Thematic Patterns in International Blended Learning Literature, Research, Practices, and Terminology

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Abstract

The goal of this research was to discover and compare themes of the top blended learning (BL) articles from seven different regions of the world. Top cited articles in BL from these regions show strong similarities in research processes, practice, terminology, and focus. Small differences are apparent among the regions and top articles in general, but similar patterns demonstrate that themes might promote collaboration and exchange between regions and that the most cited articles from around the world could fit well within the topical, research, and publication practices of the field. Our results suggest that although different regions must have their own nuances and needs, they have much in common, with considerable potential to learn from one another and collaborate on shared interests.

Keywords: Blended learning; hybrid learning; international; literature review; themes

Spring, K. J. & Graham, C. R. (2017). Thematic patterns in international blended learning literature, research, practices, and terminology. *Online Learning, 21*(4), 337-361. doi: 10.24059/olj.v21i4.998

Thematic Patterns in International Blended Learning Literature, Research, Practices, and Terminology

Previous research has studied the trends in top-cited blended learning (BL) research overall (Halverson, Graham, Spring, & Drysdale, 2012; Halverson, Graham, Spring, Drysdale, & Henrie, 2014). That these top-cited articles were predominantly drawn from North American publications generated questions about BL research in other regions which had not garnered enough citations to qualify for the top lists. We sought to compare regions on a more even base by applying the analysis methods of our earlier research to top-cited articles each from seven regions of the world as well as top-cited research spanning multiple regions.

Recently authors Spring and Graham (2016) located the 10 most-cited BL articles from each worldwide region and analyzed the citation and publication patterns around the globe, as well as citing between top articles in order to compile a broad overview of connections between research in the worldwide BL community. The current research extends the analysis using similar methods to Halverson et al. (2014) and Drysdale et al. (2013). This study examines and documents

the themes of those top-cited international articles in an effort to better understand the research community's interests and concerns.

Review of Related Literature

We have defined *blended learning* broadly as the combination of face-to-face and computer-mediated instruction (Graham, 2006). Marked disagreement on the precise definition of BL exists within the field (Bernard, Borokhovski, Schmid, Tamim, & Abrami, 2014; Oliver & Trigwell, 2005). Discrepancies across definitions involve the amount of seat time, the proportion of online learning to face-to-face instruction, and the quality of the educational experience (Graham, 2013). A broad definition can be useful as it allows space for adaptation to individual needs and contexts (Graham, 2013; Norberg, Dziuban, & Moskal, 2011). We selected a broad definition to avoid limiting the "great potentials of the concept" (p. 443) and to remain as open as possible to different conceptions of blending around the world (Alammary, Sherad, & Carbone, 2014, p. 443).

The term *blended learning* has been used inside and outside of North America for over a decade. Studies in many international locations have been conducted over this time, but so far none has attempted to compare worldwide regions to determine if there are substantive differences in the research being explored in different regions. In the following paragraphs we highlight some of the research that has addressed the global trend of blended learning.

Collis and van der Wende (2002) surveyed educators in Europe, Australia, and the USA about *informational communications technology* (ICT). Though not specifically focused on BL, they identified blended learning as an important emerging trend. Only 3.5% of total respondents were from the USA with the remainder of the responses coming from Europe and Australia. This early research considered information from seven countries in three regions, and findings suggested a strong emerging interest in BL across these regions. Additional evidence that blended learning was an emerging worldwide trend was found in the largest section of the Handbook of Blended Learning (Bonk & Graham, 2006), which contained twelve cases of blended learning from around the world, plus an additional three chapters that focused on multinational blended learning perspectives. In the same handbook, Bonk, Kim, and Zeng (2006) researched the present and future of e-learning. More than 60% of post-secondary institutions were using BL, but in fewer than 20% of their courses. Over 70% anticipated blending more than 40% of their courses by 2013. The corporate sphere had similar responses: 86% were blending already, and around 60% anticipated blending 40% of courses by 2013. Bonk et al. (2006) considered these results to suggest that BL would be a lasting trend, which has so far been accurate. This research cast a wide net to grasp the current situation and make future predictions for BL; these were positive, but generally limited to North America.

A Delphi study including experts from around the world (North America, Asia Pacific, Europe and beyond) considered how BL could support collaborative learning (So & Bonk, 2010). These experts generally agreed that BL "offers unique opportunities for international collaboration" (So & Bonk, 2010, p. 197). They also suggested that new adopters will need examples of international collaboration to effectively navigate this and other complexities of BL (So & Bonk 2010). Though it is encouraging that experts are positive about international collaboration, this and other research omits both specific examples of BL collaboration and explanations as to why it is possible and advantageous.

In 2011 Barbour et al. asked researchers in more than 60 countries about their experiences in K-12 online and BL, creating country profiles for nations in six world regions. While these country profiles are thorough and informative, they do not allow comparison between nations or regions and prevent formation of a wide view of BL around the world.

Much in-depth research has been done on individual cases of BL worldwide (Boitshwarelo, 2009; Hoic-Bozic, Mornar, & Boticki, 2009; Llambi et al., 2011). Also a few examples of research have concentrated on a larger region. Tham and Tham (2013) analyzed BL in China, Japan, South Korea, and Singapore to reveal issues important to instructors and students in Asia— including culture, pedagogy, and design. More recently researchers have collected case studies from the Asia-Pacific region to facilitate sharing and support BL within and beyond the region (Lim & Wang, 2016). Similarly, Unwin (2005) presented principles for using ICT to train teachers in Africa. This research covers discrete contexts and does not seek to draw conclusions about what might be shared among regions.

Spring and Graham (2016) discovered a large discrepancy in the numbers of citations from different regions, with a strong bias toward North America. Because of this, international perspectives on BL outside of North America may not be fully represented in the existing citation pattern and thematic trends research. We felt that it is important to listen to and learn from the BL research happening in diverse contexts around the world. This research seeks to look at and compare BL research in seven worldwide regions by locating and comparing trends across the top-cited BL research in each individual region.

Research Questions

In order to compare BL research across regions, we asked the following research questions:

1. In each region, what methods of data analysis are described in the most cited articles?
2. In each region, what types of learners and levels of blending are described in the most -cited articles?
3. What terms are used for *blended learning* in the most-cited articles over time and across regions?
4. What themes are addressed in the most-cited articles? Does this differ across regions?
5. How do regions compare with one another and with the top-cited articles in the field in terms of data analysis, learner type, level of blending, terms, and themes?

Methods

Searching and Selection Procedure

The most-cited articles examined in this study were initially identified by Spring and Graham (2016) as the most-cited research articles, according to Google Scholar, focused on BL from each identified region. We included articles published by academic journals in English that were within our broad conception of the BL community, with BL as a central tenant of their research identified by the terms *blended* and/or *hybrid.* We searched for a broad set of terms in several databases in order to locate as many relevant articles as possible. Later we narrowed our returns with more specific inclusion criteria.

