

Content analysis of articles published in open access and traditional access educational technology journals

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This study provided a comparative content analysis of articles published in a traditional access and an open access journal in the field of educational technology. We reviewed 416 articles, 199 from the *British Journal of Educational Technology* and 216 from *Australasian Journal of Educational Technology*, and categorized them based on research goal, research method, region, and primary topic. We found that there were significant differences in the research methods and research goals of articles published in the two journals. We also found that there were significant differences in the research methods and research goals of articles based on the region of the world from which the article was submitted. We also determined there was a commonality of research topics between journal types and region.

Introduction

This paper describes a study to compare the content of articles published in two journals in the field of educational technology. One journal, the *British Journal of Educational Technology* (BJET), is a traditional access journal, published in print format and using a fee for subscription business model, while the other, the *Australasian Journal of Educational Technology* (AJET), is an open access journal with no print version and free online access to its content. The purpose for this study was to determine if there were differences in the content of articles published in the two journals based on research goal, research method, and topic.

Open and Closed Access

There is currently an interesting debate over the optimal level of access to new and existing research. Currently about 20% of journals are open access (OA) (Bjork, Welling, Laakso, Majlender, Hedlund, et al., 2010) and the number of OA journals is growing at about 15% annually (Laakso, Welling, Bukvova, Nyman, Björk, et al., 2011). Additionally, Harvard University, paying \$3.75 million annually for access to their journal bundles with some costing around \$40,000, is discontinuing service with some journal publishers and modifying their agreement with others (Harvard, 2012), Great Britain has recently set out plans for opening access to publicly funded research (Willette, 2012), and a boycott of Elsevier publishing with at least 12,000 faculty members in support is underway (Neylon, 2012). Also, a petition to the United States government which seeks to expand the National Institute of Health's (NIH) Public Access Policy requirement, which mandates OA to publicly funded NIH research, so that it would apply to all publicly funded research, gained the 25,000 signatures needed for an official response from the White House within 22 days of its creation (White House, 2012).

There are, however, also arguments for retaining the traditional publishing structure. Publishing houses provide service as gatekeepers for quality through practicing rigorous peer review practices, engage in widespread dissemination of research, help to quantitatively rate and rank journals and their influence, and, in the cases of many top journals, have built a long and secure reputation for publishing quality

research. These publishing houses have met a need in higher education for a long time and will likely continue to exist and publish research well into the future. Additionally, there are questions as to whether or not OA journals are sustainable, as there are definite costs involved with publishing, and as to whether open necessarily equals free. The question of OA, although often presented as a moral issue, is also a very real business issue (Koh, 2012). Interestingly, comparisons between Open Access and Traditional Access Journal Models have shown that the two models are approaching similar scientific impacts after controlling for discipline, journal age, and publisher location (Björk and Soloman, 2012).

It is within the context of this ongoing debate about open access that this study was conducted. It was not our intent to determine which distribution format is more appropriate. Rather, we were only interested in differences in the content of articles submitted to journals in the different formats.

West and Borup (2013) recently published a content analysis examining ten years of research in ten major education technology journals. Their primary focus differs from ours in that it was on trends in the research for the field, where the focus for this paper involves comparing content across access models within the field. There have also been comprehensive reviews of the literature on trends in e-learning (Hung, 2012), the use of video podcasts in education (Kay, 2012), mobile learning studies (Wu, Wu, Chen, Kao, Lin, & Huang, 2012), and digital game-based learning (Hwang & Wu, 2012). Each of these are related to topics within educational technology, but are focused on different content areas than this paper.

Outside of this, there is relatively little research that looks at the content of educational technology journals. The most widely cited work on the topic is Reeves' (1995) paper *Questioning the Questions of Instructional Technology Research*. In that paper, Reeves analyzed manuscripts published in two of the prominent journals in the field of instructional technology, the *Journal of Computer Based Instruction* (JCBI) and *Educational Technology Research & Development* (ETR&D). He reviewed all articles published in JCBI from 1988 to 1993 and from 1989 to 1994 for ETR&D. A total of 233 articles were included in his review.

He then developed a framework for categorizing these articles by research goal and method. He developed 6 research goal categories: Theoretical; Empirical; Interpretivist; Postmodern; Developmental, and; Evaluation. He developed 5 research method categories: Quantitative; Qualitative; Critical Theory; Literature Review, and; Mixed Methods. Following this Reeves (1995) developed a matrix of goals and methods for each journal. Using the combined results, the most commonly found article type in Reeves' review was articles using a quantitative research method and an empirical goal (95 articles or 40.8%). The second most commonly found article type in Reeves' review was articles using a literature review method and a theoretical goal (48 articles or 20.6%). The third most commonly found article type in Reeves' review was articles using a mixed method and an evaluation goal (28 articles or 12.0%). No other article type in the matrix had more than 12 articles (5% of the total).

