



“Research by Design”: Forms of Heuristic Research in English Language Teaching

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Contents

Introduction	1008
Defining the Common Features Among Heuristic Forms of Research	1009
“Heuristic” in Two Senses	1010
Researching On vs Researching Through	1012
Reviewing the Family of Heuristic Research	1013
Disseminating Heuristic Research	1018
Insights into the Heuristic Perspective	1018
Development of the Heuristic Approach over Time	1018
“Family” Relationships Among Studies Within the Heuristic Approach	1019
The Geography of Heuristic Studies	1020
Heuristic Research in ELT	1021
A Framework for Heuristic Research Work	1022
Conclusion: “Heuristic” as Means and as Process	1024
Cross-References	1024
Appendix A	1025
References	1025

Abstract

This chapter examines educational research approaches that study human activity through time by intervening in those activities. These forms of “research by design” share common features that can be termed “heuristic.” Participants engage in defining the focus and designing interventions to address it; the engagement is iterative and it generally leads to understanding (or “theorizations”) which can be applied in similar contexts and circumstances. Eight forms of research are examined: action research, design-based research (DBR), design-based implementation research (DBIR), developmental work research (DWR),

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lesson study, networked improvement communities, participatory action research (PAR), and social design experiments. The chapter summarizes these eight forms and reviews key research within each one. It details common principles shared by the eight forms and proposes a framework that defines their “family” resemblance within research in general education and in English language teaching.

Keywords

Action research · Curriculum development projects · Heuristic research in education · Participatory action research (PAR) · Developmental work research (DWR) · Design-based research · Design-based implementation research (DBIR)

Introduction

This chapter examines a family of educational research approaches that focus on studying human activity through time by intervening in it. The first edition of this Handbook (Cummins and Davison 2007) included only one chapter (Burns 2007) that would have come within this scope of what we refer to here as “heuristic” approaches to researching teaching and learning. In 2007, and indeed since then, action research has predominated in the field of English Language Teaching (ELT) (Burns 2011, 2005) as a form of inquiry that is readily adaptable across classrooms and social contexts. Action research has been popularized in the professional literature (e.g., Edwards and Burns 2016; Hassen 2016) as well as through national policies (e.g., in Colombia: Angela Yicely and Liliana 2016; in Korea: Yoon et al. 1999; in Singapore: Soh 2006). In this chapter, however, we move outside of ELT to examine the various approaches that share this heuristic approach to research. Our aim is to detail what we see as common principles within this family of approaches in general educational research and to consider how these approaches play out in ELT.

As with endeavors of this nature seeking to identify common elements across seemingly diverse instances, the terms used quickly become central since they provide the tools for the analysis. We start, therefore, by defining the terms we are using. While we considered the term “paradigm” in a Kuhnian sense (Kuhn 1962; Orman 2016) to name the cluster of ways of researching included in this chapter, we decided on the term “approach.” As a term, *approach* has several advantages. It can be used as a noun (as in “research approaches”) or a verb (as in the researcher “approaches” the problem), which underscores its flexibility and dynamism. Furthermore, the term includes notions of approximation, of coming closer to but probably not reaching an established end. It suggests dealing with something in a particular way, or using a particular “method” (or “approach”) to solve a problem. For these semantic reasons, we have settled on “approach” as our umbrella term. Within the heuristic approach, we refer to the research strategies and procedures as “forms” of research or “practices” in the sense that they have largely been described procedurally at this point. These *forms* or *practices* of research share common features and assumptions that create a “family resemblance” – “a complicated network of

similarities overlapping and crisscrossing” (Wittgenstein 1963, P.I 66) – among them. We call this underlying resemblance, discussed in this chapter, “heuristic.”

Defining the Common Features Among Heuristic Forms of Research

The eight forms of research discussed in this chapter are interestingly diverse and flexible; they share a group of principles, we argue, that characterize them as “heuristic.” We use the term in two ways: First, the research practices are *heuristic* in the sense that they focus on developing solutions to locally defined problems. Second, they operate *heuristically* through a process of systematic trial and error over time. These two meanings are discussed more fully in following sections.

Heuristic research studies address, and usually attempt to resolve, specific problems or challenges in an activity in a particular social setting (Brown 1992; Schoenfeld 2006). These social settings are often educational ones – classrooms, schools, school communities, and sometimes school districts, local education authorities, or hybrid educational structures like school-university partnerships (Anderson and Shattuck 2012). The goal of the research process is to better understand and improve particular, designated activities in the setting (Cobb et al. 2003). So in this sense the research itself serves as a *heuristic* that generates explanations (referred to by some researchers as “theories”) which can be applied to (or enacted in) activities in other similar situations (Tuomi-Grohn and Engestrom 2003).

Curriculum development projects, when they are undertaken in a consultative, iterative fashion, offer good examples of how this heuristic research process plays out (e.g., in adult literacy: Reinking and Bradley 2008). When the curriculum is first developed, it is done in consultation with teachers and others in the educational setting; then this initial version is trialed. Changes are made based on these trials, and the curriculum is revised and taught again. This is the heuristic process of trial and error. Eventually the curriculum can “travel” to other educational settings with similar aims. In this way, the curriculum serves as the intervention; how it is used, and why and how it works, can create a theoretical explanation (MacKenney et al. 2006).

