

Creative Teaching Behaviors: A Comparison of Student and Instructor Perspectives

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Abstract

The purpose of this study was to explain and predict creative teaching behaviors of university instructors in the College of Agriculture, Food and Natural Resources (CAFNR) at the University of Missouri (MU). Creative teaching behaviors were examined using an instrument developed from creativity theories of divergent thinking. The study utilized two populations: undergraduate students and their instructors. Results indicated that students believe their instructors demonstrated creative teaching behaviors. These findings were remarkably similar to the self-perceived demonstration of creative teaching behaviors of instructors. There was also a significant relationship between creative teaching behaviors of experienced and inexperienced instructors when evaluated by students. No differences were observed when the creative teaching behaviors of instructors were compared by sex or teaching discipline.

Introduction

Creativity was described by early philosophers such as Plato and Aristotle and was championed as an important concept of study by John Dewey (Starko, 2005). Guilford's 1950 presidential address to the American Psychological Association (APA) resulted in considerable psychological research focused on creativity (Bleedorn, 2003, 2005; Cropley, 2001; Fasko, 2000-2001; Mumford, 2003; Runco, 1997). Although research on creativity has been a subject of study for decades, concretely defining creativity remains a difficult task (Baker, et al., 2001; Friedel and Rudd, 2005; Hocevar, 1981; Sternberg, 1999; Starko, 2005).

Perkins (1988) described creativity in terms of original and appropriate results. Torrance (1995) suggested creativity is "the process of forming ideas or hypotheses, testing hypotheses, and communicating the results (p. 23)." Starko (2005) defined creativity as a product or idea that is original or novel to the individual creator. Although creativity is challenging to define, many researchers agree that it is comprised of three factors, including: novelty, effective for others, and ethical or beneficial to society (Cropley, 2001; Fox and Fox, 2000; Torrance, 1995).

Given the complexity of defining creativity, it is not surprising the concept has been viewed through

differing theoretical lenses. For example, Starko (2005) identified several theoretical frameworks for creativity, including psychoanalytical theories, humanist and developmental theories, behaviorist theories and cognitive theories. Systems theories have also been applied to creativity research and may offer a holistic approach (Starko, 2005). Systems approaches suggest creativity cannot be identified in a vacuum, but rather as an interaction between the environment and the person (Starko, 2005). The environment can determine the type of novelty produced and thus is an active recipient of what creative people offer (Cropley, 2001).

Csikszentmihaly (1988) developed a systems model of creativity that included three aspects: the person, the domain, and the field. Thus, creativity is an interaction between product, person and environment (Starko, 2005). The field includes people who can affect the structure of a domain (Starko 2005). Gardner (1993) suggested individuals are creative, but they create in a specific setting. Perhaps teaching can also be viewed through this setting. The teacher may be evaluated by the field, which could include student evaluations, educational theories, and administrative approval. Can teaching be considered a particular domain where creativity can occur? Systems theories also suggest that the impact of the environment upon creative output inevitably involves human interaction (Starko, 2005). The environment can determine the type of novelty produced and thus is an active recipient of what creative people offer (Cropley, 2001). Education is one environment creativity researchers have explored.

Renzulli (1992) suggested teachers are a key component of developing creativity, both as mentors and role models. Fasko (2000-01) stated, "Creative teaching can enhance learning" (p. 320). Historical references suggested creativity is significantly related to educational achievement (Karnes et al., 1961). Karnes et al., (1961) suggested teachers were most effective in stimulating creativity of their students when they, as teachers, modeled divergent thinking. Cropley (2001) stated, "Creativity offers classroom approaches that are interesting and thus seems to be a more efficient way of fostering learning and personal growth in the young" (p. 28). Creative teaching behaviors may impact student success. However, how do we identify and assess creative

teaching? Would creative teaching differ between disciplines? While men appear to have slightly higher levels of creativity than women (Bleedron, 2003, 2005; Starko, 2005), would differences also occur between sex and creative teaching?

