

Bug-in-ear as an evidence-based tool for on-the-job training

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INTRODUCTION

On-going observation and feedback to support traditional teaching methods are central tools for on the job training and continued professional development. Research highlights how some specific characteristics of feedback (e.g., the latency between behavior and feedback) can impact the effectiveness. One method of enhancing the effects of feedback may be immediate feedback delivered through bug-in-ear technology. Using bug-in-ear to deliver immediate feedback, also known as cover-audio coaching, asks a supervisee to wear an ear piece that a supervisor can use directly prompt, reinforce, and correct, the behavior of the supervisee while the supervisee is working.

Bug-in-ear has begun to be explored as a teaching tool for individuals with development disabilities. Bennett, Brady, Scott, Dukes, and Frain, (2010) used bug-in-ear to teach three adults with autism or intellectual disability to engage in vocational skills (e.g., janitor work, sorting tasks) in a community employment setting. Bennett, Ramasamy, and Honsberger (2013a) taught three transition-aged students with autism to do clerical tasks (e.g., photocopying), in preparation for future employment. Bennett, Ramasamy, and Honsberger (2013b) taught three transition-aged individuals with autism how to fold t-shirts in preparation for future employment in retail.

Literature using immediate feedback via bug-in-ear for targeting vocational skills with individuals with low-incidence disabilities is still emerging. However, the literature does provide a good parallel for using immediate feedback via bug-in-ear as a teaching tool for professionals working with exceptional individuals. This review identified 17 intervention studies that examined the use of bug-in-ear coaching with pre-service and in-service teachers. We evaluated these studies using What Works Clearinghouse (WWC) quality standards and determined that bug-in-ear coaching has a strong evidence base for increasing frequency and accuracy of teaching behaviors with both pre-service and in-service teachers. Implications for practice, limitations of current research, and potential directions for future research on this method are discussed.

Research Questions

1. According to (WWC) Procedures and Standards Handbook Version 3.0, is there strong evidence that performance feedback via bug-in-ear can change teaching behaviors?
2. How feasible is the use of bug-in-ear coaching in applied settings in terms of cost, ease of use, and customer—both teacher and supervisor—satisfaction?

Methods

Inclusion Criteria:

- a) the article was published in English in a peer-reviewed journal before August 1, 2015
- b) the study included pre-service and/or in-service teachers as participants
- c) the article included the delivery of immediate feedback to the teacher through bug-in-ear as part of the intervention
- d) the article directly measured some aspect of the teacher's behavior targeted by the feedback; and
- e) the article met the quality standards according to the WWC Procedures and Standards Handbook Version 3.0

Databases:

Academic Search Premier, ERIC, and PsycINFO

Search terms:

bug-in-ear, covert audio coaching, virtual coaching, or eCoaching

Other search methods:

ancestral search using the reference lists of the potentially included articles, forward citation search using Google Scholar, hand search of Teacher Education and Special Education

Total articles searched:

The initial search captured 149 articles, seven more were added through alternative searches. Applying the criteria, we included 17 articles in this review.

Coding procedure:

Articles were coded for information on the characteristics of the study, methodological quality, and strength of evidence provided. Single-subject design studies were coded for 28 unique variables, whereas group design studies were coded for 26.

RESULTS

Fourteen articles met the inclusion criteria for analysis in this review. With the exception of Bowles and Nelson (1976), and Giebelhaus (1994), all of the studies were published after 2000. Eight studies were published in 2010 or later. Eleven studies used single case designs and three used group designs. A summary of the evidence provided by single subject design studies is provided below.

Participants:

- 39% Pre-service teachers, 55% in-service teachers, 6% paraprofessionals
- Mean years of experience 8.3 years (range: 1–28)
- 32% of studies took place in an early childhood setting, 52% in elementary, 11% in middle school (i.e., 6–8), 1% in high school (i.e., 9–12), and 20% in another setting
- 61% of participants worked in special education roles and 39% worked in general education core content roles

Dependent Variables:

- 53% of studies measured some aspect of teachers' use of three-term contingency statements (e.g., rate of praise)
- 47% of studies measured teachers' use of specific strategies or protocols (e.g., discrete trial training)
- 24% of studies also measured student's behavior that corresponded to the teaching behavior of interest

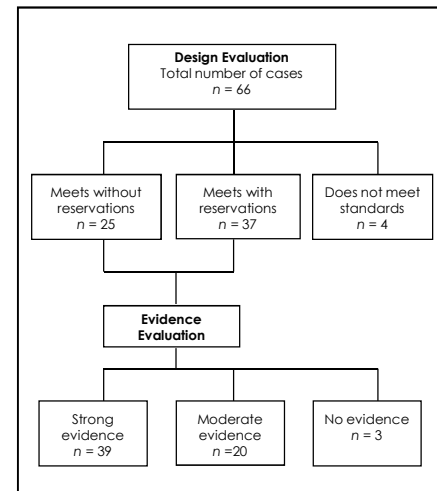
Methodological Quality and Strength of Evidence

Fifteen single-subject studies meet WWC standards. These come from six distinct groups and contain 62 cases that provide strong or moderate evidence.

This is more than enough evidence to claim that using immediate performance feedback delivered through bug-in-ear to change teaching behaviors is well supported by evidence.

Social validity data provided by these research studies was not sufficient to draw specific conclusions about feasibility and acceptability. However, preliminary evidence suggests bug-in-ear is relatively low cost and easy to implement.

Evaluation of Evidence Provided by Studies that Met WWC Quality Standards



CONCLUSIONS

These studies focused on a range of behaviors; however, the majority focused on fundamental teaching behaviors (e.g., prompting, praising). To evaluate the quality of these studies and the strength of the evidence provided we applied WWC evidence standards in addition to coding other relevant variables and evaluating qualitative information on the social validity of the intervention. This review extends the literature in several important ways.

Future directions for research:

- Large randomized control study evaluating effectiveness of bug-in-ear feedback
- In depth qualitative analysis of qualitative, descriptive, and quasi-experimental literature on bug-in-ear
- Comparative analysis of immediate feedback via bug-in-ear versus delayed (i.e., post-observation) feedback
- Comparative analysis of key word versus narrative immediate feedback via bug-in-ear