help mitigate or alleviate perceived barriers, and successful integration of classroom technology can be achieved. □

References

Brickner, D. L., (1995). The effects of first- and second-order barriers to change on the degree and nature of computer usage of mathematics teachers: A case study. Unpublished doctoral dissertation, Purdue University, West Lafayette, IN.

Clark, K. (2006). Practices for the use of technology in high schools: A Delphi study. *Journal of Technology and Teacher Education, 14*(3), 481–499.

Clark, K. E., & Clark, M. B. (1996). *Choosing to lead.* Greensboro, NC: Center for Creative Leadership.

Corn, J. O., Oliver, K., Hess, C. E., Halstead, E. O., Argueta, R., Patel, R. K., ... & Huff, J. D. (2010). A computer for every student and teacher: Lessons learned about planning and implementing a successful 1:1 learning initiative in schools. *Educational Technology, 50*(6); p. 11.

Cuban, L. (2006). Commentary: The laptop revolution has no clothes. *Education Week, 26*(8), p. 29.

Ertmer, P A. (1999). Addressing first- and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development, 47*(4), 47–61.

Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research and Development, 53*(4), 25–39.

Ertmer, P. A., Ottenbreit-Leftwich, A. T., Sadik, O., Sendurur, E., & Sendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers & Education, 59*(2), 423–435.

Kerr, S. T. (1996). Visions of sugarplums: The future of technology, education, the schools. *National Society for the Study of Education, 95*, 1–27.

Knight, J. (2009). What can we do about teacher resistance? *Phi Delta Kappan, 90*(7), 508–513.

Kopcha, T. J. (2012). Teachers' perceptions of the barriers to technology integration and practices with technology under situated professional development. *Computers & Education, 59*(4), 1109–1121.

Kouzes, J. N., & Posner, B. Z. (2006). *The leadership challenge* (3rd ed.). Hoboken, NJ: Wiley.

Morrison, G. R., Ross, S. M., Kemp, J. E., & Kalman, H. (2013). *Designing effective instruction.* Hoboken, NJ: Wiley.

Northouse, P. G. (2012). *Leadership: Theory and practice.* Thousand Oaks, CA: Sage Publications.

Tunca, B. (2002). Barriers in using technology. *Proceedings of World Conference on Educational Multimedia, Hypermedia, and Telecommunications, 2002,* 1980–1982.

Educational Technology Research Journals

Journal of Educational Computing Research, 2003–2012

Rob Nyland
Noelle Anderson
Tyler Beckstrom
Michael Boren
Rebecca Thomas
Richard E. West
Brigham Young University

This article analyzes articles published in the *Journal of Educational Computing Research (JECR)* from 2003 to 2012. The authors analyzed the articles looking for trends in article types and methodologies, the most common topics addressed in the articles, the top-cited articles, and the top authors during the period. The analysis suggests that *JECR* employs a primarily inferential approach to their articles, which aligns with the journal's goal of "outcome effects" based research (*Journal of Educational Computing Research,* n.d.). The most common topics addressed by the articles were "educational technology" and "computer assisted instruction."

Introduction

The *Journal of Educational Computing Research*, with it's first issue in 1985, is published by Baywood Publishing Company. For the journal's first nine years, publication was annually four issues and roughly 20 articles per volume. Starting in 1994, the journal doubled its output and frequency. The *Journal of Educational Computing Research* is a peer-reviewed journal that publishes articles meant for educators, researchers, policymakers, and scientists. Most articles published in the journal focus on "outcome effects" of educational computing applications, design and development of educational hardware and software, research in educational computing fields,

and foundations of computer-based education (*Journal of Educational Computing Research,* n.d.). Since computer-based education is an interest to people from diverse backgrounds, the journal's editors and authors are international and interdisciplinary.

The purpose of this study was to analyze articles in the *Journal of Educational Computing Research* in the years 2003 to 2012. Our purpose in analyzing these articles was to find what kinds of articles (methodologies and topics) are published in this journal as well as to identify the major authors and the most-cited articles of the journal.

Methods

We reviewed 428 articles published in the *Journal of Educational Computing Research* between 2003 and 2012. Introductions to issues, editorials, and book reviews were not included in the analysis. We analyzed the articles for trends in article types, topics, authorship, and citations.

