

Let's Get Theoretical: A Quantitative Content Analysis of Theories and Models Used in the Journal of Applied Communications

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Abstract

Theories and models are an important element in the progression of an academic field. This article focused on quantifying theories and models used in agricultural communication through a quantitative content analysis of the last 20 years of the Journal of Applied Communication (JAC). Specifically, the following research objectives guided this study: 1) describe characteristics (methods, number of authors) of articles in JAC, 2) identify which theories and models have been used in JAC, 3) determine how theory was used in JAC, 4) determine what characteristics predict the use of a theory or model in JAC. Researchers found 87 theories and models identified in JAC with 11 used five or more times and 19 that used between two and four times. Approximately 35% of the articles in JAC used a theory or model. Of those using a theory or model, the majority used it to inform the study, but rarely tested, created/built theory. Other results indicate the use of theory has increased in recent years and the number of authors and number of articles published. Implications for this study are a clear need for increased theoretical vigor in agricultural communication through increased focus on using theory to build on previous work in the industry.

Key Words

Journal of Applied Communications, Theory, Models, Agricultural Communication, Content Analysis

Literature Review

The importance of theory to the field of agricultural communication was established in a 2006 article in *The Journal of Applied Communications (JAC)* (Evans, 2006). This article documented the use of theory in agricultural communication but was a commentary piece without empirical evidence on how theory was used in the discipline. Evans challenged the profession to use theory more strategically, rather than the scattered use of theory that he saw at the time. The importance of theory to the mainstream communication discipline has been established with the progression of theory documented and the concept of communication theory explained (Baldwin, Perry, & Moffitt, 2004; McQuail, 2005). Baldwin et al. (2004) described theories as tools used by both scientists and laypeople to help process and understand the world around them. Theories are naturally conceptual and not specifically related to a certain subject (Glanz, 2011), but may inform multiple disciplines and subject areas at the same time. The agricultural communication field is also informed by a myriad of disciplines in its creation and practice and, as such, draws upon theory from multiple areas (Evans, 2006).

This article was in response to proposals for the 100th issue of JAC.

Theory can be used in research in various ways: informing, testing, and building/creating (Glanz, 2011). When a theory informs a study, it is identified as contributing to the study in concept, but the use of the theory is limited and the theory is not specifically tested. When a theory is tested in a study, the framework is very specific and the different components or concepts of the theory are measured and tested. Theory can also be created by studies through measuring and analyzing specific constructs (Glanz, 2011). Some theories reflect the same common notions but are called different names in different bodies of literature. For example, self-perception theory in communication literature (Baldwin et al., 2004) is referred to as self-discrepancy theory in psychology literature (Higgins, 1987). Additionally, some theories are elements within another theory like opinion leadership (Katz & Lazarsfeld, 1955) is a stand-alone theory, but is also a component of the diffusion of innovations (Rogers, 2003). Each theory uses different words or models to identify specific factors that theorists deem significant. Theories differ in the degree to which they have been developed and tested (Glanz, 2011).

Theory is used in both quantitative and qualitative study designs in an effort to understand, explain, or even predict associations for researchers. The primary goal of theory is to make sense of reality and guide the gathering and assessment of data (McQuail, 2005). Quantitative research can be used to test theories or answer relevant questions (Creswell, 2009). Qualitative research uses theory in many different capacities, it can create a whole new theory, use a theory to frame the study (Creswell, 2009), or test or build a theory through the use of case studies (Creswell, 2009; Eisenhardt & Graebner, 2007). Models are visual representations of theories or concepts that make them more understandable. In communication theory, models are a “verbal or diagrammatic form of some aspect of the dynamic process of mass communication” (McQuail, 2005, p. 5).

One important element in theory development is replication. Replication increases the reliability, external and internal validity, and credibility of a theory (Tsang & Kwan, 1999). In the social sciences replication is sometimes an overlooked necessity (Berthon, Pitt, Ewing, & Carr, 2002; Tsang & Kwan, 1999), but when developing or progressing theory it is important to replicate studies (Tsang & Kwan, 1999). “The growth of knowledge is a cumulative process in which new insights are added to the existing stock of knowledge” (Tsang & Kwan, 1999, p. 771). Thus, replication should be encouraged for a discipline to move from a scattered pattern of theory development to a multifocal pattern with in-depth understanding, generalizability, and explanatory power (Tsang & Kwan, 1999).

