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Learning transfer in English-for-academic-purposes contexts: A systematic review of research

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A B S T R A C T

A fundamental goal of EAP instruction is learning transfer to students' other courses. Although research has provided evidence of such transfer, gaps exist regarding its circumstances. However, a related body of research, focusing on learning in EAP contexts, is of value here: While this research does not provide evidence of transfer specifically to other courses, it does provide evidence of transfer across situations in EAP contexts, and an analysis of this can shed light on transfer to other courses. Therefore, 41 studies that investigated learning in EAP contexts were analyzed using the transfer taxonomy (Barnett & Ceci, 2002) (i.e., a 9-dimension analytic tool developed to clarify research on transfer and used to analyze studies in experimental psychology). This analysis revealed much about what is possible for transfer in EAP contexts, specifically that (a) instruction can result in transfer, and such transfer can (b) involve various kinds of learning, (c) have a positive impact on the quality of students' work, (d) occur in situations that place minimal demands on students' memories and in situations that place greater demands on students' memories, and (e) occur across varying distances. Implications for research and practice in EAP contexts are discussed.

1. Introduction

English for academic purposes (EAP) describes "any English teaching that relates to a study purpose" (Dudley-Evans & St. John, 1998, p.34). In other words, EAP instruction aims to help students who are non-native speakers of English to participate in academic contexts or in academic activities that involve the use of English, for example to study in English-medium elementary/secondary schools, colleges, and universities. It is critical, then, that when students are participating in such contexts or activities, they are able to successfully apply whatever EAP instruction has helped them to learn. This is reflected in the notion that the goals of EAP instruction are "transcendent" (Leki & Carson, 1997, p.39). Meeting these goals therefore involves *learning transfer*, which occurs "when learning in one context or with one set of materials impacts on performance in another context or with another set of materials" (Perkins & Salomon, 1994, p.6452). For EAP instruction to be considered successful, learning transfer is necessary.

However, promoting learning transfer from EAP instruction poses a substantial challenge. Generally speaking, successful learning does not automatically lead to successful transfer: A vast body of research findings in psychology, education, and human resources development indicates that learning does not inevitably transfer and that transfer can be difficult to stimulate (e.g., see reviews by Detterman, 1993, and Haskell, 2001). Furthermore, academic contexts in which transfer is

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expected to occur are complex. In these contexts, students often need to be able to participate in a variety of activities that deal with diverse issues from a range of disciplines, and this must be done in a regularly shifting landscape of people (e.g., teachers and classmates) and places (e.g., classrooms) over an extended period of time (e.g., 3 or 4 years in a secondary school, 4 years in undergraduate studies). Furthermore, these activities may not include explicit clues (e.g., in a teacher's instructions) that lessons learned during EAP instruction would be helpful, and when transfer does occur, it may involve various kinds of learning (e.g., a strategy for listening to lectures, a rule for documenting sources) and various kinds of impacts (e.g., higher grades, faster work). This complexity is apparent in needs analysis research that has identified numerous challenges faced by non-native speakers of English in English-medium academic contexts (e.g., Bacha & Bahous, 2008; Bosher & Smalkoski, 2002; Cheng & Fox, 2008; Evans & Green, 2007; Harklau, 1994; Leki, 2001, 2003, 2006; Spack, 1997; Waters, 1996). The challenges are evident, for example, in the model of communicative language proficiency in academic contexts developed by Chapelle, Grabe, and Berns (1997). This model describes academic language use as occurring in at least 12 different settings (e.g., classroom, laboratory, library, office), with 40 different text types (e.g., informal conversations, lectures, textbooks, research papers), involving 21 different kinds of tasks (e.g., comprehending main idea and details, inferring, persuading, summarizing); based on these numbers, the academic activities in which students participate could involve any of over 10,000 different combinations of setting, text type, and task type.

Amplifying this challenge is the complexity of transfer itself, as transfer can be influenced by multiple factors and can occur in multiple ways. For example, one factor that can influence transfer is the degree of similarity/difference between situations. Perkins and Salomon (1994) distinguished between *near transfer*, which occurs between similar situations, and *far transfer*, which occurs between different situations, and researchers have pointed out that near transfer is easier to achieve than far transfer (e.g., Brooks & Dansereau, 1987; Clark & Voogel, 1985; Detterman, 1993; McKeachie, 1987). Another factor that can influence transfer is the learning involved. Perkins and Salomon (1988) explained that transfer can occur along the *low road*, which means transfer involves "the automatic triggering of well-practiced routines" (p.25), or along the *high road*, which means transfer involves "deliberate mindful abstraction of skill or knowledge" (p.25); therefore, specific facts or procedures may be expected to transfer differently than general principles or rules. A third factor that can influence transfer is the presence of clues. Detterman (1993) pointed out that many studies that claimed to show transfer involved "just telling the subject to transfer by using hints or outright suggestions" or "manipulations that call the subject's attention, in obvious ways, to what the experimenter expects on the transfer problem" (p.15). Finally, whether transfer is identified depends on the impact one looks for. Perkins and Salomon (1994) pointed out that the impact of transfer can be positive or negative. Furthermore, this impact might involve different aspects of an activity, for example efficacy (e.g., the quality of a student's work), efficiency (e.g., the speed of a student's work), or approach (e.g., the procedure a student uses).

Despite the substantial challenge, evidence does exist to suggest that learning can transfer from EAP instruction to students' work in other courses. Such evidence comes from studies of EAP instruction in various contexts, including institutions of higher education in Australia (Dooey, 2010; Terraschke & Wahid, 2011), Bahrain (Hayes, Holden-Rachiotis, Kavanagh, & Otoom, 2011), Canada (Currie, 1999; James, 2006a), New Zealand (Basturkmen & Lewis, 2002), and the United States (James, 2010; Kasper, 1997; Leki, 1995; Leki & Carson, 1994; Moulton & Holmes, 2000; Snow & Brinton, 1988; Song, 2006; Spack, 1997).

However, gaps are apparent because these findings provide limited detail about the transfer that occurred. Some of these studies produced evidence of transfer through analyses of academic records of students: Kasper (1997) and Song (2006) compared students who received content-based EAP instruction to students who received non-content-based EAP instruction and found that the former group outperformed the latter in terms of success in subsequent English courses, graduation rates, and overall GPA. This superior performance suggests that content-based EAP instruction led to some kind of transfer; however, beyond a general indication of where transfer occurred, the circumstances associated with this transfer are unclear.

Although more information is available in the studies in which evidence of transfer came from students' reports (i.e., in survey questionnaires, interviews, or email dialogs) and from students' performance (i.e., on writing tasks in other courses), there are still important gaps. These studies point to various kinds of learning that can transfer from EAP instruction to students' work in other courses, including learning related to reading (Hayes et al., 2011; James, 2006a; Snow & Brinton, 1988; Spack, 1997; Terraschke & Wahid, 2011), writing (Basturkmen & Lewis, 2002; Dooey, 2010; Hayes et al., 2011; James, 2006a, 2010; Leki, 1995; Leki & Carson, 1994; Moulton & Holmes, 2000; Snow & Brinton, 1988; Terraschke & Wahid, 2011), listening (Hayes et al., 2011; James, 2006a; Snow & Brinton, 1988), speaking (James, 2006a; Moulton & Holmes, 2000), and academic study in general, for example managing time (Hayes et al., 2011; Snow & Brinton, 1988), finding sources (Leki & Carson, 1994; Moulton & Holmes, 2000), preparing for tests (James, 2006a), and conducting analyses (Currie, 1999). However, there is little detailed information about this transfer in terms of impact or the characteristics of the activities involved. Furthermore, there is little information about the relationship between EAP instruction and the learning that transferred. In some studies (Leki 1995; Leki & Carson, 1994), students were asked about EAP courses they had taken in the past, without reference to any specific EAP courses. The other studies focused on specific EAP courses, but because non-experimental research designs were involved, it is difficult to determine what role the EAP instruction played in any transfer, for example whether the EAP instruction helped students to learn new skills or to improve existing skills, and whether the EAP instruction was the only source of support for this learning. Pointing to this potential problem, James (2010) explained that the transfer observed in that study could have originated in the EAP course under investigation but could also have originated elsewhere, and suggested that "to generate sharper images of the impact that particular instructional settings (e.g., a specific EAP writing course) have on transfer, future research might examine more directly the learning that occurs in that instructional setting" (p.199).