Source of publications.

The Education Resource Information Center (ERIC) was our primary database because it covers a large variety of topics on education literature. ERIC provides access to more than 1.4 million records beginning in 1996 (ERIC, 2014). For a more complete perspective we also included Academic Search Premier, Business Source Premier, CINAHL (Cumulative Index to Nursing and Allied Health Literature), and Education Full Text (H.W. Wilson). We chose these databases because of the large number of returns they provided in our initial search of all EBSCO databases, and because they provided a more varied sample of topics, including use of BL in business, health, and other disciplines outside of education (Halverson et al., 2012).

Search terms. Because BL is discussed in many works and is conceptualized in various ways, we ran an initially wide search of related terms. With the ERIC thesaurus capabilities, we searched for descriptors in general educational technology and distance education. We included specific BL phrases in the primary list to search titles, abstracts, keywords, and descriptors in Academic Search Premier, Business Source Premier, CINAHL, Education Full Text (H.W. Wilson), and ERIC:

> "blend* learn*," "blend* environment*," "blend* approach*," "blend* method*," "blend* course*," "blend* class*," "blend instruction," "blend program*," "hybrid learn*," "hybrid course*," "hybrid class*," "hybrid instruction*."

We narrowed our returns from the search for BL terms by adding regional terms. As shown in Figure 1, we divided the globe into seven regions: Africa, Asia, Europe, Latin America, the Middle East, North America, and Oceania. We began separating regions based on the United Nations' composition of regions (indices and data) and further delineated some based on cultural and linguistic boundaries. For example, we placed Mexico in Latin America, though it is usually a part of North America, because it is on the border of the regions and is a Spanish-speaking nation. We divided Western Asia from the rest of Asia and referred to it as the "Middle East," as we felt it was culturally and linguistically unique enough to be examined separately. The final delineations we followed for each region are shown in Figure 1.

We conducted individual searches for each region except North America, employing country names included in that region in addition to the name of the continent and/or region. In some situations, we added or removed short form names (e.g., searching for both *Democratic Republic of the Congo* and *Congo*). We searched for these terms within the full text to encompass any author affiliations (e.g., university) or the research location, and connected a publication with a region based on either criterion. We narrowed each search with blended terms: blend*, hybrid*, or (*online* AND *face-to-face*) to limit the returns to those most likely to be relevant. We also referred to the list of highly cited articles from Halverson et al. (2012) to ensure that none of those articles was overlooked. That list also provided the 10 most-cited articles for North America.

We searched for each relevant publication in Google Scholar to determine the number of citations it had as of June 18-21, 2013. Because of the large number of articles, the search spanned several days. Though some publications might have gained a few citations during that short period, we feel any such changes would be negligible when examining larger patterns. We updated the most-cited lists and citation counts using Google Scholar on March 10, 2016 and ranked publications by citation count to determine the 10 most-cited BL research articles. While it is not possible for Google Scholar (or any other current system) to produce completely accurate citation

counts, we believe it has best suited our needs. We chose Google Scholar because the citation counts and the methods for compiling them are freely accessible, allowing for greater transparency and accuracy (Harzing, 2016; Publisher Support).

We included only English language articles in this research because the researchers are fluent only in English and were not able to confidently identify or analyze works in other languages. We acknowledge, unfortunately, excluding a section of the BL community because of our linguistic limitations. English is, however, the most common language of academic publishing (Blecher, 2007) and research citations (Breeze, 2015). We anticipate that our research could help highlight studies that, although written in English, are acknowledged less because they focus outside of the Anglophone center (Curry & Lillis, 2010; Lillis & Curry, 2010). We included only articles using the terms *blended* or *hybrid* because we were focused on the specific BL community, which we define as existing around these terms. Even authors who discuss important issues with the term *blended* (e.g., Oliver & Trigwell, 2005) use the term in some situations presumably because it is still used by others in the conversation (e.g., Holley & Oliver, 2010). We included work by authors who considered their work part of the BL field (by using the words *blended* or *hybrid)* and made BL (by the basic, broad definition of combining face-to-face and online learning) a central fixture of their work. Our criteria were created to draw some lines around what we see as the BL field, while remaining as inclusive as possible.

Our final list of top articles included 76 publications: 10 each from Asia, Africa, Europe, the Middle East, North America, and Oceania; six from Latin America (the total number of retrieved publications that fit the inclusion criteria); and 10 spanning multiple regions. We were surprised that we were not able to find more than six BL publications from Latin America. While it is possible that there is simply little BL or little BL research happening in the region, we did come across many publications in languages besides English (e.g., Spanish) when searching for Latin American publications. This suggests that authors in that region might have more opportunities to publish in a local language like Spanish or Portuguese and therefore publish less in English.

Figure 1. Map of the seven regions with which top articles were affiliated

Manuscript Coding

We began coding by using a priori categories to determine methods of data analysis (Question 1), types of learners, levels of blending (Question 2), and terms (Question 3) among the most-cited articles. Finally, we used open coding to identify themes in research questions and purposes (Question 4).

Thematic coding. We coded each top article using established codes for context, level of blend, and terminology (Table 1). Context coding categories originated from Graham (2006), and level of blend categories were taken from Halverson et al. (2012); these codes produce an overview of BL practice across regions. Terminology codes acknowledge use of the terms *blended* or *hybrid*, allowing us to examine accepted terms for BL worldwide. Each publication fit into only one code for each category. For example, a publication that would fit in the *blended* code but for a mention of *hybrid* would not be coded *blended* or *hybrid*, but only *blended*+.

Context	Level of Blend	Terminology
K-12	Activity	*Blended*
Higher ed	Course	*Hybrid*
Corporate	Program	*Blended*+*
Multiple	Institution	*Both*
	Multiple	

Note: **Blended*+ denotes a publication that primarily uses the term *blended* but also acknowledges the term *hybrid*. The reverse was also an option, but did not describe any of the top articles.

Table 1. A Priori Codes on the Context of Each Top Publication

We also coded each manuscript based on a priori codes from Drysdale, Graham, Spring, and Halverson (2013) and Halverson et al. (2014, Table 2). To verify reliability of the codes and agreement between coders two trained researchers independently coded 30% of the manuscripts. We selected Cohen's kappa because it considers chance agreement (Cohen, 1960). After training with an initial 20% and attaining a Cohen's kappa score of .69 (substantial), the coders achieved a final score on 10% of the manuscripts of .88 (almost perfect) through discussion and clarification of the codes before independent coding and comparison. The overall kappa achieved was .75 (substantial; Landis & Koch, 1977). Further coding was completed by one of the trained coders once we were confident that the codes were sufficiently objective and the coder could organize the manuscripts appropriately. Another coder was available for verification if questions arose.