Many types of creativity assessments have been developed to address the numerous and complex models of creativity (Feldhusen and Eng Goh, 1995). Hocevar (1981) concluded creativity is the most difficult psychological concept to measure. Creativity tests may have appeared as early as 1915, and many more were developed between World War I and World War II (Cropley, 1967). Torrance integrated many of these early tests into what is today referred to as the Torrance Tests of Creative Thinking (TTCT) (Cropley, 2001). The latest version of the TTCT, the Abbreviated Torrance Test for Adults (ATTA), measures four components of divergent thinking, including fluency, flexibility, originality, and elaboration (Goff and Torrance, 2002). "To this day, the Torrance Tests of Creative Thinking remains the most widely used assessments of creative talent" (Sternberg, 2006, p. 87). However, not all researchers support using Torrance tests to assess creativity.

Self-reported instruments are one alternate method for assessing creativity. Hocevar (1981) suggested, "A useful way to measure creativity is to simply ask the subject" (p. 459). In addition, past creative behaviors may be used to assess creativity. Past behavior may be the best indicator of future behavior (Hocevar, 1981). Said differently, can past creative behavior predict future creative endeavors? Can self-assessments be used to evaluate creative teaching?

The ability to assess and enhance creativity of teachers has been the focus of some research (Milgram, 1979; Davidovitch and Milgram, 2006). In fact, Davidovitch and Milgram (2006) suggested that determining the creativity of pre-service and in-service teachers and enhancing the creative thinking of these teachers is a worthwhile endeavor. Some researchers have concluded that creative teaching may be subsumed under teacher effectiveness research (Esquivel, 1995). In addition, Milgram (1979) stated, "Although few studies of the relationship exist, creative teacher behavior probably makes for more effective teaching" (p. 125).

Despite the apparent need, research focused on teacher creativity appears to be limited. Torrance (1995) suggested creative teachers are relatively unstudied. Current research focused on teacher creativity appears to be lacking. While some may suggest that creative teaching is effective teaching (Anderson, 2002; Bain, 2004; Bleedron, 2003, 2005; Cropley, 1967, 2001; Davidovitch and Milgram, 2006; Esquivel, 1995; Fasko, 2000-01; Renzulli, 1992; Torrance, 1981, 1995), concrete measures that define creative teachers appear to be lacking in the literature. Although a few preliminary creativity studies have been conducted in colleges of agriculture,

(Aschenbrener, et al., 2007; Baker et al., 2001; Friedel and Rudd, 2005), a research gap still exists. While some research suggests differences in creativity between sex (Bleedron, 2003, 2005; Starko, 2005), other important distinctions may also exist. Identifying characteristics of creative behavior of instructors is needed to establish the impact of creativity in the classroom environment.

Purpose and Research Questions

The purpose of this study was to explain and predict creative teaching behaviors of university instructors. The following research questions and hypotheses guide this study and identify creativity specifically in the context of instruction:

1. What are the characteristics of college of agriculture undergraduate instructors, including sex, years of teaching experience, age, and teaching discipline?
2. What is the self-perceived level of creative teaching behaviors of instructors?
3. What is the level of creative behaviors exhibited by instructors, as perceived by their students?
4. What is the amount of variance in instructors' self-perceived creative teaching behaviors that is accounted for by their age, sex, teaching experience, and discipline?

Null Hypotheses

1. H_0 : There is no relationship between instructors' age and their level of creativity (student perceptions [y_1] and instructor perceptions [y_2]).
2. H_0 : There is no difference between instructors' sex and their level of creativity (student perceptions [y_1] and instructor perceptions [y_2]).
3. H_0 : There is no difference between instructors' teaching experience and level of creativity (student perceptions [y_1] and instructor perceptions [y_2]).
4. H_0 : There is no difference between instructors' discipline (natural/physical science or social science) and their level of creativity (student perceptions [y_1] and instructor perceptions [y_2]).

Methods

This descriptive-correlational study utilized two accessible populations at MU to represent both instructors and students as specified in the research questions. The frame for both populations was developed from electronic mail accounts assigned by the university for students and faculty members. The specific criteria for the instructor population included instructors teaching all sections of undergraduate courses in CAFNR at MU, excluding seminar, research and special problems courses, during the 2007 fall semester ($N = 44$). Instructors teaching multiple courses or multiple sections of the same course were randomly selected to represent one section of one course.