These gaps reflect researchers' concerns that not enough is known about learning transfer in EAP contexts (e.g., Leki & Carson, 1994; Snow, 1993; Spack, 1997), and point to important questions. If transfer occurs, what kind of transfer is it? Is it near transfer or far transfer? Is it spontaneous or solicited? Does it involve learning that is relatively specific or relatively general? What impact does it have? Given the complexity of academic contexts, various kinds of transfer are likely desirable. Unfortunately, the research reviewed above (i.e., the existing research that has provided evidence of transfer from EAP instruction to students' work in other courses) provides insufficient detail to shed much light on the kinds of transfer that may occur.

However, there is a related body of empirical research that can be examined to gain an understanding of transfer in EAP contexts: experimental studies of student learning in EAP contexts. The label *learning transfer* points to the obviously close relationship between transfer and learning, and researchers have suggested that the border between these two constructs is "fuzzy" (Butterfield, Slocum, & Nelson, 1993; Gott, Parker Hall, Pokorny, Dibble, & Glaser, 1993; Perkins & Salomon, 1988, p.22). One way to view the relationship is the suggestion by Gick and Holyoak (1987) that a distinction between learning and transfer is on a continuum: "We take the view that no empirical or theoretical chasm separates transfer from the general topic of learning. Rather, the consequences of prior learning can be measured for a continuum of subsequent tasks that range from those that are mere repetitions (self-transfer), to those that are highly similar (near transfer), to those that are very different (far transfer)" (p.10). As will be explained below, while experimental studies of student learning in EAP contexts do not provide evidence of transfer from EAP instruction specifically to other courses, they do provide evidence of transfer across situations in EAP contexts, and an analysis of this can shed light on transfer to other courses. Also, the picture of transfer that these studies provide is detailed, and can therefore be systematically examined with an analytic tool called the transfer taxonomy.

1.1. The transfer taxonomy

Building on the idea of near/far transfer (Perkins & Salomon, 1994), Barnett and Ceci (2002) developed the transfer taxonomy to bring clarity to the extensive collection of research findings on learning transfer. The taxonomy views transfer as near versus far in terms of six dimensions of activities: (a) knowledge domain (e.g., whether activities deal with similar topics); (b) physical context (e.g., whether activities are in the same location and involve the same people); (c) temporal context (e.g., whether activities occur around the same time); (d) functional context (e.g., whether activities have similar purposes [e.g., to get grades, to make friends]); (e) social context (e.g., whether activities are all collaborative, or all individual); (f) modality (e.g., whether activities have a similar format [e.g., multiple-choice, essay]). Besides these six dimensions that deal with transfer distance, the taxonomy also includes three dimensions that describe the nature of the learning that transfers:

- specificity-generality (i.e., whether the learning that transfers involves specific facts or procedures vs. general principles or rules). For example, a student's understanding that audience should be taken into account when writing in English (i.e., a general principle) might transfer differently (e.g., along the high road rather than the low road [Perkins & Salomon, 1988]) than knowledge of a 5-paragraph structure for writing English essays (i.e., a specific procedure).
- performance change (i.e., whether transfer involves an improvement in the quality or accuracy of a student's work, the speed of the student's work, or the way the student carries out her/his work). For example, with instruction that focuses on developing a student's speaking fluency in English, transfer might be expected in terms of increased speed; with instruction that focuses on developing a student's written accuracy in English, transfer might be expected in terms of improved quality of writing; with instruction that focuses on helping students to learn a collection of study strategies, transfer might be expected in terms of students' reported use of these strategies.
- memory demands (i.e., whether transfer is spontaneous or is the result of hints or instructions). For example, transfer may be more likely during activities that include explicit references to skills learned during EAP instruction than during activities that do not include such references.

  In terms of context, the nine-dimensions of this taxonomy focus on transfer between situations in general; the taxonomy can therefore appropriately be used to examine transfer between situations regardless of whether the situations happen to be, for example, in two different courses or within one course.

A view of transfer through the lens provided by this taxonomy is valuable. Barnett and Ceci (2002) used the taxonomy to analyze a collection of 14 well-known transfer studies in psychology. The analysis generated substantial detail about this collection of studies and revealed useful patterns. For example, in terms of similarities, in all 14 studies, the observed transfer was near on at least 3 of 6 dimensions; this highlights the need for further research on far transfer. In terms of differences, although all of the studies reported finding transfer, 9 of the 14 studies had actually looked at transfer in a unique way (i.e., with a unique combination of near dimensions and far dimensions); this highlights the need for care in interpreting the findings of any individual study. The analysis was therefore valuable in clarifying what is known about transfer from existing psychology research, for example showing that "instances of far transfer … are documentable and may even be predictable once the relevant dimensions are specified" (Barnett & Ceci, 2002, p.634). The analysis also successfully shone a bright light ahead by revealing specific gaps that can be filled with future research.

With this in mind, the current investigation examines transfer in EAP contexts through the lens provided by the transfer taxonomy. The main question guiding this investigation is: What, if anything, can be learned about transfer in EAP contexts by applying this framework?

2. Methodology

As pointed out above, empirical research that has produced evidence of transfer from EAP instruction to students' work in other courses provides only a general picture of this phenomenon. Most of the details targeted by the transfer taxonomy are not available in these studies. Thus, while the taxonomy points in directions that might be taken in future research, applying the taxonomy to these studies would reveal little.

However, there is a collection of existing empirical research in EAP contexts that is a suitable and worthwhile focus for an immediate application of the transfer taxonomy: the substantial collection of experimental studies of student learning in EAP contexts. Although these studies typically make no explicit connections to transfer, those that report successful student learning do in fact involve transfer. The design of these studies required students to demonstrate learning, and any demonstration of learning, by definition, involves transfer. This can be seen in researchers' conceptualizions of transfer as involving application of prior learning not only in subsequent situations that are very different (e.g., *displacement/creative transfer* [Haskell, 2001], *far transfer* [Gick & Holyoak, 1987]), but also in subsequent situations that are very similar (e.g., *near transfer* [Gick & Holyoak, 1987]), for example when "after having learned about a word processing system, one is then able to apply the learning to actually operating a word processor" (Haskell, 2001, p.29). In other words, transfer is conceptualized as *any* application of prior learning, a point echoed in James's (2007) argument that an individual's performance of learned L2 knowledge and skills across tasks is an example of transfer. Furthermore, experimental studies of student learning in EAP contexts typically involve an instructional period followed by some kind of posttest that is meant to elicit students' performance of what was learned during the instructional period. From the perspective of the definition of transfer offered by Perkins and Salomon (1994), the instructional period involves "learning in one context or with one set of materials", and the posttest then examines students' "performance in another context or with another set of materials" (p.6452). Therefore, if reports of student learning in EAP contexts have been based on performance on a posttest, those studies have involved transfer.