The heuristic research process starts with a *problem* that is articulated by (and not on behalf of) participants, who are often referred to as *stakeholders*. These first consultations generate an *initial solution* to the problem as developed with stakeholder-participants (for a discussion of this process, see Penuel et al. 2013). As the initial solution is tried out in the social setting, it becomes an *intervention* in the ongoing course of activity. The participants (stakeholders and researchers) then evaluate what happens, revise the intervention, and try it out again. Through this *iterative process* of trial, assessment, and adjustment, the intervention is adapted to the social context of the activity in which it is being used (Sannino et al. 2016). At the same time, the activity is influenced by the intervention. The interweaving of existing and new activity generates information (data) about the intervention and how it is designed and about the activity in which it is used (MacKenney and Reeves 2012). In reasoning through this information to understand how the intervention has

worked and how the changes have improved or shaped its effectiveness (as judged by stakeholder-participants), the researchers generate explanations about “what works” about the intervention and why (Vissher-Voerman et al. 1999). Researchers in heuristic approaches contend that these rationales, or *theories*, are what “travel” from one social activity and context to other situations (Sloane and Kelly 2008). In a sense, the rationales capture and represent findings that are “generalizable” or “replicable” from the particular study to other contexts (Tuomi-Grohn and Engstrom 2003).

“Heuristic” in Two Senses

We refer to the entire process as *heuristic* in that it probes an activity in a social context to better understand how the activity functions and why. At the same time, the intervention itself functions as *a heuristic* since its design and implementation are guided by the intent of resolving the initial problem. Together these two dimensions define the research as “heuristic,” according to the following key features (see Fig. 1):

- *Stakeholders* working with, and sometimes as, the researcher(s) to articulate
- *A problem* in an activity in their social setting
- For which they develop an *initial solution*.
- As it is carried out, this solution *intervenes* in – and thus becomes a heuristic to better understand – what is happening in the activity.
- The process is *repeated over time* in order to refine the solution. Each iteration generates information about what is happening and why.

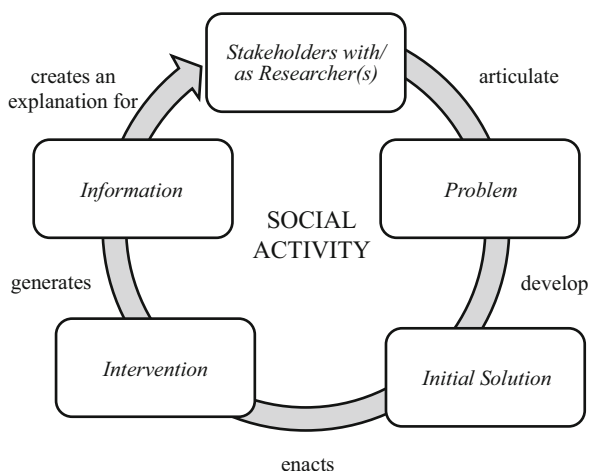


Fig. 1 Key features in heuristic research

- Thus the *intervention* functions *iteratively* to help participant-stakeholders better understand the problem. At the same time, carrying out the intervention generates *information* that helps to *explain* or *theorize* what is happening with and through the change or improvement.

These features help to distinguish forms of research within the heuristic approach from research conducted within the positivist or the post-positivist paradigms (Polkinghorne 1983). While research is broadly concerned with identifying meaningful patterns in information about a phenomenon or situation, the definition of what constitutes valid interpretation of meaning depends on the warrants invoked within the paradigm (Creswell 1998). Within the positivist paradigm, categories in process-product research are generally linked through correlational analyses to suggest or argue for a broad view of causal connection (Dunkin and Biddle 1974). Within the post-positivist paradigm, categories in hermeneutic studies assume meaning through analytic processes that are either couched (or “grounded”) in participants’ own interpretations or in the researcher’s understanding (Strauss and Corbin 1997).

While research grouped within the heuristic approach often uses analytic procedures drawn from hermeneutic work, the approach differs fundamentally in how participation in activity over time is used to understand social phenomena. In heuristic work, these phenomena are seen as sociohistorical, meaning that they happen *in time* (which is why they are “social”) and *over time* (which is why they are “historical”). Thus the meaning of the phenomenon arises out of – and its interpretation depends on – these two types of time: the *timing* and the history of the phenomenon *over time*. There is a third sense of time in heuristic work, which distinguishes it from sociocultural studies more broadly. Heuristic studies use interventions; these are introduced into the social phenomenon to understand and improve the activity. These changes are happening *at the same time* as the ongoing activity. In other words, the status quo is being changed at the same time that it is being studied.

These three dimensions of time frame heuristic work. To take a simple example: A teacher is trying out a different way of managing the class. Students often get loud and rowdy just before lunch, and the teacher usually needs to discipline them. The intervention is a different way of responding to students’ (mis)behavior. The three dimensions of time are at work here: The *timing* – that misbehavior generally happens before lunch – is one dimension of the problem. The *over-time* dimension are the histories of the individuals and of the class as a group. If some students often seem to act in this way, their particular histories could likewise be relevant. Perhaps these students seem to “set off” their classmates, which brings in the history of the class. When the teacher tries the new way of responding to the students’ behaviors, this intervention is happening within this timing and these histories; the intervention is happening *at the same time* as the problem it means to address. In that the teacher’s aim is to improve how the class is working, the intervention serves two ends: it alters the class management while creating a contrast between the old and new ways of managing the students.