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The population for the student component of the study included all students enrolled in undergraduate courses, excluding seminar, topics or problems courses, being taught by instructors selected as subjects for this study. Frame and selection error were addressed by securing student enrollment in college of agriculture courses through the official MU registration system and elimination of duplicate names.

A time and place sample was utilized for instructors teaching undergraduate agriculture courses during the fall, 2007 semester. The group of 44 instructors included in the accessible population was considered representative of future populations in the college, justifying the use of a time and place sample (Oliver and Hinkle, 1982). Sampling procedures were not imposed, as all members of the accessible population were included in the study.

Probabilistic sampling was obtained from the student population. Because students were considered an intact group, cluster sampling was considered an appropriate sampling technique. Attempting to equate members within each cluster, courses were selected where the cluster represented a minimum of 25 students. Students with multiple classes were only allowed to be a member of one cluster and could only complete the questionnaire for one instructor. An effort was made to assign students with multiple classes to the cluster with the lowest student enrollment to preserve as many clusters as possible. Two criteria were used to ensure the sample approximated members of each cluster. A response rate of 50%, or a minimum number of 30 responses, was required for each cluster to be included. Fifty percent was chosen for smaller clusters ($n = 25$) unable to meet the target of 30 respondents per class.

A researcher-developed instrument, named the Creative and Effective Teaching Assessment (CETA), was used to assess student perceptions of creativity teaching behaviors and the self-perceived creative teaching behaviors of university instructors. The CETA addressed the four creativity constructs identified on the ATTA, including fluency, originality, elaboration and flexibility. For each construct, four questions were developed. Each response was given a numeric value to be summated to create a total scale score (Ary, et al., 2002). The 16 items were measured using the following seven point Likert scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Slightly Disagree; 4 = Undecided; 5 = Slightly Agree; 6 = Agree; and 7 = Strongly Agree.

Measurement error was addressed by assessing the CETA for validity and reliability. A panel of experts composed of four individuals, including two content experts and two instrumentation experts, established validity for the CETA. The panel of experts reviewed the 16 statements associated with the four creativity constructs identified by Torrance (1995) and assessed the instrument for content, construct and face validity. Reliability was estimated

by conducting a pilot test of the CETA instrument on the four constructs of creativity. Following guidelines from Gall et al. (2003), the questionnaire was administered to a sample of 47 students not selected to participate in the study who had characteristics similar to those of the population. The instructor pilot test was conducted by university faculty ($n = 29$) from colleges of agriculture across the nation. This sample was selected because it closely resembled the instructor population used as subjects in this study.

Cronbach's alpha was computed to determine the reliability estimates of the measured constructs. The student measure of the four creativity constructs resulted in an overall Cronbach's alpha of .96. Each of the four creativity constructs were also evaluated for reliability, including fluency ($\alpha = .81$), flexibility ($\alpha = .87$), originality ($\alpha = .89$), and elaboration ($\alpha = .89$). Each was deemed to be acceptable. For the instructor measures, the overall Cronbach's alpha for the four creative constructs was .84. Each individual construct was also examined. The reliability coefficient for the instructor pilot included fluency ($\alpha = .46$), flexibility ($\alpha = .74$), originality ($\alpha = .77$), and elaboration ($\alpha = .68$). Nunnally (1962) suggested that reliability estimates of .50-.60 might be high enough in the early stages of research. The construct of fluency was lower than what is recommended by Nunnally, thus the individual results for each construct was not considered appropriate. The reliability of the entire instrument ($\alpha = .84$), however, was acceptable.

Data were collected through the use of an online questionnaire given to students at the conclusion of the fall, 2007 semester. Clusters for each class were used to generate a summative measure for each instructor. Specifically, the four construct areas of creativity measured by the questionnaire were summated and a creativity score for each instructor was developed. Instructor data were collected directly from instructors through personal interviews.

Data were analyzed using SPSS 15.0®. The alpha level was set *a priori* at .05. Conventions established by Davis (1971) were used to describe the magnitude of correlations where 1.0 is described as perfect, .70-.99 is described as very high, .50-.69 is substantial, .30-.49 is moderate, .10-.29 is low and .01-.09 is described as negligible.

