The Role of Creative Coursework in Skill Development for University Seniors

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Abstract
Previous research suggests that creativity training can be effective in academic settings and that teachers, in particular, can have an impact on creativity. Furthermore, creativity is one of many transferable skills in higher education that will benefit students when they enter the workforce. This study extends research on creativity training and transferable skills in higher education, using data from the "Senior Transitions" topical module of the National Survey of Student Engagement (NSSE). Responses from over 48,000 seniors at 227 different U.S colleges and universities were used to explore curricular differences across disciplinary fields as well as how exposure to creative coursework can predict confidence in numerous skills and abilities. Exploratory and confirmatory factor analysis provided support for a measure of exposure to creative coursework, and an ANOVA suggested significant differences by major fields, with arts majors showing a distinct advantage. Results from ordinary least squares regression models found that even after controlling for several demographic and institutional characteristics, creative coursework is a significant positive predictor of confidence in several different skills and abilities that are important for adapting to traditional and non-traditional work settings, including creative thinking, critical thinking, entrepreneurial skills, and networking abilities. Potential reasons for these patterns of results are discussed. These findings can help to inform curricular and programming enhancements for college students across all major fields, helping to better prepare them for their futures in various workplace settings.

Keywords
coursework, creativity, creative thinking, critical thinking, higher education, major field, skills, abilities

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Introduction
Creativity is an important element of human cognitive functioning, although not everyone even agrees on the definition (Davis, 2004). A basic description of the construct would be any behavior or outcome that is both "novel" and "appropriate" (Brown, 1989; Runco & Jaeger, 2012). Many might associate the teaching of creativity with elementary school collage projects or middle school short story skills can be improved in students at a variety of

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educational levels (Scott, Leritz, & Mumford, 2004). Creativity is an advantageous skill to develop during higher education, as it can transfer to traditional workplace settings as well as benefit those embarking upon an entrepreneurial journey through self employment or starting a business. Therefore, further exploration of how exposure to coursework that emphasizes creative thinking can influence confidence in other transferable skills provides valuable information for researchers and practitioners in the field of education and beyond.

Creativity: Environmental Influence

Although some see creativity as an internal construct, there is also evidence that one's environment can impact creative expression. Research suggests that authority figures can have an influence on creativity. The effect of parents on creativity has been explored in younger populations (Meador, 1992; Jonsson & Carlsson, 2000), but studies have also examined particular behaviors of teachers that may decrease or increase creativity (Baloche, 1994; Smith, Michael, & Hocevar, 1990; Sternberg, 2010). For example, Smith and colleagues (1990) found that high-anxiety test instructions were related to lower creative performance scores in high school students, while Baloche (1994) found that the regular use of problem solving activities, open discussions, and flexibility in lesson plans related to higher scores on creative performance at the end of the school year. Even relatively minimal adaptations of task instructions can influence creative output, such as directions to generate more ideas (Paulus, Kohn, & Arditti, 2001) or to explicitly be more creative (Rietzschel, Nijstad, & Stroebe, 2014). Additionally, types of tasks assigned in educational training programs (Fabricatore & Lopez, 2013) and temporal requirements like deadlines and time pressure (Agypt, Rubin, & Spivack, 2012) can have both direct and indirect effects on the creative climate. Furthermore, classic research from Amabile (1983, 1996) suggests that several aspects of the surrounding situation, including the presence of rewards, competition, restriction in choice, and the expectation of evaluation, can all have a detrimental impact on creativity. Since all students, ranging from pre-school to postsecondary, have frequent interactions with instructors in classroom settings, it is reasonable to believe that teacher behaviors could be having similar influence on creativity at the various educational levels.

The environment can also impact creativity on a broad level. From a wider perspective, research suggests that curriculum reform across an entire country (Hong Kong) led to growth in creative thinking across different cohorts, even when matched for other characteristics (Cheung & Lau, 2013). More general environmental effects can also have a negative influence on creativity, as Kim and Hull (2012) found trends using a national U.S. database to suggest that anti-creative school environments are negatively correlated with creativity scores, which also affect the likelihood that these creative students will drop out of high school. Additionally, there is also evidence that socioeconomic status (SES) can play a role in creative performance, as Dai and colleagues (2012) found evidence for a "creativity gap" between upper-middle class students and those in impoverished school districts in the U.S., even when other important characteristics like school size, student-teacher ratio, English proficiency, and ethnic composition were held constant. The influence of environment on creativity, therefore, extends past the individual students,

cumulating in creative growth or deficit for the overall population, so it is essential to investigate the nuanced role of the environment in creativity across all levels of education.

