USING INSTANT FEEDBACK FOR EFFECTIVE AND ENGAGING MUSIC THEORY HOMEWORK

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The 21st Century learner

The 21st century learner has always been connected to the digital world. Their life has always included mobile phones, Facebook, Wikipedia, Instagram, and Google. Their access to the world of information is immediate, continuous and always available, nearly free of charge, anytime and anywhere. The 21st century learner enters the traditional or virtual classroom with the same kinds of expectations as their experience in their "real world." Feedback on homework is expected to be as instant as a Google search[1].

Instant feedback is particularly challenging in a learning environment where the teacher may not be immediately available. There are, however, several resources that allow 21st century learners to receive meaningful feedback and that also satisfy this expectation. One integral area of immediate feedback comes in the form of the ever popular social media network. One study recognized the importance of Facebook in disseminating news that was important to one's social group. The 21st century learner seemingly also desires an instant reaction to whatever is going on in their world[2].

This article will present solutions for educators who are working with any level of 21st century learner who is interested in improving their musical skills. Some of the applications are suitable for young children, while others apply to those who are just beginning their musical training and wish to advance to a professional level. The authors have selected apps that allow students, either as individuals or as a group, to develop at their own pace and achieve their personal desired level of competency.

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[1] **Beaudoin**, **P**. 2009. iTunes, Youtube and me: Integrating media technology in the music classroom. – Music and Environment: The Changing Face of Music Education (eds. T. Selke & G. Lock). Tallinn: Tallinn University.
<http://www.tlu.ee/CFMAE/CFME09_Beaudoin.pdf >, (28.01.2015).

[2] **Bolkan, J**. 2015. Research: Facebook Sharing May Increase Engagement in News. – Campus Technology. Social Networking. 15 January.
<http://campustechnology.com/articles/2015/01/15/research-facebook-sharing-may-increase-engagement-in-news.aspx?admgarea=News>, (22.01.2015).

Designing Effective Homework

Within the traditional classroom format, homework is typically an essential learning component at any level. It is imperative that in between those traditional sessions, 21st century learners continue the learning process through a series of assignments, projects or other learning activities. Given the nature of the 21st century learners, a teacher should consider creating homework that engages and motivates their 21st century learners. Aside from requiring the 21st century learner to "do the homework," it might be more useful for the teacher to assign homework that compels the 21st century learner to *want* to do the work.

But, what kinds of resources and strategies can a teacher utilize to offer effective and engaging homework? One possibility is to understand the acknowledged learning styles that significantly impact the 21st century learner's knowledge retention and consider designing assignments that incorporate those learning styles.

The 21st Century Learners' Perspective on Effective Homework

21st century learners want their overall learning experience to be meaningful. They desire assignments that target a specific learning task, and that are challenging and engaging. When an assignment fails to meet those criteria, the 21st century learner finds the homework to be boring, too difficult or too easy, or that it takes up too much time[3] and as a result, becomes unmotivated. Even with the realization that it will negatively impact their grade, 21st century learners often decide that it is "not worth their time" to complete an assignment[4]. When designing homework, in addition to taking into account motivation, and the necessity of engaging the learner, it must also be emphasized that 21st century learners expect rapid feedback. After answering a question, the 21st century learner wants to know, immediately, whether the answer is right or wrong. So why should it come as a surprise that these are their expectations for homework, as well?

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[3] **Parker, C. B**. 2014. Stanford research shows pitfalls of homework. – Stanford Report. 10 March. <http://news.stanford.edu/news/2014/march/too-much-homework-031014.html>, (22.01.2015).

[4] **Case, A**. 2008. Why your students don't do their homework. – Using English. Articles. Teaching English. <http://www.usingenglish.com/articles/why-your-students-dont-do-their-homework.html>, (22.01.2015).

A Teacher's Perspective on Effective Homework

Essentially, a teacher wants to offer homework that either (1) provides training as well as knowledge/skills acquisition that supplements the lecture or (2) prepares the 21st century learner for the next lesson (i.e. the flipped classroom idea[5],[6]). The "flipped classroom" scenario, combined with some of the tools we will suggest in the next section will allow an educator to give effective and immediate feedback, or offer additional lecture/information presentations that the students can view independently[7]. Effective homework should stretch a 21st century learner's understanding of the topic and/or help them gain the skill(s) they lack. To help ensure the success of any assigned work, it is essential that the grading of such homework be quick, clearly marked and adaptable for a class of any size.