While positivist and post-positivist research studies seek at the broadest level to document phenomena and activity, heuristic research aims to make changes in social activity in order to understand and to improve it. Heuristic approaches take the research environment (a classroom, school, educational system, work setting, etc.) as a dynamic and emergent system of social activity (Fenwick et al. 2011) that responds to – and thus reshapes – any intervention in it, including those that have been intentionally introduced. The intervention, which is usually initiated through a collaboration among stakeholders, is refined as it is implemented over time in the activity setting. This iterative interaction creates tensions between the social environment and the intervention, which become the focus and the means of the research.

Researching On vs Researching Through

Heuristic approaches start from the assumptions that social settings are dynamic and changing and that participants in these settings understand the activities they do, for better or worse, more or less accurately compared to external perspectives on those activities. Intervening in the setting generates a change, directed to a certain end, and that change becomes a tool for probing, understanding, and for altering activity. In this way then, heuristic approaches recognize or give agency to participants as stakeholders in the intervention-change process. MacKenney and Reeves (2012) distinguish between two types of agency in this heuristic process. In the first, participant-stakeholders are interested in how well the intervention does what it is supposed to; they are *researching on* its effectiveness in meeting its intended goal. The data generated in this process is focused on how to improve the intervention, and the data analysis leads to improving the intervention to better meet the goal. In the second type of agency, participant-stakeholders are using the intervention as a way to probe and understand a problem or phenomenon, which they are *researching through* (be means of) the intervention. The intervention serves in generating data about the problem or phenomenon, and the data analysis leads to a more complete understanding.

Returning to the example above: In using the new way of managing rowdy students, the teacher could focus on the specifics of the new class management strategy – how to name the problem and lay out the choices and consequences in an ordered and commensurate fashion, using the right words and tone of voice, and so on. In using the strategy, each time the teacher may make modifications to better meet the intended goal. In this way, the teacher would be *researching on* the strategy. But perhaps the teacher is drawn to understanding why certain students seem to be ringleaders in the disruption, and so watches how the new way of responding as a class management strategy seems to (re)shape their behaviors. Here the focus would be on *researching* how to better manage disruption *through* the intervention, and the strategy by virtue of being different from the status quo could furnish insight into the students and their reactions.

Reviewing the Family of Heuristic Research

In arriving at the family of heuristic approaches, we identified eight forms of research that share the features discussed previously. These forms of research, which include the following listed alphabetically, seek to address – and attempt to resolve – specific educational problems or challenges in a particular social setting:

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1. Action research

 2. Design-based research

 3. Design-based implementation research

 4. Developmental work research

 5. Lesson study

 6. Networked improvement communities

 7. Participatory action research

 8. Social design experiments

Although they share common features which create a “family resemblance,” they have developed differently. Each form of research arose at particular moment in time and therefore captures a particular way of thinking about how knowledge is generated in and through educational practice. They have each achieved different levels of dissemination in the educational research and the ELT research communities. While some forms are distinctive (e.g., lesson study), others are interrelated with one sometimes extending or deepening an existing form (e.g., action research and *participatory* action research or design-based and design-based *implementation* research; italics added). The following section elaborates these eight forms in more detail (they are organized here by affinity rather than alphabetically).

The term **action research** is usually linked to the work of the social psychologist Kurt Lewin. Writing in the United States in the 1940s, Lewin suggested a form of research organized as a spiral process in which a possible solution to a problem is formulated and tried out, its success monitored, and the proposed solution reformulated in light of insights gained. The revamped solution is implemented and assessed and so on until participants are satisfied or the activity becomes saturated. The central notion in Lewin’s thinking was that these iterative trials of design, implementation, redesign, and assessment would lead to closer approximation of a solution to the problem, which anticipated MacKenney and Reeves’ (2012) definition of *researching on* the intervention. Through these repeated iterations of, or *research through*, the intervention, the process could generate a deep understanding of what was involved in change and improvement (Hammersley 2004). In this process, which became known as the “action-research cycle,” the iterative use of time and social context are intertwined and are central to evolving both a fuller understanding of the problem and its workable solution.

Although the iterative cycle as a heuristic, trial-and-error improvement process is most often associated with action research, the ideas of participation and engagement are equally central. In Lewin’s view, action research emphasized a close connection between the actions, inquiry, and change in practical or political activities. This

dynamic relationship, proponents argued, between intervention, change, and the particular activity is centrally important to the research strategy. The agency of participants as stakeholders in the action-research process focuses the investigation on, and feeds the results back into, that activity (Hammersley 2004).