Code	Description	Methods
Inferential	Goes beyond initial data to make generalizations beyond the available population	ANOVA, Chi-Square, T-tests, P-value, factory analysis
Descriptive	Identifies themes/patterns with descriptive statistics	Means, medians, standard deviations, codes
Qualitative	Focuses on interpretation of data	Case study, quotations, interviews, focus groups, open-ended surveys
Non-empirical	Forms an argument without empirical data	Literature review, model, theoretical discussion, position, explanation
Gold Star	Combines empirical and non-empirical methods to build and test a theory.	

Table 2. A Priori Codes on Data Analysis Methods

Open coding. We extracted and identified themes in the research questions or purpose statements from each article, loosely following coding schemes from Drysdale et al. (2013) and Halverson et al. (2014). To establish trustworthiness, an independent coder reviewed each placement and suggested adjustments.

Limitations

The main limitation of this research is that we included only articles published in English—an unfortunate result of our linguistic weakness. Also, we covered only a small portion of the totality of articles on BL published around the world. We chose those that were the most-cited, considering those to be the most impactful, but future research could look more broadly at all of the articles in the field or all of the articles on BL in a given region or country for a more complete examination. While we believe that our coding methods were sufficiently rigorous, additional coders can always add further reliability.

Results and Discussion

This research presents a snapshot of BL contexts and themes worldwide.

Methodological Patterns

We coded every article for data analysis methods (Figure 2), placing it in as many analysis methods categories as necessary; thus, the total is above 100%. Descriptive data analysis (60.5%) was the most common type applied in the most-cited articles, though usually in conjunction with other forms of analysis like inferential (18.4%) and qualitative (17.1%). Only 10.5% of the top articles used descriptive methods alone. Non-empirical analysis was found in 19.7% of the top articles; it was the least likely of the methods to be combined with others—which occurred in only seven manuscripts (9.2%). These seven manuscripts constitute our "gold star" category: articles employing both empirical and non-empirical methods and therefore building theory as well as testing it.

We found a healthy mix of data analysis methods among the regions. The Middle East outnumbered other regions in inferential methods (25.8%) and descriptive (18.2%) studies—the

highest percentages for both methods—though those methods were implemented considerably worldwide. Top articles from Europe presented the most theoretical analyses (20.0%), possibly because these articles are generally older and more highly cited than those from other regions, and theoretical articles may prove more relevant than others with the passage of time. Fewer articles from Asia focused on theory (13.3%), but a higher proportion combined theory with empirical data to qualify for the "gold star category" (three articles, 25.0% of the gold stars); no North American or Latin American articles met the "gold star" criterion. Rigorous research methods had been used in the most-cited articles regardless of region, and while regions presented preferences for certain methods, none clearly avoided any particular form of analysis. This suggests that no region should have particular issue with the research methods of any other when evaluating top cited research.

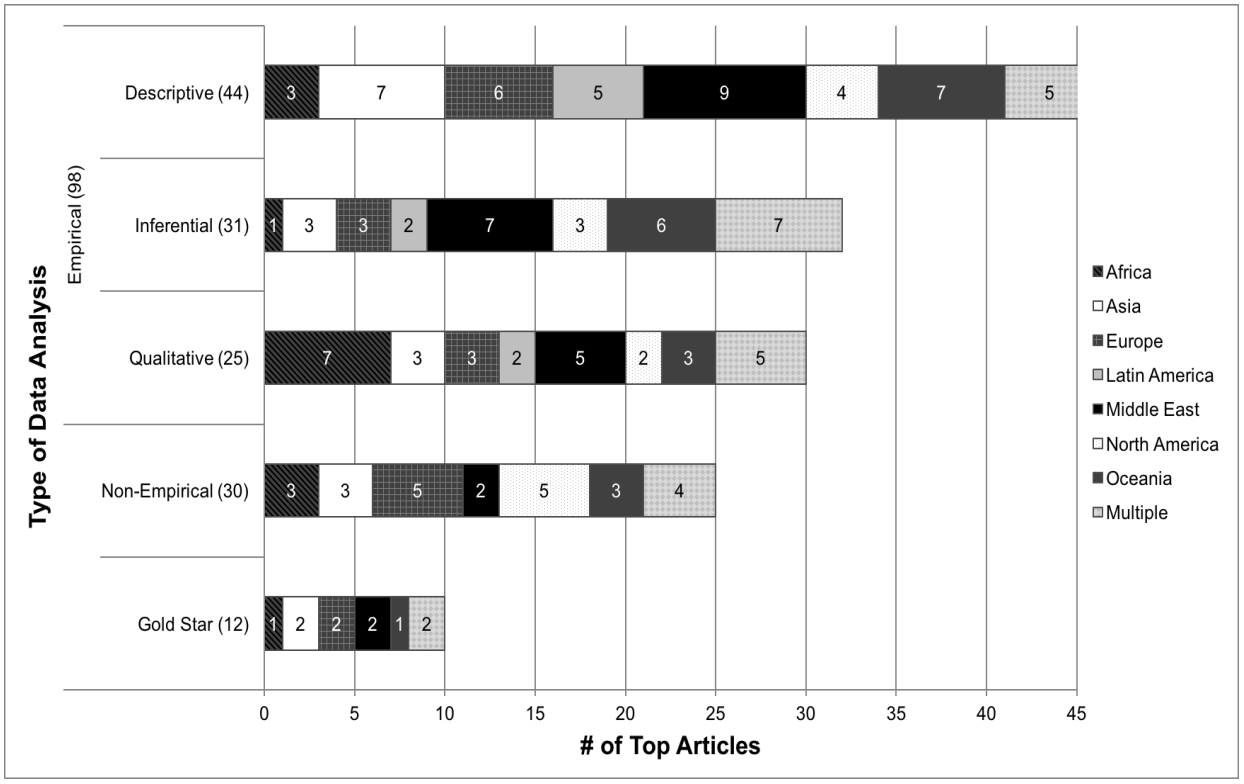

Figure 2. Data analysis methods applied by top-cited blended learning articles differentiated by region. For Latin America N=6; for all other regions N=10.

Learner Type

We saw a focus on higher education (Figure 3), which, reflecting earlier findings, was dominated by North America (Halverson et al., 2012). The fact that our criteria specified research articles—which are often produced by professors and graduate students who have experience with and access to secondary students—likely influenced this. We noted some promising interest in corporate blending in half of the regions, as well as K-12 in three regions. As the top-cited articles in the regions share a common interest in higher education with a smattering of activity in other contexts, learner types should not be a hindrance to international transfer or collaboration in the community.