Web Portals to the Rescue

For some topics, such as music theory, there is a tremendous amount of repetitive learning. The drilling of scales, building of chords, understanding of key signatures and the like can be greatly facilitated through the use of web based tutorials. Thankfully, there are many web-based portals where the teacher can access materials that work very well for meeting the demands of the 21st century learner. These websites offer a plethora of assignments in a variety of ways and many have instant feedback capabilities.

In our search for the available options, we had four essential criteria:

1. access to the materials is essentially free of charge
2. it exists in a multi-platform format[8]

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[5] **Musallam, R**. 2014. Should You Flip Your Classroom? – Edutopia. Technology Integration. 10 December.
<http://www.edutopia.org/blog/flipped-classroom-ramsey-musallam>, (22.01.2015).

[6] **Schell, J**. 2013. What is a flipped classroom? (in 60 seconds). – Turn to Your Neighbor. The Official Peer Instruction Blog. 22 April. <http://blog.peerinstruction.net/2013/04/22/what-is-a-flipped-classroom-in-60-seconds/>, (22.01.2015).

[7] For example, <http://www.musictheory.net/lessons> offers excellent music theory tutorials that can be used as lecture supplements.

[8] An Operating system (OS) is the software that manages the computer hardware and the software resources and provides common services for computer programs. Examples of popular modern operating systems include Android, BSD, iOS, Linux, OS X, QNX, Microsoft Windows, Windows Phone, and IBM z/OS.
<http://en.wikipedia.org/wiki/Operating_system>, (22.01.2015).

3. it has a friendly and easy to understand user interface
4. it allows for the possibility of creating specifically targeted tasks

Here are some of the options we found that would work well for a higher education music curriculum.

From the Web: www.musictheory.net

At this web portal a 21st century learner can study music theory and apply that knowledge in a series of practical exercises. Much of the material at the website is free of charge[9] and requires no sign-in or registration. Musictheory.net supports most internet browsers as well as the Apple iOS operating platform[10].

One important component of this website that distinguishes it from others, is that the teacher has the ability to prepare exercises for specific theory skill acquisition according to the current needs of a 21st century learner (http://www.musictheory.net/exercises/customize; see Figure 1). When a teacher does this, Musictheory.net automatically creates a unique and permanent link (see the bottom of Figure 1), which can be easily forwarded to a 21st century learner, or embedded into a course homepage.

When the exercise is customized by the teacher and the permanent link is sent to the 21st century learner, effective and engaging learning can begin. During the customized exercise, the 21st century learner receives real-time feedback, and the program informs them as to whether or not their answer was correct/incorrect. In the case of a wrong response, the 21st century learner may either try again, have the correct answer revealed, or move on to the next questions/task (see Figure 2, where the 21st century learner has answered wrong twice (colored in red) and then hit 'Reveal Answer' (right answer colored on green). From this screen you can see how many correct answers have been given from the total number of questions, in this case 7 of

[9] One can purchase apps for theory lessons (see further: <http://www.musictheory.net/products/lessons>) and there is an enhanced version of the exercises and calculators called Tenuto for iPhone, iPad, and iPod touch (see further: <http://www.musictheory.net/products/tenuto>) but this is not actually necessary as you can access the page and its content simply as a webpage.

[10] iOS (originally iPhone OS) is a mobile device platform developed by Apple, Inc. With the iOS platform 21st century learners can access the website via their iPad or mobile device. <http://en.wikipedia.org/wiki/IOS>, (25.03.2015).