The notion of participants' agency as proactive engagement has evolved into the central recognition of the potential knowledge that practitioners have of social activity like classroom teaching (e.g., Burns 2009 in ELT). Action research rejects classroom research practices that conceive the role of the researchers as an external authority entering the school setting to describe and represent what is happening (Kemmis et al. 2014; Freeman 1998). By virtue of being "insiders"—people living and working in the particular settings—action researchers see participants as having unique access and perspectives on how social and educational life and work unfolds in these settings (see Freeman 2018; also Burns and Khalifa 2017). These participants are actively engaged in all aspects of the research process: orienting the work, to making improvements in the practices in their setting, and conducting the research work themselves (Noffke 1997).

Participatory action research (PAR) is a version of action research focusing explicitly on creating change in social settings. It is defined as "systematic inquiry involving the collaboration of those affected by the issue being studied for purposes of education and taking action or effecting change" (Ballard and Belsky 2010, p. 611–612). PAR grows out of participants' active involvement in all aspects of the research process, which is likewise a central feature of action research highlighted by Kemmis et al. (2014). Since this form of research generally takes place in a specific site, participants must play a central role, not as recipients or clients in the research process, but as those with inside knowledge and understanding to carry the research out. To capture and take advantage of this knowledge, the roles of researcher and participant, as well as the interactions between them, need to change from the conventional, hierarchical view of outside researcher and inside participants to one in which they collaborate in the research process.

The dynamics of PAR reorient the process of knowledge production in research by giving an active role and voice to the participants, as the name suggests. Proponents argue that the approach promotes new understandings and action to effect positive change. Since fully authentic participation means sharing the ways in which the research is conceived, designed, practiced, and brought to life, these commitments are seen to lead to collective ownership and responsible agency in the production of knowledge and improvement of practice (Ballard and Belsky 2010; McTaggart 1991). In this way, PAR is seen as a collective undertaking that acknowledges differences in status, power, and influence among participants in the research endeavor.

First mentioned in articles by Brown (1992) and by Collins (1992), **design experiments** were developed as a type of formative research. The intention was to implement, evaluate, and refine a particular educational design, often a curriculum, based on theoretical principles and prior research. The notion of design experiments introduced the two-planed dialectic to the research undertaking. On one level, the

"design" was seen as a strategy for developing a response in a particular educational situation. On the other level, "designing" these responses and tracking how they played out in actual classroom situations, rather than in laboratory settings, led to the progressive refinement of the design and its effects (Collins et al. 2004). In this way, the designed response contributes to and reshapes the theories on which it was initially based. As Schoenfeld (2006) put it, "The act of creation is one of design. If the creation is done with an eye toward the systematic generation and examination of data and refinement of theory, the result may be considered a *design experiment*" (p. 193; original italics).

These two intertwined processes came to be known as "design-based research" (DBR). As Cobb et al. (2003) defined it, DBR entails "... both 'engineering' particular forms of learning and systematically studying those forms of learning within the context defined by the means of supporting them" (p. 9). They continue, saying that "design experiments are extended (iterative), interventionist (innovative and design-based), and theory-oriented enterprises whose 'theories' do the real work in practical educational contexts" (2003, p. 13). A central premise in DBR, as it was in design experiments, is to acknowledge authentic learning environments as complex contexts where multiple variables are involved. This open-ended dynamism can be seen as feeding lack of predictability, which could be argued from a positivist point of view as threatening the validity of the research process. Conversely, this unstructured messiness can be seen as part and parcel of working with social processes like teaching and learning in human settings. Since these settings cannot be controlled as one would in a conventional laboratory, how the design plays out provides insight into how those who have developed it understand the activity and context.

DBR researchers proceed then, through iterative cycles of design and implementation, using each implementation as an opportunity to collect data that can inform revision and subsequent design. Reflecting on the design and what is happening as it is implemented, both simultaneously and retrospectively, proponents elaborate on their initial understanding of the problem as they gradually articulate a more coherent theory that reflects the design experience and the improvement achieved through the work of the study (Collins et al. 2004). In this sense, the heuristic nature of DBR reflects its attempts to address specific problems or challenges around learning in a particular social setting.

In the last decade, this design-based approach, sometimes called "design thinking," has been expanded to specifically embrace schools, districts, and even national education reforms as educational systems. This expanded commitment is to understanding educational issues and phenomena while implementing changes or reforms at a systemic level in order to improve them. Promoting these twin goals is referred to by proponents (e.g., Fishman et al. 2013; Penuel et al. 2011) as **design-based implementation research** (DBIR). The insertion of the term "implementation" emphasizes the fact that the research is aimed simultaneously at developing large-scale interventions and at improving their implementation (Penuel and Fishman 2012). Penuel et al. (2011) describe "what distinguishes this approach [DBIR]

from both traditional design research and policy research. . .” as “four key elements: (a) a focus on persistent problems of practice from multiple stakeholders’ perspectives; (b) a commitment to iterative, collaborative design; (c) a concern with developing theory related to both classroom learning and implementation through systematic inquiry; and (d) a concern with developing capacity for sustaining change in systems (p. 331).

In developing and testing out of innovations to foster improvements at the school and district level (Penuel et al. 2011), DBIR expands the locus of DBR, which usually focuses on teaching and learning in classroom environments. The systemic orientation of DBIR anticipates another heuristic practice, “network school improvement communities,” which are described below.