Journals Analyzed in Study

One of the primary issues in selecting a traditional access model and an OA model journal to compare for this study was finding two journals that were similar enough to make a fair comparison. After considering several journals, we decided to use the *British Journal of Educational Technology* (BJET) and the *Australasian Journal of Educational Technology* (AJET) for the comparative content analysis in this study. BJET and AJET are two of the most prominent peer reviewed research journals in the educational technology field. Both journals have a long history with BJET starting in 1970 and AJET starting in 1985. In 2007, AJET converted to an online only OA journal model. Each journal has a double blind peer review system in place, with AJET requiring at least 2 peer reviewers and BJET requiring at least 3. Each journal publishes bi-monthly (six issues annually).

Aside from the different access models, the two journals primarily differ on rejection rate, H-Index, and Journal Impact Factor. AJET lists a 65-70% rejection rate on its website, while BJET posts an 85% rejection rate on its website. The H-Index for AJET is 42, while it is 72 for BJET. The journal impact factor in 2011 is 1.655 for AJET, and 2.139 for BJET. Both H-Index score and impact factor are measures of how often articles published in a journal are cited in subsequent published articles. Finally, the word limit for AJET submissions is 5000-8000 words, while BJET has a 4000 word maximum.

While we do concede that the two journals selected for this study have important differences other than their access model, we believe a content analysis of the two journals can offer interesting and useful insights. Of course, because the journals are not identical, the ability to generalize the findings of this study to all traditional and open access journals in the field of educational technology is limited.

Method

Surry (2011) modified Reeves' (1995) framework to include region, and primary, secondary, and tertiary topics, and analyzed all articles published in the *British Journal of Educational Technology* from 2009 through 2011. We decided to use Surry's modification of Reeves' research classification framework, as well as the BJET articles he analyzed from 2009 to 2011 as the basis for this study. In this study, we analyzed all articles published in BJET from 2011 through June 2012 and added those articles to Surry's (2011) data (n=199). We also analyzed all of the articles published in AJET from 2009 until June 2012 (n=216). All of these articles were analyzed and categorized according to research goal, research method, and primary research topic.

We began our content analysis by having a meeting to review the Reeves (1995) framework and the original BJET content analysis (Surry, 2011). During this meeting, we discussed each of the research goals and methods to ensure each of us had a similar understanding of the terminology and concepts. We then assigned volumes of AJET and the remaining BJET articles to be analyzed. For the purpose of this study, given the relatively large number of articles to be analyzed (416), each article was only analyzed by one person.

After each of us returned the data for the articles we analyzed, the data were entered into a statistical analysis software program and descriptive statistics were developed. Upon reviewing the descriptive results, we were somewhat concerned that the data from each of us seemed to vary widely, even within the same volume of a journal. For example, one of us analyzing several articles from a volume of AJET had a large percentage of articles with the evaluation research goal while another one of us analyzing different articles from the same volume had relatively few articles with the evaluation research goal. We then met and discussed the situation and agreed that, despite our original meeting and what appeared to be a general consensus, these inconsistencies were the result of differences in our particular understandings of the terms and concepts within the agreed upon framework. We then made the decision to throw out the data from this first round of analysis, and then held another meeting to further define and discuss the terms and to come to a shared perspective of the terms and concepts in the framework. After this meeting, each of us reanalyzed the articles we were originally assigned. The new data were once again entered into a software package and new descriptive results were displayed. The new results, while still containing different percentages for each item, were much more homogeneous and did not contain wildly different ratings based on method or goal. At this point, we determined that the second round of analysis was usable and continued on to further analysis of the data.

Results

In this section, we will discuss the results of the study. We will describe the total number of articles analyzed and present data related to the goals, methods, topics, and regions for the articles in each journal. We will also compare the findings for each journal. As mentioned above, a total of 415 articles were analyzed as part of this study. Of these, 199 (48%) were from the *British Journal of Educational Technology* and 216 (52%) were from the *Australasian Journal of Educational Technology*.

Goal of Published Articles

Reeves (1995) sought to differentiate between the goals of research and the methods of research. The research goal of an article refers to the research paradigm used by the researcher. In Reeves' categorization, researchers with theoretical goals seek to explain phenomena through analysis and synthesis, those with empirical goals seek to discover how education works by testing conclusions, those with interpretivist goals seek to describe and interpret phenomena, those with postmodern goals seek to examine the underlying assumptions for the application of technology, those with developmental goals seek to describe the process of inventing or improving some approach, and those with evaluation goals seek to describe some application or detail of a particular product, method, or process (Reeves, 1995).

For articles in the *British Journal of Educational Technology*, the most common goal was empirical with 90 (45.2%) followed by interpretivist and developmental, each with 37 articles (18.6%), theoretical with 24 articles (12.1%), and evaluation with 11 articles (5.5%). For articles in the *Australasian Journal of Educational Technology*, the most common goal was empirical with 73 (33.8%) followed by interpretivist with 53 (24.5%), developmental with 46 (21.3%), evaluation with 29 (13.4%), and theoretical with 15 (6.9%). Figure 1 shows a comparison of the goals of articles in each journal.