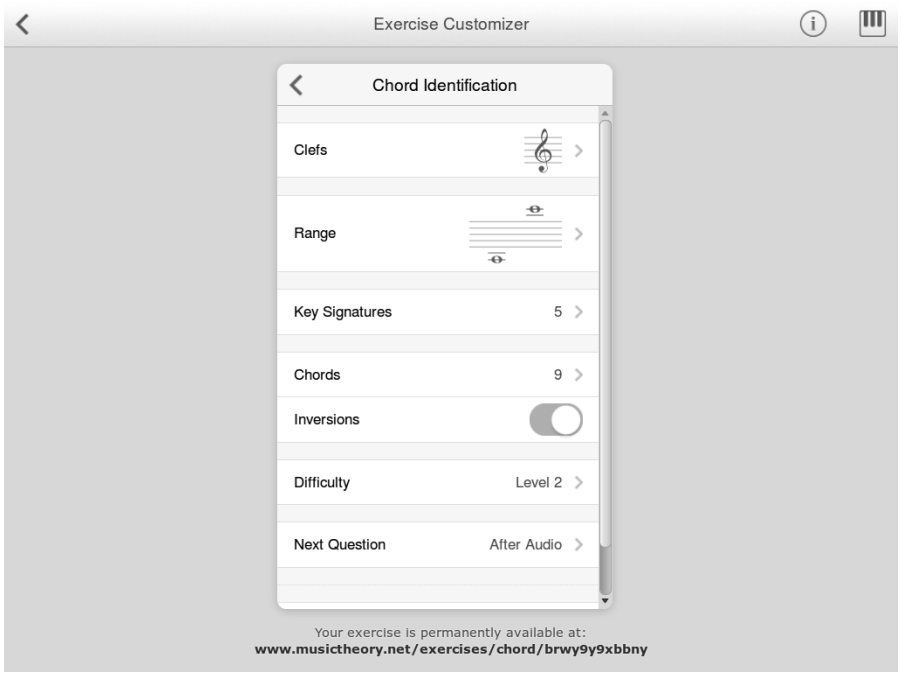

Figure 1. Screenshot from exercise customizer page on www.musictheory.net

12 questions have been correctly answered. That also allows the 21st century learner to know their overall success rate – in this case 58%.

Musictheory.net can generate questions *ad infinitum*, so it is important to set an end target for 21st century learners. It could either be X number of attempts, X number of right answers, or a percentage of correct answers. Musictheory.net also has a built in timer function which allows a parameter of X number (or %) of correct answers within a specified time length. All of these options work well together to help build confidence and motivate the 21st century learner towards the most successful outcome. Additionally, the program's playful atmosphere makes it appear as though 21st century learners are in control of their progress. At the end of the exercise, the program creates a unique verification code which enables the teacher to check the 21st century learner's progress and final score (see one example on Figure 3).