Results and Discussions

Results from this study are limited to the accessible population and should not be generalized to other populations. After initial data collection and two follow-up contacts, data were collected from 40 instructors, yielding a response rate of 91%. Sampling procedures identified 44 qualifying classes and a total of 1674 students in those intact groups. Following three follow-up contacts, total students responses ($n = 921$) yielded 40 student clusters that met the parameters of the study.

The first research question addressed the characteristics of the instructors ($n = 40$). Specifically, instructors' age, years of teaching, sex, and teaching discipline were examined (see Table 1).

Instructors ($n = 40$) averaged 47 years of age and the range of ages was from 25 to 77 years. The sample averaged slightly less than 16 years of teaching experience and was predominately male (68%). However, the range in teaching experience was one to 47 years ($SD = 10.98$). In addition, roughly two-thirds (62.5%) of the instructors taught in natural/physical science disciplines.

The second research question sought to determine the self-perceived level of creative teaching behaviors of instructors. The four constructs comprising the creative teaching assessment included originality, frequency, flexibility and elaboration (see Table 2).

The highest summated mean score for the four areas assessed by the CETA was the elaboration construct ($M = 6.18$; $SD = .61$). Originality had the lowest mean score ($M = 5.35$; $SD = 1.15$), but the greatest range in scores. The mean score on the self-

perceived level of creative teaching behaviors was 5.73 ($SD = .72$).

The third research question sought to determine the level of creative teaching behaviors exhibited by instructors, as perceived by their students (see Table 3). From the student clusters, the highest mean score derived from summated data associated with the four construct of creativity was elaboration ($M = 5.72$; $SD = .72$). The construct of originality had the lowest mean score ($M = 5.29$; $SD = .84$) from students. The summated mean for creative teaching behaviors, as perceived by students, was 5.43 ($SD = .75$).

To address research question four, a simultaneous linear regression analysis was calculated. An intercorrelation matrix was generated prior to conducting the regression analysis to analyze multicollinearity (see Table 4). The intercorrelation matrix contained the independent variables (age, sex, experience, and discipline), and the variable of interest (instructor's CETA). Guidelines outlined by Berry and Feldman (1985) were used to address multicollinearity. Bivariate correlations between the predictor (independent variable) approaching .80

were potential threats and were removed prior to conducting regression analysis. Because age and teaching experience was highly correlated ($r = .80$), a variable was removed. Age had a higher correlation with the dependent variable than did teaching experience, thus teaching experience was removed from the regression analysis.

Table 5 shows instructors' perceived creativity was the dependant variable and age, sex, and discipline were the independent variables. Approximately 12% of the variance in perceived creative teaching behavior can be explained by the linear combination of age, sex, and discipline. However, the model was not significant ($F(3, 34) = .22$; $p > .05$).

The first null hypotheses stated no relationship exist between age and level of creativity (instructor perceptions and student perceptions). Relationships were classified using Davis' (1971) conventions for describing magnitude of correlation coefficients. A

Characteristic	<i>f</i>	%	Mean	<i>SD</i>	Range
Age			47.05	10.48	25 - 77
Years of Teaching			15.95	10.98	1 - 47
Sex					
Male	27	67.50			
Female	13	32.50			
Discipline					
Natural/physical	25	62.50			
Social	15	37.50			

Construct	Mean	<i>SD</i>	Range
Summated Self-Perceived Creative Teaching Behavior	5.73	.72	3.00 - 6.89
Elaboration	6.18	.61	5.00 - 7.00
Frequency	5.81	.87	3.00 - 5.00
Flexibility	5.58	.93	2.75 - 7.00
Originality	5.35	1.15	1.00 - 6.92

Note. Scale: 1 = strongly disagree, 2 = disagree, 2 = disagree, 3 = slightly disagree, 4 = undecided, 5 = slightly agree, 6 = agree, 7 = strongly agree.

Construct	Mean	<i>SD</i>	Range
Summate Creative Teaching Behaviors	5.43	.75	3.32 - 6.67
Elaboration	5.72	.72	5.00 - 7.00
Frequency	5.41	.73	3.00 - 7.00
Flexibility	5.31	.80	2.75 - 7.00
Originality	5.29	.84	1.00 - 6.74

Note. Scale: 1 = strongly disagree, 2 = disagree, 2 = disagree, 3 = slightly disagree, 4 = undecided, 5 = slightly agree, 6 = agree, 7 = strongly agree.

