A Sequential Analysis of Gagne's Nine Events of Instruction in Audio Podcasts with Viewer Ratings

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Abstract: According to Gagne, instruction should follow the prescribed nine events of instruction, but that the sequence need not be absolute and that not all events are necessary. To what extent are the prescribed sequence implemented in practice? How might variations in event sequencing affect learning? This study sequentially analyzed audio podcasts to identify sequential patterns in events presented in audio podcasts with low versus high viewer ratings. The findings, implications, limitations and directions for further research are presented.

Introduction

To design more effective instruction, Gagne (1985) developed the nine events of instruction model that identifies the instructional events, including a prescribed event sequence, that support the cognitive processes (e.g., attention, coding, retrieval) needed to achieve successful learning. According to Gagne, instruction should follow this prescribed sequence, but the event ordering can be altered and that not all events are necessarily needed to achieve learning. Given this assumption, studies have been conducted to examine the effects of each individual event and the effects of various event combinations on student learning, attitudes, and study time (Martin & Klein, 2008) across different instructional contexts such as computer-based instruction, multimedia presentations, and classroom instruction. However, no studies have yet been conducted to determine how variations in the way the events are ordered affect learner outcomes. One possible reason as to why no such studies have yet been conducted to address the effects of ordering is because the number of possible event sequences between the nine events is too great in number, making any type of controlled study on the effects of each possible pairing of events a logistical challenge.

Given these challenges, the purpose of this study was to use a *correlational* approach to begin the preliminary process of identifying potential associations between certain event sequences and outcomes by identifying the event sequences implemented in iTune audio podcasts, and by identifying patterns in the event sequences used in audio podcasts with high versus low viewer ratings. Using this approach, this study addressed the following questions:

1. To what extent are the prescribed event sequences implemented in audio podcasts?
2. Which variations in event sequencing are associated with audio podcasts with high versus low viewer ratings?

Method

A total of 13 educational audio podcasts with viewer ratings ranging from 2 to 3.5 were randomly selected from iTunes (more podcasts will be added and analyzed by the time of presentation) to examine the event sequences used in poorly rated audio podcasts. Likewise, a total of 13 educational audio podcasts with viewer ratings from 4 to 5 were randomly selected and used to examine the event sequences used in highly rated podcasts. The cutoff point was set at 3.5 because podcasts with ratings of less than 2 could not be found on iTunes.

For each event observed in a given podcast, the event was recorded into a single spreadsheet column (entered in chronological order from top to bottom) by event number (numbered 1 through 9). The data for all the low rated podcasts were aggregated into a single column and was imported into the Discussion Analysis Tool software (Author, 2014) to produce the left transitional state diagram (Figure 1). Likewise, the event sequences for all high rated podcasts were aggregated into one column and imported into the DAT software to produce the right state diagram. In the state diagrams, the arrows reveal which events were most likely to follow any one given event. For example, the top-most arrow in the left state diagram shows that 77% of all events following Attention were Stating Goals. Arrows presented in black identify probabilities that are significantly higher than the expected probabilities based on *z*-score tests at $p < .05$ (to be described in greater detail at time of presentation), and hence, reveal a sequential "pattern" observed within the group. The thickness of each arrow reflects the size of the observed probability. The first value presented within a node identifies the frequency of the given event. The second value presents the number of events that immediately followed the given event. The size of the halo surrounding each node conveys the relative frequency of each observed event/node within the group.