Communication Theory

Communication is not a standalone discipline. Early theoretical elements of the dominant paradigm were not new inventions for mass media but were adapted from sociology, psychology and information sciences (McQuail, 2005). The growth of the communication discipline has drawn the attention of many disciplines including philosophy, history, geography, psychology, sociology, ethnology, economics, political science, biology, cybernetics, and the cognitive sciences (Mattelart & Mattelart, 1998). Communication theory started to evolve shortly after World War II. The “dominant paradigm” became the paradigm under which communication research would blossom. This paradigm is defined as one that unites mass media with the research practices of social sciences and has been effected by larger societal issues. In third world countries research under the dominant paradigm operated under the assumption that societies would either converge or surpass the Western model. The dominant paradigm was vulnerable to communism, which used mass media for the destruction of democracy (Mattelart & Mattelart, 1998).

The “alternative paradigm” is a criticism of the dominant paradigm. The alternative paradigm is based on a more comprehensive interpretation of communication “as sharing and ritual rather than just ‘transmission’” (McQuail, 2005, p. 67). It is focused on qualitative methodology, rather than quantitative. Instead of following mainstream society, the alternative paradigm opposed society and was involved with inequality (McQuail, 2005). Interpretativism and constructionism were also embraced by the alternative paradigm.

JAC Background

The field of agricultural communication has evolved alongside agriculture and mass media since the passing of the Morrill Act of 1862 (Irani & Doerfert, 2013). However, prior to the creation of *JAC*, there was not a publication outlet dedicated specifically to the field of agricultural communication. *JAC* was originally a newsletter known as the ACE Quarterly, but converted to a peer-reviewed journal in 1990 (Association for Communication Excellence in Agriculture, Natural Resources, and Life and Human Sciences (ACE) Records | Special Collections, n.d.; Naile, Robertson, & Cartmell II, 2010). It is published quarterly by the Association for Communication Excellence in Agriculture, Natural Resources, and Life and Human Sciences (ACE) ("ACE," n.d.). While *JAC* is a peer-reviewed journal, it is not just for those in academia, but anyone interested in agriculture, communication, and education (Telg, Tucker, & Dolbier, 2001). *JAC* is used by members of ACE to aid in professional development for both academicians and practitioners (Telg, et al., 2001). *JAC* is considered a core journal for the field of agricultural communication (Zumalt, 2008).

In 2001, the format of *JAC* changed from only having a designated section for reviews, while including other unspecified articles to a format with four focus areas: commentary, research and evaluation, professional development, and reviews. The research section of the journal was intended to be scholarly articles, open to both qualitative and quantitative methods (Telg et al., 2001). *JAC* is intended to appeal to the broad ACE membership, many of whom are not academics, but also practitioners in the field (Telg et al., 2001). The research section of the journal is no exception. "While not all ACE members conduct or publish research, nearly all can benefit greatly by reading and using applied communication research findings in their work" (Telg et al., 2001, p. 11). *JAC* not only calls for research practitioners can use but also for practitioners to implement the findings to improve their work (Miller, Stewart, & West, 2006).

Previous Studies Related to JAC

In 2010, Naile, Robertson, and Cartmell (2010) analyzed *JAC* for content and trends in scholarly progression, and for citation structure, from 1997 to 2006 by Edgar and Rutherford (2011). Edgar and Rutherford sought to increase the understanding of the range and influence of the agricultural field. Edgar and Rutherford's study established *JAC* as the premier journal for agricultural communication. Additionally, in the ten-year span studied by Edgar and Rutherford (2011), there were 1,732 works cited, with an average of 19 citations per article, and it was established that the discipline uses a diverse array of sources for research. Miller et al. (2006) analyzed *JAC* from 2000-2004 for themes, authors, and citations. Major themes were communication management, information technology, media relations, distance education, public accountability, and biotechnology and 119 authors were identified (Miller et al., 2006).

Evans commented on theory usage in the agricultural communication discipline in his 2006 article in *JAC*. He stated that in the young field, general signs of scatter and lack of focus were evident, as well as a lack of theoretical vigor (Evans, 2006). Evans commented that communicators used theories daily, whether they recognized it or not. The roots of these theories spanned across many different disciplines. Evans called for collaboration with people in these other disciplines to increase theoretical vigor of the agricultural communication field (Evans, 2006). The current study sought to build on Evans work to quantify the use of theory in the agricultural communication discipline.

