
    1.1. How long have they had music as a hobby?
    1.2. What kind of knowledge, playing and vocal skills do they have?
    1.3. Where (and how) have they studied music?
    1.4. What are their attitudes and experiences regarding music?

During the second phase, the questions elicited more information about the students' experiences related to *learning processes.*

2. What are the students' learning and skill-learning processes like during the e-learning module?
    2.1. What is required for practicing the skills and for the learning process?
    2.2. What are the phases of the skill-learning processes, and what are they like?
    2.3. What kind of pedagogical observations do the students make while practicing the skill?

During the third phase, the question focused on the self-evaluations the students made regarding their own *learning outcomes*.

3. What goals did the students report to have achieved through the module?

Skill Learning

During the learning process, previous experiences and perceptions of one's knowledge and skills are moulded and refined as the basis of new knowledge (Tynjälä, 2004). Suitable feedback and guidance direct skill practicing towards greater efficiency. This is achieved through plentiful and versatile practice (Hofer & Bonhoeffer, 2010; Kumpulainen et al., 2015). According to Ericsson et al. (1993), purposeful practice must include certain factors, such as a difficulty level suitable for the individual, feedback and corrections, and conscious self-reflection. A connection has also been discovered between playing skill and the amount of time spent practicing. The research group of Debatin et al. (2021) argues that practice can also result in failure, such as through over practicing.

During the learning process, terms such as *learning style* and *learning orientation* are applied. Learning style refers to a feature characteristic of the learner utilised as a study habit (Tynjälä, 2004). This style is an inherent feature, with which a student naturally approaches to learning (Green, 2010). Learning orientation can be divided into: a) meaning, b) repetition, and c) achievement. Out of these, the meaning orientation is the most effective for learning because it requires that the learner searches for and evaluates connections in a critical manner and has intrinsic motivation for learning. For the repetition orientation, the learner is motivated by external factors, or waits for precise instructions. Achievement orientation concerns motivation to achieve goals (Tynjälä, 2004).

Strategy refers to the manners of approach with which the learners plan to achieve their goals (Green, 2010). Learning strategies are modified by the learners themselves or based on feedback from the environment (Suonperä, 1992; Tynjälä, 2004). In conventional education, a teacher guides the learner to make relevant observations and orients them towards a deeper level of learning (Suonperä, 1992). Skilled players have been found to use more advanced practicing strategies (McPherson & Zimmerman, 2002; Debatin et al., 2021). Skill learning is also associated with problem-solving, suitable practice assignments, structured practical planning in an optimal learning environment, and the achievement of learning goals (Debatin et al., 2021).

Self-regulation and Experiential Learning

Zimmerman (1990, 1998, 2000) defines self-regulation as a context-specific process, in which the learners control their behaviour, environment, and cognitive and affective states.

1) In the first phase, the learners perform a *task analysis*, which includes goal setting and strategic planning. In addition, the learner has self-motivation beliefs, such as expectations regarding the results, intrinsic interest, and self-efficiency;
2) During the performance phase, the learners utilise *self-regulation* and make observations of themselves and their actions;
3) During the last phase, a *self-assessment* and *self-reaction* are performed, orienting the learner's thoughts, feelings, and behaviour for the upcoming learning situations (Zimmerman, 2000).

Ryan and Deci (2000) have studied the impact of self-determination theories in maintaining learners' self-regulated motivation (see also Chang et al., 2017). The significance of self-regulation has also been studied in meta-analytic research. Learners' performance, self-regulating strategies, and motivation can be improved through teaching that reinforces self-regulation (Dignath, Büttner & Langfeldt, 2008).

According to Tynjälä (2004), *metacognitive* skills are related to self-determination. These skills include goal setting, strategy choosing, methods of self-regulation, and adjustable ways of working, utilised by learners while playing an instrument or singing. Contrarily, beginners' focus during a performance can be unorganised. For example, they may focus on self-defence reactions and defining their abilities (McPherson & Zimmerman, 2002). With metacognitive regulation, beginners can

regulate their learning in terms of planning, goal setting and strategy selecting. While studying, the learners observe and, if necessary, change their strategy, ultimately evaluating their learning. The fewer metacognitive skills the learners have, the greater their need for outside guidance. In such cases, learning is guided from the outside, and the learner has to follow the guidance (Tynjälä, 2004).

According to Ikonen (1999), *experiential learning* arises from interactions with the environment. The objective is to make the learner learn independently, slowly shifting the responsibility of learning to the learner (Ikonen, 1999.) Similarities exist between experiential and constructivist learning as both approaches steer learners towards independent information-processing and thinking, but constructivism emphasises the importance of the learner's reflections (Rauste-von Wright & von Wright, 1994).