Figure 1. Research goal by journal

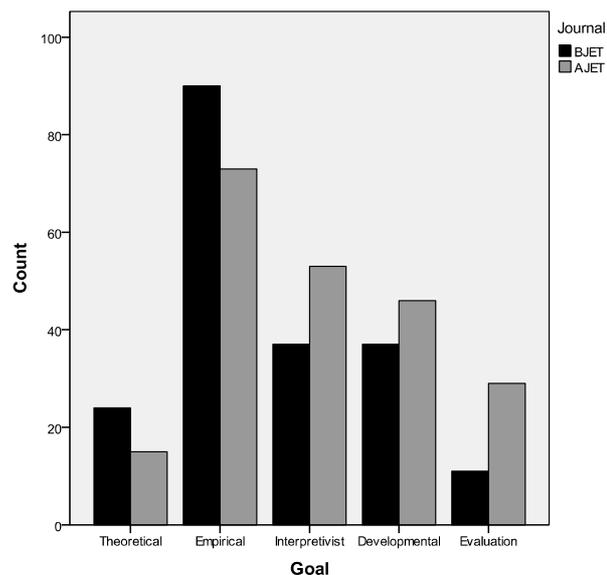


Figure 1. Research goal by journal

While the empirical goal was the primary goal in articles for both journals, a much larger percentage of the published articles in the *British Journal of Educational Technology* (45.2%) were empirical than those published in the *Australasian Journal of Educational Technology* (33.8%). In AJET, interpretivist, developmental, and evaluation goal articles made up the majority of the analyzed articles. It is interesting to note differences in the percentage of theoretical articles (BJET 12.1%, AJET 6.9%) and evaluation articles (BJET 5.5%, AJET 13.4%).

Method of Published Articles

As mentioned above, the method of an article refers to the approach to data collection and analysis that a researcher uses. For articles in the *British Journal of Educational Technology*, the most commonly used method was quantitative with 70 (35.2%) followed by mixed methods with 53 (26.6%), qualitative with 46 (23.1%), and literature review with 30 (15.1%). There were no articles using the critical theory method among those analyzed in BJET. For articles in the *Australasian Journal of Educational Technology*, the most common method was mixed with 83 (38.4%) followed by qualitative with 63 (29.2%), quantitative with 46 (21.3%), literature review with 21 (9.7%), and critical theory with 3 (1.4%).

Figure 2 shows a comparison of the method of articles in each journal. As shown in Figure 2, the *Australasian Journal of Educational Technology* articles had more mixed method and qualitative articles in the set we reviewed, while the *British Journal of Educational Technology* had more quantitative and literature review articles. These percentages provide a profile of the dominant type of data collection and analysis approaches that are published within the two journals.

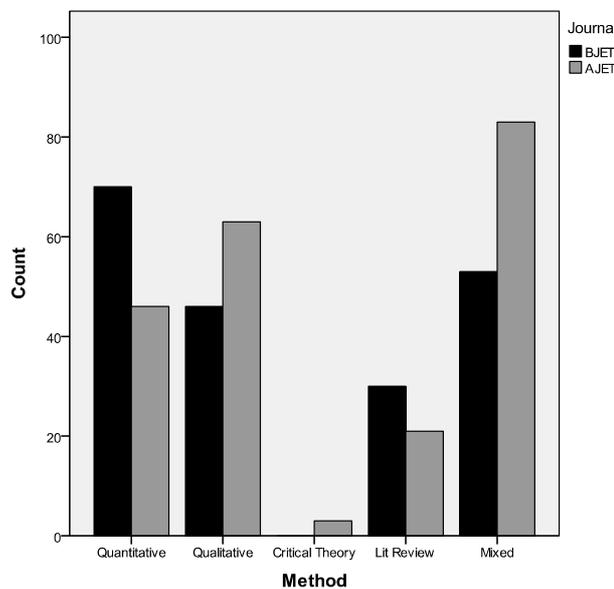


Figure 2. Research method by journal

Topic

After analyzing the goal and methods used in articles published in the two journals, we looked at the primary research topic for each article. Determining the primary research topic of an article was a difficult process. For example, it can be difficult to determine if an article about the use of a particular instructional strategy in an online course is primarily about instructional strategies or online learning. Therefore, while interesting, the description of primary topics should be viewed as much more subjective than other areas of this study. Table 1 shows the 7 most common primary topics for the combined journals as well as the 7 most common topics for each journal.