Following the principles of design-based research, **social design experiments** seek to democratize forms of inquiry that encourage design experimentation as a participatory process of co-construction among different institutional stakeholders. According to Gutierrez and Vossoughi (2010), “Social design experiments [are] cultural historical formations designed to promote transformative learning for adults and children.” These “experiments” “. . . are organized around expansive notions of learning and mediated praxis and provide new tools and practices for envisioning new pedagogical arrangements, especially for students from nondominant communities” (p. 100).

The approach embodies a strongly held political commitment to expanding notions of learning and transformative education for members from nondominant communities. Participants collaborate to transform current educational practices, drawing from their experiences and understandings of the social practices in which they are engaged. “By understanding the individual and her or his cultural means in relation to her or his contexts of development,” Gutierrez and Vossoughi argue, “this approach contests the tendency to invoke the Cartesian divide between the individual and the social” (p. 101). For their proponents, social design experiments bring together DBR with an emphasis on participation and who stakeholders are, and how their positioning reflects social and historical context. These concerns are central to the form of heuristic work discussed next.

Developmental work research (DWR) is based in cultural-historical activity theory (Engeström 2000), which holds that human activity is dynamic, driven social interaction that happens in and over time. “Work” has two meanings in this sense. There is the “work” of the activity and the “work” to improve it, both of which happen in a social context over time. The motive for change efforts arises, proponents assert, “from analyzing the contradictions and possibilities in the object [goal of the social activity] and from projecting a new historical form of the object as an expansive solution to the present tensions” (Engeström 2005, p. 186). Like the foregoing heuristic practices, DWR involves an iterative process of analyzing data, creating representations in the activity system that allow participants to recognize how it functions, and how particular ways of doing things have come to exist. These depictions allow participants to understand where these ways of doing things create tensions and contradictions. The core premise is that through understanding these contradictions, the activities can be improved (Leadbetter et al. 2007).

Through its roots in cultural-historical activity theory, DWR examines how a social activity unfolds over time (its historicity) and the different perspectives participants have through their role in the activity, referred to as the "multivoicedness" of the activity. DWR often focuses on workplaces. It is highly collaborative, engaging stakeholders and researchers in coproducing solutions and transforming the social practices of these institutional spaces. In this way, proponents argue, DWR participants become agents of change within their own activity systems.

A "networked improvement community" is a social group, often in a school or school district, that "arranges human and technical resources so that the community is capable of getting better at getting better" (Bryk et al. 2011, p. 131). This type of network productively organizes the expertise of the community to address "complex educational problems." The focus on improvement acknowledges the complexity of educational systems, the dynamics of classrooms, the distinctive features of school communities, and the high demands placed on educators seeking to respond to learners' individual and collective needs. "Networked improvement" speaks to how educators respond to the complexity of these problems by developing ways of working to support and improve the quality of work across these diverse educational settings (Bryk 2015). Thus a networked improvement community is an intentionally formed social organization with rules and norms of participation that lay out the goals, the plans to address them, and ways to document and evaluate what emerges. These goals and plans evolve into – and come to depend on – a shared language to describe and analyze the problems and the context. The language also supports agreed upon protocols to challenge what is not working (Bryk et al. 2011).

The eighth heuristic approach is **lesson study**. With a long-standing history in Japanese classrooms that proponents trace to the early 1900s, lesson study has been described as both a form of collegial professional development and a research-based process for focusing teaching on student learning. The purpose of a lesson study is agreed upon by the practitioners, usually fellow teachers, who are engaging in the study. They identify a common pedagogical problem or learning goal and collaboratively develop a lesson that one person then teaches, while the others participants observe and document what happens. After this public enactment, the participants gather to share their observations and revise the original plan based on their insights. The observers may later reteach the lesson with their own students following the modified lesson plan. In many cases, multiple iterations of the original lesson plan are created and enacted in order to improve the outcomes and reach the desired goals (Fernandez 2002).

A highlight of the approach, which proponents contend makes lesson study a powerful tool for improving teaching, are the norms of participation that go well beyond the study of the particular lesson itself. The lessons are referred to as "study" or "research" lessons because the teachers systematically examine how the teaching is achieving the agreed upon objective (Fernandez et al. 2003). In this way, the approach can go beyond the study of specific lessons to embrace systematic forms of inquiry into particular types of teaching practices or subject matters. The process of lesson study is directed and undertaken by teachers thus creating peer-learning opportunities. This integrated bottom-up engagement in research is supported,

from a sociocultural point of view, in the ways in which many of the norms and conditions in the Japanese educational system support teachers (Fernandez 2002).

Disseminating Heuristic Research

Publications can serve as social representations of the work of a professional or disciplinary community. Investigating their number and timing can map how, in this case, a particular form of research has taken hold and spread within and across these socio-professional communities. In order to gauge how the heuristic approach has coalesced, we undertook a version of this broad strategy. In a sense, our analysis is an abbreviated form of “reception study” (e.g. Lee, Murphy, and Baker 2015; also Swales 2012; Swales and Leeder 2012). We focused on the eight terms as “social facts” (Freeman 2016), using citation information to chart their uptake across research communities. We searched two databases– the Educational Resources Information Center (ERIC) database and the Modern Language Association (MLA) International Bibliography– to identify articles that refer to these eight heuristic practices. We used “natural language” searching, reasoning that the terms authors had chosen in their titles and abstracts would provide more direct access to their use of the ideas as social facts (Freeman 2016).

