Students in MUTH 2400, Music Theory III, must be proficient in spelling chords, and in connecting each voice of a chord to the corresponding voice of the next chord. In this course historically, up to 75% of students could not retain information covered in the most recent lectures and could not complete their assignments correctly. Recently, a new music theory application, Chorale Composer, became available, and it addresses this need by giving students immediate feedback on errors that they make in practice assignments. This study demonstrated that students who used the practice mode of this product, and received immediate feedback about their errors, scored higher on graded assignments.

OBJECTIVE

To determine whether students who complete a practice drill with real-time feedback about their errors will score higher on a graded assignment than students who complete the assignment without first completing the practice drill. In this study, the learning protocol was limited to the topic of augmented sixth chords, which are chromatic chords that students often find difficult to spell and to resolve correctly.

BACKGROUND

To complete a music theory exercise correctly, a student must imagine relationships among notes in multiple dimensions. To spell a chord, the student must be able to assign correct note spellings to the intervals that characterize that chord. To enable men and women to sing the notes of the chord, the notes must be placed in the octaves that are within the singing ranges of the voices. Connecting a chord with the one that precedes it requires selecting, from the set of correct note spellings, the melodic connection in each voice that is smoothest and easiest to sing. These connections are called voice-leading. Because these tasks require imagining simultaneously the vertical spacing and all of the possible horizontal connections among notes, it is more an art than a skill.

Individual tutoring is the most effective way to enable a student to learn voice-leading, but tutoring 150 students individually is not possible. Previous to the development of the software application called Chorale Composer, no software was available to tutor students in voice-leading. While tutoring 150 students individually is not possible, tutoring 150 students simultaneously is.

ABSTRACT

Chorale Composer is a software application developed at the University of Illinois at Urbana-Champaign by Professor Rick Taube. It is unique among music courseware applications because it provides the student with a music notation editor that the student uses to complete an assignment. Each time the student completes the spelling of a chord, the software informs the student if the solution contains an error, provides the name of the error, and provides additional information about how to correct the error. Figure 1 shows Chorale Composer in Practice Mode, with errors marked, and one of the errors described in detail in the salmon-colored box at the top of the screen. Figure 2 shows Assignment Mode, in which students receive feedback only after they complete their assignment.

PROCEDURE

Of the 158 students in MUTH 2400 who chose to participate in this study, 79 subjects completed a practice drill using Chorale Composer that covered chord spelling and voice-leading of augmented sixth chords. The subjects each received immediate feedback on any errors that they made. The remaining 79 controls did not complete the practice drill. Both groups completed the augmented sixth chord assignment that was graded. Both subjects and controls received feedback on their errors after completing the assignment and before submitting it.

RESULTS

Figure 3 shows the results of the study. The data points are ordered by the subjects’ final grades (red and pink). Overlaid are data from the controls (blue and aqua). Subjects scored an average of 93% on the assignment, SD=6.7%. Controls scored an average of 84% on the assignment, SD=16.1%.

DISCUSSION

Figure 3 shows that the trend line for the scores of the subjects is nearly flat at 90%. The trend line for the controls begins at 50% and converges with the subject trend line at 90%. This suggests that students with high final averages in the course were not helped significantly, but that students with lower final averages received significantly higher scores on the assignment (p<0.0001). The figure also shows that, except for the first 7 data points, subjects had a final average approximately 5 percentage points higher than controls, which was significant (p<0.0001).

In a survey of study participants, 78% of subjects believed that Chorale Composer helped them complete the assignment and 22% did not believe that it helped. Of the controls, 77% believed that it would have helped them get a higher score on the assignment and 23% did not believe that it would have helped them.