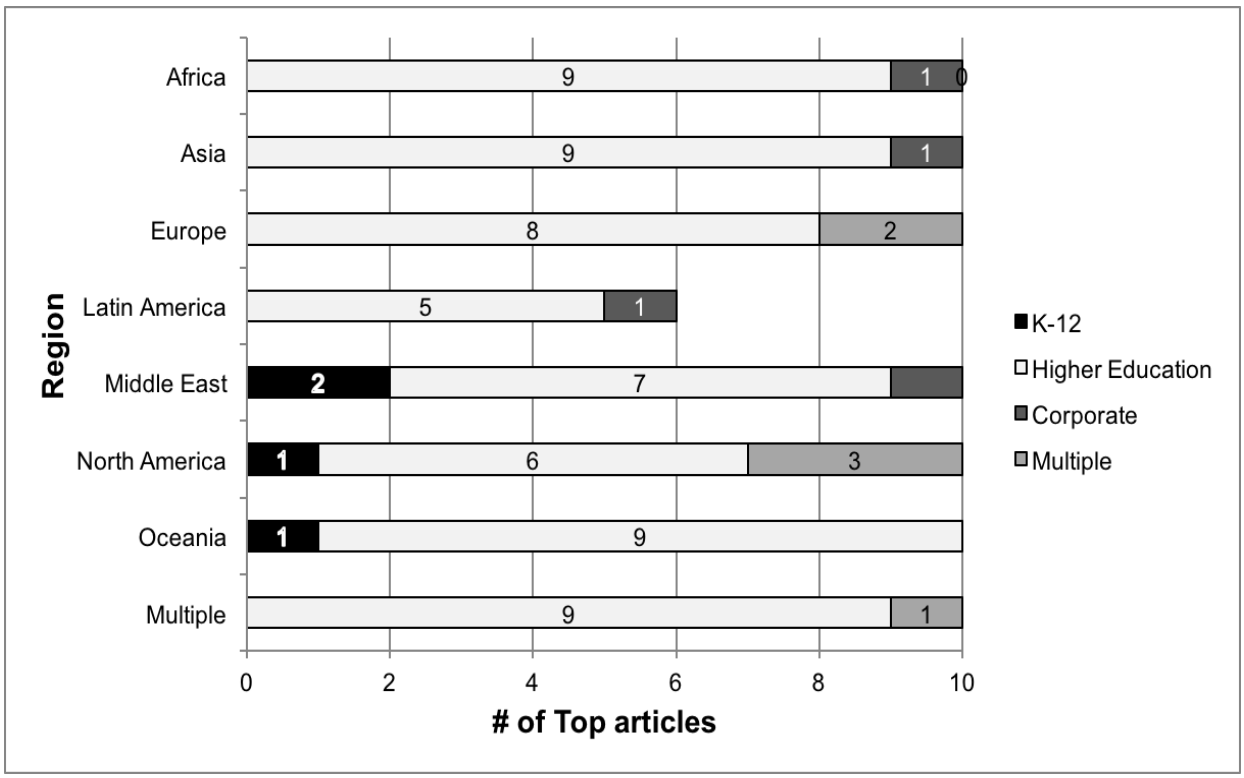

Figure 3. A comparison of regions (y-axis) based on the type of learners featured in each top article

Level of Blend

The majority of articles in almost every region treated course-level blending (Figure 4). We found a strong focus on multiple levels in North America, likely due to several papers focused on the practicalities of blending in general. We saw, however, a much stronger mix in this area than in learner type. Africa presented the most diverse landscape, including all four levels, while Oceania and Asia presented three levels each. Africa may include so much diversity because of its more recent development of BL compared to more established regions, which might allow for greater flexibility and exploration. In this regard, all regions focused mostly on courses and should not be inhibited from sharing or cooperating because of the level of blending practiced or researched.

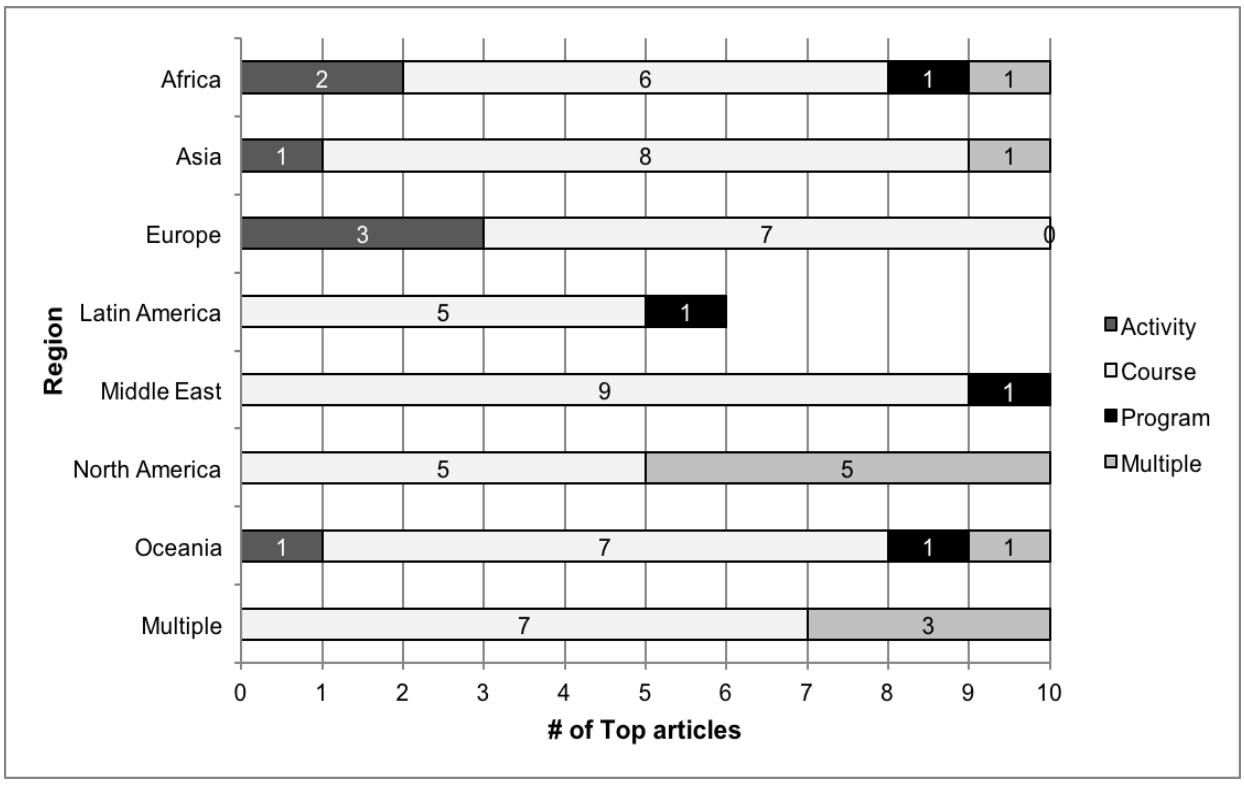

Figure 4. A comparison of regions (y-axis) based on the levels of blending featured in top articles