Table 1. Seven most common topics for combined journal and for each journal

| Rank | Combined | AJET | BJET |
|-------------|-----------------------------|-----------------------------|-----------------------------|
| 1 | Technology 105 | Technology 64 | Online Learning 53 |
| 2 | Online Learning 85 | Online Learning 32 | Technology 41 |
| 3 | Instructional Strategies 46 | Instructional Strategies 22 | Instructional Strategies 24 |
| 4 | Learners 32 | Implementation / Use 20 | Learning Environments 20 |
| 5 | Learning Environments 30 | Learners 17 | Learners 15 |
| 6 | Implementation / Use 29 | Assessment 12 | Games 10 |
| 7 | Assessment 18 | Learning Environments 10 | Implementation / Use 9 |

As shown in Table 1, technology was the most common primary topic for the *Australasian Journal of Educational Technology* and for the combined journals total. In our coding, technology was defined as an article about either a particular hardware or software product or an article about technology in general. The second most common primary topic in AJET was online learning. This pattern was reversed in the *British Journal of Educational Technology* articles with online learning being the most common primary topic and technology being the second most common. As shown in Figure 3, technology and online learning together account for 56% of the top 7 combined journal topics, with instructional strategies third (13%), then learners and learning environments tied for the fourth largest category (9%), implementation/use articles sixth (8%), and assessment the seventh most common primary topic (5%).

Figure 3. Percentage of the seven most common primary topics for combined journals

It is clear from these results that the topics of technology and online learning are dominant in the educational technology field right now. This is not surprising given the recent growth in online and distance learning in education and the rapid expansion of technology-based innovation brought on by advances in information and communication technology. It is interesting to note that BJET published more articles about learning environments than AJET while AJET published more articles about implementation/use than BJET.

Region

The next area we looked at in the content analysis was the region from which the article was submitted. As with primary topic, this turned out to be a difficult and somewhat subjective process. To determine region, we looked at the contact information provided in the article and determined the country of the primary author. This approach has several potential limitations, of course. One potential problem is that the research may have been conducted, all or in part, in a country other than the one from which it was

submitted. Another potential problem is that the primary author may be originally from a country other than the one in which they currently work. For example, a graduate student from China studying at a university in the United States would be listed as being from the United States if they listed their university address under contact information. While we understand the problems with this approach, we felt the categorization method had merit and decided to report the results here.

Table 2. Ten most common countries of 1st Authors

| Rank | Combined | <i>AJET</i> | <i>BJET</i> |
|------|----------------------------|----------------------------|-----------------------------------|
| 1 | Australia 95 | Australia 76 | USA 37 |
| 2 | Taiwan 59 | Taiwan 24 | Taiwan 35 |
| 3 | USA 49 | New Zealand 19 | UK 32 |
| 4 | UK 37 | Singapore 16 | Australia 19 |
| 5 | New Zealand 23 | USA 12 | Korea 7 |
| 6 | Singapore 21 | Hong Kong / South Africa 8 | China / Netherlands 6 |
| 7 | Turkey 12 | | |
| 8 | Malaysia / South Africa 11 | Malaysia 7 | Turkey 6 |
| 9 | | Turkey 6 | Singapore 5 |
| 10 | Hong Kong 10 | Canada / UK 5 | Canada / Malaysia / New Zealand 4 |

Once we determined the country of the 1st author, we then grouped the countries into regions. We determined that the majority of the articles were from 4 regions, East Asia, North America, Europe, and Australia/New Zealand. We also included a category of “Other” to account for articles submitted from countries that are not a part of one of the four main regions. We are, of course, sensitive to the issue of categorizing countries as “Other” and were hesitant to use that label. However, after weighing different options, we determined it was the clearest term to use in this instance. We want to stress that the label “Other” is not intended in any way to minimize or disparage countries in that category or researchers from those countries.

For articles in the *British Journal of Educational Technology*, 64 (32.2%) were submitted from East Asia, 56 (28.1%) were from Europe, 42 (21.1%) were from North America, 23 (11.6%) were from Australia/New Zealand, and 14 (7%) were from Other. For articles in the *Australasian Journal of Educational Technology*, 95 (44%) were from Australia/New Zealand, 61 (28.2%) were from East Asia, 24 (11.1%) were from Other, 19 (8.8%) were from Europe, and 17 (7.9%) were from North America.

Comparative Analysis

After looking at each of the four categories of information (goal, method, topic, and region), we conducted a series of statistical analyses to determine if there were any statistically significant differences between the types of articles published in the two journals. We also compared findings across categories, such as comparing research method by region, to look for other interesting relationships that might exist.

We conducted a Pearson’s chi square test to determine if there was a statistically significant difference in the goal of articles published in AJET and BJET. The percentage of articles of each goal type did differ by journal, $\chi^2(4, N = 415) = 15.10, p = .004$. The contingency table for goal and journal is shown in Table 3. The *British Journal of Educational Technology* had higher than expected counts for theoretical and empirical articles, and less than expected counts for interpretivist, developmental, and evaluation articles.