Purpose and Objectives

The purpose of this study was to empirically determine which theories and models have been used in agricultural communication. While Evans (2006) has commented on how he used theory in the field and has seen others use theory, there has not been a study that quantified the use of theory in agricultural communication. Additionally, in an effort to understand the use of theory in the discipline and offer strategic recommendations for improving theoretical vigor, it was important for the researchers to determine the characteristics that predicted the use of theory in an article. As the primary journal of agricultural communication, *JAC* served as the publication outlet of interest in this study. The following research objectives guided this study:

RO1: Describe characteristics (methods, number of authors) of articles in *JAC*

RO2: Identify which theories and models have been used in *JAC*

RO3: Determine how theory has been used in *JAC*

RO4: Determine what characteristics predict the use of a theory or model in *JAC* articles

Methods

Sample

Articles from *JAC* were gathered from the past 20 years. This was the largest sample we were able to collect. Years 2008 to 2015 were available online and years 1995 to 2007 were borrowed from faculty members and libraries across the United States. At the time of this data collection, the most recent volume and issue of *JAC* available was 99(2), which was half way through 2015. This census sampling method resulted in 338 articles. To keep formats consistent, all articles were printed for analysis. Two articles were removed from the sample: one was removed because it was abstracts of research presentations from an ACE Conference and one was a commentary piece about theory, which mentioned over 30 theories and would have skewed the results of this study. This brought the number of articles in the census sample to 336.

Instrumentation

A codebook and codesheet were created using guidelines set forth by Krippendorff (2013) and Riffe, Lacy, and Fico (2013). The unit of analysis for this study was an individual article. Three coders were trained on the use of the codebook: coder 1) a second year Master's student in agricultural communication; coder 2) a faculty member in agricultural communication, and coder 3) a first semester graduate student in agricultural communication. The researcher developed code book included 27 items with 14 variables. Eight of the items were factual descriptors including coder ID, article name, number of authors, names of authors, volume and issue number, year, and section of journal. Other variables included whether or not the article identified theory or models, the study type/methods used, the number of theories used, names of theories used, and how the theories were used.

Study type included choices of 1) quantitative, 2) qualitative, 3) mixed methods, 4) not research, and 5) research but unable to identify type. If the article authors directly identified study type, then that was the type documented. If not, we reviewed the methods to determine study type. If a survey had open-ended questions that were analyzed qualitatively, the study was identified as mixed methods. To determine if the article used theory, we included any theory or model identified by the author(s) as a theory or a model. If the theory was not identified by the author(s), but we thought it could be a theory, a Google search was done with the name and "theory." If it was identified as a theory on any page in the first page of results, it was included as a theory or model. The item related to how the theory was used included choices of 1) informed the study, 2) tested, 3) created/built, 4) informed and tested 5), informed and created/built, and 6) informed, tested, created/built. These categories were based on literature related to the use of theory in social sciences (Baldwin et al., 2004; Creswell, 2009; Eisenhardt & Graebner, 2007; Glanz, 2011; Mattelart & Mattelart, 1998).

Reliability and Analysis

Initial interrater reliability was conducted on 10 percent of the entire sample. Articles were chosen from each journal year in the sample and all sections of the journals so the interrater reliability was representative of the entire sample. Cohen's Kappa was used to measure the level of agreement between all coders on an item basis. The interrater reliability for factual descriptor items' described earlier between coders 1 and 2 ranged from Kappa = .80 to 1.0 and Kappa = .85 and 1.0 between coder 3 and coders 1 and 2. The more difficult items related to the study had Kappa scores of .70 to .81 between coders 1 and 2 and between .30 and .93 between coders 1 and 3 and 2 and 3. Upon reviewing the items and codebook, we determined coder 3 did not have enough experience with theory and methods as a first semester graduate student to identify and understand theory and methods used in each unit of analysis. At this point, coder 3 was removed from the study and coders 1 and 2 proceeded to code the next 10% of the data. On the next 10%, the interrater reliability between coders 1 and 2 on the factual descriptor data was a Kappa of 1.0 for all items individually. For the more difficult items, Kappa scores ranged from .76 to 1.0. Recommended reliability is at .70 on 20% of the sample (Riffe, et al., 2005), which was achieved in this study. After the interrater reliability was determined to be acceptable for all items on 20% of the sample, coders 1 and 2 divided the remaining articles in half and coded the rest of the articles individually. Data were analyzed using IBM SPSS 22. Analysis included frequencies, percentages, crosstabs, correlations, and linear regression. We chose predictive regression analysis over causal analysis because it lessens the concerns related to not having all available variables. In this study, the only available variables were related to data within the JAC articles. Additionally, there was a potential for multicollinearity within the data, made which predictive regression more suited (Allison, 1999). The variables were entered into the model in order of R^2 in the initial simple regression, with the highest correlations entered first as recommended by Field (2013). All variables of interest explained some level of variance in the use of theory or models in a JAC article, so multiple regression was used to further explore the relationship. More details on the procedures used are included in the results section.