Creativity in Higher Education

A wide variety of studies in education and psychology demonstrate that creativity training is effective, especially in academic settings (Pyryt, 1999; Scott et al., 2004). Many different curricular programs and methods are available for use with various types of students and across numerous content areas (Hummell, 2006; Maker, Jo, & Muammar, 2008). However, the majority of the research on the effectiveness of direct instruction in creativity takes place in K12 settings, and most studies on creativity training for college students are restricted to laboratory settings and can be lacking in ecological validity. These training sessions can involve instruction on brainstorming (Dugosh & Paulus, 2005), perspective-changing heuristics (Butler & Kline, 1998), planning techniques (Osburn & Mumford, 2006), and variations in instructional style (Ruscio & Amabile, 1999). Some research exists on creativity training in more naturalistic higher education settings, but it is often specific to individual content areas such as science (DeHaan, 2009; Crowe, Dirks, & Wenderoth, 2008), design (Lau, Ng, & Lee, 2009), physics (Kohl, Kuo, Kowalski, & Kowalski, 2011), and engineering (Cropley & Cropley, 2000). Furthermore, it is often assumed that creativity is inherently taught in the fine and performing arts (Azzam, 2009), although the empirical evidence for this can be mixed (Moga, Burger, Hetland, & Winner, 2000).

There are multiple approaches concerning the integration of creativity into the higher education experience. Numerous benefits emerge for both faculty and students with the inclusion of flexible, open-ended assignments for undergraduates, allowing them to creatively express a variety of concepts and ideas pertaining to an individual course (Halpern, 2010). Entire courses can even be focused on the academic study of creativity, for example, Plucker and Dow (2010) developed a semesterlong course for undergraduates on the nature of creativity, and found that this course not only raised awareness of the construct but also altered previously held attitudes toward creativity, and expanded preconceived notions of who and what could be considered creative. However, higher education institutions should also be cognizant of current elementary and secondary trends for a culture of accountability and standardized testing that may inadvertently work as a barrier to the creativity of their incoming students (Beghetto, 2010), as they have been habituated to an emphasis on multiple-choice test performance for virtually all of their prior formal education. They may be less comfortable with the ambiguity of creative assignments and instead prefer more passive assessments with “right” and “wrong” answers, even though these are often less engaging. It should also be noted that cultural differences within the education system can play a role in how creativity is perceived and expressed (Nui & Sternberg, 2003; Zha, Walczyk, Griffith-Ross, Tobacyk, & Walczyk, 2006). The cultural influence of Eastern/Confucian and Western/Socratic frameworks do affect the student experience within higher education (Tweed & Lehman, 2002), although it should also be noted that comparing these two educational philosophies as a mutually exclusive dichotomy may be an oversimplification (Ryan & Louie, 2007).

Unlike K-12 settings, when students get to their university studies there may be great

differences in their curriculum, even at the same institution. At the higher education level, students select a major, and thus the content of their studies becomes more focused on preparation for a future career. Therefore, it is not surprising that variations in creativity have also been studied among different disciplines. Previous research indicates that vocational interests in college students are related to creativity (Kelly & Kneipp, 2009). Other studies demonstrate that various *types* of creativity, such as artistic and scientific, differ between music and engineering majors (Charyton & Snelbecker, 2007), while *levels* of creativity differ between business majors and English majors (Eisenman, 1969). Additionally, students with investigative (i.e., social and hard sciences) and artistic (i.e., visual and performing arts) majors are higher on the personality trait of openness to experience, as well as self-reported creativity (Kaufman, Pumaccahua, & Holt, 2013). This evidence for the connection between creativity and career choice or major suggests that these constructs may be having a circular influence on one another and that major should be considered when looking at creativity within a higher education setting.