Article Types and Methodologies

The research methodology used in the articles were coded into one of the following categories:

- *Inferential analysis*—Articles using quasi-experimental, experimental, or correlational methods of statistical research. These articles report inferential statistics that test hypotheses or report differences between groups. Additionally, statistics used to validate measurement tools, such as factor analysis, were placed in this category.
- *Interpretive analysis*—Articles that use case studies, interviews, observational studies, or other qualitative methods to gather data and interpretative approaches to analyzing the data.
- *Descriptive analysis*—Articles reporting descriptive statistics, often based on surveys or questionnaires.
- *Theoretical/conceptual articles* — Non-data-based articles and reviews of literature, which are meant to present and discuss theories, models, and technologies.
- *Combined methods*—Articles that combined Interpretive and Inferential/Descriptive methods to interpret and present findings.
- *Content/discourse analysis*—Articles with a purpose of coding written and recorded discourse into discrete, measurable categories, with the data reported descriptively.

To ensure reliability between the coders, while analyzing methodologies, the authors used the following system: First, we discussed 10% of the articles together as a group to establish consensus on the methodology definitions, after which we coded the remaining articles. At least 10% of articles were double-coded by another author for spot-check agreement. Any disagreements regarding methodologies were brought before a third person or the group and discussed until consensus was reached.

Topic Analysis

The authors extracted subject terms for every article from the Educational Resources Information Center EBSCO database into a spreadsheet and then alphabetized and analyzed them for number of occurrences. In addition to the subject term analysis, a word frequency count was performed on the article titles, using the Website *textalyser.net*. Of the 428 articles from the years 2003–2012, three did not have subject terms provided by EBSCO. Related subject terms and words (such as Education and Education–Research) were combined. Subject terms and words deemed irrelevant to the journal subject matter (such as United States) were not included in the analysis.

Table 1. Total by methodology from 2003–2012.

Method	# of Articles	% of Articles (rounded)
Inferential	261	61%
Interpretive	65	15%
Combined Methods	37	9%
Descriptive	18	4%
Theoretical	33	8%
Content Analysis	13	3%
Other	1	<1%

Citation Analysis

We used Google Scholar to determine the number of citations of all published articles from the *Journal of Educational Computing Research* from 2003–2012. We felt that Google Scholar provides the most comprehensive list available on scholarship, as it is the basis for other scholarship analysis tools, including *Publish or Perish* (*http://www.harzing.com/pop.htm*). While Google Scholar, like all scholarship databases, might not be the most statistically valid way of measuring scholarship alone, we nonetheless felt that such an analysis will still uncover major contributions published in the journal during the highlighted time period.

Author Analysis

A medal count was used to identify the most prevalent authors. First authors received three points, second authors received two points, and additional authors received one point. All author names were organized into an Excel document, and color-coded by authorship (for example, first authors were red and second authors were green). Authors were then placed in alphabetical order, and total points for each author were calculated. Authors with the highest number of points were identified as the most prevalent authors for the 10 years reviewed in the *Journal of Educational Computing Research*.

Findings

Article Types and Methodologies

Our analysis showed that inferential studies are the most common methodology utilized in the *Journal of*

Table 2. Article types and methodologies by year.

Year	Inferential	Interpretative	Combined	Descriptive	Theoretical	Content Analysis	Other	Total
2012	33 (77%)	3 (7%)	1 (2%)	3 (7%)	2 (5%)	0	1 (2%)	43
2011	26 (56%)	8 (17%)	9 (20%)	0	3 (7%)	0	0	46
2010	27 (61%)	4 (9%)	6 (14%)	2 (5%)	4 (9%)	1 (2%)	0	44
2009	23 (55%)	7 (17%)	5 (12%)	2 (5%)	1 (2%)	4 (9%)	0	42
2008	28 (70%)	4 (10%)	2 (5%)	2 (5%)	2 (5%)	2 (5%)	0	40
2007	25 (58%)	11 (25%)	2 (5%)	0	3 (7%)	2 (5%)	0	43
2006	29 (71%)	4 (10%)	0	1 (2%)	5 (12%)	2 (5%)	0	41
2005	18 (44%)	13 (32%)	2 (5%)	2 (5%)	5 (12%)	1 (2%)	0	41
2004	16 (42%)	6 (16%)	10 (26%)	2 (5%)	3 (8%)	1 (3%)	0	38
2003	36 (72%)	5 (10%)	0	4(8%)	5 (10%)	0	0	50

Educational Computing Research. As shown in ***Table 1***, inferential articles made up more than half of the articles found in our range from 2003 to 2012, with 261 articles, or about 61 percent. Interpretive analysis ranked second, with 65 articles at 15 percent. Combined methods and theoretical were fairly close for third. The remainder made up little of the content in the journal.