Terms for Blending

The definition and appropriate term for *blended* learning are still regularly debated (Oliver & Trigwell, 2005; Graham, 2013). The fact that regions differ in the way they understand (a) what blended learning is or (b) what combining online and face-to-face instruction should be called could be a major issue preventing connections between regions. In our searches for the most-cited articles, we were at first limited to the terms that we knew, but we compared the terms in the articles to search for differences among regions. Every region has strongly favored blended, especially as time has passed. Blended is currently the most prevalent term, and has been for several years (Figure 5). The earliest top-cited article (from 2002) used only *hybrid*. Blended became most popular in 2003 and has dominated the field since. More recently, emphasizing *blended* while acknowledging *hybrid* as another name for the same construct has gained acceptance; hybrid is rarely used alone. In more recent years the term hybrid has been used less and less. This decrease could relate to the wide use of the word *hybrid* in other fields.

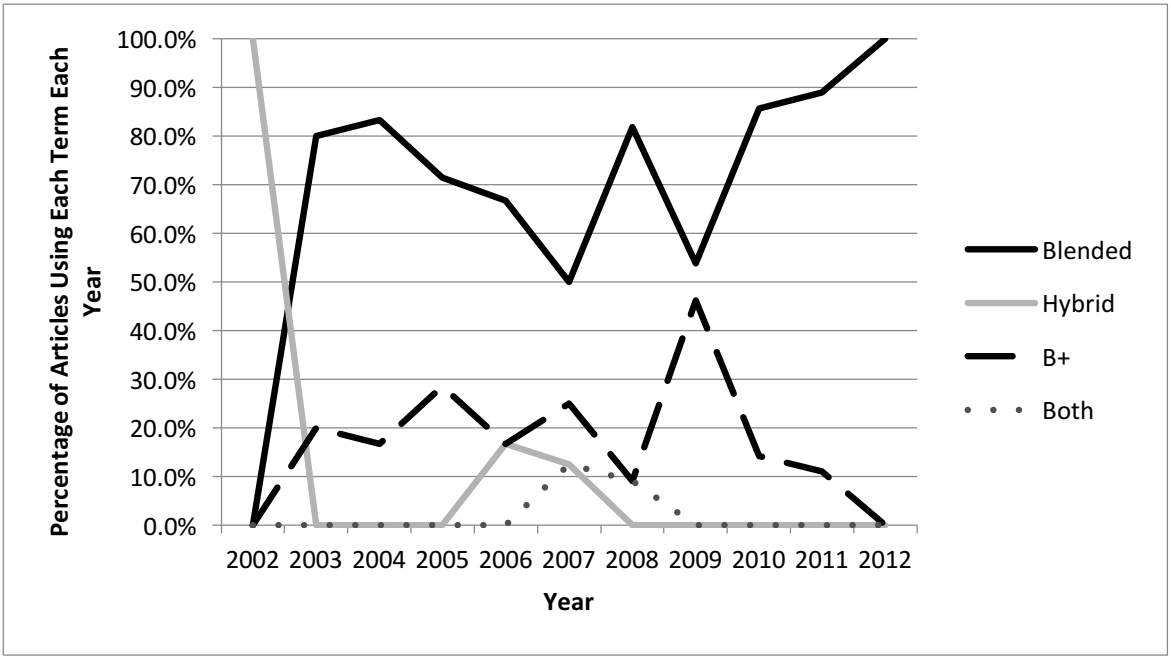

Figure 5. Comparison of blended/hybrid learning terms over time (x-axis). Each term is represented according to the percentage of articles using it each year (y-axis).
Note: **Blended*+ denotes a publication that primarily uses the term *blended* but also acknowledges the term *hybrid*. The reverse was also an option, but did not describe any of the top articles.

Research Questions

Open coding of research questions generated nine primary categories, several of them divided into subcategories (Table 3). Each article supplied one or more research questions or statements expressing purpose and was placed into as many categories as appropriate; therefore, the number of articles totals more than 76, and the percentages total over 100.

Topic	#	%	Subtopics
Learner outcomes	32	42.1%	Cognitive, affective, behavioral
Instructional design	24	31.6%	Models and theories, measurement, best practices, and implementation
Disposition	21	26.4%	Student/faculty perceptions, experience, intention, preferences
Exploration	16	21.1%	Single case, position, discipline specific, literature review, multiple case
Technology	16	21.1%	Tools, disposition, access
Interaction	8	10.5%	Student-student, multiple
Regional	8	10.5%	-
Comparison	6	7.9%	Blended/online, Blended/F2F, Blended/F2F/online
Other	4	5.3%	future, open educational resources, professional development

Table 3. Primary Topics Addressed by Research Questions and Purpose Statements of the Top Articles

Learner outcomes. Learner outcomes, the most common category, was found in 42.1% of the top articles (Table 4). It was also the most prevalent category in Drysdale et al. (2013; 51.7%), a study of graduate BL research, and was the fourth-ranked category in Halverson et al., a study of top-cited BL research (2014; 28.2%). Halverson et al. suggested this difference in ranking may be due to differences between data collected by graduate students, who often focus narrowly, and top cited articles, which focus more broadly. The top-cited international BL research in the current study encompasses a wider range of contexts—from the burgeoning to the more established. While novice researchers explore individual cases, more established researchers are building on earlier exploration to examine the field with more breadth.

Focus on learner outcomes is understandable, as a growing field like BL must prove itself useful through "superior learning outcomes" (Means, Murphy, Bakia, & Jones, 2009, p. 9). We divided the questions about learner outcomes into cognitive, affective, and behavioral categories. Like Halverson et al. (2014) and Drysdale et al. (2013), cognitive outcomes, which they referred to as *performance outcomes*, was the most common topic. Because cognitive outcomes are highly regarded and are the simplest to measure, they are useful for an expanding field like BL. Affective outcomes, which Halverson et al. (2014) and Drysdale et al. (2013) divided further, came next in all three data sets, though earlier percentages were higher than those of this study. Student and faculty satisfaction and experience has been an important consideration in distance and blended education (Allen, Bourhis, & Burrell, 2010; So & Brush, 2008) for both institutions and instructors (Porter, Graham, Spring, & Welch, 2014). While our top articles addressed each of the major learning outcome domains (Bloom, Krathwohl, & Masia, 1956), the clear preference was for cognitive and affective outcomes. The most-cited articles in each region agree with one another, with the top-cited articles overall, and with up-and-coming research in North America about the importance of learner outcomes. This is a point of consensus for the BL community.