Transferable Skills

Creativity is not the only skill that can benefit students in their future careers. An important argument for higher education is the need to develop transferable skills that will increase workplace success (Evers, Rush, Berdrow, 1998; Tait & Godfrey, 1999). Recent debate over policy and effectiveness has encouraged reflection from educators and other invested parties on how to best prepare students for jobs (Baker, 2009). While some acquired skills are considered discipline-specific, many "transferable skills," such as problem solving and effective communication, are applicable to a wide range of academic majors (Bradshaw, 1985; Kemp & Seagraves, 1995; Stasz, 1997) and these skills are considered essential within the context of a liberal arts education (Pascarella, Wang, Trolian, & Blaich, 2013). Some research further distinguishes between transferable "soft skills" such as critical thinking, communication, and creativity, and "hard business knowledge" concerning specific content, with evidence that employers desire both kinds of competencies (Andrews & Higson, 2008). Although not every single skill acquired during one's higher education experience will transfer to the workplace (Stasz, 2001), institutions must still prioritize their efforts to prepare students to enter the workforce and become contributing member of society (Beard, 2009). Given the current economic realities, institutions of higher education are under considerable pressure to produce a return on investment through capable, productive graduates (Collins, 1996; Bogue & Johnson, 2010) and an emphasis on transferable skills is increasingly important (Billing, 2007).

The idea of acquiring skills for workplace success may be implicit in the structure of higher education, but over the last three decades, there have been substantive changes in the job market and in the relationships between employers and employees. Compared to the past, it is now much more common for workers to take on many different jobs, often in multiple fields, over their work lives, and this results in less traditional careers that are progressively selfdesigned, with workers exerting more control over their own career paths across their various jobs (Cornfield, Campbell, & McCammon, 2001; Kalleberg, 2011). Given these fluctuating patterns in work and the economy, entrepreneurship is a transferable skill that is

gaining more and more relevance. Essig (2009) argued that entrepreneurship should be taught across the curriculum in the same way that "writing across the curriculum" was stressed in the 1980s, and need not be limited to students in business-related disciplines.

Continuing with this perspective, Watson (2012) suggested that entrepreneurship should not be conceptualized solely as creating a new business. Instead, entrepreneurial skills encompass creating, innovating, and the ability to make tangible connections between entities. This expanded conceptualization of entrepreneurship is more closely aligned with the rising trend for workers to independently adapt their careers with self-employment, project-based or "gig" work, and freelance work. Even employees on more traditional paths in large companies can be rewarded when they are able to think and act entrepreneurially. Furthermore, managers within those corporations are encouraged to display entrepreneurial skills as a means of establishing their worth and in turn increasing the company's value (Smith, 1997). Given this demand, curricular programs featuring entrepreneurism as a way to combine career self-management and new venture development are growing in popularity and serve to connect field-specific skills and more general practical knowledge (Hong, Essig, & Bridgstock, 2012).

As previously discussed in relation to creative thinking, it is important to consider institutional experiences and skill development by discipline, as results may differ greatly depending on major (Williams & Van Dyke, 2008). One example of a field where transferable skills play an important role in potential career success is the arts. Arts programs are often criticized for a failure to prepare students for the "real world" of work (Cantor, 2012). One European study found that practical business and management-related (i.e., entrepreneurial) skills were greatly underemphasized within arts curricula (Bauer, Viola, & Strauss, 2011). Additionally, working artists cite the necessity of being able to "learn on the fly" and utilize networking abilities (Smilde, 2008). Within the arts economy, there are higher rates of self-employment, and therefore those studying the arts need explicit information related to marketing, budgeting, taxes, and strategic planning (Haase & Lautenschlager, 2011). Despite this lack of entrepreneurial skills, arts majors may have an advantage when it comes to other transferable skills. Pitt and Tepper (2012) found that arts majors were much more likely than business and science majors to say their coursework encouraged them to be creative, to take assignments in multiple directions, to make connections across classes and topics, and to further explore something about which they are curious.

The Current Study

Given the previous research findings, there is a need for further integrating creativity in higher education settings. Moreover, there are several other transferable skills, such as entrepreneurism, that are increasingly important for graduating students to develop for eventual success in the workplace. The current study explores these constructs through an investigation of several patterns in creative coursework and confidence in various skills among university seniors. What are some components of creative coursework, and are they consistently related? Are there differences between majors (in the degree to which students are exposed to these components), and if so, are they in the expected directions? Finally, how does exposure to creative components predict

graduating seniors' confidence in various skills that are needed for future career success, including creative thinking, entrepreneurial skills, networking skills, and critical thinking? Are there significant relationships between creative coursework and skill confidence, even after controlling for other student and institutional characteristics known to influence student development and the overall university experience?