The importance placed on reflection is also observed in Kolb's (1984) cycle of experiential learning. Kolb (1984) divided the learning process into four parts:

1) *Active experimentation* involves practical experimentation and influencing;
2) *Concrete experiencing* consists of the learner's experiences and feelings;
3) *Reflective observation* occurs when observations and experiences are evaluated;
4) *Abstract conceptualization* is achieved through systematic thinking and problem-solving.

The learning process is a cyclical construction because after the four phases, the learner will put their skills to the test (Kolb, 1984). The objective is to become more familiar with guiding one's learning and to function in a self-determined manner (Rauste-von Wright & von Wright, 1994). This allows the learner to influence the learning objectives and content. According to Moore (2010), experiential learning commits and motivates the learner to attach their actions to practical learning experiences. Thus, the experience of influencing one's learning is achieved.

Collecting the Data

Similarly, to phenomenological philosophy, the students' learning experiences were considered their personal manifestations in this study. Learning was evaluated as an authentic, meaningful and dignified event, when the subject is encountered without expectations (Varto, 1992; Anttila, 2000). An intensive case study was conducted with a focus on examining the experiences and meaning-making processes of the subjects (Travers, 2001; Eriksson & Koistinen, 2014). The aim was to gain deeper insights into students' ability to cope with the new e-learning conditions.

Data were collected as learning diaries because the focus was on the experiences occurring during the learning process. In the diaries, the learners describe and reflect on their learning and experiences (Lindblom-Ylänne, Levander & Wager, 2003). Thus, interviews, the music theory exam and students' video playing samples were ruled out as a data collecting method. The students' task was to use the learning diary to monitor and reflect on their own development and the building of skills and knowledge throughout the study period. In the learning diary, the students had to deal with their own learning goals and expectations for the course and to evaluate their own starting levels. The aim was to analyse and structure observations and

experiences from their own skill learning processes and to evaluate their achievement of the goals. Students were allowed to decide how and to what extent they dealt with these contents.

At the end of the online course, the students returned the learning diary in digital form to the Moodle return box. The diary was about seven A4 pages long. In addition, their task was to keep a training diary when, and for how long and what they had practiced. The task of the exercise diary was to help students with schedule planning, to monitor the progress of studies and the workload and to evaluate the progress of the skill-learning process. The students did not highlight factors related to learning a skill in the exercise diary; rather, the names of the songs played and sung as a whole for a few weeks and the exercises done were marked on them. Consequently, exercise diaries were not used as research material.

Following ethical principles, informed consent was provided by the subjects (including the privacy policy and consent for scientific research). Names and other identifying factors were deleted before analysis. As no personal data were collected for the study, it was not necessary to seek for ethics approval.

The Analysis and Reliability of the Data

The method used was an inductive content analysis, the phases of which were reduction, clustering and abstraction (Tuomi & Sarajärvi, 2009). First, original expressions were selected from the data, and the message conveyed was simplified. The simplified expressions were grouped into main categories and subcategories. Finally, a synthesis category was formed. The presentation of the results was divided into three parts in accordance with the main themes of the study that is a) background factors, b) learning processes and c) results.

In the analysis, the points of view raised by all students were taken into account. In addition, the students' observations were combined into a uniform guideline. They describe the requirements of learning a musical skill (see Figure 1), and the progress of the learning process of the musical skill on a timeline (see Figure 2) as well as they embody the cyclical process of learning the skill (see Figure 3).

Case studies as a scientific method need to be clarified and justified. Flyvbjerg (2006) has summarised in five misunderstandings related to case studies:

1) General, theoretical (context-independent) knowledge is more valuable than concrete, practical (context-dependent) knowledge;
2) One cannot generalize on the basis of an individual case; therefore, the case study cannot contribute to scientific development;
3) The case study is most useful for generating hypotheses; that is, in the first stage of a total research process, whereas other methods are more suitable for hypotheses testing and theory building;
4) The case study contains a bias toward verification, that is, a tendency to confirm the researcher's preconceived notions;
5) It is often difficult to summarize and develop general propositions and theories on the basis of specific case studies (p. 221).

According to Flyvbjerg (2006), a case study can provide reliable information about a broader class. The case study produces a type of context-dependent knowledge from learning. This helps people to develop from beginners to virtuoso experts. In the study of human affairs, the possibility of theoretical construction can also be achieved (Flyvbjerg, 2006).