In addition, experimental studies of student learning in EAP contexts are structurally similar to studies that have been analyzed with the transfer taxonomy. To illustrate, the following list describes four studies. The first two (Chen & Klahr, 1999; Vanderstoep & Shaughnessy, 1997) explicitly focused on transfer and were among those studies analyzed with the transfer taxonomy by Barnett and Ceci (2002); the second two (Halenko & Jones, 2011; Shehadeh, 2011) are experimental studies of student learning in EAP contexts that did not explicitly focus on transfer and that were selected for the current investigation:

- Chen and Klahr (1999) examined the impact of instruction on elementary school students' scientific reasoning skills (i.e., students' ability to design experiments and make valid inferences). 87 elementary school students participated in a pretest and three post-tests, all of which involved doing hands-on science experiments (e.g., comparing springs of different sizes to see what variables influence how far the springs stretch). After the pretest, some of the students were given an explanation and examples of how to design experiments, while the rest of the students did not receive this training. Findings showed that the students who had received the training significantly improved their performance from pretest to posttests, while the other students did not.
- Vanderstoep and Shaughnessy (1997) examined the impact of instruction about research methods on university students' reasoning skills. Two groups of undergraduate students participated. One group was enrolled in a research methods course, and the other group was enrolled in a developmental psychology course. Both groups took a pretest at the beginning of the semester and a posttest at the end of the semester, and these tests measured statistical reasoning and methodological reasoning (e.g., recognizing everyday examples of the law of large numbers or spurious causal relations). Scores from pretest to posttest improved significantly more for students in the research methods course than for students in the developmental psychology course.
- Halenko and Jones (2011) examined the impact of English instruction for non-native speakers of English studying at a university in the UK. The students were in two EAP classes; one class participated in six hours of instruction on strategies for making appropriate requests in academic contexts (e.g., asking for help in a library); the other class did not receive this instruction. The classes were given a discourse completion test before and again after this six-hour instructional period. These tests required students to read brief descriptions of several scenarios and for each one to write a question they would ask if they were in that scenario. The results showed that the two classes performed comparably on the pretest; however, the class that had received instruction showed significant gains on the posttest, while the other class did not.
- Shehadeh (2011) examined the impact of English instruction for non-native speakers of English studying at a university in the United Arab Emirates, where some of the students' subject courses (i.e., mathematics and information technology) were English-medium. This study focused on the impact of collaborative activities on the development of writing skills over a 16-week instructional period. During this period, one group of students did a variety of writing activities (e.g., writing a paragraph to describe a picture, a town, something that happened when shopping) in pairs, while another group did such activities individually. The two groups were given a writing test at the beginning and again at the end of this

instructional period: The pretest asked them to write a paragraph describing their house, and the posttest asked them to write a paragraph describing the university campus. The results showed no difference between the two groups on the pretest, but on the posttest, the group that had done instructional activities collaboratively significantly outperformed the group that had done instructional activities individually.

Although there are superficial differences between these studies, at a deeper level they are similar in that in all four studies, students learned something during an instructional period that they then applied on a posttest. In other words, all four studies involved transfer. Since the first two studies are typical of those that have been successfully analyzed with the transfer taxonomy, it is reasonable that the other two studies – which are typical of experimental studies of student learning in EAP contexts – are also suitable candidates for such an analysis.

One potential concern about analyzing this collection of studies is that they did not examine student performance in courses beyond the English instruction students were receiving, and therefore may not shed light on the fundamental question of whether learning transfers from EAP instruction to students' work in other courses. However, *other courses* is a complicated notion: Transfer from EAP instruction might occur to other courses that are (a) very different from the EAP instruction (e.g., taught by a different instructor, during a different semester, in a different classroom or building, involving different subject matter, and taken by a different group of students), (b) very similar to the EAP instruction (e.g., taught during the same semester, in the same classroom or building, involving similar subject matter, taken by many of the same students, and even taught by the same instructor), or (c) similar in some ways to but different in other ways from the EAP instruction. Because of this complexity, an understanding of specific characteristics of situations in which transfer occurs is valuable. Such an understanding *can* come from an analysis of experimental studies of student learning in EAP contexts: Transfer observed in any of these studies occurs in a situation (i.e., a posttest) that may be similar to or different from the learning situation (e.g., an instructional treatment) in terms of location, time, subject matter, people involved, and so on, and these are all ways that other courses may be similar to or different from EAP instruction.

With this in mind, experimental studies that have shown student learning in EAP contexts are a suitable focus for an application of the transfer taxonomy. Such an application is worthwhile because a more detailed picture may emerge regarding where and how transfer in EAP contexts occurs. A more detailed picture will help illuminate potentially fruitful future directions for transfer-related research in EAP contexts. More importantly, a more detailed picture may, as Barnett and Ceci (2002) suggested, make it possible to predict where transfer is likely to occur.

Therefore, I gathered a collection of suitable studies and analyzed them with the transfer taxonomy. To gather studies, I used the following criteria:

- conducted in an EAP context. This included studies that self-identified with the labels "English for academic purposes" or "EAP", as well as studies that did not use these labels but that had been conducted with non-native speakers of English who were already involved in or would shortly be entering English-medium academic studies and were receiving some kind of English language support, or who were taking English-as-a-second-language courses that had an explicit academic focus (e.g., called "academic writing"). I did not include studies that took place in an intensive English program at an English-medium university unless it was clear that the students in that program were in or were planning to attend university programs. The included studies therefore were all set in academic contexts, though they did not necessarily involve EAP "courses" nor treatments that might be seen as typical forms of EAP instruction: Flexibility seemed appropriate here given the inconsistent use of labels for courses, the range of forms that EAP instruction can take (e.g., discipline-specific vs. discipline-general [Dudley-Evans & St. John, 1998; Jordan, 1997], or combinations of these), and the possibility that an EAP course may contain "non-EAP components" like a grammar/vocabulary workshop or information about social/survival English (Jordan, 1997). Consequently, these studies reflect Dudley-Evans and St. John's (1998) broad definition of EAP instruction (quoted at the beginning of this article) and explanation that EAP instruction occurs in a variety of contexts: in countries where English is widely spoken as a first language as well as in countries where English is not widely spoken as a first language, and in institutions that are completely English-medium, partly English-medium (i.e., some subject courses are taught in English and other subject courses are taught in students' first language), and not English-medium (i.e., all subject courses are taught in students' first language, and courses focusing on English language are offered, e.g., to help develop skills for reading English textbooks).
- involved participants above first grade (i.e., approximately age 6). Most of the studies that appeared in the search results involved students at post-secondary or secondary levels of education, and several involved students at elementary level. Of the latter, I excluded those that focused on students in preschool, kindergarten, and first grade because I assumed that, in these very early grades, the academic work that English instruction supports may be relatively limited.
- used an experimental or quasi-experimental research design. I included studies that self-identified with the labels "experimental" or "quasi-experimental"; however, I also included studies that did not use these labels but involved some variation of an experimental/control group and pretest-posttest design, or a time series design (i.e., one group that was tested at multiple times);
- included findings that showed instruction had led to learning that students could demonstrate. I therefore excluded studies that met the above criteria but did not show any performance difference between experimental and control groups. For example, if studies showed instruction had *not* led to learning that students could demonstrate, it would be

difficult to draw conclusions specifically about transfer: Not being able to demonstrate learning could be the result of a problem with learning rather than with transfer. Also, the original application of the transfer taxonomy by Barnett and Ceci (2002) focused on studies in which transfer occurred and excluded studies in which transfer had not occurred, and it made sense to try to use that application as much as possible as a model for the current investigation. Studies I excluded here were also any that (a) involved only self-report data (e.g., questionnaires, interviews, reflection essays), (b) focused on affective outcomes, and/or (c) focused on independent variables besides instruction (e.g., age of arrival).