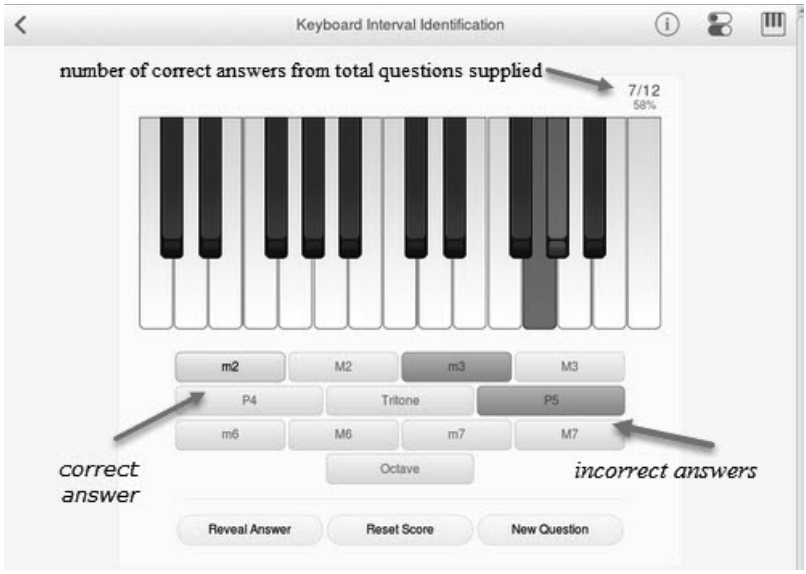

Figure 2. Screenshot from Keyboard Interval Identification exercise

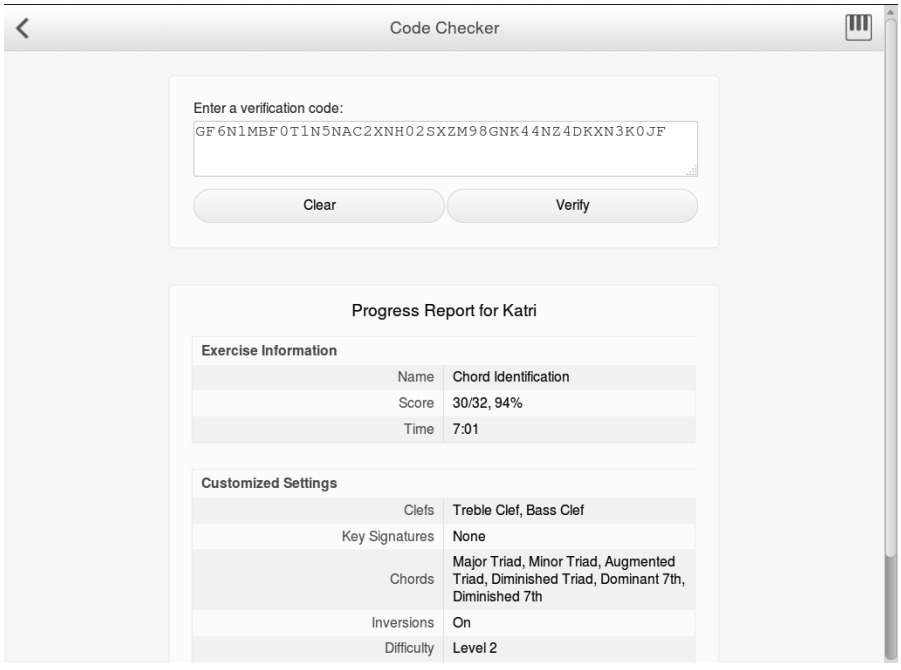

Figure 3. Screenshot of 21st century learner's homework result via Musictheory.net's score checker option

Several 21st century learners whose mother tongue is not English have stated that sometimes they need to think twice about their answers because, for example, the abbreviations in Musictheory.net differ from those that are used in Estonian music theory/solfeggio lessons for intervals and chords[11]. However, they also say that is not actually a problem, but rather something minor that they notice as they go along. The other aspect that 21st century learners have mentioned is that when it comes to choosing an instrument sound for the exercises[12] the options are limited. This is something which is a little at odds with the 21st century learner's need to have an infinite number of choices.

From the iPad app Store – Gerry Porter: Suite of Music Theory Tutorials

Gerry Porter has created a series of nine free music theory tutorials for the iPad that create random questions for the student[13]. The available apps are: Write Key Signature; Write Interval; Write Chord; Identify Scale: Identify Scale Degree Names; Complete Measures with Rests; Identify Interval Aurally; Chord Ear Training and an app that allows for Error Detection. Each of these apps creates a series of randomized exercises, and some of them come with timers so that students can be aware of their improvement. For example, in the Write the Chord app the student is given a chord to build with a single pitch that is a part of that chord. The student must then complete the chord. Like the tutorials at the musictheory.net website, students can either have the correct answer revealed or submit their answer for evaluation.

In Porter's Error Detection app, the student is given a notated melody which can then be played. The student is asked to determine which measure included an error. In Figure 4, the error occurs in measure 5 and when the student selects Box 5 (under the music notation) that measure is then highlighted. The student can play the melody again to check whether they have indicated the correct measure and then either submit the answer for evaluation or show the answer.

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[11] The apps discussed in this article use Anglo-American music theory terminology as opposed to the Russian-German terminology (i.e. *h* versus *b*). This difference is easily explained to the 21st century learner who will overcome it without difficulty.

[12] Currently (January 2015) Musictheory.net offers the following sounds: (grand) piano, guitar, flute, oboe, clarinet and bassoon.

[13] This and all other iPad apps mentioned in this section are available, free of charge, at Apple's App Store.
<https://itunes.apple.com/us/artist/gerry-porter/id684255222>, (25.03.2015).