Methods

Data Source

This study uses data from the 2015 and 2016 Senior Transitions module of the National Survey of Student Engagement (NSSE). NSSE is an annual survey administered in the spring semester to first-year and senior students at four-year colleges and universities across the U.S. to assess student exposure to and participation in effective educational practices (McCormick, Kinzie, & Gonyea, 2013). Institutions can elect to append additional questions to the survey by selecting from several topical modules. The Senior Transitions module explores seniors' post-graduation plans, links between academic major and future plans, and confidence in skill development. This study used responses from over 48,000 seniors attending 227 baccalaureate-granting institutions. Approximately 65% of the seniors were female, 84% were enrolled full-time, 67% were traditional age (i.e., less than 25 years old), and 48% were first-generation students (i.e., neither parent/guardian holds a bachelor's degree). About 63% of the respondents were White, 6% were Asian/Pacific-Islander, 8% were AfricanAmerican/Black, 9% were Hispanic/Latino, 7% identified as more than one race/ethnicity group, and 6% identified with another racial/ethnic group (e.g., Native American) or preferred not to respond. Self-reported academic major was grouped into 11 different major fields: Arts (6%); Humanities (6%); Biological Sciences, Agriculture, and Natural Resources (10%); Physical Sciences, Mathematics, & Computer Science (5%); Social Sciences (14%); Business (17%); Communications, Media, and Public Relations (4%); Education (8%); Engineering (8%); Health Professions (17%); and Social Service Professions (6%). These characteristics are fairly consistent with the overall patterns for NSSE respondents (NSSE 2015 Overview, 2015; NSSE 2016 Overview, 2016). The average institutional response rate was 29% in both 2015 and 2016.

Measures

The variables of interest were taken from the Seniors Transitions module, specifically focusing on two sets of items. The first set of items asked students "How much confidence do you have in your ability to complete tasks requiring the following skills and abilities?" This set included a list of 10 different skills: 1) critical thinking and analysis of arguments and information, 2) creative thinking and problem solving, 3) research skills, 4) clear writing, 5) persuasive speaking, 6) technological skills, 7) financial and business management skills, 8) entrepreneurial skills, 9) leadership skills, and 10) networking and relationship building. The second set of items asked students "To what extent has your coursework in your major(s) emphasized the following?" This set included a list of 4 different types of activities: 1) generating new ideas or brainstorming, 2) taking risks in your coursework without fear of penalty, 3) evaluating multiple approaches to a problem, and 4) inventing new methods to arrive at unconventional solutions. The response options

for both sets of items were a 4-point Likert-type scale: 1) very little, 2) some, 3) quite a bit, and 4) very much. The survey instrument also collected demographic information from respondents, which was then combined with institution-level data. Because certain demographic and institutional characteristics have been shown to impact student development in college (see McCormick et al., 2013; Pascarella & Terenzini, 2005), they were included as grouping and/or control variables in some analyses.

Analyses

To explore the construct of creative major coursework, factor analysis was used to determine scale properties for the four items focusing on creative activities. Exploratory factor analyses (EFA) were conducted on these items to identify a reliable measure of creative coursework. As a follow-up, a confirmatory factor analysis (CFA) was conducted using the suggested factor from the exploratory factor analysis results. Since the items produced a reliable measure of creative coursework (see results section), this scale served as the dependent variable in a one-way ANOVA to investigate potential differences between academic majors. The 11 major categories were included as the fixed factor. All ANOVA assumptions were met, with the exception of a significant Levine's test suggesting unequal variances. Therefore, Games-Howell post-hoc tests were used to determine specific group differences for significant ANOVA models while correcting for multiple means comparisons.

To explore potential relationships between creative coursework and confidence in skills, a series of four Ordinary Least Squares (OLS) regression analyses, controlling for certain student and institutional characteristics, were conducted. OLS regression was chosen due to the ordinal nature of the dependent variables and the appropriateness of this method for testing theory with real-world data collected outside of manipulated laboratory settings (Field, 2009; Tabachnick & Fidell, 2001). In each of the analyses, the creative coursework score was entered as the last step predictor variable by itself. Selected student and institutional characteristics were entered as step one of the models, as previous research (Pascarella & Terenzini, 2005) suggested that there are differences in student engagement and educational experiences for students based on these characteristics. The student-level characteristics included were sex, transfer status, enrollment status, first-generation status, age, SAT/ACT, race/ethnicity, major, grades, and percentage of online courses. Control (private/public) and size were included as the institutional-level characteristics. All categorical independent variables were dummy coded prior to entry in the model (Table 1). Based on the literature on transferable skills and the changing economy, four relevant skills were selected as outcome variables for the models: 1) creative thinking, 2) critical thinking, 3) entrepreneurial skills, and 4) networking. The Variance Inflation Factor (VIF) values for each predictor variable in these regression models were all well below 5 (ranging from 1.0 to 2.8), suggesting that multicollinearity was not an issue in the models (Field, 2009).

