Utilizing Programmed Instruction Modules to Teach Reinforcement Terminology

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INTRODUCTION

Problem:

- Is programmed instruction (PI) an appropriate method to teach new vocabulary surrounding reinforcement?

Literature:

- The Crone-Todd and Pear (2001) article, *Application of Bloom's Taxonomy to PSI* , discusses the use of a computer-aided personalized system of instruction (CAPSI) programs and how it relates to Bloom's taxonomy in each of the domains; knowledge, comprehension, application, analysis, synthesis, and evaluation in higher-level learning (university level).
- Authors Jaehnig and Miller (2007) discuss how there are a variety of ways in which feedback on question answers in PI can be delivered. The authors studied existing reviews of feedback for PI and compared the results. When comparing the various types of feedback (knowledge of results, knowledge of correct response, elaboration feedback, delayed feedback, answer until correct) they found that regardless of what feedback you give to someone, that is better than nothing. This information is important when deciding how to create the PI one intends to use.
- Boradsky and Fineup (2018) discuss equivalence-based instruction (EBI) and how base information (e.g. term and definition) are taught to mastery, one can then begin to expand upon the information taught about that subject (e.g. an example of how that term is applied). This then means an instructor can then make further relations: Term=A, Definition=B, Example=C, therefore, one can make relations of A-B, B-A, B-C, C-B, A-C, C-A.

Purpose:

- This study utilized PI and EBI methods to teach basic terms concerning reinforcement and reinforcement contingencies. With this information, individuals may be able to better understand reinforcement and its many uses within behavior analysis.

Table 1. Example questions and answers of frames with the relations

	Reinforcement
A-B	The relationship between a response and consequence involving a stimulus change following a response is_____. (Reinforcement)
B-A	Reinforcement is the relationship between a _____and _____ involving a stimulus change following a response. (response, consequence)
	Positive reinforcement
A-B	Positive Reinforcement is the _____ of a stimulus following a response leading to the increased likelihood of similar future responses. (addition)
B-A	The addition of a stimulus following a response leading to the increased likelihood of similar future responses is _____ _____. (Positive Reinforcement)

METHOD

Participants:

- Six students in the Behavior Analysis program at Salem State University.

Setting:

- The PI modules were completed within the students' homes.

Materials:

- Students' personal computers and internet access (arrangements for technology/internet access could have been made if necessary)
- The link for the Module Based Learning (MBL) website
- Students' individual login information.
- Two module frame sets, 60 frames total.
  - Frame one: 20 individual frames (A-B and B-A relations)
  - Frame two: 40 individual frames (B-C, C-B, A-C, C-A relations)

Design:

- Each module frame was a fill-in-the-blank
- Consideration for variation in answers (e.g. plurals, numerical answers, etc.).
- Correct answers were marked with a green check
- Incorrect answers were marked with a red X and the correct answer was displayed
- All incorrect frames were then moved to the end of the module set to allow for another attempts.
- Unlimited attempts were allowed.

PROCEDURE

- Students were provided a login for the MBL website
- Students could complete the modules at their leisure prior to the deadline
- Students were allowed unlimited attempts to mastery (100%)
- Correct frames were not repeated during the module set
- Incorrect frames were moved to the end of the module set to allow for another attempt.
- Module set one must be completed to mastery before moving to module set two.
- The same criteria was needed for both module sets.
- Once completed, results were logged by the MBL website
- Reports were generated by the MBL website:
  - Duration of completion for each module set
  - Cumulative latency
  - Attempts to mastery for each frame and module

RESULTS

Data Explanation:

- Data for module 2 excluded students two and six, for non completion of the module.
- Data for the duration of completion was logged in seconds, average time for all students to complete module 1 was 876.6 seconds, average time for module 2 was 1266.32 seconds.
- Spikes in some frames were consistent overall (M1=2,7,13; M2=10,14,16,29,34)
- Trials to mastery for module 1: S1-31, S2-33, S3-28, S4-29, S5-30, S6-56
- Trials to mastery for module 2: S1-70, S3-68, S4-54, S5-87
- Cumulative latency was also measured in seconds.
- Cumulative latency shows that there was some consistency with the completion of each frame from one to the next
- Several jumps in the cumulative latency data shows that there was some inconsistency in the completion time from one frame to the next.

Outcomes:

- Overall, PI led to mastery learning for the students who completed all modules. The data shows there may be areas in which improvement to the specific modules may be necessary.

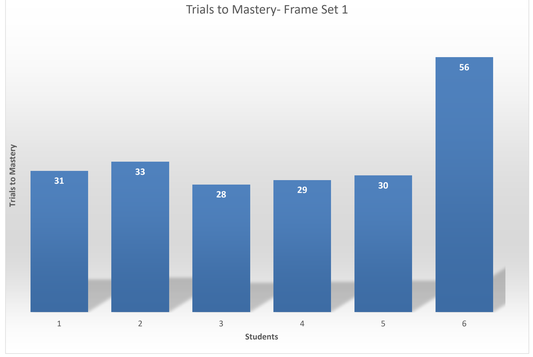

Figure 2. Bar graph depicting attempts to mastery of module 1

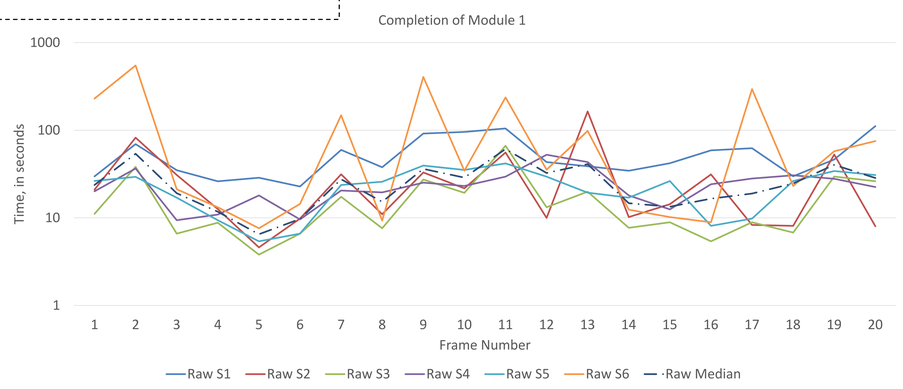

Figure 1. Logarithmic graph depicting time in seconds of module 1 completion

DISCUSSION

- Overall, the data suggests that there is some consistency amongst individuals completing this module. The use of PI and EBI to teach basic concepts of reinforcement and reinforcement contingencies appears to be possible.
- Results showed that students did not require many trials to reach mastery criteria.
- This may suggest that students had base knowledge of reinforcement terms prior to beginning the modules
- Knowing and understanding terminology surrounding reinforcement is important for those studying behavior analysis

Limitations:

- With the testing format being at the leisure of the students, the main limitation for the study was ensuring students did not leave the testing area.
- Accurate time measures are not possible at the time this study was completed.
- Limited response variation

Nest Steps:

- Editing frames to add more response variations
- Adding a 'time out' feature to the MBL website to allow students to stop the time to keep data as accurate as possible
- The second module would be broken up into two modules. The length of the second module is too long.

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