To enhance the reliability of this study, the results are reported in a meticulous manner (Yin, 2014). Furthermore, the theoretical reliability was evaluated based on the accuracy of the concepts used. The result of abstraction refers to the theory or model created (Syrjälä & Numminen, 1988), thus, adding a deductive component.

Findings

A. Background factors

The background factors of the study are musical a) knowledge, b) skills, c) education and d) attitude prior to the study. All students had practiced music outside of basic education for several years. Consequently, they had a foundation in musical skills and knowledge prior to their online studies. In their learning diaries, the students also described how long they had been playing music and when they had had breaks in the hobby. Some of the students had music as a hobby throughout their lives. Some had longer breaks from music: *"As a child, I took piano lessons and played the piano for fun. After that, I had a long break from it. I didn't play for 10 years".*

Students' estimations of their skills were divided into three categories: a) good skills, b) little or poor skills and c) no experience with some of the instruments in the course. When describing their musicianship, some students estimated their piano playing skills were rather good; however, the playing material had varied. During piano lessons, some had only played classical music: *"During upper comprehensive school, I played only classical compositions, particularly film scores from Harry Potter and the Pirates of the Caribbean".* One student had also played children's songs with basic chords. In addition, the skill of accompanying with the piano had been utilised in teaching. Some students estimated their playing skills to be poor: *"I was very lazy about practicing and as a result, my playing skills are bad".* Being able to accompany with the piano or the ukulele was not common. Some of the students were unfamiliar with the band instruments and the ukulele, tablature, and accompaniment in general: *"I had zero prior skills of playing the band instruments".* There were also variations between the students' skills with different instruments. For example, some had excellent piano playing skills but no experience with band instruments, while some had equivalent exposure to different instruments. A similar kind of variety was reported for the use of vocals. One student stated that skills regarding the use of the voice are mostly related to the importance of warming up and trying to avoid coughing: *"Regarding the healthy use of the voice, I mainly remembered before the course, that it's not good to cough while singing, but rather to drink water. I also remembered the importance of opening the voice".* For others, singing felt natural, or they had earned a degree in singing.

The students reported to have gained their music skills through independent practice or classroom teaching lead by a teacher. To learn to play the guitar, ukulele, and piano independently, video recordings found on the Internet had been used. In addition, one

student had been taking some private lessons from friends. Hence, being able to read the notes and building chords had developed along with the playing. The students stated that independent study had left gaps in music theory. One student had developed incorrect interpretations of musical concepts. The music lessons at school had created a basis for self-study. Some students were motivated to self-study to impress their friends: *"All the instruments I know I started playing as a kind of a "party trick" – surprising my friends by playing a well-known piece".* Amongst those who had received an education, studying music had been a part of their vocational degree in educational studies. They had learned the basics of playing the piano and the guitar. For the degree, music theory had been included in the playing lessons. Music had also been studied at music schools, conservatories, and other types of music education environments. One student had even earned a degree in music: *"I have a degree in singing, and I took singing lessons for several years".*

The students described their relationships with music in four ways categorized as a) positive relationship, b) being nervous about learning new things, c) change of attitude, and d) unpleasant experiences. At the beginning of the semester, some students had positive expectations about the e-learning module: *"However, I was excited about this module to begin with, since I knew that I will be able to go back and practice playing the piano again, and learn about some instruments that are completely foreign to me".* For these students, taking an e-learning module course was unfamiliar, and they felt it was intriguing. They were also excited to learn how to play different instruments. Some of the students were nervous about the unfamiliar instruments, such as the drums: *"I am the most nervous about the drums. I do not understand how it is possible to combine playing with both your hands and feet".* Some students had unpleasant memories related to some instruments. These experiences caused the students to feel insecure about trying to play new instruments. Thus, the negative experience of playing the guitar had on effect on playing the ukulele, for example. There were also some unpleasant memories related to singing; being forced to sing in front of other pupils had created humiliating and negative memories for some students in the past: *"When I was at the school, the singing tests were held in such a way that you sang in front of the whole class. Those were such moments of humiliation".* These negative experiences made them fearful and anxious, and they reported this to have caused problems when learning new skills; however, students reported to being conscious of their bad experiences and wanting to change their attitudes: *"I find it difficult to play the guitar. During this course, I will try and change my attitude towards a more positive one".*

B. Learning processes

Skill-learning processes. As a result of the analysis, the criteria and requirements for skill-learning processes were divided into seven factors. According to the students' diaries,

- A starting point for learning is open-mindedness and positive attitude;
- For skill practicing it is important to identify the suitable learning styles and strategies: 'Everyone is also creating their own study habits and means for learning';
- While practicing, should be patient and persistent because learning a skill requires many repetitions (metacognitive skills, self-regulation);

- Realistic goals are set, and skill practicing progresses slowly;
- From the beginning of practicing, one must practice correctly, as this will accelerate future learning;
- Should recognise development and the skills acquired and pride oneself in achieving mid-way goals;
- Gradually, the number of goals is increased.