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Table 4. Intercorrelational Matrix for Instructors' Self-Perceived Creativity (n = 40)

Variable	X ₁	X ₂	X ₃	X ₄	Y
Age (X ₁)	1.00	.43	.80	-.12	.12
Sex (X ₂)		1.00	.45	-.01	-.10
Experience (X ₃)			1.00	.15	-.02
Discipline (X ₄)				1.00	-.29
Instructors' Perceived Creative Teaching Behaviors (Y)					1.00

^aSex coded: female = 0, male = 1; ^bdiscipline: 0 = social, 1 = natural/physical; ^cexperience: 0 = ? five years, 1 = > five years.

Table 5. Simultaneous Linear Regression of Self-Perceived Creative Teaching Behaviors (n = 40)

Variable	R	R ²	b	t- value	p-value
	.35	.12			
Age			.01	.90	.38
Sex ^(a)			-.25	-.93	.36
Discipline ^(b)			-.44	-1.85	.07
Instructors' Self-Perceived Creativity Teaching Behaviors (constant)			5.69	9.90	.01

Note: Adjusted R² = .04.
For Model F(3, 32) = .22; p > .05.
^aSex coded: female = 0, male = 1; ^bdiscipline: 0 = social, 1 = natural/physical.

low, non-significant relationship was found between age and creative teaching behaviors, as perceived by students (see Table 6 and 7).

There was not a significant relationship between instructors' self-perceived creative teaching behaviors ($p = .47$) and their age. Students' perceived creative teaching behaviors and age of their instructors also failed to show a significant relationship ($p = .08$). Therefore, the null hypothesis stating that no relationships exist ($p > .05$) between age and level of creativity (instructor perceptions and student perceptions) was accepted.

Null hypothesis two stated that no differences exist between sex of the instructor and the level of creativity of the instructor, as perceived by instructors and students. A non-directional, independent samples t-test was calculated to test the second null hypothesis. Levene's Test for Equality of Variances was conducted.

No significant differences in group variances were identified ($p > .05$), thus equal variances were assumed for each of the variables and evaluated for differences (see Tables 8 and 9).

Instructors' self-perceived creative teaching behaviors ($p = .54$) and students' perceived creative teaching behaviors of instructors ($p = .35$) and were not statistically different when compared by sex. Therefore, the null hypotheses stating that no differences exist between sex and level of creativity (instructor perceptions and student perceptions), was accepted.

The third null hypotheses stated that no differences exist between teaching experience and level of creativity (instructor perceptions and student

perceptions). Five years was selected to distinguish between experience levels, as this time period is the criteria for tenure and for award recognition in CAFNR. A non-directional, independent t-test was calculated to test the second null hypothesis. Levene's Test for Equality of Variances was conducted and the variances for instructors' self-perceived creative teaching behaviors ($p = .45$) and student perceptions of creative teaching behaviors ($p = .20$), as measured by the CETA, were calculated. Due to no significant differences in group variances ($p > .05$), equal variances were assumed for each of the variables and evaluated for differences (see Tables 10 and 11).

Differences between teaching experience and the creativity measures revealed differences in teaching experience were not significantly different on one of the creativity measures. Instructors' self-perceived creative teaching behaviors were not statistically

Table 6. Pearson Product Moment Correlations for Creative Teaching Behaviors, as Perceived Students (n = 40)

Variable	Student Perceived Creative Teaching Behaviors	p - value
Instructor Age	.29	.08

Table 7. Pearson Product Moment Correlations for Instructors' Self-Perceived Creative Teaching Behaviors (n = 40)

Variable	Self-Perceived Creative Teaching Behaviors	p - value
Instructor Age	.12	.47

Table 8. Independent Samples t Test between Sex and Instructors' Perceived Creative Teaching Behaviors (n = 40)

Sex	<i>N</i>	Mean	<i>SD</i>	<i>t</i> -value	<i>p</i> -value
Female	13	5.83	.58	.62	.54
Male	27	5.68	.78		

Note. Scale: 1 = strongly disagree, 2 = disagree, 2 = disagree, 3 = slightly disagree, 4 = undecided, 5 = slightly agree, 6 = agree, 7 = strongly agree.