Table 1. *Independent Control Variables and Values*

Variable	Description
Student-Level	
First-generation status [a]	0 = At least one parent earned a college degree or attended some college; 1 = Neither parent attended college
Race/ethnicity	American Indian or Alaska Native; Asian; Black, African American; Hispanic, Latino; Pacific Islander; White [b]; Other race/ethnicity; Multiracial; Prefer not to respond
Sex [a]	0 = Female; 1 = Male
Transfer Status [a]	0 = Not transfer; 1 = Transfer
SAT/ACT	Converted equivalent percentile
Age	Continuous variable
Enrollment status [a]	0 = Part-time; 1 = Full-time
Percentage of courses taken online	Continuous variable (0 to 100)
Earned college grades	Mostly As [b]; Mostly Bs; Mostly Cs
Major field	Arts[b]; Humanities; Biological Sciences, Agriculture, & Natural Resources; Physical Sciences, Mathematics, & Computer Science; Social Sciences; Business; Communications, Media, & Public Relations; Education; Engineering; Health Professions; Social Service Professions; Other; Undecided
Institution-Level	
Institution size (in thousands)	Continuous variable (.46 to 40.21)
Control	0 = Public; 1 = Private

[a] Coded as a dichotomous variable (0 = not in group; 1 = in group); [b] Reference group

Results

Factor Analyses

To determine a scale of creative coursework exposure, the sample was randomly divided into two even sub-samples. The first half of the sample was used in the exploratory factor analysis (EFA), and the second half was used to conduct the confirmatory factor analysis (CFA). Results of the EFA (using Maximum Likelihood Estimation with orthogonal rotation) suggested the four items all loaded on one factor and produced a sufficiently high Cronbach's alpha of .878 (McMillan & Schumacher, 2001; for EFA details see Table 2). Following up with CFA, the 1-factor solution showed good model fit (χ^2 = 47.430). Because traditional measures of model fit are sensitive to sample size, a variety of other fit indices were considered as well (Hu & Bentler, 1999). These indices also suggested good model fit, even those that are more conservative indices of model fit (Table 3), and all path coefficients were significant. The standardized regression weights were all significant at the .001 level and showed adequate strength of factor loadings (ranging from .73 to .89).

Overall, the fit indices, Cronbach's alpha, and regression weights suggest a good subscale for creative coursework. Therefore, scores for the factor were created using a 60-point scale, in order to be consistent with the established Engagement Indicator scoring already used with the NSSE core survey items. This was done by converting the response sets to 60-point intervals and then averaging the rescaled items. Consequently, a score of zero would mean a student responded at the bottom of the response set for every item in the scale, while a score of 60 would mean that a student responded at the top of the response set for every item in the scale. Thus, a higher score on the scale means a higher level of exposure to aspects of creative coursework.

Table 2. *Creative Coursework Scale: Exploratory Factor Analysis Details*

		Factor Loadings
FYSsr07a	Generating new ideas or brainstorming	.749
FYSsr07b	Taking risks in your coursework without fear of penalty	.766
FYSsr07c	Evaluating multiple approaches to a problem	.839
FYSsr07d	Inventing new methods to arrive at unconventional solutions	.874
	Cronbach's α	*.878*

Note: Kaiser-Meyer-Olkin statistic = .827; Maximum Likelihood $\chi 2$ = 373.532, p <.001; Factor 1 eigenvalue (2.95) explains 73.8% variance

Table 3. *Confirmatory Factor Analysis: Model-fit Results for Senior Students*

	N	GFI	CFI	RMSEA (C.I.)	PCLOSE
Model statistics	23,855	.999	.999	.044 (.034, .055)	.798

Note: GFI = Goodness-of-fit Index; CFI = Comparative Fit Index; RMSEA = root mean square error of approximation. Strong model fit is reflected by GFI greater than .85, CFI greater than .90, RMSEA less than .06, and PCLOSE greater than .05.