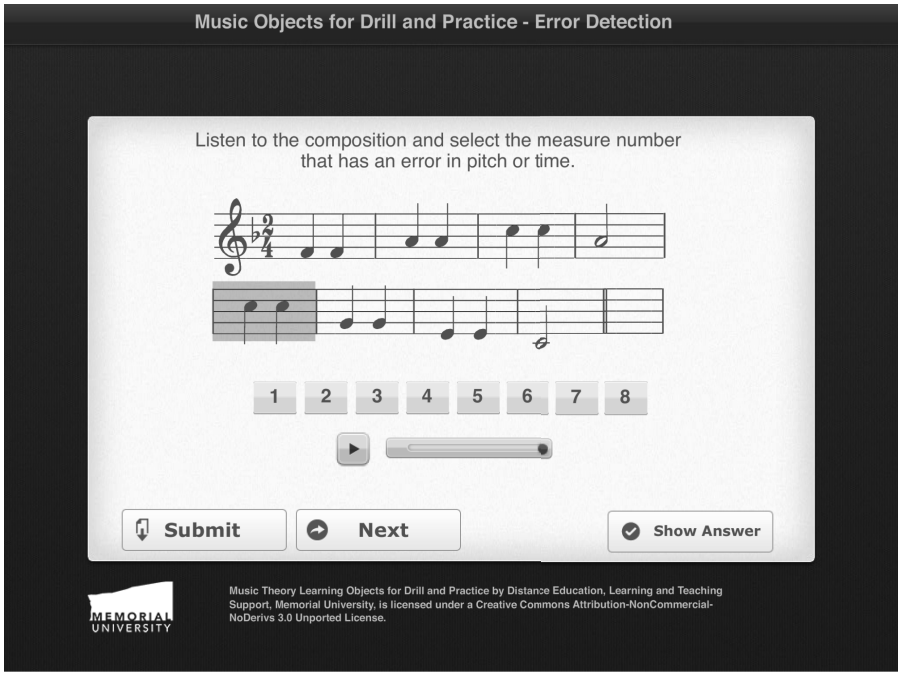

Figure 4. Screenshot of Porter's Error Detection app

In Porter's Write Key Signature app, the student is offered a blank staff with either a treble or bass clef, to build a requested major or minor key signature. If the submitted answer is correct, the student receives a CORRECT! Message, which validates their success in learning key signatures. In this example (Figure 5), the requested scale was a challenging Cb major and the student was able to build the key signature with no mistakes.

There are other free iPad apps that each teacher can evaluate to see whether it fits the needs of their students. However, a teacher should be aware that some "free" apps have more choices that become unlocked after an "upgrade" purchase had been made. These are called "Freemium" apps – free to try but more powerful and with more options after a purchase.

Some teachers may want to look at "Music Tutor Free," a sight-reading app by JSplash Apps, Music Theory (with AUDIO) or Brainscape (a Freemium app), or Music Theory Tutorials by Nonlinear Educating, Inc. whose tag line is "If you don't have a solid understanding of Music Theory, you can't make solid music." A statement we think many of us who teach music theory would agree with.