Table 3. Contingency table for journal and goal

Crosstab

| | | | Goal | | | | | Total |
|---------|------|----------------|-------------|-----------|----------------|---------------|------------|-------|
| | | | Theoretical | Empirical | Interpretivist | Developmental | Evaluation | |
| Journal | BJET | Count | 24 | 90 | 37 | 37 | 11 | 199 |
| | | Expected Count | 18.7 | 78.2 | 43.2 | 39.8 | 19.2 | |
| | AJET | Count | 15 | 73 | 53 | 46 | 29 | 216 |
| | | Expected Count | 20.3 | 84.8 | 46.8 | 43.2 | 20.8 | |
| Total | | Count | 39 | 163 | 90 | 83 | 40 | 415 |

We next conducted a Pearson's chi square test to determine if there was a statistically significant difference in the method of articles published in AJET and BJET. The percentage of articles of each method type did differ by journal, $\chi^2(4, N = 415) = 18.16, p = .001$. The contingency table for method and journal is shown in Table 4. The *British Journal of Educational Technology* had higher than expected counts for quantitative and literature review articles and less than expected counts for qualitative, critical theory, and mixed methods articles, while the count for *Australasian Journal of Educational Technology* showed the opposite.

Table 4. Contingency table for journal and method

Crosstab

| | | | Method | | | | | Total |
|---------|------|----------------|--------------|-------------|-----------------|------------|-------|-------|
| | | | Quantitative | Qualitative | Critical Theory | Lit Review | Mixed | |
| Journal | BJET | Count | 70 | 46 | 0 | 30 | 53 | 199 |
| | | Expected Count | 55.6 | 52.3 | 1.4 | 24.5 | 65.2 | 199.0 |
| | AJET | Count | 46 | 63 | 3 | 21 | 83 | 216 |
| | | Expected Count | 60.4 | 56.7 | 1.6 | 26.5 | 70.8 | 216.0 |
| Total | | Count | 116 | 109 | 3 | 51 | 136 | 415 |
| | | Expected Count | 116.0 | 109.0 | 3.0 | 51.0 | 136.0 | 415.0 |

We next conducted a Pearson's chi square test to compare the method used by authors from different regions for both journals combined. The percentage of method types did differ by region, $\chi^2(16, N = 415) = 40.38, p = .001$. The contingency table for method and region is shown in Table 5. As seen in Table 5, East Asia and North America had higher than expected counts for quantitative methods submissions, with East Asia having the highest count and the region coded Other having the lowest percentage of quantitative method articles. Australia/New Zealand and North America had higher than expected qualitative methods articles, with Australia/New Zealand having the highest count and the region coded as Other having the lowest percentage of qualitative articles. Australia/New Zealand, Europe, and the region coded as Other each had a higher than expected percentage of literature review method submissions, with Australia/New Zealand having the most and North America having the lowest percentage of literature review articles. Australia/New Zealand had the only higher than expected count

for mixed methods article publications. For mixed methods, East Asia met the expected count, and North America had the lowest count.

Table 5. Contingency table for region and method

| | | | REGION | | | | | Total |
|--------|-----------------|----------------|--------|--------------------------|-----------|--------|---------------|-------|
| | | | Other | Australia New Zealand | East Asia | Europe | North America | |
| Method | Quantitative | Count | 9 | 12 | 47 | 23 | 25 | 116 |
| | | Expected Count | 10.6 | 33.0 | 34.9 | 21.0 | 16.5 | 116.0 |
| | Qualitative | Count | 11 | 38 | 25 | 17 | 18 | 109 |
| | | Expected Count | 10.0 | 31.0 | 32.8 | 19.7 | 15.5 | 109.0 |
| | Critical Theory | Count | 0 | 1 | 2 | 0 | 0 | 3 |
| | | Expected Count | .3 | .9 | .9 | .5 | .4 | 3.0 |
| | Lit Review | Count | 6 | 18 | 10 | 12 | 5 | 51 |
| | | Expected Count | 4.7 | 14.5 | 15.4 | 9.2 | 7.3 | 51.0 |
| | Mixed | Count | 12 | 49 | 41 | 23 | 11 | 136 |
| | | Expected Count | 12.5 | 38.7 | 41.0 | 24.6 | 19.3 | 136.0 |
| Total | | Count | 38 | 118 | 125 | 75 | 59 | 415 |
| | | Expected Count | 38.0 | 118.0 | 125.0 | 75.0 | 59.0 | 415.0 |

As seen in Figure 4, mixed methods was the primary research method in the two journals for the Australian/New Zealand region and the Other region, while the quantitative method was primary for the East Asian and North America regions. There are an equal number of mixed methods and quantitative methods publications in the European region. This suggests that the quantitative method is predominant for educational technology researchers in East Asia and North America, but not in other regions.