Due to practicing, the skill becomes better: 'A skill can develop a lot and quickly when the level of practice is adequate, and the motivation for learning exists'.

Some of the students reported that they started with the **music theory** section. They felt that it supported playing and singing, or they had set themselves the goal of thoroughly studying music theory. One student described the music theory section as heavy, requiring a lot of effort and time: 'I got all sweaty, thinking I'm not going to make it through this. But I was determined, and decided I would not give up, but really invest my time into this part. I went through the PowerPoint slides multiple times'. While completing the theory portion, some students had even noticed that they had misleading perceptions about music theory, formed during independent practice before the studies: *"Somehow, I had been under the impression, that if the head of the note is hollow, it means the note has either been sharpened or flattened"*. In contrast, some of the students delved into music theory later. For these students, the theory materials functioned as a recap and provided a re-evaluation of their skills. Some had even detected shortcomings in the more challenging materials: "The material for the music theory part of the e-module focused on familiar things at first. I thought, I am well-versed on theory. As studying continued, I noticed my knowledge was inadequate about the more challenging parts, and I felt like I hadn't even heard of all the concepts before".

Students reported that during the e-module they started to focus on the 'right things'. For example, as their knowledge of music theory improved, their note-reading quickened. In addition, students emphasised the importance of music theory in improving playing skills: *"Being able to read the notes is also related to the process of learning to play the piano"*. One student expressed that note-reading could be strengthened by following the notes of a familiar piece while playing, or by following a video about practicing playing skills.

The online module also included a theory exam. The students took the exam either at the end of the module, or both at the beginning and the end. Thus, they could see their improvement: *"After all, I wanted to take the exam and see how my skills were at the start of the module. The exam didn't probably go too well! I took the exam again at the end of the course, and I believe it went better than on my first try"*.

The stages of the music theory learning process were created as a result of analysing the students' descriptions. The following is a summary of music theory learning processes:

1. Scanning through the material, getting a first impression;
2. Starting the studying process with a goal, or taking a theory exam to determine one's skill level;
3. Evaluating and identifying one's skills while studying;

4. Completing small practice tasks in different sections of the module and applying music theory to one's playing skills;
5. Re-reading the e-module material several times;
6. Comparing the e-module material with the theory sections of one's old schoolbooks, if necessary;
7. Taking the music theory exam.

Students' learning processes for **playing the piano** were diverse due to different skills, progress, study habits and goals. The students with less playing experience reported to have placed more importance on playing independently with either their left or right hands. They reported that only after such practice did they play with both hands simultaneously: *"As I was playing the piano, I noticed how important even for an adult learner it is to first learn how to play with your right hand, then with the left, and only then to slowly combine the two".* The same method was used when practicing accompaniment without melody. Here, the chord is divided into left and right hands, which are rhythmised in a way that suits the style of the song. According to the students, it was difficult to sing along with this style of accompaniment because the piano did not follow the melody. 'Playing from the notes', in which the notes for the left hand were in the f-key and the notes for the right in the g-key, was new, and some students said they had not practiced it for a while: *"Playing notes from the f-key has always been difficult for me. It's hard for me to figure out the note positions because the g-key note positions are so strongly in my mind. The most I practiced was playing the notes of the F-key and playing the changing bass".*

The students reported that filming the sessions supported piano playing skills. They deemed it beneficial for learning. This was especially needed when detecting one's progress was difficult. The videos helped students realise how much progress had been made even after little practice, or since the previous session: *"When watching the videos, I noticed that even though I had felt like my skills in some areas were not improving, I had actually gained more speed and fluency even after a short session. The next time I played, the practice had clearly worked its magic".*

Many students mentioned that their skill learning occurred in instalments, especially with playing the piano. At first, practicing required a lot of directing one's learning. Practicing progressed from learning the basic notes of a chord to their counterparts. The chords then became more varied and corresponded to the rhythm of the pieces. Finally, the skills were used to accompanying new pieces.