Table 4. *Means and Standard Errors for Creative Coursework Scale by Major*

	Mean	Standard Error
Arts	43.560	.321
Humanities	40.465	.320
Biological Sciences, Agriculture, & Natural Resources	34.854	.243
Physical Sciences, Mathematics, & Computer Science	35.533	.338
Social Sciences	38.227	.205
Business	36.390	.188
Communications, Media, & Public Relations	41.252	.397
Education	40.499	.272
Engineering	33.952	.271
Health Professions	37.325	.186
Social Service Professions	40.006	.321

ANOVA

Results suggest that there were significant differences between majors for creative coursework, ($F(10,43823) = 107.405$, $p < .001$, $\eta^2 = .024$). Means and standard deviations are provided in Table 4. Games-Howell post-hoc analyses (Table 5) indicated that arts majors had significantly higher scores than all other majors. Furthermore, communications, education, and humanities majors also performed relatively well, with scores significantly higher than biological science, physical science/math, social science, business, engineering, and health professions majors. Engineering majors were the lowest of the group, with scores significantly lower than all but biological science majors. These differences were not entirely unexpected, but important to note that major does have an impact on aspects of creativity that are present during coursework. However, the relatively low percentage of explained variance (partial eta squared) suggests that major is not the sole contributor to these differences, nor are major and exposure to creative coursework redundant variables.

Table 5. *Games-Howell Mean Differences by Major*

	Arts	Hum.	Bio. Sci.	Phys. Sci.	Social Sci.	Bus.	Comm.	Educ.	Engin.	Health Prof.	Soc. Serv. Prof.
Arts	--	3.905*	8.706*	8.027*	5.333*	7.169*	2.308*	3.061*	9.608*	6.235*	3.554*
Hum.	-3.095*	--	5.611*	4.932*	2.238*	4.074*	-.787	-.035	6.513*	3.140*	.459
Bio Sci.	-8.706*	-5.611*	--	-.679	-3.373*	-1.537*	-6.398*	-5.646*	.902	-2.471	-5.152*
Phys. Sci.	-8.027*	-4.932*	.679	--	-2.694*	-.858	-5.719*	-4.967*	1.581*	-1.792*	-4.473*
Social Sci.	-5.333*	-2.238*	3.373*	2.694*	--	1.836*	-3.025*	-2.273*	4.275*	.902	-1.779*
Business	-7.169*	-4.074*	1.537*	.858	-1.836*	--	-4.861*	-4.109*	2.439*	-.935*	-3.616*
Comm.	-2.308*	.787	6.398*	5.719*	3.025*	4.861*	--	.752	7.300*	3.927*	1.246
Education	-3.061*	.035	5.646*	4.967*	2.273*	4.109*	-.752	--	6.548*	3.174*	.493
Engineering	-9.608*	-6.513*	-.902	-1.581*	-4.275*	-2.439*	-7.300*	-6.548*	--	-3.373*	-6.054*
Health Prof.	-6.235*	-3.140*	2.471*	1.792*	-.902	.935*	-3.927*	-3.174*	3.373*	--	-2.681*
Soc. Serv.	-3.554*	-.459	5.152*	4.473*	1.779*	3.616*	-1.246*	-.493	6.054*	2.681*	--

*Significant difference ($p < .05$) after Bonferroni adjustment for multiple comparisons

OLS Regression Models

The results of the regression models indicate that exposure to creative coursework has a statistically significant, positive effect on confidence in all four of the selected skills even after controlling for other student and institutional characteristics. Specifically, seniors with more exposure to creative coursework reported more confidence in their creative thinking, entrepreneurial, networking, and critical thinking skills. For each model, even though many other predictor variables were significant, creative coursework was the strongest predictor (β = .306 to .369) and contributed between 8.7% and 12.8% of the variance. Model summary statistics are reported in Table 6, and individual beta weights for all models are reported in Table 7. Overall, the predictor variables accounted for 15.9% to 19.8% of the total variance on confidence for the selected skills. Given the adjusted R^2 and ΔR^2 values, including the creative coursework scale in the model had important explanatory power.