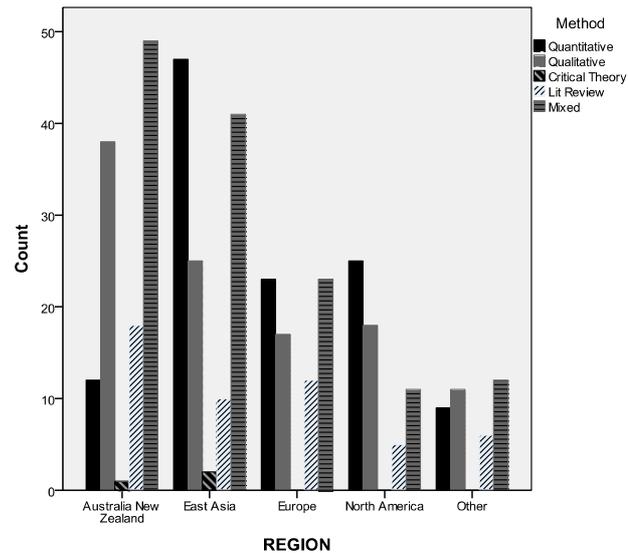


Figure 4. Research method by region

We next conducted a Pearson's chi square test to compare the goal of research published by authors from different regions for both journals combined. The percentage of research goal types did differ by region, $\chi^2(16, N = 415) = 35.09, p = .004$. As seen in Table 6, the region coded Other and Australia/New Zealand had higher than expected counts for theoretical articles and Europe had the expected count of 7. Australia/New Zealand had the highest count, while North America had the lowest count. The region coded Other and East Asia both had higher than expected empirical goal counts, with East Asia having the highest count and North America having the lowest. It is interesting to note the large differences between expected and actual counts for Australia/New Zealand and East Asia. Australia/New Zealand, Europe, and North America each had higher than expected counts for interpretivist articles, with Australia/New Zealand having the most publications and the regions coded Other having the lowest count. East Asia, Europe, and the region coded "Other" had higher than expected counts for developmental articles, with East Asia having the highest and the region coded "Other" having the lowest. Regarding the evaluation goal, Australia/New Zealand had the highest count, with Europe and Other having the lowest. Australia/New Zealand and North America were the only two regions with higher than expected counts for the evaluation goal.

Table 6. Contingency table for goal and region

| | | | REGION | | | | | Total |
|-------|----------------|----------------|--------|-----------------------|-----------|--------|---------------|-------|
| | | | Other | Australia New Zealand | East Asia | Europe | North America | |
| Goal | Theoretical | Count | 6 | 13 | 9 | 7 | 4 | 39 |
| | | Expected Count | 3.6 | 11.1 | 11.7 | 7.0 | 5.5 | 39.0 |
| | Empirical | Count | 17 | 32 | 59 | 28 | 27 | 163 |
| | | Expected Count | 14.9 | 46.3 | 49.1 | 29.5 | 23.2 | 163.0 |
| | Interpretivist | Count | 5 | 30 | 22 | 20 | 13 | 90 |
| | | Expected Count | 8.2 | 25.6 | 27.1 | 16.3 | 12.8 | 90.0 |
| | Developmental | Count | 8 | 20 | 28 | 18 | 9 | 83 |
| | | Expected Count | 7.6 | 23.6 | 25.0 | 15.0 | 11.8 | 83.0 |
| | Evaluation | Count | 2 | 23 | 7 | 2 | 6 | 40 |
| | | Expected Count | 3.7 | 11.4 | 12.0 | 7.2 | 5.7 | 40.0 |
| Total | Count | | 38 | 118 | 125 | 75 | 59 | 415 |
| | | Expected Count | 38.0 | 118.0 | 125.0 | 75.0 | 59.0 | 415.0 |

Figure 5 shows the research goals by region. The empirical research goal was the most common in each region, but in the East Asia region it is much more prevalent than the other research goals. Evaluation is the least common goal in Europe, East Asia, and the region coded “Other,” where theoretical is the least common in North America and Australia/New Zealand. This suggests that the empirical research goal is the predominant goal for educational technology researchers in East Asia and North America while researchers in Europe and Australia/New Zealand conduct research using other goals almost as much as empirical.

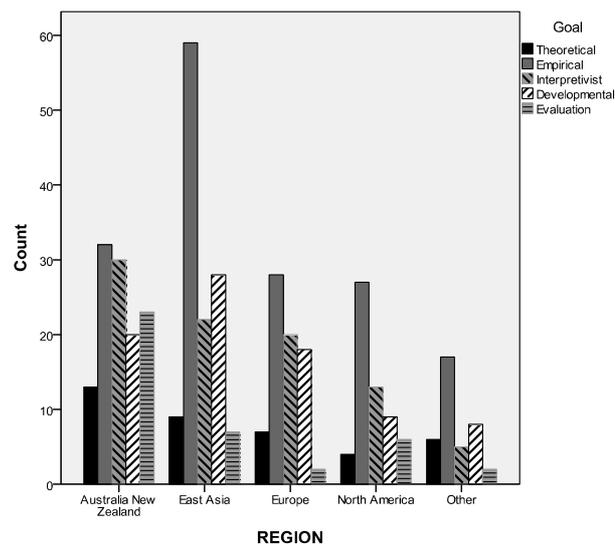


Figure 5. Research goal by region

As seen in Table 6, the total article counts submitted for each region is as follows: Other 38, Australia/New Zealand 118, East Asia 125, Europe 75, and North America 59. The percentage of articles published by region can be seen in Figure 6. East Asia and Australia/New Zealand account for more than half (59%) of the total published articles in *British Journal of Educational Technology* and *Australasian Journal of Educational Technology*, while articles from North America, Europe, account for 14% and 18% respectively, and regions coded as Other account for 9%.