- were published in a book or peer-reviewed journal. Studies that met all of the above criteria came in a variety of forms, including chapters in edited books, articles in refereed and non-refereed journals, unpublished master's and doctoral dissertations, program evaluation reports, and conference proceedings. I chose to aim for consistency by limiting the analysis to book chapters and peer-reviewed journal articles.
- provided enough detail that they could be analyzed meaningfully with the transfer taxonomy. Studies that met the above criteria would do little to meet the purpose of this paper if they provided insufficient relevant details about their research designs. If a study lacked details related to one or two of the dimensions of the taxonomy, I included the study; if there were more gaps than two, however, I excluded the study.

With these criteria in mind, I searched for studies in several stages in Fall 2012. First, I searched under the ERIC thesaurus descriptor "English for academic purposes" for books and articles that indicated peer review. Since the number of records was under 600, I read through all the records, looking for studies that met the rest of the criteria above. This procedure produced eight studies, in seven independent sources (i.e., one of the sources described two studies). Then, assuming that English for academic studies would not all have been categorized under that thesaurus descriptor in the ERIC database, I expanded the search. Since my focus was on the impact of instruction, I searched through one more thesaurus category in ERIC: "Second language instruction". The number of peer reviewed books and articles in this category is over 13,000, so this time I used the following keyword search terms to narrow the field: "intervention", "treatment", "experiment", "control group", "comparison group", "significant difference", "significant improvement", and "significant gain". The total number of unique records that this series of searches produced was almost 850. I read through all these records to find studies that fit the criteria above, and found 33, in 31 independent sources (i.e., two of the sources described two studies each). Finally, having noticed that ERIC does not index several issues (from volumes 5 to 10) of one journal that regularly includes EAP-related scholarly work (i.e., the *Journal of Second Language Writing*), I searched the table of contents for each of those issues. I did not find any relevant studies in that search. Therefore, the total number of studies I found was 41. (These sources are marked with asterisks in this article's reference list.) Of these studies, 32 had been conducted with post-secondary students in or preparing to enter colleges or universities, and 9 had been conducted with students in elementary or secondary schools.

Once I had identified a suitable collection of studies, I analyzed each of the studies using the transfer taxonomy. This involved looking for research design details that were related to each of the nine dimensions of the taxonomy. For example, for *learned skill* I identified the learning (e.g., a grammar point, a list of vocabulary words) that students had demonstrated, for *performance change* I identified the way(s) student performance was quantified (e.g., number of grammatical errors in a text, amount of time to complete an activity), and for *memory demands* I identified the type(s) of activities (e.g., multiple choice questions, open-ended essays) students had to complete on tests. For each of the nine dimensions of the taxonomy, I placed each study into one of two or three categories (see Findings section below). With several studies I could not find sufficient detail for a given dimension, so I categorized the study as "unsure" for that dimension.

3. Findings

Table 1 presents the findings of the analysis related to the content of transfer (i.e., the first three dimensions of the taxonomy). In this table, the *Learned skill* column deals with the nature of the learning that transferred in terms of specificity/generality, in other words whether the learning that transferred involved relatively specific facts or procedures, or relatively general principles or rules. The studies examined here were categorized as *specific* if they focused on phonological awareness (e.g., being able to distinguish between vowel sounds) (Wang & Munro, 2004), pronunciation (e.g., of segmentals) (Saito, 2011), idioms (Boers, Piquer Piriz, Stengers, & Eyckmans, 2009), words (Boers, Eyckmans, Kappel, Stengers, & Demecheleer, 2006; Deconinck, Boers, & Eyckmans, 2010; Fehr et al., 2012; Hermann, 2003; Kim, 2008; Laufer & Rozovski-Roitblat, 2011; Li, 1988; Lindstromberg & Boers, 2005; Mancilla-Martinez, 2010; Pauwels, 2012; Sánchez, 2004; Tian & Macaro, 2012; Townsend & Collins, 2009; Vaughn et al., 2009), or discipline-related concepts (e.g., the violation of slaves' human rights) (Vaughn et al., 2009). On the other hand, studies were categorized as *general* if they focused on grammar rules (i.e., syntax, morphology) (Bitchener & Knoch, 2010; Chandler, 2003; Evans, Hartshorn, & Strong-Krause, 2011; Herman & Flanigan, 1995; Kieffer & Lesaux, 2012; Radwan, 2005; Sheen et al., 2009; Sheen, 2010; Tyler, Mueller, & Ho, 2010; Yang & Lyster, 2010; Zhang, 2008), language functions (e.g., showing sarcasm, asking questions) (Ayaduray & Jacobs, 1997; Bouton, 1994; Halenko & Jones, 2011), reading (e.g., comprehension, or strategies like previewing a text and identifying main ideas and supporting details) (Choo, Eng, & Ahmad, 2011; Macalister, 2010; Zhang, 2008), writing (e.g., developing content, organizing) (Henry & Roseberry, 1998; Xing et al., 2008), or critical thinking (Hashemi & Ghanizadeh, 2012). Two studies were categorized as *general* and *specific* because transfer occurred at multiple levels of specificity: words and grammar rules (Esit, 2011), and words and writing skills (Shehadeh, 2011).

Table 1
Content (i.e., What transferred?).

Study	Learned skill	Performance change	Memory demands
Bitchener and Knoch (2010) [a]	General	Accuracy/quality	Recall
Boers et al. (2006) [a]	Specific	Accuracy/quality, speed	Recall
Boers et al. (2009) [a]	Specific	Accuracy/quality	Recall
Bouton (1994) [a]	General	Accuracy/quality	Recognize
Chandler (2003) study 1[a]	General	Accuracy/quality	Recall
Chandler (2003) study 2[a]	General	Accuracy/quality	Recall
Deconinck et al. (2010) [a]	Specific	Accuracy/quality	Recall
Esit (2011) [a]	General, specific	Accuracy/quality	Recognize, recall
Evans et al. (2011) [a]	General	Accuracy/quality	Recall
Halenko and Jones (2011) [a]	General	Accuracy/quality	Recall
Hashemi and Ghanizadeh (2012) [a]	General	Accuracy/quality	Recognize
Henry and Roseberry (1998) [a]	General	Accuracy/quality	Recall
Hermann (2003) [a]	Specific	Accuracy/quality	Recognize, recall
Kim (2008) [a]	Specific	Accuracy/quality	Recognize, recall
Laufer and Rozovski-Roitblat (2011) [a]	Specific	Accuracy/quality	Recognize, recall
Li (1988) [a]	Specific	Accuracy/quality	Recall
Lindstromberg and Boers (2005) study 2[a]	Specific	Accuracy/quality	Recognize, recall
Lindstromberg and Boers (2005) study 3[a]	Specific	Accuracy/quality	Recognize, recall
Macalister (2010) [a]	General	Speed	Recall
Pauwels (2012) [a]	Specific	Accuracy/quality	Recall
Radwan (2005) [a]	General	Accuracy/quality	Recognize, recall
Saito (2011) [a]	General	Accuracy/quality	Recall
Sánchez (2004) [a]	Specific	Accuracy/quality	Recognize, recall
Sheen (2010) [a]	General	Accuracy/quality	Recall
Sheen et al. (2009) [a]	General	Accuracy/quality	Recall
Shehadeh (2011) [a]	General, specific	Accuracy/quality	Recall
Tian and Macaro (2012) [a]	Specific	Accuracy/quality	Recall
Tyler et al. (2010) [a]	General	Accuracy/quality	Recognize
Wang and Munro (2004) [a]	Specific	Accuracy/quality	Recognize
Xing et al. (2008) [a]	General	Approach	Recall
Yang and Lyster (2010) [a]	General	Accuracy/quality	Recall
Zhang (2008) [a]	General	Accuracy/quality	Recognize
Ayaduray and Jacobs (1997) [b]	General	Accuracy/quality, approach	Recall
Choo et al. (2011) [b]	General	Accuracy/quality	Recognize
Fehr et al. (2012) [b]	Specific	Accuracy/quality	Recognize
Herman and Flanigan (1995) [b]	General	Accuracy/quality	Recall
Kieffer and Lesaux (2012) [b]	General	Accuracy/quality	Recognize, recall
Mancilla-Martinez (2010) [b]	Specific	Accuracy/quality	Recognize
Townsend and Collins (2009) [b]	Specific	Accuracy/quality	Recognize, recall
Vaughn et al. (2009) study 1[b]	Specific	Accuracy/quality	Recognize, recall
Vaughn et al. (2009) study 2[b]	Specific	Accuracy/quality	Recognize, recall

[a] Conducted with post-secondary students in or preparing to enter colleges or universities.
[b] Conducted with students in elementary or secondary schools.