Results

Article Characteristics in JAC

To determine differences in how articles used theory and models, it was necessary to first determine the characteristics of the articles published in JAC articles. The number of authors in JAC ranged from one to seven with a mean of 2.24 ($SD = 1.30$). More articles used quantitative methods than any other type of method ($n = 121$, 36%) with 113 (33.60%) not being research, 60 (17.90%) used qualitative methods, and seven (2.10%) articles researchers were unable to determine the type of method used in the research (Table 1).

Table 1

<i>Methods Used in JAC</i>	<i>f</i>	<i>%</i>
Quantitative	121	36.00
Not Research	113	33.60
Qualitative	60	17.90
Mixed Method	35	10.40
Unable to determine method	7	2.10

Theories and Models Used

Of the 336 articles, 120 (35.70%) identified at least one theory or model, leaving 216 (64.3%) that did not identify either a theory or a model. Eighty-seven theories and models were identified in the 120 (35.70%) articles that used a theory or model. The number of theories or models used in these articles ranged from one to six with a mean use of 1.64 (SD = .48).

Of the 87 theories and models used, only eleven were used in five or more articles. The most used theory was framing with 20 (6%) occurrences, followed by diffusion of innovations and uses and gratifications both with nine (2.7%) occurrences. Agenda setting was identified eight (2.4%) times, excellence in public relations was identified seven (2.1%) times, and theory of planned behavior was identified six (1.8%) times. Experiential learning, elaboration likelihood model, gatekeeping, semiotics, and the technology acceptance model were each used five (1.5%) times (Table 2).

Table 2

	<i>f</i>	<i>%</i>
Framing	20	6
Diffusion of innovations	9	2.7
Uses and gratifications	9	2.7
Agenda setting	8	2.4
Excellence in public relations	7	2.1
Theory of planned behavior	6	1.8
Experiential learning	5	1.5
Elaboration likelihood model	5	1.5
Gatekeeping	5	1.5
Semiotic theory or social semiotics	5	1.5
Technology acceptance model	5	1.5

Nineteen theories or models were used between two and four times; none were used four times. Accountability, cognitive dissonance, knowledge gap, media dependency, social capital, social presence, and source credibility were all used in three (.9%) articles. Theory of education and identity, critical thinking, digital divide, intentional social change theory, knowledge transfer or exchange, program-systems model, schema theory, self efficacy, social cognitive theory, social construction of reality, visual literacy, and computer-mediated communication, were all used in two (.6%) (Table 3).

Table 3

Theories and Models Used in JAC Between Two and Four Times

	<i>f</i>	%
Accountability	3	.90
Cognitive dissonance	3	.90
Knowledge gap	3	.90
Media dependency	3	.90
Social capital	3	.90
Social presence	3	.90
Source credibility	3	.90
Theory of education and identity	2	.60
Critical thinking	2	.60
Digital divide	2	.60
Intentional social change theory	2	.60
Knowledge transfer or exchange	2	.60
Program systems model	2	.60
Schema theory	2	.60
Self efficacy	2	.60
Social cognitive theory	2	.60
Social construction of reality	2	.60
Visual literacy	2	.60
Computer-mediated communications	2	.60

Note: The other 57 theories and models identified in *JAC* only appeared in one article (.30%).

How Theory Was Used in JAC

To determine how theory was used in *JAC*, we evaluated how theory was used in the 120 articles that used a theory or model. The majority of the articles used a theory or model to inform the research ($n = 103$, 30.60%). Eleven (3.30%) articles used theory or a model to inform and test the theory or model, three (.90%) created/built a theory or model, two (.60%) informed, tested, and created/built a theory or model, and one (.30%) used theory or model to inform and created/built a theory or model (Table 4).