Figure 6. Articles Published by Region

We next compared the most common research topic for each region. For Australia/New Zealand, and East Asia, North America, and the region coded Other the most common topics were 1) technology, 2) online learning, and 3) instructional strategies. For Europe, the most common topics were 1) online learning, 2) technology, 3) learning environments. We conducted a Pearson's chi square test and determined the percentage of research topics did not statistically differ by region, $\chi^2(76, N = 415) = 73.36, p = .564$. This suggests that educational technology researchers tend to conduct research on similar topics regardless of the geographic region in which they work. Figure 7 shows the seven most common overall topics divided by region.

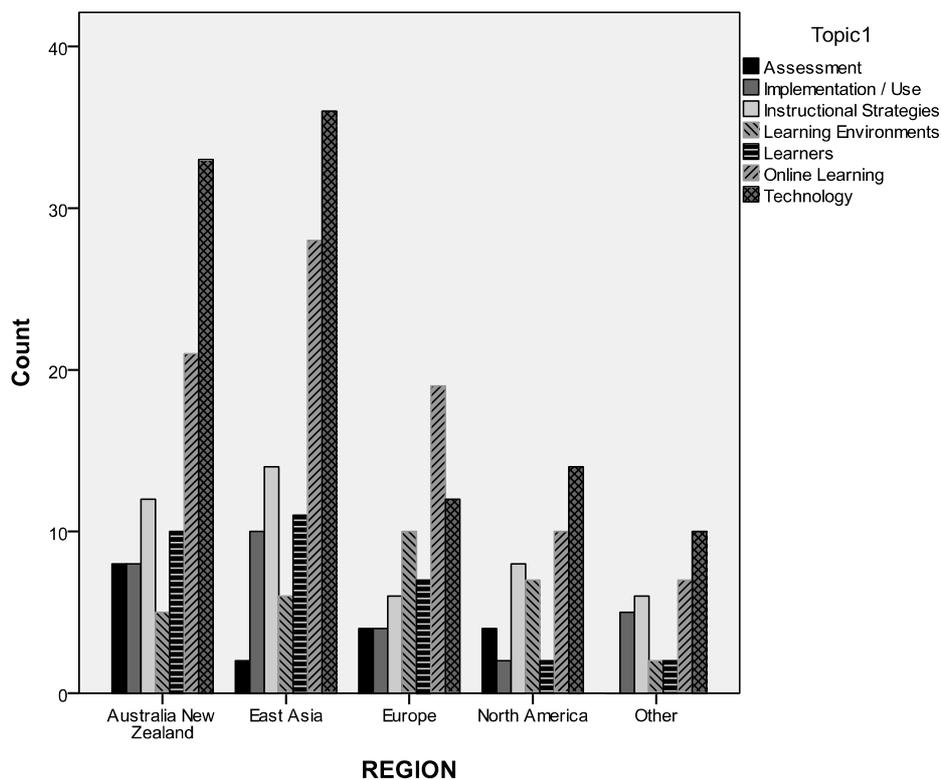


Figure 7. Research Topic by Region (Top 7 topics overall)

Discussion

The results of the present study show some interesting similarities and differences to the Reeves (1995) study. As shown in Table 7, there was a large difference in the percentage of qualitative and quantitative studies found between the current study and Reeves' study. Reeves found 50.2% of his articles used a quantitative method while only 5.6% used a qualitative method. Conversely, in the current study we found 28% quantitative articles and 26.3% qualitative articles. When looking at research goal, Reeves found 20.6% of articles in his sample had a theoretical goal while we found only 9.4% with that goal. The current study found 21.7% with interpretivist goals while Reeves found less than 1% with that goal. Additionally, the current study found 20% with the developmental goal, while Reeves found less than 1% with that goal.

Table 7. Matrix showing comparison of data from current study and Reeves' (1995) study

| | Quantitative | | Qualitative | | Critical Theory | | Lit Review | | Mixed Methods | | Total | |
|-----------------------|--------------|-------------|-------------|--------------|-----------------|-----------|-------------|-------------|---------------|--------------|--------------|--------------|
| | Reeves | Current | Reeves | Current | Reeves | Current | Reeves | Current | Reeves | Current | Reeves | Current |
| Theoretical | 0 | 0 | 0 | 5 1.2% | 0 | 0 | 48 20.6% | 31 7.5% | 0 | 3 | 48 20.6% | 39 9.4% |
| Empirical | 95 40.8% | 91 21.9% | 3 1.29% | 18 4.3% | 0 | 1 0.2% | 2 0.86% | 0 | 9 3.9% | 53 12.8% | 109 46.8% | 163 39.3% |
| Interpretivist | 6 2.58% | 6 1.4% | 3 1.29% | 44 10.6% | 0 | 0 | 0 | 5 1.2% | 1 .42% | 35 8.4% | 10 0.43% | 90 21.7% |
| Developmental | 9 3.9% | 9 2.2% | 1 0.42% | 28 6.7% | 0 | 2 0.5% | 7 3% | 13 3.1% | 3 1.29% | 31 7.5% | 20 0.86% | 83 20% |
| Evaluation | 7 3% | 10 2.4% | 6 2.58% | 14 3.4% | 0 | 0 | 5 2.2% | 2 0.5% | 28 12% | 14 3.4% | 46 19.74% | 40 9.6% |
| Total | 117 50.2% | 116 28% | 13 5.6% | 109 26.3% | 0 | 3 0.7% | 62 26.6% | 51 12.3% | 41 17.6% | 136 32.8% | 233 100% | 415 100% |