Subtopic	#	%	Example research question
Cognitive	20	26.3%	El-Deghaidy & Nouby (2008): "What is the effectiveness of a BeLCA on PSTs' achievement levels in a science teaching?" (p. 991)
Affective	8	10.5%	DeGeorge-Walker & Keeffe (2010): "The design is then evaluated using a mixed methodology in which the students' voices illuminate their experiences of blended learning unit design with regards to engagement, learning and self-determination" (p. 1).
Behavioral	4	5.3%	Peixoto, Peixoto, & Alves (2012): "This study aimed to investigate the learning habits and strategies of undergraduate and post-graduate students matriculated in hybrid courses in the area of healthcare at a Brazilian university" (p. 551).

Table 4. Subtopics of the Primary Topic Learner Outcomes: 32 manuscripts, 42.1% of total

Instructional Design. The second most researched topic, instructional design, was addressed in 31.6% of the top articles (Table 5). This finding is understandable for a field like BL which involves consistent development and exploration of new designs. The most common subtopic, found in 14.5% of the top BL articles worldwide, was models and theories (see Graham, 2013); manuscripts were coded this way only if we could identify the model or theory to which they referred. Of the 11 manuscripts discussing BL models and/or theories in research questions or purposes, no theory was represented multiple times. Europe supplied the most articles discussing a model or theory (36.4%), possibly because articles from Europe tend to be older and more highly cited, and theory articles are more likely to be relevant for many years.

The third ranked subtopic, *best practices,* appeared in 5.3% of the articles. Best practices are of particular interest to a developing field like BL as institutions and individuals navigate the adoption process. Discussion of best practices was fairly even across the regions, but the scope of the contexts varied. Unwin (2005) presented best practices for BL in Africa generally, while others, like Mortera-Gutierrez (2006), Precel, Eshet-Alkalai and Alberton (2009), and Sife, Lwoga, and Sanga (2007) gleaned their best practice recommendations after examining specific countries or institutions. While *best practices* are of interest, there is divergence on the methods for discovering them.

Consideration of BL *implementation* was also 5.3% in the top articles, which is consistent with the findings of Halverson et al. (2014; 5.9%) and Drysdale et al. (2013; 3.5%). Some works, such as Porter et al. (2014), which consider the shift from early BL adoption to institutional implementation, have begun to fill this gap.

Subtopic	#	%	Example research question
Model/theory	11	14.5%	Akyol & Garrison (2011): "The main research question is whether online and blended collaborative communities of inquiry can create cognitive presence that supports higher-order learning processes and outcomes" (p. 234).
Measurement	5	6.6%	Ozkan & Koseler (2009): "The purpose of this research is to develop a comprehensive e-learning assessment model using existing literature as a base, incorporating concepts from both information systems and education disciplines" (p. 1285).
Best practices	4	5.3%	Unwin (2004): "This paper . . . outlines a possible framework for the successful implementation of teacher training programmes that make advantageous use of appropriate ICTs. It argues that six fundamental principles of good practice must be addressed for such programmes to be effective" (p. 113).
Implementation	4	5.3%	Ocak (2011): "The purpose of this study, therefore, was to investigate impediments faculty members face while teaching blended courses" (p. 689).

Table 5. Subtopics of the Primary Topic Instructional Design: 24 Manuscripts, 31.6% of Total

Dispositions. Of the most cited BL articles worldwide, 27.6% discussed dispositions: perceptions, experiences, intensions, and preferences (Table 6). A majority focused on students, with only 3.9% researching faculty perceptions. This is consistent with Halverson et al. (2014) and Drysdale et al. (2013). Faculty, understandably focused on their students, conduct a majority of this research. However, institutions seeking to implement BL on a larger scale are more successful when supporting and recognizing faculty needs (Porter et al., 2014). Almost half the manuscripts that inquired about student or faculty perceptions were from the Middle East, which suggests a strong interest there from which researchers in other regions with an interest in perceptions could benefit.

Subtopic	#	%	Example research question
Student perceptions	14	18.4%	Precel, Eshet-Alkalai, & Alberton (2009): "The present evaluation study focuses on students' perceptions of pedagogical and design issues related to a new model for blended learning" (p. 1).
Faculty perceptions	3	3.9%	Oh & Park (2009): "What are the faculty attitudes toward and perceptions of blended instruction?" (p. 328)
Experiences	2	2.6%	Ellis, Goodyear, O'Hara et. al (2007): "How do students experience the combination of face-to-face and online discussions? Do all students experience them in ways that support their learning?" (p. 84)
Intentions	1	1.3%	Ellis, Goodyear, Prosser et. al (2006): "A combination of open-ended questionnaires and semi-structured interviews was used to investigate students' conceptions of what they were learning, their intentions and their approaches to learning through discussion" (p. 244).
Preferences	1	1.3%	Pearson & Trinidad (2005): "In this paper, we report on the design and development of the Online Learning Environment Survey (OLES), an instrument which can be used to gather and represent data on students' 'actual' (experienced) and 'preferred' (ideal) learning environments" (p. 396).

Table 6. Subtopics of the Primary Topic Disposition: 21 Manuscripts, 27.6% of Total

Exploration. Among the top articles, 19.7% were exploratory: describing individual or multiple cases of BL, taking a position on BL, focusing on a specific discipline, or reviewing the literature (Table 7). Single case descriptive was the largest subcategory (9.2%) of the total manuscripts. Exploratory articles made up almost one-third of those found from Latin America (30.0%) and North America (30.8%), though Latin American articles focused on single cases while North American articles focused elsewhere. Top Latin American articles may focus on single cases because they tend to have been published more recently, and that type of research provides a strong exploratory foundation. As research progresses over time, as it has in North America, it might make more sense to focus on other types of exploration, like comparing several cases or blending within a specific discipline.

This category was not present in Drysdale et al. (2013), likely because graduate committees require specific research questions, but was even larger than this study in Halverson et al. (2014; 29.4%), likely because such descriptive pieces apply widely and garner many citations. Their exploratory category did not include single or multiple descriptive cases, likely because these are most useful in the very early stages of a field's development and citations drop off quickly as more overarching pieces become available.

This is one area where regions differ, splitting into two groups. Africa, Asia, Europe and Latin America supplied at least one single case descriptive each, while the other regions had none in their most-cited lists. Articles from North America, Oceania, and articles concerning multiple regions each supplied research about multiple cases or a literature review, while the other regions did not. Research in the regions focusing recently on individual cases might use top-cited articles from other regions as examples of how to progress to comparing multiple cases, to using a wider context to understand more about their region as a whole, or to viewing multiple regions from a new perspective.