The *Performance change* column deals with the impact of transfer, in other words whether there was an improvement in the quality or accuracy of students' work, in the speed of students' work, or in the way students carried out their work. Studies were categorized as *accuracy/quality* if they focused on the correctness students displayed in recognizing or producing words (e.g., matching words with sentences or pictures, providing definitions or translations, using words in a sentence) (Boers et al., 2009; Bouton, 1994; Deconinck et al., 2010; Esit, 2011; Fehr et al., 2012; Hermann, 2003; Kieffer & Lesaux, 2012; Kim, 2008; Laufer & Rozovski-Roitblat, 2011; Li, 1988; Lindstromberg & Boers, 2005; Mancilla-Martinez, 2010; Sánchez, 2004; Tian & Macaro, 2012; Townsend & Collins, 2009; Tyler et al., 2010; Vaughn et al., 2009; Wang & Munro, 2004), recognizing grammar mistakes (Herman & Flanigan, 1995; Radwan, 2005), answering comprehension questions about a text they had read or a topic they had been studying (Choo et al., 2011; Vaughn et al., 2009), answering questions on standardized tests (Hashemi & Ghanizadeh, 2012; Zhang, 2008), or assessing others' English (Lindstromberg & Boers, 2005; Radwan, 2005). In studies that focused on the accuracy/quality of sentences or longer stretches of discourse that students produced, accuracy/quality was judged in various ways, including grammatical or lexical accuracy (Bitchener & Knoch, 2010; Chandler, 2003; Evans et al., 2011; Pauwels, 2012; Radwan, 2005; Sheen, 2010; Sheen et al., 2009; Yang & Lyster, 2010), richness or complexity (Boers et al., 2006), appropriateness (Halenko & Jones, 2011), elaborateness (Ayaduray & Jacobs, 1997), degree of effort involved for a listener (Saito, 2011), texture (i.e., related to coherence) (Henry & Roseberry, 1998), or on a scale of *excellent* to *poor* (Shehadeh, 2011). Studies were categorized as *speed* if they focused on the amount of reading students could accomplish in a given amount of time (Macalister, 2010) or the fluency of students' speaking (Boers et al., 2006). Studies were categorized as *approach* if they focused on the number of certain features (e.g., paragraphs, discourse markers, thesis statements) in students' writing (Xing et al., 2008), or the types of questions students asked during discussions (Ayaduray & Jacobs, 1997). Two studies were placed in multiple categories because transfer was observed through multiple kinds of measurements (Ayaduray & Jacobs, 1997; Boers et al., 2006).

The *Memory demands* column deals with the question of whether transfer occurred in the presence of explicit direction, therefore placing relatively little demand on student memory (i.e., just recognition of something that had been learned), or occurred with less explicit direction, therefore placing more demand on student memory (i.e., not just recognition, but complete recall of something that had been learned). Studies were categorized as *recognize* if they involved activities that had a narrow explicit focus (e.g., word meanings or grammatical form) and provided answers for students to choose (e.g., true/false, multiple choice, matching, judging sentences as grammatical or not, judging sentences on a 5-point scale of naturalness, judging words as familiar or not, judging English sentences and L1 translations on a 3-point scale of similarity, filling in blanks in sentences with words from a provided list) (Bouton, 1994; Choo et al., 2011; Esit, 2011; Fehr et al., 2012; Hashemi & Ghanizadeh, 2012; Hermann, 2003; Kieffer & Lesaux, 2012; Kim, 2008; Laufer & Rozovski-Roitblat, 2011; Lindstromberg & Boers, 2005; Mancilla-Martinez, 2010; Radwan, 2005; Sánchez, 2004; Townsend & Collins, 2009; Tyler et al., 2010; Vaughn et al., 2009; Wang & Munro, 2004; Zhang, 2008). Studies were categorized as *recall* if they had a narrow focus but, rather than providing answers for students to choose, instead required students to produce answers (i.e., written or spoken definitions, sentences, or words) (Boers et al., 2009; Deconinck et al., 2010; Esit, 2011; Halenko & Jones, 2011; Herman & Flanigan, 1995; Hermann, 2003; Kieffer & Lesaux, 2012; Kim, 2008; Laufer & Rozovski-Roitblat, 2011; Li, 1988; Lindstromberg & Boers, 2005; Macalister, 2010; Pauwels, 2012; Saito, 2011; Sánchez, 2004; Sheen, 2010; Tian & Macaro, 2012; Townsend & Collins, 2009; Yang & Lyster, 2010), or if the studies involved open-ended activities like essay writing (Bitchener & Knoch, 2010; Chandler, 2003; Evans et al., 2011; Henry & Roseberry, 1998; Radwan, 2005; Sheen, 2010; Sheen et al., 2009; Shehadeh, 2011; Vaughn et al., 2009; Xing et al., 2008; Yang & Lyster, 2010), interview (Boers et al., 2006), or group discussion (Ayaduray & Jacobs, 1997). Many studies were categorized as *recognize* and *recall* because transfer was observed in multiple kinds of activities.

Table 2 presents the findings of the analysis related to transfer distance (i.e., the remaining six dimensions of the taxonomy). The *Knowledge domain* column deals with transfer distance in terms of topic. Studies were categorized as *near* if the teaching and testing activities involved topics that were similar (e.g., related in both cases to academic disciplines, to current or historical events, to social issues, to everyday activities, to personal experiences, or to fictional stories) (Ayaduray & Jacobs, 1997; Bitchener & Knoch, 2010; Boers et al., 2006; Bouton, 1994; Chandler, 2003; Evans et al., 2011; Halenko & Jones, 2011; Hashemi & Ghanizadeh, 2012; Henry & Roseberry, 1998; Kieffer & Lesaux, 2012; Macalister, 2010; Mancilla-Martinez, 2010; Radwan, 2005; Sheen, 2010; Sheen et al., 2009; Shehadeh, 2011; Tyler et al., 2010; Vaughn et al., 2009; Xing et al., 2008; Yang & Lyster, 2010; Zhang, 2008), or if the teaching and testing activities both involved language that was decontextualized (i.e., lists of words and definitions) and therefore was not associated with any particular topic (Boers et al., 2009; Deconinck et al., 2010; Hermann, 2003; Wang & Munro, 2004). Studies were categorized as *far* if teaching activities involved language that was contextualized and therefore could be linked to a topic but testing activities involved language that was decontextualized (Fehr et al., 2012; Laufer & Rozovski-Roitblat, 2011; Li, 1988; Tian & Macaro, 2012), or vice versa (Lindstromberg & Boers, 2005; Pauwels, 2012). One study was categorized as both *far* and *unsure* because transfer had occurred for multiple groups of students experiencing different teaching activities, and transfer distance was far for some and unsure for others (Pauwels, 2012).