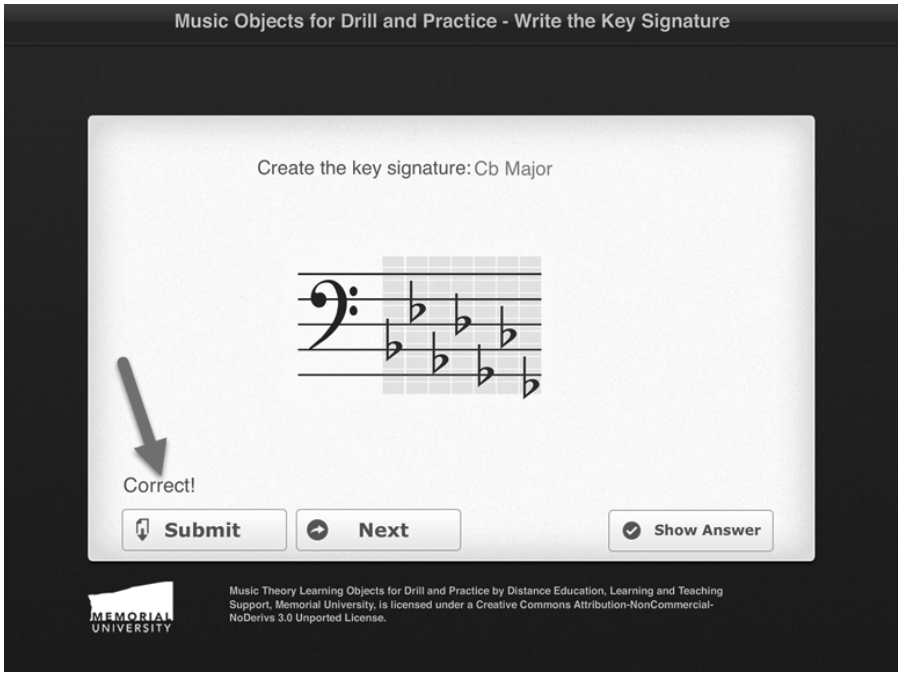

Figure 5. Screenshot of Porter's Write Key Signature app

From an Android App – Interval Recognition-Ear Train

Students who use Android phones might consider exploring an app called "Interval Recognition-Ear Train"[14] that helps music students improve their listening skills and train their ears. It includes ear training for intervals (a random interval is selected from a user defined list that is played ascending, descending or harmonic), clusters (up to 9 notes with a variable arpeggiation speed), phrases (from 3 to 10 notes and based on selected intervals/notes or a scale/mode, with the possibility of setting the pitch range and rhythm), and modes/scales (played ascending or descending; Figure 6).

[14] **marchantpeter.co.uk** 2014. Interval Recognition-Ear Train. – Android application. 31 March. <https://play.google.com/store/apps/details?id=uk.co.marchantpeter.intervalrecognition>, (27.01.2015).

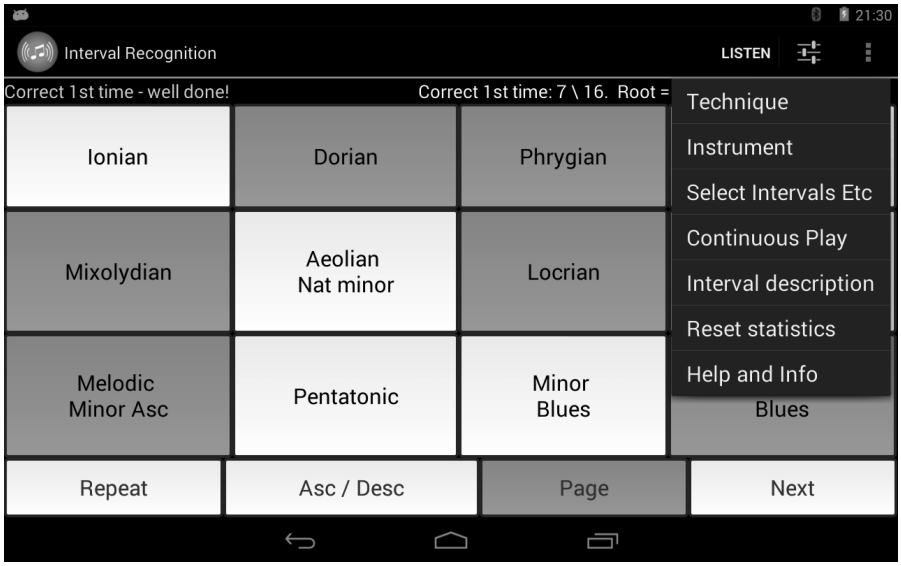

Figure 6. Screenshot of Interval Recognition-Ear Train app feature for training modes and scales

It is similar to the previously introduced Musictheory.net and Gerry Porter's Suite of Music Theory Tutorials, but it also has options to replay correct and/or incorrect answers so that the learner can hear the difference. There are also a wide variety of instruments to choose from (16 instrument categories from piano to Sound FX). The Interval Recognition – Ear Train app also contains a feature that helps to associate intervals with common melodies to make them easier to learn and remember (Figure 7). This particular app provides a wide selection of exercises from which a user can put together a customized and personalized exercise that would target the specific area one wants to improve.

Some teachers may also want to suggest apps that are more rhythm-focused and available for the Android platform. One of these would be "Music Rhythm Master"[15] which is described as an "ideal app to learn music theory for students in music conservatory". Even though it is a Freemium app, the free download gives 21st century learners access to more than 80 exercises and lessons, as well as exams of increasing degrees of difficulty (with text and music roll; Figure 8).

[15] **CIVOGAMES** 2014. Music Rhythm Master. – Android application. 22 November. <https://play.google.com/store/apps/details?id=com.civogames.rythmmaster>, (27.01.2015).