Subtopic	#	%	Example research question
Single case	7	9.2%	Boitshwarelo (2009): "The specific aim of this paper is to give an account of a case study that used a blended learning approach in the context of science teacher professional development" (p. 4).
Position	4	5.3%	Bhattacharya & Sharma (2007): "The purpose of this paper is to make a strong case for investing in information and communication technologies (ICT) for building up of quality human resource capital for economic upliftment of India" (p. 543).
Multiple case	2	2.6%	Picciano & Seaman (2007): "The purpose of this study was to explore the nature of online learning in K–12 schools and to establish base data for more extensive future studies" (p. 13).
Discipline-specific	2	2.6%	Ruiz, Mintzer & Leipzig (2006): "The authors provide an introduction to e-learning and its role in medical education by outlining key terms, the components of e-learning" (p. 207).
Literature review	1	1.3%	Bliuc, Goodyear, & Ellis (2007): "The discussion of studies below is used to provide a representative summary of categories of research into blended learning, for the purpose of moving the field forward" (p. 232).

Table 7. Subtopics of the Primary Topic Exploration: 16 Manuscripts, 21.1% of Total

Technology. Technology (Table 8) was covered in almost one in five of the top BL articles worldwide (21.1%). The largest subcategory was tools, which is comparable to the "types of" subtopic that Halverson et al. (2014) and Drysdale et al. (2013) employed. The 17.1% here was higher than the percentage in the aforementioned projects (3.5% and 2.9% respectively). While most regions supplied a top-cited article discussing tools, Africa and Asia had the most, as well as the largest variety. Top African papers studied chats, social media, and podcasts, while Asian

articles looked at forums and blogs, short message service (SMS), and social media. The tools most commonly discussed were SMS and social media, featured in publications from both Asia and Africa. Research covered a wide range of technological types and complexity, including USB-delivered content (Garrote, Pettersson, & Christie, 2011) in Latin America; live chats in South Africa (Cox, Carr, & Hall, 2004); and video in Turkey (Kırkgöz, 2011).

Discussion of tools is one aspect on which the regions seem to differ. While each region showed an interest in tools, the specific tools discussed were different ones. This is likely connected to the available and popular technology in each locale. Rather than a weakness in collaboration, this could be a strength. Many tools are available, and as a wide variety is being tested around the world, those interested in learning from research in a region that has more experience using a particular tool would find it efficient to become familiar with use of the tool before adopting it.

Subtopic	#	%	Example research question
Tools	13	17.1%	Ng'ambi & Lombe (2012): "The study reported in this paper aimed at developing a framework for integrating podcasts into the curriculum" (p. 182).
Disposition	2	2.6%	Garrote, Petersson, & Christie (2011): "The purpose of this study is to investigate the attitudes of third world engineering educators towards the LUME method and the use of OER in order to determine if the LUME method can contribute to making computer aided education more accessible worldwide" (p. 623).
Access	1	1.3%	Prinsloo & VanRooyen (2007): "How many students have access to computers? What type of computers? What computer skills do students have? How many students have access to the Internet?" (p. 54)

Table 8. Subtopics of the Primary Topic Technology: 16 Manuscripts, 21.1% of Total

Interaction. We found that 10.5% of the manuscripts discussed interaction (Table 9). As in the 4.7% found by Halverson et al. (2014), the emphasis was on student-student interaction (6.6%). The majority of these articles originated in Africa. Drysdale et al. (2013) also found several instances of research on student-instructor interaction with 8.3%, although this study found none. Our findings agreed with both previous projects; all lacked focus on student-content interaction, though we analyzed one article that included it lightly (Bernard et al., 2009). Interaction is an important possible benefit of BL (Bernard et al., 2009; Dziuban, Moskal, & Hartman, 2005), and we were surprised by the limited focus on all forms of it in this and in previous projects.

Subtopic	#	%	Example research question
Student-student	6	7.9%	Hall & Davison (2007): "To what extent can blog technology serve as a means of encouraging interaction between students in a module cohort? What are the consequences of this interaction in terms of peer learning and peer support?"(p. 165)
Multiple	2	2.6%	Bernard, Abrami, & Brorokhovski et al. (2009): "What are the effects of the three kinds of interaction (SS [student-student], ST [student-teacher], and SC [student-content]) on achievement?" (p. 1249)

Table 9. Subtopics of the Primary Topic Interaction: 8 Manuscripts, 10.5% of Total

Comparison. Only 9.2% of the top articles focused on comparison (Table 10), a much lower percentage than found by either Drysdale et al. (2013; 21.5%) or Halverson et al. (2012; 17.6%). Across all regions, only North America supplied more than one paper with a comparative focus.

Subtopic	#	%	Example research question
Blended/F2F	3	3.9%	Chandra & Lloyd (2008): "This paper maps the achievements in Year 10 Science of two cohorts of students over two years where students in the first year studied in a traditional environment while students in the second took part in a blended or e-learning environment" (p. 1087).
Blended/F2F/ online	2	2.6%	Brown & Liedholm (2002): "Do students enrolled in online courses learn more or less than students taught face to face?" (p. 444)
Blended/online	1	1.3%	Akyol & Garrison (2011): "The main research question is whether online and blended collaborative communities of inquiry can create cognitive presence that supports higher-order learning processes and outcomes" (p. 234).

Table 10. Subtopics of the Primary Topic Comparison: 6 Manuscripts, 7.9% of Total

Regional issues. One of the motivations for this research was the limited interest in international issues (Table 11) found by Drysdale et al. (2013; 1.0%) and Halverson et al. (2014; 2.4%). The current research sought regional issues and exceeded earlier percentages at 9.2%; this is still a small proportion of articles, considering the diversity of contexts. Our result may be partially due to difficulties in identifying unique attributes of one's own experience. Also, authors might identify with the particular qualities of their own institutions rather than with their countries or regions. Most researchers do not seem to be particularly focused on their region, which suggests that they may be open to sharing information with other researchers regardless of the context they study.

Unique topics. We found two unique topics: future predictions (2.6%) and professional development (1.3%) (Table 11). Future directions did not appear in Drysdale et al. (2013), likely because of the nature of graduate research, but was found in 10.6% of the articles analyzed in Halverson et al. (2014). Professional development was discussed more often, but was still reported infrequently by Drysdale et al. (7.3%), though more than by Halverson et al. (3.5%). Professional development is important for many faculty members wishing to adopt BL and improve their skills (Porter et al., 2014), and we were surprised to find it so rarely examined.

Subtopic	#	%	Example research question
Regional	8	10.5%	Bozalek & Biersteker (2010): "This article examines the value of Participatory Learning and Action (PLA) techniques for the education and training of health and human service professionals given the legacy of apartheid and the deepening poverty and inequality of contemporary South Africa" (p. 551-2).
Future predictions	1	1.3%	Kim & Bonk (2006): "In particular, the study makes predictions regarding the changing roles of online instructors, student expectations and needs related to online learning, pedagogical innovation, and projected technology use in online teaching and learning" (p. 23).
Professional development	1	1.3%	Botishwarelo (2009): "The specific aim of this paper is to give an account of a case study that used a blended learning approach in the context of science teacher professional development" (p. 4).

