

Harmonia-on-the-Go

Mobile App for Learning Music Harmony

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KEY IMPLICATIONS

- A specially designed rule-based AI mobile app can offer student users feedback that is linked to the curriculum taught, and learning analytics that allow them to track their learning progress.
- The learning analytics can also enable teachers to monitor students' learning progress, either individually or by class, so as to follow up with any necessary remedial teaching or curricular modifications.

BACKGROUND

In music studies, the theory of harmony – principles and rules governing music harmony – is an important foundation for musical understanding. As such, it is typically taught in many music curricula, including our local O- and A-level music ones. The learning of this music grammar will naturally entail much practice in application. However, the traditional pen-and-paper practice hardly appeals to students, not to mention that the music-aural dimension is also missing. For the teacher, paper worksheets will translate into marking load, thereby limiting the students' practice to some extent.

The idea of a music app that allows users to create harmonic progressions and receive

technical feedback along the lines of the harmonic theory taught therefore arose. However, to date, whilst there are many music apps designed for both the Android and iOS platforms, none deal with such sophisticated learning contents. A music app that runs on rule-based AI was therefore conceived and developed.

FOCUS OF PROJECT

In the light of the above teaching and learning needs, the music app developed builds in the following features:

- A user interface that allows students to conveniently create chord progressions that can be automatically validated and given text-based feedback; there is also an audio playback function for users to hear the chord progression created.
- A rule-based AI system was created based on the theory of harmony found in most standard music theory textbooks (e.g. Laitz, 2008 and Roig-Francolí, 2003) so that both the validation and, very importantly, the feedback are in accordance with the theory that music students learn.
- A gradated sequence of app levels is designed to allow students to move from the rudimentary to the more advanced levels.

Registered users have access to two additional functionalities:

- a. learner analytics that allow them (as well as their teachers) to track their learning progress; and
- b. a query forum for them to submit questions to their teachers and receive asynchronous feedback, in addition to the automated feedback generated by the app.

KEY FINDINGS

A total of 95% of the student participants who submitted their post-pilot feedback were positive about their user and learning experience with the app. In particular, they appreciated the automated feedback feature and other learning affordances. A comparison between their pre- and post-test results suggests that the technical feedback automatically generated did leave some mark on their musical understanding of harmony. The teachers' feedback generally corroborated with the students' positive experiences; in particular, two teachers mentioned how the app supported students' musical exploration with harmony.

SIGNIFICANCE OF FINDINGS

Implication for Practice

- The app can be used as a supplementary tool in class not only for teaching harmony and aural training but also to facilitate music composing.
- Students can use this tutoring app for self-directed practice 24/7 with immediate technical feedback given; if registered, they can additionally monitor their own learning and seek personal tutoring input from their teacher.
- When teachers give students each a registered account, they can access the students' learning analytics to monitor their learning and respond accordingly in the course of teaching.

PARTICIPANTS

A total of 50 Music Elective Programme students from four Secondary Schools and one Junior College participated in the trial use of the app; 37 of them completed the pre-test, post-test and post-pilot survey.

REFERENCES

- Laitz, S. (2012). *The Complete Musician: An Integrated approach to tonal theory, analysis and listening* (3rd ed.). New York: Oxford University Press.
- Roig-Francolí, M. (2011). *Harmony in Context* (2nd ed.). New York: McGraw-Hill.

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