Our intent was to overview each form of heuristic research specifically and to track the dissemination of knowledge within the approach more broadly. Using this bibliographic methodology, we were able first to identify studies that included one of these eight forms of heuristic research. By examining when and where the articles were published, we have been able to organize a timeline and geography that reflects how the heuristic approach has become established as a form of research. Clearly, these particular database searches did not surface all the publication activity associated with these forms of research, and these analyses do not represent a full-fledged reception study (Swales 2012). They do, however, offer a panoramic view of how these eight forms of heuristic research have become established in the fields of educational research generally and in language teaching research.

Insights into the Heuristic Perspective

Development of the Heuristic Approach over Time

The first analysis (Table 1) reflects the development of the heuristic perspective over time through these eight forms of research. Just under half of the studies we identified (3822 out of 8129, or 47%) have been published since 2010. Even the forms of heuristic research, such as “action research” or “lesson study,” that have been more widely cited over a longer time show a higher number of publications since 2010. Some forms like “design-based implementation research” or “networked improvement communities” have entered the field of educational research very recently and thus show a smaller number of publications in the last 7 years.

Table 1 Publications associated with the heuristic approach to educational research (listed chronologically)

Research strategy	First appears in databases	# of publications per decade							Total
		1950s	1960s	1970s	1980s	1990s	2000s	2010s	
Action research	1959	1	42	137	281	1216	2260	2975	6912
Lesson study	1961	–	1	2	0	1	117	250	371
Participatory action research	1982	–	–	–	11	67	213	451	742
Developmental work research	1989	–	–	–	1	–	–	15	16
Design based research	2003	–	–	–	–	–	78	344	422
Social design experiments	2009	–	–	–	–	–	–	4	4
Design-based implementation research	2011	–	–	–	–	–	–	24	24
Networked improvement communities	2015	–	–	–	–	–	–	9	9
Total^a	–	1	42	137	293	1283	2551	3822	8129

^aThe totals combine entries indexed in the two databases: Educational Resources Information Center (ERIC) database and the Modern Language Association (MLA) International Bibliography

"Family" Relationships Among Studies Within the Heuristic Approach

Through this exploration of published research activity, we further see that some strategies have had a longer and more established presence, often through extending or specifying the particular scope and focus. For instance, "participatory action research" seems to have started in the 1980s as a particular specification of "action research" that attends explicitly to perceived power imbalance between researchers and non-researchers. The aim is to contribute to what its proponents have called more resilient ecosystems and communities (Ballard and Belsky 2010). Likewise, "design-based implementation research" (DBIR) has been conceived by its proponents as a form of "design-based research" that aims to simultaneously develop interventions and to improve their implementation. As Penuel et al. (2011) argue, "the [DBIR] approach represents an expansion of design research, which typically focuses on classrooms, to include development and testing of innovations that foster alignment and coordination of supports for improving teaching and learning" (p. 331). Similarly, "social design experiments" differ somewhat from conventional "design-based research" by emphasizing how the research process can be co-constructed through effective partnerships with members of the community (Gutierrez and Jurow 2016).

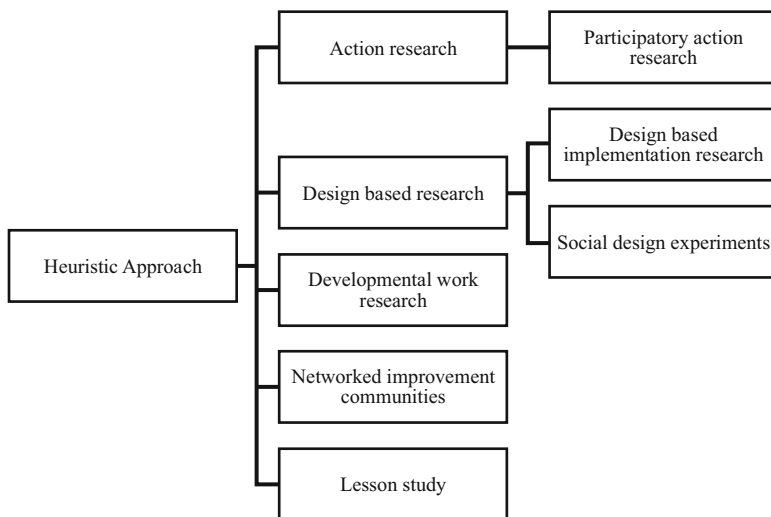


Fig. 2 Family connections among research forms within the heuristic approach

Figure 2 represents these “family” interconnections among the eight research strategies graphically, showing how they have developed over time to build and extend the heuristic approach.

The Geography of Heuristic Studies

This analysis of heuristic forms also offers insight into their geography, where the different strategies arose, and the core text in each one is shown in Table 2. To identify the core text, we simply took the article that is most frequently cited for each strategy.