Table 9. Independent Samples t Test between Sex and Students' Perceived Creative Teaching Behaviors of Instructors (n = 40)

Sex	<i>N</i>	Mean	<i>SD</i>	<i>t</i> -value	<i>p</i> -value
Male	27	5.51	.76	-.95	.35
Female	13	5.27	.73		

Note. Scale: 1 = strongly disagree, 2 = disagree, 2 = disagree, 3 = slightly disagree, 4 = undecided, 5 = slightly agree, 6 = agree, 7 = strongly agree.

Table 10. Independent Samples t Test Between Teaching Experience and Instructors' Perceived Creative Teaching Behaviors (n = 40)

Teaching Experience	<i>N</i>	Mean	<i>SD</i>	<i>t</i> -value	<i>p</i> -value
≥ 5 years	31	5.69	.78	-.66	.52
< 5 years	9	5.87	.44		

Note. Scale: 1 = strongly disagree, 2 = disagree, 2 = disagree, 3 = slightly disagree, 4 = undecided, 5 = slightly agree, 6 = agree, 7 = strongly agree.

Table 11. Independent Samples t Test between Teaching Experience and Students' Perceived Creative Teaching Behaviors of Instructors (n = 40)

Teaching Experience	<i>N</i>	Mean	<i>SD</i>	<i>t</i> -value	<i>p</i> -value
≥ 5 years	31	5.56	.65	2.03	.05*
< 5 years	9	5.00	.94		

* *p* < .05.

Note. Scale: 1 = strongly disagree, 2 = disagree, 2 = disagree, 3 = slightly disagree, 4 = undecided, 5 = slightly agree, 6 = agree, 7 = strongly agree.

Table 12. Independent Samples t Test between Disciplines and Instructors' Perceived Creative Teaching Behaviors (n = 40)

Discipline	<i>N</i>	Mean	<i>SD</i>	<i>t</i> -value	<i>p</i> -value
Natural/Physical	27	6.00	.40	1.88	.07
Social Science	13	5.57	.82		

Note. Scale: 1 = strongly disagree, 2 = disagree, 2 = disagree, 3 = slightly disagree, 4 = undecided, 5 = slightly agree, 6 = agree, 7 = strongly agree.

Table 13. Independent Samples t Test between Disciplines and Students' Perceived Creative Teaching Behaviors of Instructors (n = 40)

Discipline	<i>N</i>	Mean	<i>SD</i>	<i>t</i> -value	<i>p</i> -value
Natural/Physical	25	6.00	.40	1.88	.32
Social Science	15	5.57	.82		

Note. Scale: 1 = strongly disagree, 2 = disagree, 2 = disagree, 3 = slightly disagree, 4 = undecided, 5 = slightly agree, 6 = agree, 7 = strongly agree.

significant ($p > .05$). Therefore, the null hypothesis stating that no differences exist between teaching experience and instructors' self-perceived creative teaching behaviors was accepted. There was, however, a significant difference between creative teaching behaviors of experienced and inexperienced instructors as perceived by students ($p = .05$). Therefore, the null hypothesis stating that no differences exist between teaching experience and students' perception of instructors' creative teaching behaviors was rejected in favor of the research hypothesis.

The final null hypotheses stated no differences exist between discipline (natural/physical or social science) and level of creativity (instructor perceptions and student perceptions). A non-directional, independent samples t-test was calculated to test the null hypotheses. Levene's Test for Equality of Variances was conducted and the variances for instructors' self-perceived creative teaching behaviors ($p = .07$) and student perceptions of creative teaching behaviors as measured by the CETA ($p = .38$) were calculated. Due to non-significant variances ($p > .05$), equal variances were assumed for each of the variables and evaluated for differences (see Tables 12 and 13).

Instructors' self-perceived creative teaching behaviors ($p = .07$) and students' perceived creative teaching behaviors of their instructors ($p = .32$) were not statistically significant when compared by discipline. Therefore, the null hypothesis stating that no differences exist ($p > .05$) between disciplines and level

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of creativity (instructor perceptions and student perceptions), was accepted.