Students' learning experiences playing **the guitar, the bass and the drums** varied. Playing these instruments was either easy or difficult, or their perceptions on the instruments were changed: *"My memories were related to playing drums: how hard it was to play the rhythms. Now, I noticed that I was learning them in a reasonable amount of time as well".* Students compared their experiences playing the ukulele with playing the guitar. The amount of practice was also related to the fluency of playing and the experience of its ease or difficulty. Even the attitudes regarding playing the ukulele became positive during the e-learning module. While practicing accompaniment, the challenges were up keeping the tempo, and combining singing and playing. When practicing playing a new instrument, it was reported to be helpful to initially choose easy pieces at first, so the basic playing technique and rhythm became more effortless. It was then easier to play more demanding pieces. After some students had learned

the basics of the ukulele, they chose to play more difficult pieces. The chords of these pieces had been partially simplified to provide new challenges for skill learning. Thus, by guiding their own learning, the students had created motivational mid-way goals: *"The accompaniment and the chords were easy to learn. So, I wanted to challenge myself a little, and I practiced doing a modulation for the piece I filmed. After the modulation, D-chord should have followed, and it is very difficult to play. Despite the practice, my fingers would not bend. In the end, I only played the D-chord with two strings".*

The following learning process below contains students' descriptions related to playing the ukulele:

1. Tuning the instrument with the piano or a tuner;
2. Becoming familiar with the instrument: *How does it differ from the guitar?*
3. The parts, strings, chords and playing technique for the instrument;
4. Starting with easy pieces with simple chords;
5. After mastering the change of chords, adding a base beat;
6. Combining singing and playing.
7. Choosing a new piece with familiar chords and possibly a new one. If necessary, the chord can be simplified.

The students completed **use of voice exercises** amid playing practice. This was done before the playing practice, during which they were supposed to sing: *"Hence, I always performed a warm-up in one way or another before I started singing".* This student's use of voice exercises became a natural part of the module. During use of voice practice, the students focused on their singing posture, breathing technique and warming up. The technique for deep breathing had been practiced, for example, while performing everyday chores.

***Pedagogical skills of music teaching*.** Based on the e-learning material and their experiences, the students had also reflected on the questions of teaching music. The **e-learning material** for independent study also gave the students **ideas** for utilising similar exercises in their future work: *"In the e-learning material for music theory, there was an app with the help of which students can easily make their own compositions".* Thus, the experiences gained during the module inspired students to use new learning strategies in their future work.

The students also reported how important it is for the teacher to choose meaningful exercises and to create the **feeling of joy while creating music**. Finding this joy was deemed more significant than playing ability. According to the students, creating with others and participating in different experiments helped to build a positive atmosphere for the classes: *"Practice is supposed to be enjoyable for the students, and as teachers, we are responsible for that. How can we enable the students to discover the joy of music while we're teaching? I think it is important to make time for experimenting, enjoying music and playing together".*

The students placed importance on the teacher having **the necessary skills for teaching music**. Mastering different instruments is helpful in **guiding skill learning**, as the teacher has undergone the same phases of learning and has experienced similar challenges as the students: *"When I practice on that (instrument) myself, it will be easier for me to support my students".* In addition, mastering different instruments enables one to accompany music in diverse situations and to use the new skills in

future work: *"I fulfilled my goals and am very satisfied with the skills I learned. I will surely use them in my profession".* The acquired skills motivated the students to adapt and to utilise them in their future work.

The students highlighted the significance of **lifelong learning** in skill practicing. They hoped to continue learning while working. Skill learning can also involve the students teaching new things to the teacher: *"On the other hand, it (practicing) can be also done together with the students. And what's best, there are always bound to be pupils who can play during class. They can function as assistant teachers, teaching the rest of the class and perhaps even the teachers themselves. In my opinion, those are the best moments".*

Mastering **music theory** was associated with teachers' pedagogical skills and considered a necessary basis for teaching music: *"I think it's important for a classroom teacher to have pedagogical knowledge of music theory – it creates a foundation also for teaching music in primary school".* According to the students, it would be beneficial to know more about music theory than is expected in their education. It benefits the teachers and the work they do by being able to make personalised exercises for more skilled students.

Students also emphasised the importance of the correct **use of voice** for singing and speaking. They explained that the voice must remain healthy throughout the career and afterwards: *"The lessons on use of voice made me think about how I can ensure my voice remains healthy during my career and after it".* Different exercises related to use of voice during the e-module provided tips on how to ensure voice health. Students observed that the exercises could also be done with their future students. The students found it important to encourage all their future students to sing, even if their own voices were not pure in its quality.