Table 4

How Theory or Models Were Used in JAC

	<i>f</i>	%
Informed the research	103	30.60
Informed and tested	11	3.30
Created/built theory or model	3	.90
Informed, tested, and created/built	2	.60
Informed and created/built	1	.30
Tested theory or model	0	0

Note: The codebook only allowed for an article to be used in one category

Crosstabs were used to further investigate how theory or models were used in *JAC* based on study type and whether or not an article identified a theory or model. It is important to note that percentages were calculated based on the total in each method, not the total number of articles in the entire study. Fifty-four quantitative articles identified a theory or model, which was 44.63% of all quantitative articles in the study. Forty-one qualitative articles identified a theory or model, which was 68.33% of all qualitative articles in the study (Table 5).

Table 5

Comparison of Study Type and Identification of Theory or Model

	Identified a theory or model	Did NOT identify theory or model
Quantitative ($n = 121$)	54 (44.63%)	67 (55.37%)
Qualitative ($n = 60$)	41 (68.33%)	19 (31.67%)
Mixed Method ($n = 35$)	16 (45.71%)	19 (54.29%)
Not Research ($n = 113$)	5 (4.42%)	108 (95.58%)
Unable to determine method ($n = 7$)	4 (57.14%)	3 (42.86%)

Note: Percentages are based on the total number of articles within the method type.

To understand how theory and models were used in *JAC*, crosstabs were used to compare theory or model use and publication year in five-year increments. From 1995 to 1999, 13 (15.29%) of the articles identified a theory or model, from 2000 to 2005 14 (14.14%) identified a theory or model, from 2006 to 2010 22 (44.00%) articles identified a theory or model, and from 2011 to 2015 71 (69.61%) of the articles published identified a theory or model (Table 6).

Table 6

Comparison of Use of Theory or Model by Publication Year

	Identified a theory or model	Did NOT identify theory or model
1995 to 1999 ($n = 85$)	13 (15.29%)	72 (84.71%)
2000 to 2005 ($n = 99$)	14 (14.14%)	85 (85.86%)
2006 to 2010 ($n = 50$)	22 (44.00%)	28 (56.00%)
2011 to 2015 ($n = 102$)	71 (69.61%)	31 (30.39%)

Note: Percentages were calculated based on the total number of articles within the publication year range

To further explore how theory or models were used in *JAC*, crosstab analysis was conducted between the type of study and how a theory or model was used. Informing a study was the most common use of theories and models with 63.33% ($n = 38$) of the qualitative articles using a theory or model to inform the study, 37.14% ($n = 13$) of the mixed methods, and 35.54% ($n = 43$) of the quantitative articles. The next highest use of theory or a model was through informed and tested with 7.44% ($n = 11$) of quantitative studies using theory or a model to inform and test a theory or model and 5.71% ($n = 2$) of mixed methods studies (Table 7).

Table 7

Comparison of How a Theory or Model Was Used and Type of Study

	Quantitative <i>n</i> = 121		Qualitative <i>n</i> = 60		Mixed Method <i>n</i> = 35		Not Research <i>n</i> = 113		Unable to Determine <i>n</i> = 7	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Informed (<i>n</i> = 103)	43	35.54	38	63.33	13	37.14	5	4.43	4	57.14
Informed & tested (<i>n</i> = 11)	9	7.44	0	0	2	5.71	0	0	0	0
Created/built (<i>n</i> = 3)	0	0	2	3.33	1	2.86	0	0	0	0
Informed, tested, created/built (<i>n</i> = 2)	2	1.65	0	0	0	0	0	0	0	0
Informed and Created/Built (<i>n</i> = 1)	0	0	1	1.67	0	0	0	0	0	0
Tested (<i>n</i> = 0)	0	0	0	0	0	0	0	0	0	0
Did not use theory or model (<i>n</i> = 216)	67	55.37	19	31.67	19	54.29	108	95.58	3	42.86

Note: Percentages are based on the total number of articles within method type

Characteristics predicting the use of a theory or model in JAC articles

Correlation and multiple regression analyses were conducted to examine the relationship between inclusion of a theory or model and the number of authors, year, section of journal, and study type. Table 8 summarizes the descriptive statistics and analysis results. Bivariate correlations were run on all variables of interest. The correlation between independent variables was reviewed to eliminate multicollinearity, which is a concern in regression analysis. None of the correlations were considered to be high, with all correlations at .42 or less. Next, correlations between the dependent variable of inclusion of theory or model and independent variables were explored. These correlations were year (-.48); number of authors ($r = -.28$); section of journal (.37); and study type (.34). All correlations were significant at the $p < .001$ level. As can be seen, section of journal and study type are each positively and significantly correlated with the outcome variable. The negative, significant correlations in year and number of authors indicate that the higher number of authors of an article, the more likely the article was to use theory or a model and the more recent the year, the more likely the article was to use theory or a model.