Summary

The profile of an instructor in the CAFNR at MU is a middle-aged male who has taught courses for nearly 16 years in the natural/physical sciences. These characteristics must be taken into consideration when developing and delivering faculty in-service programs intended to enhance the creativity of instructors.

Instructors believe they are creative in their teaching. Of the four creativity constructs, instructors most frequently report using elaboration in their teaching and are least likely to use originality. Considering the presence of creative teaching behaviors, instructors may value creativity as a component of teaching. However, can we identify specific creative teaching behaviors? Further research should include qualitative methods to observe and record creative behaviors used by instructors. In addition, training to help instructors learn to promote and embrace creative teaching practices may be implemented to increase the occurrence of these creative teaching behaviors.

Students on average perceive that instructors demonstrate creative teaching behaviors. However, the range in scores suggests that students varied considerably in their perceptions of instructor creativity in the classroom. Although past research suggests that assessing creativity is complex, (Hocevar, 1981), students may be able to identify this construct. Students appear to be capable of evaluating creativity in the classroom, given the range of scores associated with student perceptions of instructors' use of creative teaching behaviors. This conclusion is a valuable step in research focused on teacher creativity as documentation of students' perceptions of creative teaching does not appear to be available in previous literature.

Perhaps of equal importance, students agreed with their instructors regarding the presence of creative teaching behaviors. Frequency of teachers' use of elaboration, frequency, flexibility, and originality were rated in the same order by both instructors and students. Instructors reported slightly more agreement with the frequency of creative behaviors than did students. Differences in student and instructor perspectives may be an area for future research. Are creative teaching behaviors related to effective teaching? Would qualitative data support these findings? The CETA could be expanded to include qualitative data designed to determine instructor behaviors that impact student perceptions of creative teaching.

Only 12% of the variance in creative teaching behaviors, as perceived by students, can be accounted for by the linear combination of age, sex, and teaching discipline. This model, however, was not significant. The implication of this finding may be consistent

with the ambiguous nature of creativity. What factors contribute to creative teaching behaviors of instructors? What characteristics of instructors account for additional variance in creative teaching behaviors? These questions should be the focus of future research.

Discipline may not be a factor to consider when addressing creativity of university instructors, as both measures of creativity failed to show significant differences. Perhaps creativity does not differ due to the research environment found in both natural/physical and social sciences within the college. Creativity may provide new avenues of understanding between the vastly different disciplines. If creativity does not appear to vary between disciplines, would measures to enhance creative teaching behaviors be effective in both disciplines? All instructors, regardless of discipline, should be addressed in future research. Opportunities to enhance creativity may appropriately target both natural/physical and social science disciplines.

Teaching experience does not impact the self-perceived creativity of instructors. There was a significant difference, however, between students' perceived creative teaching behaviors of instructors and the experience of these instructors. Students suggest instructors with five or more years of teaching experience exhibit more creative teaching behaviors. However, it would seem appropriate to consider all instructors in future efforts to enhance creativity. It is important to consider the differences between instructors' and students' perceptions. Would student perceptions of creative teaching be consistent with creative behaviors identified by instructors? Further research is needed to address the specific behaviors experienced instructors demonstrated in the classroom which led to the significant differences in student perceptions of creative teaching behaviors.

Creativity does not appear to differ based upon the sex of instructors. Sex does not appear to be a significant factor when examining creativity of instructors. This finding differs from previous creativity research which found men displayed greater levels of creativity (Bleedron, 2003, 2005; Starko, 2005). The apparent absence of a gender gap suggests both groups could be addressed by similar professional development opportunities regarding creativity. It is important to note that sex and teaching discipline are the only areas where the two creativity measures appear to have similar rankings for the creativity constructs.

Although considerable creativity research has been conducted, the influence of creative teaching behaviors may offer an opportunity for new insight on teaching and learning. Further research, including replication of this study, should include identifying the value students place upon creative teaching behaviors and identifying specific behaviors students believe lead to creative teaching. Finally, the connec-

tion between creative and effective teaching should be explored.

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