Table 6. *Model Summary Statistics for OLS Regression*

	F	df	Sig.	Adjusted R^2	ΔR^2
Creative Thinking	138.611	32, 23330	<.001	.159	.126
Entrepreneurial Skills	180.506	32, 23273	<.001	.198	.087
Networking Skills	149.373	32, 23274	<.001	.169	.128
Critical Thinking	149.775	32, 23358	<.001	.169	.110

Although the main research question found support for the connection between exposure to creative coursework and confidence in skills, several other patterns of note also emerged upon examination of the control variables. Some of these patterns were not surprising, such as majoring in business as a strong positive significant predictor of entrepreneurial skills (β= .269; p<.001). Additionally, with arts majors as the referent group, many other majors (biological science, business, education, and health science) were negative predictors of creative thinking (β= -.024 to -.037; p<.01 to .001) and positive predictors of critical thinking (β= .019 to .127; p<.05 to .001). An interesting pattern emerged for standardized test scores, which were positive predictors for confidence in creative and critical thinking (β= .124 and .195, respectively; p<.001) but negative predictors for confidence in entrepreneurial and networking skills (β= -.085 and -.073, respectively; p<.001). This suggests that more traditional academic success does not necessarily transfer to all types of skills. Furthermore, higher grades were positive predictors of confidence in critical thinking, creative thinking, and networking, but *not* for entrepreneurial skills, again calling into light a contrast between traditional markers of academic success and potentially important career skills.

Another noteworthy finding was that a higher percentage of online courses was positively related to confidence in entrepreneurial skills (β= .031; p<.001), perhaps because both completing online courses and starting one's own business both require relatively higher degrees of self-motivation. Finally, there was a consistent pattern for sex, with males being more confident in all selected skills (β= .014 to .124; p<.05 to .001). This is of particular interest, given that with independent samples t-tests, females have higher skill confidence. Therefore, in this case it is especially important to have all of the other demographic and institutional variables in the model, as this provides a more complete understanding of the trend.

Table 7. *OLS Regression Models for Skill Confidence: Standardized Beta Coefficients*

	Creative Thinking		Entrepreneurial		Networking		Critical Thinking	
	Std. β	Sig.	Std. β	Sig.	Std. β	Sig.	Std. β	Sig.
Step 1: Student Demographics								
Male	**0.046**	0.000	**0.124**	0.000	**0.014**	0.028	**0.087**	0.000
First-generation Status	-0.013	0.049	0.002	0.697	**-0.019**	0.003	-0.004	0.568
Age	**0.044**	0.000	0.007	0.316	**-0.022**	0.001	**0.048**	0.000
ACT/SAT Score	**0.124**	0.000	**-0.085**	0.000	**-0.073**	0.000	**0.195**	0.000
Race: American Indian[1]	0.009	0.126	**0.013**	0.024	0.000	0.988	0.004	0.547