Table 8

Correlation Between Use of Theory and Variables of Interest

	<i>r</i>
Year	-.48**
Number of Authors	-.28**
Section of Journal	.37**
Study Type	.34**

Note: ** $p < .001$

To determine how much of the independent or outcome variable was explained by the characteristics of the article, regression analysis was used with the outcome variable of “identified theory or a model. Simple regression was used initially to determine if the characteristic variable should be included in the multiple regression model. Simple regression analysis using the year of publication resulted in the model $R^2 = .23$, $F(1,334) = 217.92$, $p < .001$, which indicates the year variable is significant and explains 23% of the variance in use of a theory or model. The number of authors variable produced $R^2 = .08$, $F(1,334) = 29.04$, $p < .001$. This indicates that number of authors is significant and accounts for 8% of the variance in use of theory or a model. The section of the journal simple regression produced $R^2 = .14$, $F(1,334) = 53.33$, $p < .001$, which indicates 14% of the variance is predicted by the section of the journal in which the article appeared. The last variable of interest was study type, which produced $R^2 = .12$, $F(1,334) = 44.65$, $p < .001$ indicating 12% of the variance is accounted for by the study type.

Because all variables of interest explained some level of variance in the use of theory or models in a *JAC* article, multiple regression was used to understand the relationship further. The multiple regression model with all four predictors produced $R^2 = .30$, $F(4,331) = 35.43$, $p < .001$. This model with all four predictors explains 30% of the variance in use of theory or models in a *JAC* article. Study type and year had significant regression weights, indicating these variables had a significant influence on the use of a theory or model in an article, after controlling for the other variables in the regression model (Table 9). The negative regression weight for year indicates that after accounting for other variables in the model, the articles with a more recent year of publication, used theory. Number of authors and section of journal were not significant and did not contribute to the multiple regression model.

Table 9

Regression Analysis With Use of Theory and Variables of Interest

	<i>b</i>	<i>B</i>
Year	-.03	-.41**
Number of Authors	-.01	-.03
Section of Journal	.01	.02
Study Type	.09	.25**

Note: ** $p < .001$

Conclusions, Discussion, and Implications

Over the past 20 years, 338 articles were published in *JAC*, with 336 being appropriate for analysis in this study. Analysis of the methods used indicated non-research articles ($n = 113$, 33.60%) were the most common followed by quantitative ($n = 121$, 36%), qualitative ($n = 60$, 17.90%), mixed methods ($n = 35$, 10.40%), and unable to determine ($n = 7$, 2.10%). One hundred and twenty of the articles (35.70%) identified at least one theory or model with 87 individual theories and models identified over the last 20 years. Eleven of these theories were used in five or more articles, 19 were used between two and four times, and 57 were used in only one article. It should be noted that not every article in *JAC* has to use theory and we did not make any value judgments related to the use of theory in a study. The articles that were not research or were commentary or professional development may not have needed theory to be successful. However, the lack of consistent use of theory is a bit concerning. It is difficult for a field to grow and develop when it is spread across so many theories with an apparent lack of focus. As Tsang and Kwan (1999) explained, replication is a necessary step in order to develop and grow the theoretical base of a discipline. With the majority of the theories in *JAC* only being used once ($n = 57$), replication and use of theory in the context of agricultural communication has not been done in order to advance the knowledge and rigor of the field. This study offered empirical evidence to support Evans' (2006) commentary on the scattered nature of theory in our discipline as a whole, which resulted in a lack of general theoretical vigor and the absence of knowledge accumulation and multifocal pattern recommended by Tsang and Kwan (1999) to develop theoretical vigor and generalizability.