As is evident above, some of the research strategies (e.g., action research) have been taken up globally in the field of educational research, while others (e.g., networked school improvement communities) have a particular geographical locus. These differences may be due, at least in part, to the length of history and greater volume of publication activity. For example, Lewin’s article, “Action Research and Minority Problems,” published in 1946 is the progenitor of heuristic work, which is reflected in the almost 7000 citations in publications around the world. In contrast, for example, “networked school improvement communities” was first written about in 2015 and has only nine citations at the time of writing (2018), all of which are with a US focus.

“Lesson study” is an interesting counterexample to this argument that a longer history leads to broader uptake. First written about in English in the early 1960s, the strategy has a comparatively long history, but the number of citations and their

Table 2 Geographical locus and leading references for each form of heuristic research (listed chronologically)

Form	Geographical locus	Most frequently cited reference ^a
Action research	United States; Europe; Australia; Global	Lewin (1946)
Lesson study	Japan and United States	Fernandez (2002)
Participatory action research	United States and Latin America	McTaggart (1991)
Developmental work research	Scandinavia/Global	Engestrom (2000)
Design-based research	United States	Anderson and Shattuck (2012)
Social design experiments	United States	Gutierrez and Vossoughi (2010)
Design-based implementation research	United States	Penuel et al. (2011)
Networked improvement communities	United States	Bryk et al. (2011)

^aThe references in Table 2 were selected based on the number of citations in Web of Science database as an indicator of the spread and uptake of the articles in the educational field

geographical range are modest. We located 371 citations in English-medium journals, 250 or 67% of which have appeared since 2010. The strategy originated in Japan as a form of professional development (Lewis et al. 2006) and was introduced to the Anglophone research community largely through the work of Lewis (Lewis et al. 2004, 2006) and Fernandez (Fernandez 2002; Fernandez et al. 2003). Although it shares the features of heuristic research strategies more generally, lesson study is usually considered a form of professional development rather than of research, which may account for the modest uptake in refereed publications.

Heuristic Research in ELT

To examine how these eight forms of heuristic research have been taken up in language teaching, we employed the same methodology using “natural language” terms to search the two databases. To identify research studies, we combined each of the eight terms with a series of four descriptors: “second language instruction,” “English language teaching,” “TESOL,” and “foreign language teaching.”

The results, in Table 3, showed that five of the forms – action research, design-based research, participatory action research, lesson study, and networked improvement communities – have found their way into language teaching research, while three, developmental work research, social design experiments, and design-based implementation research per se, have not. As we found in the general search, *action research* is by far the most prevalent form of heuristic research, while the four other forms that were surfaced in this analysis were

Table 3 Publications in ELT associated with the heuristic approach (Listed by frequency)

Descriptors				
Research strategy	“Second language instruction”	“English language teaching”	“TESOL”	“Foreign language teaching”
Action research	525	98	61	17
Design-based research	27	3	3	0
Participatory action research	12	0	1	0
Lesson study	7	3	1	1
Networked improvement communities	1	0	0	0
Total	572	104	67	18

cited much less often. We have included exemplars of the five forms from ELT in Appendix A.

The search process was itself more complicated in language teaching because of the overlap among, and subjective application of, the four descriptors. A study might have been tagged with more than one descriptor, which made the using percentages to represent the relative impact of each of the eight forms inaccurate. The different emphases and nuances among the descriptors identified different numbers of studies. For instance, the search for “design-based research AND second language instruction” identified 27 studies at the time of writing, while the search for “design-based research AND foreign language teaching” resulted in none. These differences are an indication for us of the dynamism of research activity in the language teaching community and the evolving ways in which they choose to represent their work to others in the field.

A Framework for Heuristic Research Work

The combined examinations of work in general education and in ELT allow us to map a loosely held common structure that is shared among the eight forms of heuristic research. We have distilled these shared aspects as *purpose*, *participants*, *intervention*, *time (duration and frequency of interactions)*, *understandings*, and *explanations*. Each aspect represents a decision point in developing and implementing a heuristically oriented study, so we have framed them as questions. The key terms in each question in Fig. 3 connect it to subsequent aspects and questions in the research process. To organize the aspects, we distinguish three domains in heuristic work, each of which addresses the *intervention*. The first domain – *developing the intervention* – concerns the role of the intervention in the specific setting. Decisions include determining *stakeholders*, **who** needs to be involved; the *purpose*, **why** the intervention is needed and makes sense to