C. Learning results

At the end of the e-module, the students reflected on the goals they achieved. They were content with their learning results. The students reported that they **achieved** their **objectives** and those of the module. In addition, they learned new skills and gained confidence. E-learning was found to be pleasant, and during it, the joy and enthusiasm of playing and making music had been discovered: *"I was also pleased with the pleasure, joy and enthusiasm that I gained while practicing playing different instruments".*

The students agreed that practicing music theory supported the development of their singing and playing skills. The significance of music theory was particularly associated with the development of playing skills: *"Thus, I gained important theoretical knowledge, which helps a lot with playing and understanding the pieces".*

The students estimated they had gained **good accompanying skills** on the piano. In addition to having reviewed what they already knew, they had learned **new playing techniques and notations**, making their playing more diverse and enhancing their confidence. Furthermore, playing skills for band instruments added to their knowledge of different instruments and to their confidence in accompaniment: *"I am also happy I learned to play other instruments besides the piano, and now, I might even dare to accompany with them (the band instruments, ukulele)!"*

The e-module material had also helped in achieving the goals set for the **use of voice**: *"I wanted to learn how to use my voice correctly, and the materials gave me a lot of tools for that".* The students had come close to achieving their goals of maintaining a healthy voice and practicing their singing, e.g., by combining deep breathing techniques with use of voice; however, one student expressed the need for personal guidance with use of voice to obtain the desired results. Still, during the e-module, basic skills had been achieved: *"I don't feel like I've developed in terms of singing technique. – I do dare say I've gotten better with the "basic things".*

At the end of the module, students turned in the **samples they filmed** of themselves singing while playing the piano, the ukulele, the guitar, the bass, and the drums. Thus, they were allowed to choose the pieces they performed and their level of difficulty. As the evaluation was only based on these samples, students chose the pieces carefully. Hence, it was beneficial that the pieces varied in genres (e.g., pop, tango, musicals, folk, and children's songs), providing a good overview on their skills. The students believed they had done this successfully.

The module inspired the students to keep practicing their singing and playing skills after the studies. **Lifelong learning** is an important aspect of professional development. It seems that the experiences and materials of the e-module gave the students the needed tools to further develop their skills. A comprehensive school syllabus and pedagogical exercises were **left out** of the objectives of the e-module. Therefore, the goals set by the students were not fulfilled, as they were not a part of the objectives of the module: *"…the curriculum terms were not mentioned in the material became an issue".*

Results and Conclusions

The results suggest that the students' previous musical hobbies, skills and education did not have a remarkable impact on their performance during the e-module. The students were excited about e-learning, or they were aware of their negative experiences and wanted to turn them into positive ones. Instead of these *background factors*, students' *criteria for skill-processes and self-guiding skills* became more relevant. The amount and quality of practice also seemed to impact skill learning (see also Ericsson et al., 1993).

The progressive nature of the criteria for skill-learning processes is depicted in Figure 1, and the lowest level consists of the prerequisites of the next level. In the triangle, the criteria and requirements progress step-by-step towards more demanding prerequisites.

The *learning processes* for musical skills varied between individual needs and personal goals. These descriptions regarded music theory knowledge are an important part of skill learning. Music theory created a basis for developing playing skills. It made the reading of notes, the forming of chords and playing easier. Elliot (1995) also highlights the importance of familiarising oneself with the elements of music. According to praxial music education, knowing music elements and their applications is needed to understanding music in new situations, such as practicing new pieces (Elliot, 1995). The descriptions of learning processes include seven phases, which in Figure 2 using the learning process for playing the piano as an example.

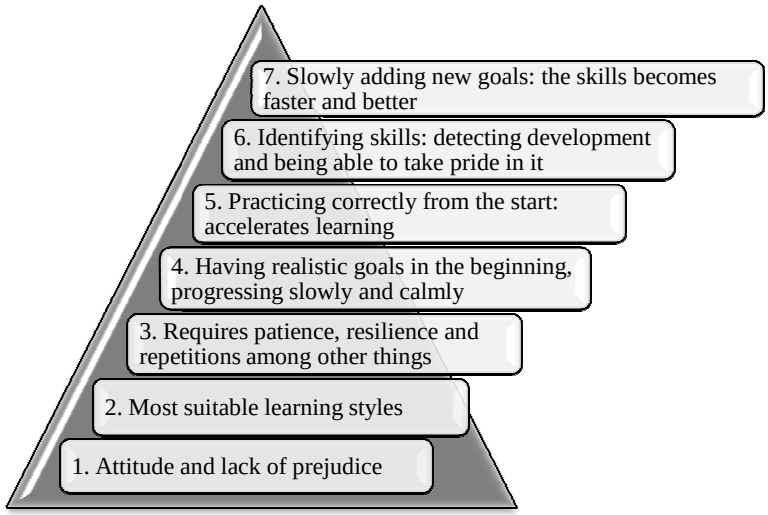

Figure 1. The criteria and requirements for skill-learning processes during music e-learning are formed in a step-by-step manner