The *Physical context* column deals with transfer distance in terms of the location and people involved. Studies were categorized as *near* if it appeared that teaching and testing activities had occurred in the same location (e.g., classroom, computer lab) and had been overseen by the same individual(s) (e.g., teacher, researcher), for example because these activities had together been part of an existing course (Ayaduray & Jacobs, 1997; Bitchener & Knoch, 2010; Bouton, 1994; Chandler, 2003; Choo et al., 2011; Deconinck et al., 2010; Esit, 2011; Halenko & Jones, 2011; Henry & Roseberry, 1998; Herman & Flanigan, 1995; Hermann, 2003; Kieffer & Lesaux, 2012; Laufer & Rozovski-Roitblat, 2011; Macalister, 2010; Mancilla-Martinez, 2010; Radwan, 2005; Sheen, 2010; Sheen et al., 2009; Shehadeh, 2011; Tyler et al., 2010; Vaughn et al., 2009; Yang & Lyster, 2010; Zhang, 2008) or because these activities had together been arranged specifically for the study and were not part of any existing courses (Boers et al., 2009; Hashemi & Ghanizadeh, 2012; Li, 1988; Lindstromberg & Boers, 2005; Saito, 2011; Wang & Munro, 2004). Studies were categorized as *far* if teaching and testing activities had occurred in different places (e.g., learning in a classroom and testing in a computer lab, or learning online and testing in a face-to-face class) and/or were overseen by different individuals (e.g., learning overseen by a teacher and testing overseen by a researcher, or vice versa) (Boers et al., 2006; Evans et al., 2011; Fehr et al., 2012; Tian & Macaro, 2012; Townsend & Collins, 2009; Xing et al., 2008). One study was placed in both categories because transfer had occurred on two different posttests (i.e., one immediate and one delayed), and these posttests differed in physical context (Kim, 2008).

The *Temporal context* column deals with transfer distance in terms of the interval of time between teaching and testing activities. Studies were categorized as *near* if transfer occurred immediately at the end of the given period of instruction (Ayaduray & Jacobs, 1997; Bitchener & Knoch, 2010; Boers et al., 2006; Boers et al., 2009; Bouton, 1994; Chandler, 2003; Choo et al., 2011; Deconinck et al., 2010; Esit, 2011; Evans et al., 2011; Halenko & Jones, 2011; Hashemi & Ghanizadeh, 2012; Henry & Roseberry, 1998; Herman & Flanigan, 1995; Hermann, 2003; Kieffer & Lesaux, 2012; Kim, 2008; Laufer & Rozovski-Roitblat, 2011; Li, 1988; Lindstromberg & Boers, 2005; Macalister, 2010; Mancilla-Martinez, 2010; Pauwels, 2012; Radwan, 2005; Sheen, 2010; Sheen et al., 2009; Shehadeh, 2011; Townsend & Collins, 2009; Tyler et al., 2010; Vaughn et al., 2009; Wang & Munro, 2004; Xing et al., 2008; Yang & Lyster, 2010; Zhang, 2008). Studies were categorized as *far* if testing was separated from the end of instruction by a delay of one week (Fehr et al., 2012), two weeks (Deconinck et al., 2010; Kim, 2008; Saito, 2011; Tian & Macaro, 2012; Yang & Lyster, 2010), four weeks (Herman & Flanigan, 1995; Radwan, 2005; Sheen, 2010; Sheen et al., 2009), eight weeks (Sánchez, 2004), or ten weeks (Bitchener & Knoch, 2010). Several studies were placed in both categories because transfer had occurred on an immediate posttest and on a delayed posttest.

Table 2
Distance (i.e., When and where did learning transfer?).

Study	Knowledge domain	Physical context	Temporal context	Functional context	Social context	Modality
Bitchener and Knoch (2010) [a]	Near	Near	Near, far	Near	Near	Near
Boers et al. (2006) [a]	Near	Far	Near	Near	Near	Near
Boers et al. (2009) [a]	Near	Near	Near	Near	Near	Far
Bouton (1994) [a]	Near	Near	Near	Near	Far	Far
Chandler (2003) study 1[a]	Near	Near	Near	Near	Near	Near
Chandler (2003) study 2[a]	Near	Near	Near	Near	Near	Near
Deconinck et al. (2010) [a]	Near	Near	Near, far	Near	Near	Far
Esit (2011) [a]	Unsure	Near	Near	Near	Near	Far
Evans et al. (2011) [a]	Near	Far	Near	Near	Near	Near
Halenko and Jones (2011) [a]	Near	Near	Near	Near	Far	Near
Hashemi and Ghanizadeh (2012) [a]	Near	Near	Near	Near	Near	Far
Henry and Roseberry (1998) [a]	Near	Near	Near	Near	Near	Near
Hermann (2003) [a]	Near	Near	Near	Near	Near	Far
Kim (2008) [a]	Unsure	Near, far	Near, far	Near	Near	Far
Laufer and Rozovski-Roitblat (2011) [a]	Far	Near	Near	Near	Near	Near
Li (1988) [a]	Far	Near	Near	Near	Near	Far
Lindstromberg and Boers (2005) study 2 [a]	Far	Near	Near	Near	Far	Far
Lindstromberg and Boers (2005) study 3 [a]	Far	Near	Near	Near	Far	Far
Macalister (2010) [a]	Near	Near	Near	Near	Near	Near
Pauwels (2012) [a]	Far, unsure	Unsure	Near	Near	Near	Far
Radwan (2005) [a]	Near	Near	Near, far	Near	Near	Far
Saito (2011) [a]	Unsure	Near	Far	Near	Near	Near
Sánchez (2004) [a]	Unsure	Unsure	Far	Near	Far	Far
Sheen (2010) [a]	Near	Near	Near, far	Near	Near	Near
Sheen et al. (2009) [a]	Near	Near	Near, far	Near	Near	Near
Shehadeh (2011) [a]	Near	Near	Near	Near	Far	Near
Tian and Macaro (2012) [a]	Far	Far	Far	Near	Near	Far
Tyler et al. (2010) [a]	Near	Near	Near	Near	Near	Near
Wang and Munro (2004) [a]	Near	Near	Near	Near	Near	Near
Xing et al. (2008) [a]	Near	Far	Near	Near	Near	Near
Yang and Lyster (2010) [a]	Near	Near	Near, far	Near	Near	Near
Zhang (2008) [a]	Near	Near	Near	Near	Near	Far
Ayaduray and Jacobs (1997) [b]	Near	Near	Near	Near	Near	Near
Choo et al. (2011) [b]	Unsure	Near	Near	Near	Near	Far
Fehr et al. (2012) [b]	Far	Far	Far	Near	Near	Far
Herman and Flanigan (1995) [b]	Unsure	Near	Near, far	Near	Near	Near
Kieffer and Lesaux (2012) [b]	Near	Near	Near	Near	Near	Far
Mancilla-Martinez (2010) [b]	Near	Near	Near	Near	Near	Far
Townsend and Collins (2009) [b]	Unsure	Far	Near	Near	Near	Near
Vaughn et al. (2009) study 1[b]	Near	Near	Near	Near	Far	Near, far
Vaughn et al. (2009) study 2[b]	Near	Near	Near	Near	Far	Near, far

[a] Conducted with post-secondary students in or preparing to enter colleges or universities.
[b] Conducted with students in elementary or secondary schools.