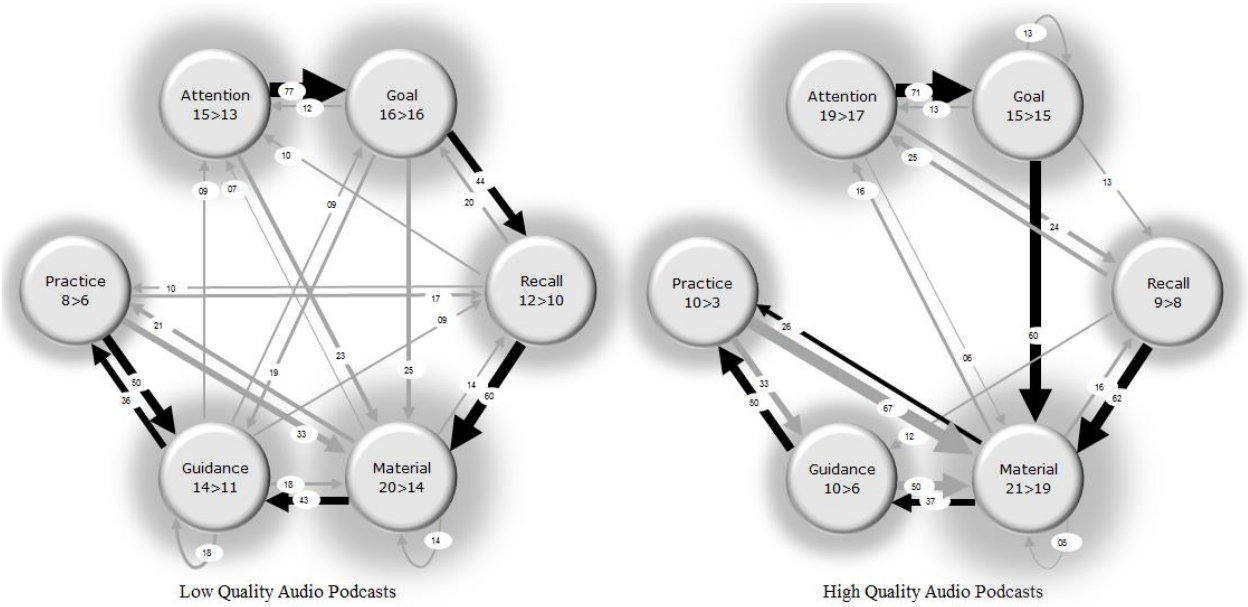
Main Findings & Discussion

The left diagram shows that low-rated podcasts generally followed the first six events of instruction in a linear sequence, starting with Attention and moving clockwise through the prescribed sequence. The last three events are not included because they were observed at too low a frequency to conduct *z*-score tests (additional data will be collected and analyzed before the conference to increase frequencies and to include the last three events). The left diagram also shows that Practice was often followed with Guidance, to reveal the use of an iterative process between Guidance and Practice. When comparing the low versus high-rated podcasts, the diagrams show that high-rated podcasts shared four of the six sequential patterns found in the low-rated podcasts (Attention→Goal, Recall→Material, Material→Guidance, and Guidance→Practice). As a result, both state diagrams provide preliminary and partial evidence to support the event sequences prescribed in Gagne's model. A Chi-square test showed no significance difference in the relative frequency of events between groups.

However, the high-rated podcasts revealed two variations from the prescribed sequence. Goal statement was often followed with Material Presentation (rather than Stimulate Recall), and Material Presentation was sometimes followed by Practice (rather than Guidance). The results of additional statistical tests will be reported at the conference to further substantiate observed differences in sequential patterns. These finding suggests that learners may at times find it preferable to skip Recall, Guidance, and the Guidance→Recall sequence in the instructional process when using audio podcasts. One plausible explanation for these findings is that listeners may prefer audio podcasts that are briefer and more to the point given the ephemeral nature of audio content and the mental effort needed to mentally process audio podcasts. Future studies can be conducted with text-based instruction (content that can be reviewed more easily and at one's own pace) to determine if these sequential patterns applies only to instruction presented in audio-only format.

Overall, this study provides some evidence to support Gagne's model, and provides findings to suggest which events may not be necessary when designing audio podcasts. Although no cause-effect relationship between the event sequences and viewer ratings can be made in this study, the preliminary findings provides leads to which event pairings can be tested in the future

with controlled experiments to establish guidelines on how to vary event sequences in ways that can improve learning outcomes.



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