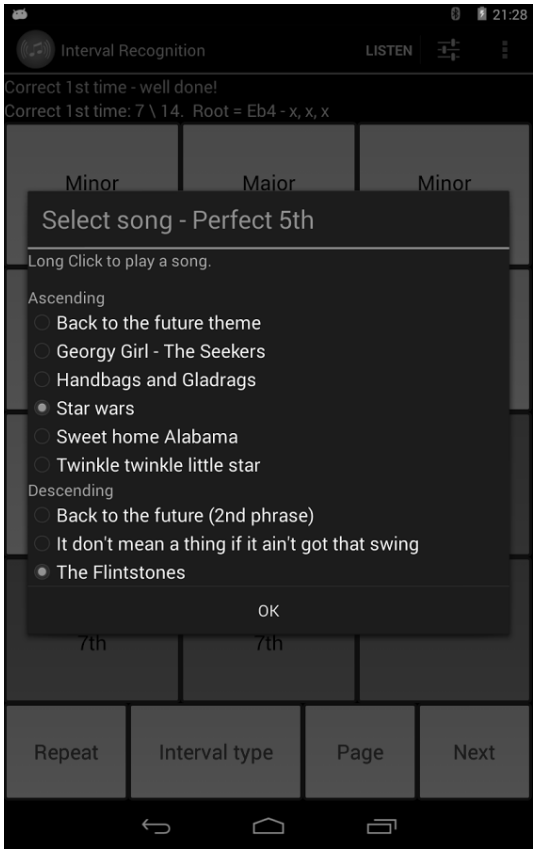

Figure 7. Screenshot of Interval Recognition-Ear Train app feature associating intervals with common melodies

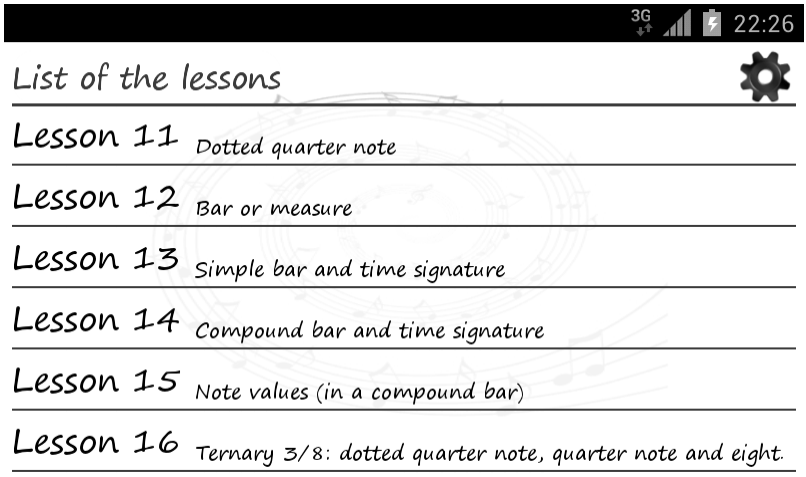

Figure 8. Screenshot of Music Rhythm Master's list of lessons

It is also possible to create and listen to your own rhythms, then to play them back to check your accuracy, and a learner can also create an exercise by picking the levels they particularly want to work on.

Bigger, Faster, More Powerful – and Still Free!

There is no doubt that the 21st century student has access to bigger, faster, and more powerful music theory programs than any generation previous to it. The student's experience and desire for instant feedback is likely to continue and software/app designers are stepping up to the plate by offering a myriad of options to both the teacher, and the 21st century learner. The impact of such software and apps can engage the student in the learning process and offer the teacher a reprieve from the often highly repetitive nature of acquiring music theory skills. But we might want to offer one piece of advice to the teacher who is looking to employ software/apps in their classroom.

It is quite likely that there is a piece of software or an app that already exists which you can immediately begin to use in your classrooms. In fact, the number of choices may feel overwhelming. So, before you head out to have a look, ask yourself some basic questions such as: what skill do I need my students to acquire? What software/app seems like the best choice to achieve that, and how will I use that tool to best serve the pedagogical aims of my class? Try to remember these two steps:

1. Begin with the pedagogy,
2. Find the software/app that best fits your pedagogy. There will always be lots of choices!

Knowing in advance what you wish your students to achieve will help focus your choice of homework. That focus will help engage your 21st century learners, and make the homework challenging, fun, and with the addition of instant feedback, more motivating. You may even find yourself moving through your materials faster than you imagined.

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