There are many possible reasons that would account for these differences. It is possible that these differences result from our analyzing different journals than Reeves (1995). It may also be possible that the differences are due to variances in the raters' opinions of the goal and method categories. It is also possible that our sample contained more articles authored by researchers from regions where certain

research methods and goals are more prominent than in Reeves' sample. Finally, in what would certainly be the most interesting possibility, it could be that these differences reflect changing trends in educational technology research over the 18 years between Reeves study and our own.

Our findings also showed some interesting differences and similarities between articles that were published in a traditional access journal and an open access journal in the field of educational technology. We believe that the most interesting result is that the articles published in the OA journal used a broader variety of research goals than the traditional access journal (see Fig. 1). Both journals had empirical as the primary goal, but the traditional access journal had a more homogeneous focus on empirical and theoretical research goals, where the OA journal had higher percentages of interpretivist, developmental, and evaluation articles. Another interesting difference is that the dominant research method for articles published in the traditional access journal was quantitative (35.2%), while the dominant method in the OA journal was mixed methods (38.4%), followed by qualitative (29.2%) research methods (see Figure 2). These differences could simply be the result of regional preferences in research goals and methods showing up in the journals that we studied or they might reflect fundamental differences in the types of articles favored by either editors of different journals or by authors seeking a type of journal to submit their work.

The most interesting similarity between the traditional access and open access journals is that the top three topics for both journals were technology, online learning, and instructional strategies (see Table 1). In both journals in our study, there were approximately twice as many articles dedicated to either of the first two topics (technology and online learning) than there were for the third most common topic (instructional strategies). While this could be the result of the journals that we selected for our study, it is also possible that these topics reflect a worldwide trend in education technology research topics.

Taken as a whole, the results of this study provide an interesting perspective of the types of research going on now in the field of educational technology. The results of this study also provide an important perspective from which to compare the open access and traditional access journal models. But the results also raise more questions. Based on the results of this study, we developed several recommendations for future research. First, more research is needed in order to determine whether the differences between our results and Reeves' represent actual trends in methods and goals or are resultant of something else. One possible way to achieve this would be for future researchers to look at the same journals that Reeves' reviewed in his study 1995 study to determine if the changing trends in research method and topic we observed in our study do exist. Second, more research is needed to determine whether our findings on regional research cultures reflect the true dominant research goals and methods for the regions that we surveyed. For example, is there really more emphasis on mixed methods and qualitative research by researchers in the Australia/New Zealand region than those in other regions and, if so, why? Do researchers in the North America and East Asia regions really have a strong preference for quantitative research methods and, if so, why? One way to help answer these questions would be for future researchers to replicate our study but analyze articles from open access and traditional access journals that attract authors from the same region. Third, the common set of dominant topics between the journals provides another possible area for future research. It would be interesting to see future researchers develop a taxonomy of subtopics that breaks the major topics into smaller components. This would allow for a more detailed understanding of the actual research questions that are driving educational technology research.

Conclusion

Our study has confirmed that important and interesting research in the field of educational technology is being conducted by researchers around the world. Whether they chose to send their manuscripts to a traditional journal or an open access journal, educational technology researchers submitted articles using a wide variety of methods and research goals. It is possible, and perhaps even probable, that for many of these researchers in this study there was no conscious choice made between submitting their work to a traditional access or an open access model journal. However, this choice will become more and more important for researchers as the open access model gains notoriety.

As open access becomes a more popular alternative, researchers choosing between traditional and open access model journals will have to consider additional criteria when determining which model is the most beneficial outlet for their research. These criteria may include, at the least, the intended reach of the article (whether intended for a select group of professionals or suitable for global dissemination), the potential for citation and quality or reputation of the citers, the intended audience for the article (professionals, laypeople, students, businesses), and the author's openness to feedback and possible criticism for their work. The traditional and open access journal models seem to have different purposes and strengths regarding these areas, yet this decision will ultimately be influenced by the author's perception of differences in the journal models and their benefits. This study informs these decisions by providing a comparative perspective on the actual research goals, methods, and topics published in traditional access and open access educational technology journals.

From these results we can reliably conclude that differences exist between the research goal, method, and dominant topic based on region and journal access type. While we cannot reliably generalize the results of this study to speak to all traditional and open access journals or to the research cultures of the submission regions in our study, we can use these results to obtain a more solid perspective of the dominant topics, goals, and methods of articles that are published in traditional and open access model journals. We hope this study will provide a starting point for more research and discussion in this important area.

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