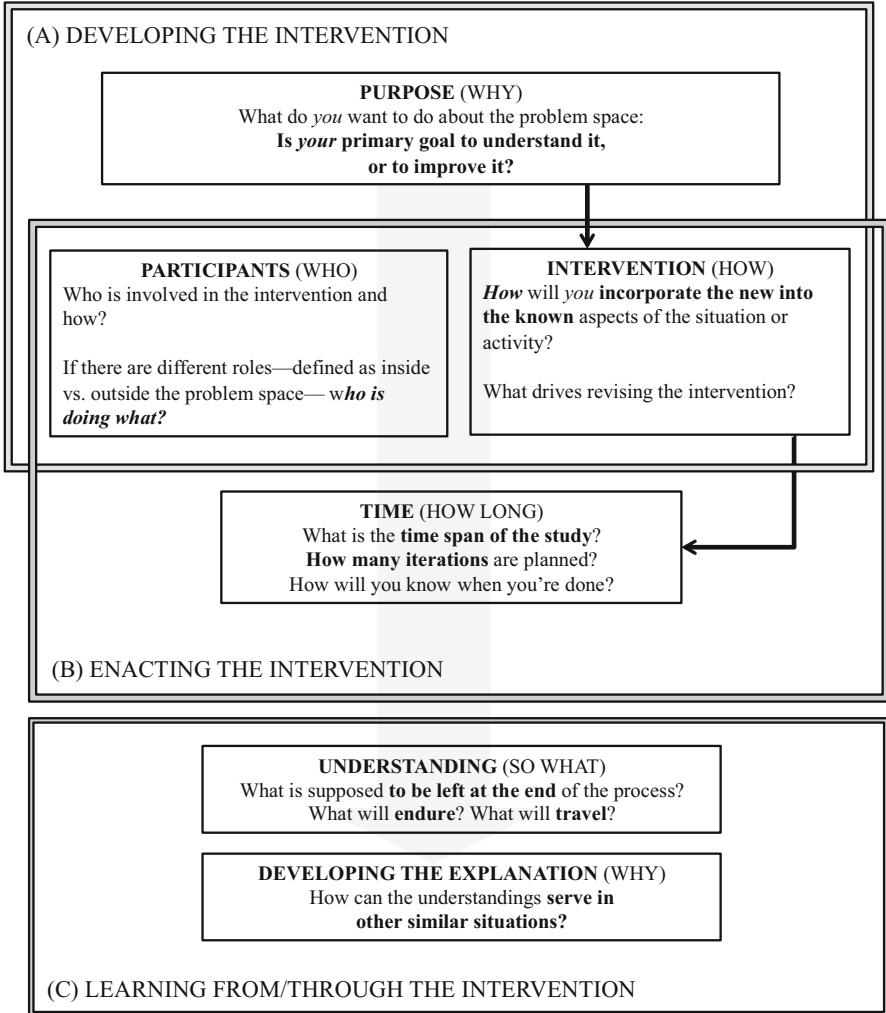


Fig. 3 Framework for heuristic research work

undertake; and **how** the intervention happens within the ongoing activity of the participants' social worlds.

The second domain – *enacting the intervention* – positions the participants and the intervention in time. Introducing time brings decisions about the three dimensions of time in heuristic work discussed previously: when to start the intervention (timing); of *duration* over time, **how long** will the intervention process run; and *frequency* in time, how many times of the intervention will be iterated. Time as the fundamental characteristic of heuristic work leads to the third domain: *learning from and through the intervention*. This domain responds to the question **so what**:

What is – or can be – learned from doing the intervention? Focusing on the *understandings* gained from the intervention entails abstracting knowledge from the specifics of the social context to develop *explanations* for what happened with the intervention that can travel to, and be applied in, other similar situations. This third dimension highlights the iterative nature of the heuristic process as new purposes and refinements of the interventions arise from considering what happened. Figure 3 maps the flow of these aspects and the questions and decisions associated with them.

Conclusion: “Heuristic” as Means and as Process

This chapter has assembled eight forms of research that share a “family resemblance” which we have labeled “heuristic.” We have defined heuristic research as work that makes, studies, and develops explanations for changes in social phenomena in order to improve practices and outcomes for the participants. These heuristic forms of research arise from a common premise that social environments are more than settings or contexts for the research process, they are the source of issues, means for examining them, and ultimately provide the validation for the work itself. This orientation to working with and through social phenomena is particularly suited to problems and issues in education. The heuristic research process recasts the typical roles of research expert and experiment subject to frame everyone as participants. The process takes time as the central mechanism for the study. All of which reshapes what can be taken from one heuristic study to other contexts. Instead of generalizations, there are descriptions of what has happened accompanied by explanations.

Examining this family of forms of research helps to recognize the basic truth that studying a phenomenon always changes it, even in subtle and unacknowledged ways. Heuristic work simply builds from that truth to reveal the agency of those working in the situation and makes these intentions central to study and change. This makes the work “heuristic” as we have said in two senses: it focuses on interventions as heuristic means to understand what is happening in the social situation and activity, and it uses time, in the form of trial and error, as a heuristic process.

Cross-References

- ▶ [Action Research in English Language Teaching: Contributions and Recent Developments](#)
- ▶ [Autonomy and Its Role in English Language Learning: Practice and Research](#)
- ▶ [Critical Research in English Language Teaching](#)
- ▶ [Mediating L2 Learning through Classroom Interaction](#)
- ▶ [Qualitative Approaches to Classroom Research on English-Medium Instruction](#)

Appendix A

Exemplars of publication for different forms of heuristic research in the field of ELT

Form of heuristic work	Exemplar from English Language Teaching	Type of publication
Action research	Burns (2005)	Paper in peer-reviewed journal
	Burns (2009)	Book
Lesson study	Anwar (2015)	Paper in peer-reviewed journal
Participatory action research	Malebese (2017)	Paper in peer-reviewed journal
Networked improvement communities	Li (2015)	Dissertation
Design-based research	Hung (2017)	Paper in peer-reviewed journal

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