The *Functional context* column deals with transfer distance in terms of the purpose of teaching and testing activities. All studies were categorized as *near* because it was stated explicitly that students were told the purpose of teaching and testing activities (e.g., because students had to volunteer or give formal consent to participate in the research) (Bitchener & Knoch, 2010; Deconinck et al., 2010; Esit, 2011; Kim, 2008; Lindstromberg & Boers, 2005; Pauwels, 2012; Saito, 2011; Sánchez, 2004; Tian & Macaro, 2012; Townsend & Collins, 2009), or because neither teaching nor testing activities were part of an existing course, and therefore were likely seen by participants as having a research purpose (Boers et al., 2009; Li, 1988; Wang & Munro, 2004), or because teaching and testing activities took place in an existing course and therefore were likely seen by participants as having an educational purpose (Ayaduray & Jacobs, 1997; Boers et al., 2006; Bouton, 1994; Chandler, 2003; Choo et al., 2011; Evans et al., 2011; Fehr et al., 2012; Halenko & Jones, 2011; Hashemi & Ghanizadeh, 2012; Henry & Roseberry, 1998; Herman & Flanigan, 1995; Hermann, 2003; Kieffer & Lesaux, 2012; Laufer & Rozovski-Roitblat, 2011; Macalister, 2010; Mancilla-Martinez, 2010; Radwan, 2005; Sheen, 2010; Sheen et al., 2009; Shehadeh, 2011; Tyler et al., 2010; Vaughn et al., 2009; Xing et al., 2008; Yang & Lyster, 2010; Zhang, 2008).

The *Social context* column deals with transfer distance in terms of the collaborative versus individual nature of teaching and testing activities. Studies were categorized as *near* if teaching and testing activities appeared to both involve work that was collaborative (e.g., group discussion) (Ayaduray & Jacobs, 1997) or individual (e.g., essay writing) (Bitchener & Knoch, 2010; Boers et al., 2006; Boers et al., 2009; Chandler, 2003; Choo et al., 2011; Deconinck et al., 2010; Esit, 2011; Evans et al., 2011; Fehr et al., 2012; Hashemi & Ghanizadeh, 2012; Henry & Roseberry, 1998; Herman & Flanigan, 1995; Hermann, 2003; Kieffer & Lesaux, 2012; Kim, 2008; Laufer & Rozovski-Roitblat, 2011, Li, 1988; Macalister, 2010; Mancilla-Martinez, 2010; Pauwels, 2012; Radwan, 2005; Saito, 2011; Sheen, 2010; Sheen et al., 2009; Tian & Macaro, 2012; Townsend & Collins, 2009; Tyler et al., 2010; Wang & Munro, 2004; Xing et al., 2008; Yang & Lyster, 2010; Zhang, 2008). Studies were categorized as *far* if learning activities appeared to be in only a collaborative format and testing activities appeared to be in

only an individual format (Bouton, 1994; Halenko & Jones, 2011; Lindstromberg & Boers, 2005; Sánchez, 2004; Shehadeh, 2011; Vaughn et al., 2009).

Finally, the *Modality* column deals with transfer distance in terms of the type of activity involved. Studies were categorized as *near* if teaching and testing both focused on similar closed-ended activities (e.g., multiple choice questions) (Tyler et al., 2010; Wang & Munro, 2004), or both focused on similar open-ended activities (e.g., writing an essay about a topic or a set of pictures, writing sentences to fit a scenario, identifying and correcting the grammar mistakes in a text, reading a text) (Ayaduray & Jacobs, 1997; Bitchener & Knoch, 2010; Boers et al., 2006; Chandler, 2003; Evans et al., 2011; Halenko & Jones, 2011; Henry & Roseberry, 1998; Herman & Flanigan, 1995; Macalister, 2010; Saito, 2011; Sheen, 2010; Sheen et al., 2009; Shehadeh, 2011; Townsend & Collins, 2009; Xing et al., 2008; Yang & Lyster, 2010), or both involved similar combinations of closed- and open-ended activities (Laufer & Rozovski-Roitblat, 2011). Studies were categorized as *far* if teaching involved open-ended activities and testing involved closed-ended activities (Bouton, 1994; Choo et al., 2011; Hashemi & Ghanizadeh, 2012; Kieffer & Lesaux, 2012; Mancilla-Martinez, 2010; Sánchez, 2004; Zhang, 2008) or vice versa (Boers et al., 2009; Deconinck et al., 2010; Hermann, 2003; Tian & Macaro, 2012), if teaching activities involved only reading without any student response (e.g., without closed- or open-ended questions) but testing activities required a student response (Esit, 2011; Fehr et al., 2012; Hermann, 2003; Radwan, 2005), if teaching and testing activities involved different types of texts (e.g., a story or extended text vs a list of isolated sentences) (Kim, 2008; Li, 1988; Pauwels, 2012), or if teaching involved students acting out the meanings of words to each other and testing involved a fill-in-the-blanks test (Lindstromberg & Boers, 2005). Two studies (both conducted by Vaughn et al., 2009) were categorized as both *near* and *far* because transfer had involved multiple learning outcomes, and transfer distance was near for some and far for others.

4. Discussion

To summarize, this analysis revealed several patterns. In this collection of studies, content of transfer was balanced in terms of the kinds of learning involved (i.e., 20 studies showed transfer of relatively specific learning, like word meanings, and 23 studies showed transfer of relatively general learning, like grammar rules) and spontaneity (i.e., in 20 studies, transfer involved recognition, and in 33 studies, transfer involved recall); however, content of transfer was imbalanced in that almost all of the studies (i.e., 39) showed the impact of transfer in terms of the improved accuracy or quality of students' work, while only 4 studies showed the impact of transfer in terms of greater efficiency (i.e., speed) or approach. As for transfer distance, in these studies transfer was both near and far, though more often near: Of the six transfer distance dimensions, far transfer occurred the most with modality (i.e., in about 50% of the studies), followed by temporal context (29%), social context (20%), knowledge domain (17%), and physical context (17%), and did not occur with functional context. Furthermore, in any given study, the number of dimensions on which transfer was far tended to be small: In 17% of the studies, transfer was not far on any of the 6 dimensions, and in another 68% of the studies, transfer was far on only 1 or 2 dimensions. The maximum number of dimensions on which transfer was far was 4 (in 2 studies).

The research question that guided this investigation asked what, if anything, can be learned about transfer in EAP contexts by applying the transfer taxonomy. In response, first, it is clear that instruction can result in transfer in a variety of EAP contexts. Each of the 41 studies analyzed here provided evidence of instruction leading to transfer, and these studies were conducted in a range of contexts and with a combined sample size of almost 2500 students. Second, such transfer can involve various kinds of learning, including learning that is relatively specific (e.g., knowledge of words, phonemes) as well as learning that is more general (e.g., knowledge of grammar rules, reading and writing strategies). Third, such transfer can have a positive impact on the quality of students' work; it is, however, less certain that such transfer can influence the speed of students' work or the way students do their work. Fourth, such transfer can occur when minimal demands are placed on students' memories (i.e., when students are asked to recognize something), but also when greater demands are placed on students' memories (i.e., when students have to recall something); in other words, such transfer can at times occur relatively spontaneously. Finally, such transfer can occur across varying distances, in other words when situations appear to be very similar, but also when situations may differ in one or more key ways. This application of the transfer taxonomy therefore reveals much about what is possible for transfer in EAP contexts.