In looking at ***Table 2***, it appears that the methodologies of the articles remained fairly consistent throughout the 10-year span of our study, with inferential articles taking the lead every year. There has been a decrease in theoretical articles from the first four years of the analysis period. Occasionally there were other methodologies that would be more prominent behind inferential from year to year, such as in 2004, when combined methods jumped to almost 26 percent.

Topic Analysis

The topical analysis of the last decade revealed the EBSCO subject terms aligned with the title of the journal, *Journal of Educational Computing Research*. The cumulative frequencies of the top 20 subject terms for the past decade in the journal are shown in ***Table 3***. The top 20-ranked subject terms made up 28% of the total. The subject terms show an emphasis in computer-based and online educational research for the journal, with computer assisted instruction, Internet in education, computers in education, and Web-based instruction making up 33% of the total occurrences of the top 20 ranked subject terms. The emphasis in online and computer-based learning could also be seen in the top 10-ranked words that appeared in the titles of the articles as shown in ***Table 4***.

In addition, the journal has had a strong emphasis on articles based on understanding how to make technology integration in education more effective, through an emphasis on learning strategies (3rd-highest subject term), the whole educational system surrounding teaching/learning (8th- and 20th-highest subject terms), student perspectives (9th- and 15th-highest term), and teaching strategies (17th-highest term). Similarly, there was a strong emphasis on learning, students, and cognition issues in the titles of the articles published during this decade.

Citation Analysis

The two most cited articles in the *Journal of Educational Computing Research* during the past 10 years were both in 2005. The top five cited papers from 2003–2012 are displayed in ***Table 5***. The article, "What happens when teachers design educational technology? The development of Technological Pedagogical Content Knowledge," by Matthew J. Koehler and Punya Mishra, was published in 2005 and has been cited 319 times, the most in this journal for this decade. The second most cited article was "Cyber-harassment: A study of a new method for an old behavior," by Tanya Beran and Qing Li. It was published in 2005, and has been cited 280 times. Roger Azevedo, John T. Guthrie, and Diane Seibert also wrote a key article in 2004, "The role of self-regulated learning in fostering students' conceptual understanding of complex systems with hypermedia," that has been cited 195 times. Nearly all of the top five cited papers used inferential methodologies.

Since article citations tend to favor older articles that have more time to be referenced in other studies, the authors also examined the top-cited paper for each year of analysis (see ***Table 6***). It is interesting to note that three of the top-cited papers for each year address the TPACK framework.

Author Analysis

From 2003 to 2012, the *Journal of Educational Computing Research* published 428 research articles authored by 923 different people. The most prevalent authors as determined by medal count publication points are shown in ***Table 7***. Roy Clariana, who received 14 publication points in five papers, was determined to be the most prevalent author. Karen Swan, who received 13 publication points in six papers, was a close second, fol-

Table 3. EBSCO subject term occurrences for 2003–2013.

Rank	Subjects	Occurrences
1	Educational Technology	110
2	Computer Assisted Instruction	90
3	Learning	71
4	Internet in Education	68
5	Computers in Education	62
6	Education–Research	59
7	Web-based Instruction	54
8	Instructional Systems	44
9	Students	37
10	Educational Innovations	29
11	Teaching Aids and Devices	26
12	Teaching Methods	25
12	Academic Achievement	25
14	Distance Education	24
15	College Students	22
16	Problem Solving	20
17	Teaching	16
17	Teachers	16
19	Technology	15
20	Instructional Systems Design	14

lowed by Xun Ge, Albert Ritzhaupt, David Passig, and Roger Azevedo. All authors listed in the table published at least four papers and received at least 10 publication points in the years 2003–2012 of the *Journal of Educational Computing Research*.

Discussion

In reflecting on the overall findings of our analysis, we found that the *Journal of Educational Computing Research* primarily used inferential-based articles during this decade in achieving its research goals. This methodology seems to align with the journal's goal of investigating "outcome effects" of educational computing applications (*Journal of Educational...*, n.d.). By using methodologies that utilize an experimental or quasi-experimental approach, it seems that article authors are trying to establish an empirical basis for the efficacy of their designs. Such a goal may also be reflected in the second-highest used methodology, interpretive, with some authors taking a qualitative approach to establish effects of computer-based education.

The journal's focus on educational computing is also reaffirmed in the keyword analysis. Top EBSCO phrases such as "Computer Assisted Instruction" and "Computers in Education," as well as abstract keywords "computer" and "technology" show that the subject of articles in the journal typically stay within its aims.

