Bridging the Gap between Literacy Research and Instructional Practice via Formative Experiments

Gerald J. Calais
McNeese State University

ABSTRACT

Generally speaking, according to many writers, neither experimental nor naturalistic educational research methodologies have pervasively influenced classroom practice. Yet, ironically, researchers are currently confronting greater accountability for generating evidence of their success. Thus, in order to bridge the gap between literacy research and instructional practice, some literacy researchers have gravitated toward formative experiments due to the shortcomings of the aforementioned methodological perspectives. This article, accordingly, focuses on the fundamental attributes of formative experiments and their pivotal role in addressing the deficits of conventional research methodologies.

Introduction

In order to bridge the gap between literacy research and instructional practice, some literacy researchers (e.g., Jimenez, 1997; Reinking & Pickle, 1993; Reinking & Watkins, 2000) have gravitated toward formative experiments due to the shortcomings of conventional experimental and naturalistic research methodologies, especially relative to the current fluctuating context of information and communications technologies (Oakley, 2003; Reinking & Bradley, 2004). When addressing the utility of optional instructional interventions, scientific inquiry, for example, does indeed generate beneficial generalizations intercontextually. However, when analyzing classroom interventions, experimental studies must abridge and moderate the extensive variation that is intrinsic to classrooms and schools and that also frequently impacts the utility of specific classroom interventions (Labbo & Reinking, 1999). According to Reinking and Pickle (1993), however, instructional interventions need to be conducted in a standard manner rather than adapted to distinct or varying conditions in order to validate experimental research, because teaching quintessentially entails an array of continually fluctuating classroom variables reflecting the need to adapt instruction to address these
variables. The naturalistic approach, in contrast to the experimental approach, may confirm the intricacies and elusive nature of applying interventions, but fail to characteristically address how practitioners manage such complexity while they seek closure regarding particular pedagogical goals. Contrary to both experimental and naturalistic studies focusing on instructional interventions, formative experiments simultaneously accommodate both intrinsic classroom variations and the necessity to modify interventions relative to pertinent variation.

In order to simplify a comparison amongst all three approaches regarding the implementation of interventions, the following juxtaposition is provided: Controlled experiments are basically interested in the best intervention on average; naturalistic studies focus on what happens upon implementing an intervention, and formative experiments are interested in if and how a viable intervention can be implemented to achieve a goal. In addition, two additional factors are instrumental for fully grasping the essence of formative experiments: What features enhance or diminish an intervention’s ability to successfully accomplish a desirable pedagogical goal? In responding to those features, how might we adapt the intervention to heighten our chances of achieving that goal? The formative nature of formative experiments is manifested especially through these two questions (Reinking & Bradley, 2004).

**Fundamental Methodological Attributes**

Due to an insufficiently articulated paradigmatic framework, formative experiments lack Campbell and Stanley (1963) and Strauss and Corbin’s (1990) consensual, authoritative sources that clearly distinguish the underlying features or procedural constituents of their respective methodological approaches: experimental studies and naturalistic studies. Despite the seemingly conflicting nature of formative experiments and diverse, overlapping related methodologies, Reinking and Bradley (2004, pp. 159-161), who adapted and extended Cobb, Confrey, diSessa, Lehrer, & Schauble’s (2003) findings, offer six general attributes that confirm formative experiments as being valid, appropriate, and rigorous, while simultaneously rendering them distinct from other associated methodologies. These enumerated attributes offer parameters to guide those who wish to employ this methodology:

1. Theory. Unlike rapid prototyping (Tripp & Bichelmeyer, 1990), formative evaluation (Flagg, 1990), and other associated methodologies that collect data, theory assumes a pivotal role in seeking specific goals in formative experiments. Formative experiments employ theories, as do other research methodologies, for rationalizing an inquiry’s importance, justifying the intervention, interpreting results, and contextualizing conclusions. Theories in this context focus on both the processes associated with learning as well as the means devised to sustain learning. Furthermore, theories not expressly enlightening practice play only an incidental role at best in formative experiments.
2. Interventionist and goal oriented. Formative experiments explore the improvement of education and learning relative to explicit goals clearly warranted in terms of theory and practice. Hence, researchers need to devise a theoretically and practically justified intervention that is believed capable of manifesting progress toward the specified goal. Interventions need not be innovative; however, they frequently are.

3. Iterative. Initially, an intervention’s data collection and analysis function as a continuous cycle to ascertain which contextual components advance or deter the intervention’s effectiveness. These data, moreover, are applied for modifying and determining how an intervention will be employed on an as-needed basis. The cyclical implementation and revisions aimed at assessing degree of progress relative to a predetermined pedagogical goal necessitate that a baseline of conditions be established. The iterative and fine-tuning nature of formative experiments also require sufficient time to be conducted, ranging from many weeks to months, perhaps.

4. Transformational. Typically, it is assumed that the educational environment will be transformed somehow by the intervention because selection of the intervention was due to its perceived potential for advancing an educational goal deemed to be worthwhile, though difficult to realize. However, a critical attribute of formative experiments is the acknowledgement that the implementation of interventions may just as well generate unintended consequences, which may advance the theory at hand and further research, too.

5. Methodologically inclusive and flexible. Any data collection and analysis technique is acceptable for formative experiments if it can justifiably advance the researcher’s grasp of the intervention’s effects and if it may potentially be more effectively implemented. Similarly, any data collection and analysis technique selected may be adapted to the intervention’s evolving development. Because formative experiments may entail mixed methods of data collection and analysis, base-line data may be acquired quantitatively by using instruments either standardized or experimenter-developed, coupled by pre- and postexperiment performance via statistical comparisons. On the other hand, due to its being classified as systemic, rather than analytic, research, formative experiments essentially require qualitative data collection and analysis for performing formative experiments (Salomon, 1991).

6. Pragmatic. Epistemologically and paradigmatically, the methodological evolution of formative experiments conforms most naturally to the philosophical tenets of pragmatism. Hence, that is why formative experiments normally reflect collaborative efforts involving not only a researcher(s) but also practitioners. It is also not uncommon for teachers (practitioners) themselves to perform formative experiments that focus on their own practice, such that they overlap action research models (Garfield, 2000).
The Pivotal Role of Formative Experiments

Generally speaking, according to many writers (e.g., Collins, 1999; Eisenhart & Borko, 1993), neither experimental nor naturalistic educational research has pervasively influenced classroom practice. Ironically, today researchers, more than ever, are being held accountable to demonstrate evidence of their success, frequently through experimental data that is quantifiable but distant from realistic classroom practice. Fortunately for the educational research community, formative experiments play an intrinsically pivotal role for filling in a neglected gap between research and practice that exists amongst heterogeneous methodologies. Formative experiments do not render more widely established and utilized methodologies obsolete or superfluous; rather, they provide insights that are not inherent in other methodologies, rendering them incomplete. Reinking and Bradley (2004) assert that we must strike a balance between grasping how education functions, or might function, and executing research directed especially at ascertaining how education might function better by employing methods soundly grounded in authentic realities typically encountered by practitioners. Methodologically, formative experiments rigorously bridge the gap currently existing between diverse research methodologies and realistic instructional practice capitalizing on data, both quantitative and qualitative, entailing processes and converging on ends that practitioners and the public at large willingly accept and understand.

References