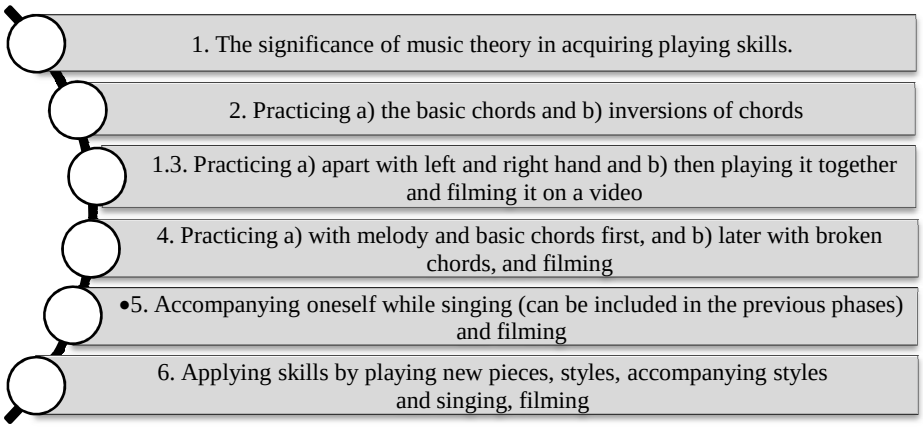

Figure 2. An example of the learning process of piano playing phases during the e-learning module

In this study, a task analysis was conducted at the beginning of the module, as goals were set. The students' self-regulation was supported by the opportunity to influence the content of the module. They were also intrinsically motivated to complete the module. During the course, they focused on building and following the phases of the learning process and regulating their own learning. After practicing, the students completed a self-evaluation form, based on which they changed their plans or exercises if necessary. To assist them with the learning process, they filmed themselves. Thus, they were able to detect skill development even after a short session. Identifying development and new skills motivated the students to continue practicing. This is similar to the self-regulation (forethought, performance and self-reflection) defined by Zimmerman (1990, 2000) and Kolb's (1984) cycle of experiential learning (experimentation, experience, observation and conceptualisation). In this study, the learners were guided towards independent information-processing and thinking, similar to experiential and constructivist learning (also Rauste-von Wright & von Wright, 1994; Ikonen, 1999).

During this study, the skill of self-regulation was observed in the student reports as their ability to regulate their learning and strategy selection. The students showed an increasingly awareness of their meta-cognitive knowledge and skills (see also Young & Fry, 2008). In addition, they determined their goals and solved the problems arising while practicing (see also Debatin et al., 2021). Similar to the findings of Dignath, Büttner and Langfeldt (2008), self-regulation increased study motivation and skill development for the students. Moreover, the students' learning orientation was aimed at accomplishing their goals. A meaning orientation was created to internally motivate the students to study and to critically assess their learning processes (see also Tynjälä, 2004).

The module also helped to indirectly develop the students' pedagogical competencies in teaching music. When students are more competent in making music and defining its terminology, they have a better basis for skill teaching (see also Vesioja, 2006). The e-module material helped to visualise the significance of goals and different forms of practice in the skill-learning process. Use of voice was also considered as a pedagogical skill. Teachers use their voices as an instrument of interaction, simultaneously providing an example on use of voice for the pupils (de Oliveira Bastos & Hermes, 2018). The students viewed this as the reason that the correct use of voice is important.

As the last step of the inductive content analysis of this study, a model was developed from the empirical data, presented in Figure 3. This figure is based on the theoretical reflection of the reports provided by the students. The criteria and processes of musical skill learning (see Figures 1–2) created a basis for developing a model on the skill-learning process (see Figure 3). The model encompasses the *learning results* of the third main research question.