Table 4. Word occurrences in article titles for 2003–2012.

Rank	Word	Occurrences
1	learning	137
2	students	96
3	computer	70
4	online	62
5	technology	57
6	effects	46
7	cognitive	29
7	Web	29
9	knowledge	27
10	teachers	26

The top citations of the journal from 2003–2012 further show the emphasis on inferential approaches to research in educational technology. Nearly all of the top-cited papers for the period use inferential methodologies. The top-cited paper (Koehler & Misra, 2005) uses the TPACK framework for educational technology integration in the classroom. □

References

Azevedo, R., Guthrie, J. T., & Seibert, D. (2004). The role of self-regulated learning in fostering students' conceptual understanding of complex systems with hypermedia. *Journal of Educational Computing Research, 30*(1), 87–111.

Hewitt, J. (2003). How habitual online practices affect the development of asynchronous discussion threads. *Journal of Educational Computing Research, 28*(1), 31–45.

Beran, T., & Li, Q. (2005). Cyber-harassment: A study of a new method for an old behavior. *Journal of Educational Computing Research, 32*(3), 265–277.

Doering, A., Veletsianos, G., Scharber, C., & Miller, C. (2009). Using the Technological, Pedagogical, and Content Knowledge framework to design online learning environments and professional development. *Journal of Educational Computing Research, 41*(3), 319–346.

Greene, J. A., & Azevedo, R. (2007). Adolescents' use of self-regulatory processes and their relation to qualitative mental model shifts while using hypermedia. *Journal of Educational Computing Research, 36*(2), 125–148.

Grimes, D., & Warschauer, M. (2008). Learning with laptops: A multi-method case study. *Journal of Educational Computing Research, 38*(3), 305–332.

Hewitt, J. (2003). How habitual online practices affect the development of asynchronous discussion threads. *Journal of Educational Computing Research, 28*(1), 31–45.

Table 5. Top-cited articles overall for 2003–2012.

Year	Title	Citations	Author(s)	Method
2005	What happens when teachers design educational technology? The development of Technological Pedagogical Content Knowledge	319	Matthew J. Koehler and Punya Mishra	Inferential
2005	Cyber-harassment: A study of a new method for an old behavior	280	Tanya Beran and Qing Li	Inferential
2004	The role of self-regulated learning in fostering students' conceptual understanding of complex systems with hypermedia	209	Roger Azevedo, John T. Guthrie, and Diane Seibert	Combined
2006	Computer gaming and interactive simulations for learning: A meta-analysis	195	Jennifer J. Vogel, David S. Vogel, Jan Cannon-Bowers, Clint A. Bowers, Kathryn Muse, and Michael Wright	Inferential
2003	How habitual online practices affect the development of asynchronous discussion threads	152	Jim Hewitt	Inferential

Table 6. Most cited articles for each year, 2003–2012.

Year	Title	Citations	Author	Methods
2003	How habitual online practices affect the development of asynchronous discussion threads	152	Jim Hewitt	Inferential
2004	The role of self-regulated learning in fostering students' conceptual understanding of complex systems with hypermedia	209	Roger Azevedo, John T. Guthrie, and Diane Seibert	Combined
2005	What happens when teachers design educational technology? The development of Technological Pedagogical Content Knowledge	319	Matthew J. Koehler and Punya Mishra	Inferential
2006	Computer gaming and interactive simulations for learning: A meta-analysis	195	Jennifer J. Vogel, David S. Vogel, Jan Cannon-Bowers, Clint A. Bowers, Kathryn Muse, and Michael Wright	Inferential
2007	Adolescents' use of self-regulatory processes and their relation to qualitative mental model shifts while using hypermedia	71	Jeffrey Alan Greene and Roger Azevedo	Interpretive
2008	Learning with laptops: A multi-method case study	56	Douglas Grimes and Mark Warschauer	Combined
2009	Using the Technological, Pedagogical, and Content Knowledge framework to design online learning environments and professional development	48	Aaron Doering, George Veletsianos, Cassandra Scharber, and Charles Miller	Combined
2010	Adding instructional features that promote learning in a game-like environment	36	Richard E. Mayer and Cheryl I. Johnson	Inferential
2011	Developing pre-service teachers' technology integration expertise through the TPACK-developing instructional model	23	Joyce H.L. Koh and Shanti Divaharan	Interpretive
2012	Do one-to-one initiatives bridge the way to 21st century knowledge and skills?	4	Deborah L. Lowther, Fethi A. Inan, Steven M. Ross, and J. Daniel Strahl	Inferential

Table 7. Journal authorship by medal count publication points and total papers.