When a theory or model was used in the articles analyzed in this study, it was most often used to inform the study ($n = 103$, 30.60%). Eleven articles informed and tested theory or a model while six either created/built, informed, tested, and created/built, or informed and created/built a theory or model. Qualitative ($n = 41$, 68.33%) and mixed methods ($n = 16$, 45.71%) studies identified a theory or model more often than quantitative ($n = 54$, 44.63%) studies. These results confirm Glanz' (2011) description of the multiple ways a theory can be used. Using theory to inform a study is certainly valuable, but the low number of studies that were testing theory or models or creating or building on theory or models speaks to the continued lack of progression in theory in the field of agricultural communication. The causes of this may be from the large number of other disciplines that agricultural communication draws from as noted by Evans (2006) and speaks to the need for agricultural communication researchers to focus on theory development and building to advance the field and body of knowledge as recommended by Tsang and Kwan (1999).

Articles in the early years of *JAC* included fewer uses of theories and models than more recent years. From 1995 to 1999, 13 articles (15.29%) identified a theory or model. In later years, the use of theory increased up to the point of present day 2011 to 2015 when 71 articles (69.61%) identified a theory or model. The number of authors has also increased throughout the years, which may be a result of more people in the profession and more master's and doctoral students who are publishing with their committee members and other faculty and graduate students. These results indicate the field is growing in the identification of theory, but work is needed in the area of theoretical progression.

The regression analysis revealed that the number of authors, year, section of journal, and study type together predicted 30% of the variance in the use of a theory or model over the past 20 years. As the number of authors increased, the article was more likely to use theory. This may be a result of the larger number of authors serving as an indication that the work was a part of a thesis or dissertation or perhaps was a collaboration across disciplines. Later publication years also correlated with the increase in number of authors, and thus may be the result of increased collaboration, increased graduate students in the discipline, and/or increased number of faculty in the discipline. These results explain some of the variance in use of a theory or model, but do not completely explain the use. The results indicated the use of theory is increasing with the addition of

people and time. However, the building of specific theories or growth in certain areas of theoretical explanation is still lacking because of the large number of theories used. Further, very few repeat studies or studies that build upon previous theoretical knowledge appeared in the data set. The agricultural communication discipline is not alone in a lack of replication, as this is an area where other social sciences struggle (Berthon, et al., 2002; Tsang & Kwan, 1999)

Recommendations

This study resulted in multiple recommendations for the agricultural communication field. We recommend authors publishing in *JAC* be more specific about the theories being used in research. This will enable those less familiar with the theory, such as practitioners or other researchers in the field, to make the connection with the theories and research them more in depth. There were many instances where researchers recognized either citations or premises of theories. However, the theories were not explicitly mentioned, so the coders could not code for those theories.

More research is needed to determine the strongest indication for the use of theory or models to completely understand the use in the agricultural communication field. The agricultural communication field can grow and develop over the next 20 years through testing and building upon previously used theories and models in order to create a discipline with strong theoretical vigor. This effort must begin with faculty in agricultural communication taking the lead on using theories previously used and testing and building on previous research in agricultural communication. Before a study is started, a thorough review of previous literature in *JAC* should be conducted in order to build on previous work in the discipline. Additionally, faculty must educate master's and doctoral students not only about the specific theories used in this industry, but about how to use theory in a way that advances the theoretical vigor of the field. While informing a study will remain an important element of how theory is used, it is imperative that future studies focus on testing, building, and creating theory so the industry can continue to advance as a respected discipline.

The results of the regression analysis indicate Evans' (2006) may have been correct that collaboration with other disciplines has helped increase theoretical vigor in recent years; future research should explore this concept further and faculty should continue to seek opportunities for collaboration. Because *JAC* audiences are not all academicians (Telg et al., 2001), future research should investigate the readers of *JAC* to understand their needs and understanding related to research and theory. Moreover, future research should look at the authors of *JAC* to understand their place in the profession (practitioners and/or academics) and the degrees they hold or are pursuing to understand the use of theory in their research.

The findings of this research indicate future research should look specifically at the research section of the journal and do a more advanced analysis of theory and models related to the strength of the research. An in-depth analysis of the more recent years of *JAC* would also be valuable since these were more likely to contain theory or models. It may be of additional value to look at the institutions where researchers were trained or where they currently work. This may be another valuable piece in understanding the use of theories and models in agricultural communication.

This study offers a snapshot of theory and model use in the agricultural communication discipline. In order to gain a better understanding of the entire discipline, it is recommended that future research investigate in what other journals agricultural communication researchers are publishing. This should be followed by an in-depth look at those journals and articles related to the discipline to examine theory and model use.

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