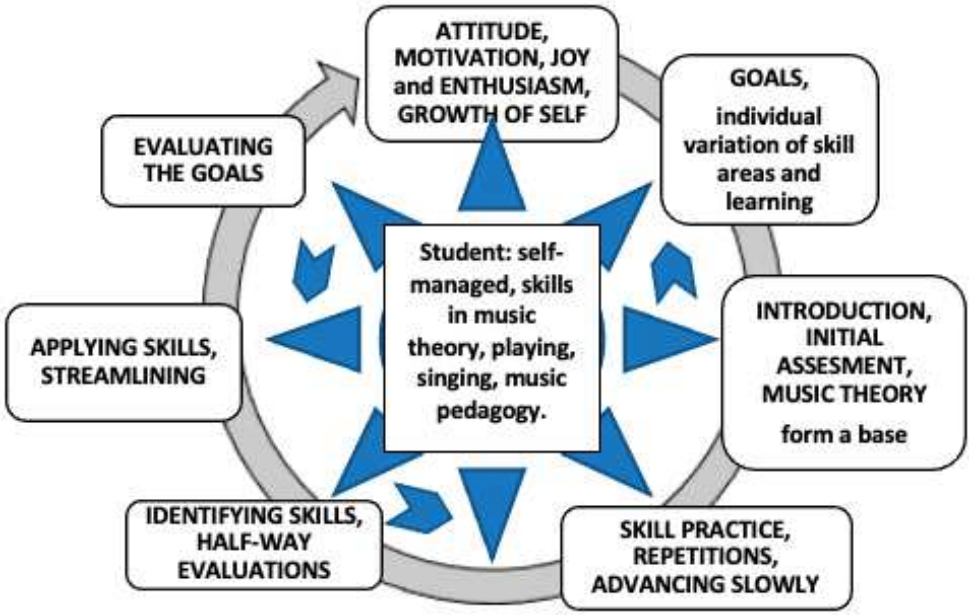

Figure 3. The skill-learning process which students go through during the music e-learning module

The skill-learning process is conceived as a cycle. If necessary, the students returned to the previous exercises, or they were practiced in parts. Skill learning was affected by students' emotional experiences regarding being successful, while students' understanding of the meaning of the learning criteria was highlighted. Skill practice requires time, repetitions, practicing partial goals, identifying skills, and applying skills in practice. Reaching goals and gaining successful experiences of success lead to joy and belief in one's skills, and motivation for skill development. Simultaneously, reaching goals enhance the commitment and the joy of making music and experiencing flow, which is included in the basis of praxial musical education (Elliot, 1995).

The students gained meaningful experiences in their growth through the skill-learning processes (see also Regelski, 1992). Simultaneously, these personal experiences helped to construct and strengthen the students' pedagogical music teaching skills, professional know-how and lifelong learning. In this study, experiential learning engaged students in their learning process as meaningful actors (see also Moore, 2010).

According to the results of this study, self-regulative learning strengthened students' motivation and feelings of success when the objectives were suitable, and studying was done through one's mid-term goals towards the main goals. Holzer et al. (2021) report similar findings in their studies on the impact of distance learning in which the well-being of university students was remarkably influenced by the experience of autonomy and self-regulative learning during distance learning. Similarly, according to Ruokonen and Ruismäki (2016), the use of IT and communicative technology encouraged students to independently practice music skills. Thus, it seems that *students' ability to impact* and make decisions related to the matters of their studies *increased their motivation for self-regulation* (see also Ryan & Deci, 2000; Chang et al., 2017). Furthermore, in this study, learning components *amplifying self-regulation* were used to influence the students' performance, self-regulation strategies and motivation (see also Dignath, Büttner & Langfeldt, 2008). In particular, this manifested as *skill-learning processes* and *actions guiding learning* amongst the students. The processes guiding learning formed during this study can be utilised in upcoming e-modules to support self-regulative learning (see also Hirsto et al., 2022).

The case study has received criticism for among other things the generalisability of the results (Quintão, Andrade & Almeida, 2020). Therefore, its status in the study has potentially been questioned. It is typical for an intensive case study to carefully analyse a number of individuals based on a variety of data (Stake, 1994; Eriksson & Koistinen, 2014; Yin, 2014). Flyvbjerg (2006) argues that case studies produce context-dependent knowledge, which is necessary for improving our understanding of new e-learning conditions. With e-learning, students can develop from being a beginner to being an expert. In addition, in this study, the importance of professional development and teaching development takes centre stage. In addition, Flyvbjerg (2006) points out that there seems to be only context-dependent information in the study of human affairs: this would exclude the possibility of epistemic theoretical construction.

Students' experiences were analysed based on their learning diaries. The study could have gained additional value from conducting interviews. Other possible research

topics could, for example, alternate between asynchronous and synchronous e-learning or could compare the learning processes of learners with different skill levels while also using interviews for data collection.

The aim of this intensive case study was to identify internal 'legalities' in learning processes, which could be used to find a broader meaning and even transferability to a larger group. The results can be utilised for developing the e-learning of music and recognising the processes guiding skill learning. Dividing skill-learning processes into phases (see Figures 1–3) allows guiding students towards using well-developed strategies for skill practicing. At the same time, it can encourage the development of self-regulation skills.

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