Table 11. Subtopics of the Primary Topic "Other": 11 Manuscripts,14.5% of Total

The topics of research questions are spread fairly evenly across the regions (Figure 6). Only Oceania and the Middle East focused more than 40.0% of questions in a single category—learning outcomes (43.8%) and disposition (42.1%), respectively. These may be areas of strength within these regions from which researchers in other places might benefit. R*egional issues* were dominated by only one region—Africa (57.1%). This was a very small category, but might have been a focus in Africa because that area may face more challenges with technology and educational development than many other regions. The research question data are similar to data on learner type, context, and terms. There are only small regional differences, as noted in our discussion of each topic. This finding suggests that researchers worldwide are interested in the same general issues as one another and as the top researchers in the community despite their distinct locations.

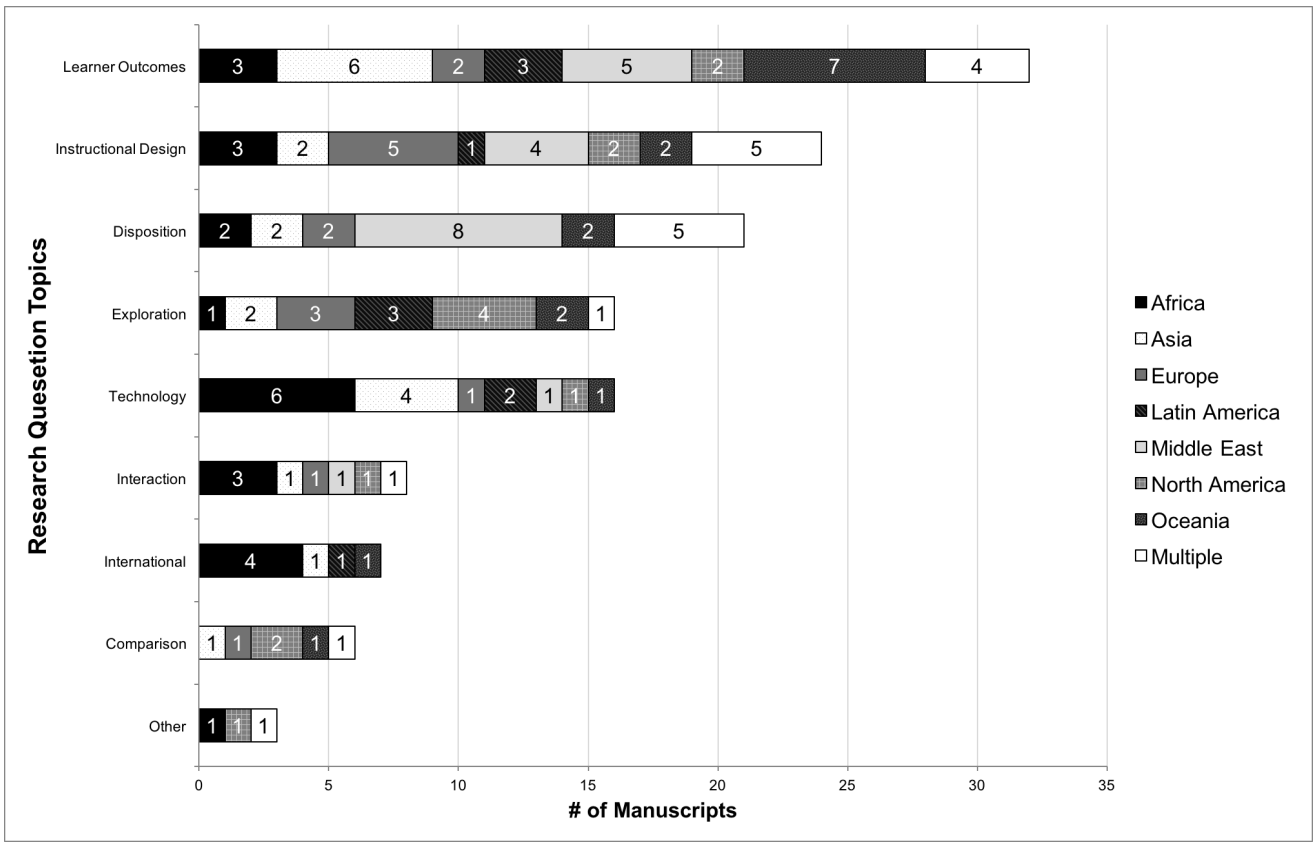

Figure 6. Major topics of research questions by region. For Latin America N=6; for all other regions N=10.

Conclusions

We classify this project as *explore* research that can serve as a basis for later *explain* and *design* research studies; specifically, the purpose of this research was to "define and categorize" (Graham, Henrie, & Gibbons, 2014, p. 16) the most-cited BL research from around the world. Our purpose was to explore the contexts, methods, and focus of the most impactful BL conversations taking place globally. The goal of this research was to begin to answer questions about commonality among regions and commonality of regions with the community as a whole raised by disparate citation patterns. Do the regions of the world have more in common with North America than they do with other regions regardless of proximity? To do this we analyzed data analysis methods, learner types, levels of blending, terms, and themes of the 10 most-cited articles in each of the seven regions of the world and compared them to one another and to the top-cited articles overall.

Though we can only present a snapshot of the field, we believe approximate findings are a valuable starting point. Although Spring and Graham (2016) found a large divergence in citation patterns among regions and a low level of collaboration involving multiple regions, we found strong similarities in BL research processes, practice, terminology, and focus. These similarities suggest that different interests and concerns in each region need not hinder connection and transfer among researchers worldwide. Considering the top-cited articles, these characteristics are more alike than unlike among regions. Small differences were found in examining the top articles in each region and the top articles in general as analyzed by Halverson et al. (2012), but they follow

basically similar patterns, indicating that the most-cited articles from around the world could fit well within the topical, research, and publication practices of the field at large. Our results suggest that although different regions must have some of their own nuances and needs, they have much in common and considerable potential to learn from one another and even collaborate on shared interests. This review of the most-cited publications can serve as a step in such directions by demonstrating how much the different regions have in common and presenting the most influential BL articles throughout the world. We recommend that as a community BL scholars and practitioners make an effort to connect with others in the field, regardless of location, and use the research that is published worldwide to improve their study and practice of BL. Researchers of BL share many interests and contexts and likely can learn much from each other across geographical regions.

Future research might include a more in-depth analysis of each region, ideally in a way that would allow for further comparison between regions. It might also look at insights to be gained from discussions with involved researchers about the current state of the field around the world. Additionally, more research is needed concerning the themes of BL publications in languages besides English, with the potential to delve further into more linguistically diverse areas of the community to present a more complete picture.

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