Author Names	Publication Points	Total Papers
Roy Clariana	14	5
Karen Swan	13	6
Xun Ge	12	5
Albert Ritzhaupt	12	5
David Passig	11	4
Roger Azevedo	10	4

Journal of Educational Computing Research. (n.d.); *http://jrnledcompresearch.com/index.php/jecr/index* .

Koehler, M. J., & Mishra, P. (2005). What happens when teachers design educational technology? The development of Technological Pedagogical Content Knowledge. *Journal of Educational Computing Research, 32*(2), 131–152.

Koh, J. H., & Divaharan, S. (2011). Developing pre-service teachers' technology integration expertise through the TPACK-developing instructional model. *Journal of Educational Computing Research, 44*(1), 35–58.

Lowther, D. L., Inan, F. A., Ross, S. M., & Strahl, J. D. (2012). Do one-to-one linitiatives bridge the way to 21st century knowledge and skills? *Journal of Educational Computing Research, 46*(1), 1–30.

Mayer, R. E., & Johnson, C. I. (2010). Adding instructional features that promote learning in a game-like environment. *Journal of Educational Computing Research, 42*(3), 241–265.

Vogel, J. J., Vogel, D. S., Cannon-Bowers, J., Bowers, C. A., Muse, K., & Wright, M. (2006). Computer gaming and interactive simulations for learning: A meta-analysis. *Journal of Educational Computing Research, 34*(3), 229–243.

Rob Nyland *is a graduate student in Instructional Psychology and Technology studying open education (e-mail: robnyland@gmail.com).* ***Noelle Anderson*** *is a graduate student in Civil Engineering.* ***Tyler Beckstrom*** *is a graduate student in Instructional Psychology and Technology pursuing research in online and blended learning as well as how sequential art can be used as a way of presenting educational material; his portfolio is available online at:* ***http://tylerbbeckstrom.weebly.com*** *.* ***Michael Boren*** *is a graduate student in Instructional Psychology and Technology studying how documentary films can change perception on culture.* ***Rebecca Thomas*** *is a graduate student in Instructional Psychology and Technology focusing on online and blended learning, project-based learning, and alternative dissertation formats.* ***Richard E. West****, a Contributing Editor and Editor of this series, is an Assistant Professor researching collaborative innovation and online collaborative learning. His research, presentations, and other scholarly contributions are available at:* ***http://richardewest.com*** *. All authors are associated with Brigham Young University.*

Q & A with Ed Tech Leaders

Interview with Punya Mishra

Susan M. Fulgham
Michael F. Shaughnessy
Contributing Editors

1. What are you currently working on?

Most of my current work has focused on creativity, specifically teacher creativity and how teachers can sustain creativity in their students. Within that, of course, is the role

Punya Mishra *is Professor of Educational Psychology and Educational Technology at Michigan State University, where he directs the Master of Arts in Educational Technology program. He currently chairs the Creativity Special Interest Group at the Society for Information Technology in Teacher Education. He is former chair of the Innovation & Technology Committee of the American Association of Colleges of Teacher Education (AACTE). He is nationally and internationally recognized for his work on the theoretical, cognitive, and social aspects related to the design and use of computer-based learning environments. He has worked extensively in the area of technology integration in teacher education, which led to the development (in collaboration with M. J. Koehler) of the Technological Pedagogical Content Knowledge (TPACK) framework, which has been described as being "the most significant advancement in the area of technology integration in the past 25 years." His current research focuses on teacher creativity and the role that technology can play in the process. He has authored over 50 articles and book chapters and has edited two books. Dr. Mishra is an award-winning instructor who teaches courses at both the master's and doctoral levels in the areas of educational technology, design, and creativity. He is also an accomplished visual artist and poet (e-mail:* ***punya@msu.edu****).*

Susan M. Fulgham *is Senior Instructional Designer and adjunct instructor for the College of Education at West Texas A & M University, Canyon, Texas (e-mail:* ***sfulgham@bfulgham.com****).* ***Michael F. Shaughnessy*** *is Professor of Special Education and Director of the New Mexico Educational Software Clearinghouse at Eastern New Mexico University in Portales, New Mexico (e-mail:* ***Michael.Shaughnessy@enmu.edu****).*