The findings of this investigation complement the existing collection of studies that have provided evidence of transfer from EAP instruction to students' work in other courses. Some of those studies showed transfer to other courses, but provided little detail regarding what transferred or where (Kasper, 1997; Song, 2006). Others provided more detail by showing transfer of different kinds of learning, but provided little detail about the impact or spontaneity of transfer or about the dimensions of transfer distance (Basturkmen & Lewis, 2002; Currie, 1999; Dooey, 2010; Hayes et al., 2011; James, 2006a, 2010; Leki, 1995; Leki & Carson, 1994; Moulton & Holmes, 2000; Snow & Brinton, 1988; Spack, 1997; Terraschke & Wahid, 2011). The findings of the current investigation help fill these gaps by showing in detail what kinds of learning can be transferred by students in EAP contexts, what kind of impact such transfer can have, whether such transfer can be spontaneous, and what distance such transfer can cover. Furthermore, the focus in this investigation on studies with experimental designs helps to clarify the role of instruction in transfer, because unlike studies that used non-experimental designs, the learning that transferred in these studies can be connected more directly to the instruction that students received. The result is a clearer picture of the potential of EAP instruction to help students deal with the complex academic settings they must navigate (e.g., Bacha & Bahous, 2008; Bosher & Smalkoski, 2002; Chapelle et al., 1997; Cheng & Fox, 2008; Evans & Green, 2007; Harklau, 1994; Leki, 2001, 2003, 2006; Spack, 1997; Waters, 1996).

The findings of this investigation have implications for research on transfer in EAP contexts. First, this investigation draws attention to important gaps in existing research on EAP instruction. Few if any empirical studies have investigated transfer from EAP instruction to students' work in other courses with the kind of multi-dimensional perspective that the transfer taxonomy (Barnett & Ceci, 2002) provides. Experimental studies of student learning in EAP contexts are helpful here, but the amount of existing research of this kind is also surprisingly small. Given the importance of transfer in EAP contexts, there is a clear need for more empirical research in this area, particularly designs (e.g., experiments) that reveal a range of details about the kinds of transfer that may occur. Second, this investigation provides detailed information about a substantial collection of relevant studies, and this information should be useful when future studies must be precisely situated in a body of existing research findings. Third, this investigation demonstrates the applicability of the transfer taxonomy (Barnett & Ceci, 2002) in bringing into greater focus the findings of existing transfer-related research in EAP contexts; so, as research on this topic expands beyond the collection of studies analyzed here, it would be reasonable to consider using this tool again to bring newer collections of findings into focus. Finally, the findings of this investigation can help in the creation of an agenda for future research on transfer in EAP contexts, since these findings point to a range of questions that still need to be answered. For example, considering the content of transfer, one might ask whether general knowledge (e.g., grammar rules, reading and writing strategies) transfers farther than specific knowledge (e.g., phonemes, words), whether transfer that involves improved accuracy/quality of student work is related to students' speed and/or approach, and whether transfer occurs when there is minimal support (e.g., no hints or instructions) or negative support (e.g., classmates or instructors in other courses say negative things when students make an effort to transfer). Furthermore, considering transfer distance, one might ask whether transfer occurs in ways not observed in this analysis, for example across functional boundaries or periods of time beyond a few months. One might also ask how students themselves judge transfer distance, for example where and how they see boundaries between knowledge domains or types of tasks. This is a particularly important question because researchers have pointed out that perceived similarity/difference is ultimately more important to transfer than is objectively-measured similarity/difference (Gick & Holyoak, 1987; Haskell, 2001; James, 2008; Pea, 1987). Finally, one might ask whether learning transfers when the distance is far on not just one or two of the taxonomy's dimensions, but on most or all of these dimensions: Given the complexity of academic contexts, it is likely that some potential transfer situations will be far in numerous ways.

The findings of this investigation also have practical implications for EAP educators. First, because it seems clear that instruction can result in transfer in EAP contexts, these findings can be seen as helping to justify in a general way the provision of EAP instruction. Furthermore, since in many of these analyzed studies transfer was near on most dimensions, educators may benefit from placing at least some emphasis on near transfer; although EAP instruction is already often designed to be similar to target situations (e.g., students' other courses), near transfer might be emphasized by ensuring these similarities reflect as many dimensions of the transfer taxonomy as possible. EAP educators should, however, be cautious about expecting transfer when target situations differ from EAP instruction in numerous ways. For example, it may be common for a student to find her/himself in another course that differs from EAP instruction in terms of subject matter (e.g., from a different discipline), location (e.g., in a different classroom and with a different teacher), and time (e.g., in a subsequent semester); although many of the studies examined in this analysis were categorized as far along 1 or 2 dimensions, only 2 of the 41 studies (Fehr et al., 2012; Tian & Macaro, 2012) were categorized as far in terms of this combination of 3 dimensions. This does not mean transfer in such situations will not occur, but it does suggest that until research can shed further light in this area, expectations for such transfer may not be prudent. In the meantime, EAP educators who wish to attempt to promote multi-dimensional far transfer can draw on practical techniques that have been suggested for teaching for far transfer (Fogarty, Perkins, & Barell, 1992; James, 2006b; Perkins & Salomon, 1988), for example by having students anticipate applying learning in diverse settings, learn general principles, think analogically, solve multiple parallel problems, and monitor and reflect on their work.

In conclusion, this investigation has limitations that should be kept in mind when interpreting the findings. First, this investigation focused only on studies that had generated evidence of transfer, and this may give the impression that transfer is common in EAP contexts. However, it cannot be assumed that EAP instruction will lead to transfer (e.g., James, 2010; Spack, 1997), so while the current analysis has revealed details about what is *possible* with transfer in EAP contexts, such transfer should not be seen as *inevitable*. Second, in identifying studies to include, the selection criteria were meant to be (a) specific enough to ensure that the chosen studies were of sufficient relevance and quality and (b) flexible enough that the number of chosen studies would be substantial. However, it is possible that the selection procedure missed some potentially relevant studies, and such studies, had they been included, may have altered the patterns that emerged. Also, the selected studies reflected a variety of EAP contexts, so depending on one's perspective some of the studies may be viewed as less typical of EAP instruction than others. Third, in analyzing the studies, I tried to stay as close as possible to the original description and application of the transfer taxonomy (Barnett & Ceci, 2002). This meant using a relatively small number of categories (i.e., two or three) for any dimension (e.g., *near* vs *far*; *accuracy/quality* vs *speed* vs *approach*); while the result is an analysis that is sufficiently detailed for the purpose of the current investigation, such a system of categorization means some detail inevitably gets set aside. A closer look might be taken, for example, at transfer specificity/generality, because a given target learning outcome can be taught in a variety of ways (e.g., giving students a rule and showing them one example, or showing students multiple examples and asking them to create a rule), some of which might lead to deeper learning than others. A closer look might also be taken at transfer distance, because in a given study, teaching and/or testing might involve multiple activities, and distance might vary depending on which activities are considered. In this investigation, I took a conservative approach with transfer distance, in that if there was *any* overlap between teaching and testing (e.g., some but not all of the teaching

activities were similar to testing activities), I categorized the resulting transfer as *near*; in future research, a relatively narrow focus on specific activities may help in adding detail to this view of transfer distance. Fourth, when categorizing each of the studies, wherever possible I based decisions on explicit, unambiguous information about their research designs. However, some studies did not include sufficient explicit information, so I made inferences based on related features of the research design (or, where this was not possible, categorized the study as "unsure"). Therefore, I assume that the inferences made reflect the actual research designs used in these studies. Finally, while this investigation has shed light on the nature of transfer in EAP contexts, little can be concluded about *how* EAP instruction might promote or inhibit transfer. For example, might there be instructional techniques that are particularly effective for promoting transfer? Might there be instructional techniques that are less effective for promoting, or perhaps inhibit, learning transfer? Research on these particular questions, and related issues, would be an effective way to build on the findings presented here.

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