Race: Asian[1]	**-0.066**	0.000	0.010	0.102	**-0.028**	0.000	**-0.077**	0.000
Race: Black/African American[1]	**0.015**	0.022	**0.042**	0.000	**0.023**	0.000	**0.021**	0.001
Race: Hispanic/Latino[1]	-0.006	0.354	0.000	0.980	**-0.024**	0.000	-0.003	0.594
Race: Pacific Islander[1]	-0.007	0.218	-0.003	0.618	-0.002	0.718	-0.007	0.217
Race: Prefer not to respond[1]	0.006	0.346	**0.022**	0.000	-0.006	0.305	0.006	0.352
Race: Other race/ethnicity[1]	-0.002	0.743	0.011	0.060	0.002	0.733	0.004	0.461
Race: Multi-racial[1]	**0.019**	0.002	0.009	0.112	0.008	0.213	0.007	0.222
Step 1: College Experiences								
Transfer Status	0.008	0.210	**0.018**	0.004	**-0.031**	0.000	0.009	0.163
Enrollment Status	-0.013	0.044	-0.003	0.603	0.008	0.190	-0.007	0.257
Major: Humanities[2]	0.009	0.284	**-0.043**	0.000	**-0.035**	0.000	**0.088**	0.000
Major: Bio Sci.[2]	**-0.035**	0.000	0.008	0.383	0.017	0.089	**0.079**	0.000
Major: Phys. Sci.[2]	-0.011	0.162	-0.005	0.504	-0.015	0.074	**0.059**	0.000
Major: Social Science[2]	-0.001	0.894	**0.034**	0.001	**0.043**	0.000	**0.127**	0.000
Major: Business[2]	**-0.030**	0.003	**0.269**	0.000	**0.132**	0.000	**0.070**	0.000
Major: Comm.[2]	-0.002	0.793	**0.029**	0.000	**0.069**	0.000	**0.037**	0.000
Major: Education[2]	**-0.030**	0.000	-0.016	0.059	**0.020**	0.022	**0.019**	0.025
Major: Engineering[2]	-0.008	0.406	**0.063**	0.000	**0.043**	0.000	**0.074**	0.000
Major: Health Prof.[2]	**-0.037**	0.000	**0.035**	0.000	**0.060**	0.000	**0.064**	0.000
Major: Soc. Serv. Prof.[2]	-0.010	0.199	0.013	0.074	**0.034**	0.000	**0.060**	0.000
Major: Other[2]	**-0.024**	0.003	**0.037**	0.000	**0.042**	0.000	**0.029**	0.000
Major: Undecided[2]	**-0.027**	0.000	0.011	0.062	-0.003	0.651	-0.005	0.393
College grades-mostly B's[3]	**-0.047**	0.000	0.010	0.110	**-0.020**	0.002	**-0.061**	0.000
College grades-mostly C's [3]	**-0.039**	0.000	0.002	0.793	**-0.035**	0.000	**-0.054**	0.000
Percent of online courses	-0.005	0.472	**0.031**	0.000	0.010	0.099	0.000	0.956
Step 1: Institutional Characteristics								
Private Institution	0.004	0.604	-0.009	0.231	-0.004	0.585	-0.007	0.335
Institution Size	-0.003	0.694	-0.016	**0.034**	0.011	0.147	-0.006	0.416
Step 2								
Creative Coursework	**0.367**	0.000	**0.306**	0.000	**0.369**	0.000	**0.343**	0.000

[1] Reference group: White

[2] Reference group: Arts majors

[3] Reference group: College grades-mostly A's

Note: Significant coefficients are bolded

Discussion

There are several noteworthy results from this study that contribute to our knowledge of creativity and its function in higher education. Exposure to creative coursework is an important construct to assess, and the factor structure that arises from the Seniors Transitions module items confirms that the various components of creative thinking are indeed related. Many empirical studies have demonstrated that through the incorporation of creativity training programs in educational or laboratory settings, increases in creativity are possible (Pyryt, 1999; Scott et al., 2004). The various components of creative thinking included in these items suggest that explicit creative instruction can be reliably measured, even without the use of the word "creativity" appearing in the items themselves. It is imperative to have a robust measure of exposure to creative coursework before any further conclusions can be made regarding the relationship of the construct to other aspects of the educational experience. Therefore, the factor analyses were an essential first step in the exploration of how creative coursework can impact skill development, providing a solid base on which to conduct further quantitative analyses.

The preliminary comparisons across major fields found patterns consistent with previous research. Arts majors were significantly higher on exposure to creative coursework, with the hard sciences and engineering falling near the bottom of the pack, which is not entirely surprising based on the cultural presupposition connecting creativity and the arts (Azzam, 2009; Runco & Bahleda, 1986). People perceive the artistic and creative identity to be somewhat synonymous, and therefore one might expect those choosing to major in the arts (and who have artistic ability) to be more receptive to creativity-related course tasks and assignments as well. Other studies that have compared majors on creative behaviors and interests have found similar advantages among arts and humanities majors (Charyton & Snelbecker, 2007; Eisenman, 1969; Kelly & Kneipp, 2009; Miller & Smith, 2014). This increased exposure to creative coursework may be especially valuable for arts majors, as they are more likely than all but business majors to have plans for starting their own business someday, and more likely than all other majors to plan for eventual self-employment (Miller, Dumford, Gaskill, Houghton, & Tepper, 2016). Developing their approaches to creative thinking will be important in achieving success along their nontraditional career paths. However, major may have a more complicated relationship with creativity, as pre-existing tendencies might play a role in choosing a certain major (Kaufman, Pumaccahua, & Holt, 2013), and then advanced study in that field may reinforce and strengthen these tendencies.

Given these differences between majors, it is imperative to take them into consideration when examining the relationships between creative coursework and other constructs, including confidence in skill development. Even after controlling for major, as well as several other demographic and institutional characteristics that are known to influence the educational experience, creative coursework was still able to significantly predict confidence in several crucial transferable skills. Not surprisingly, exposure to creative coursework was a significant positive predictor of confidence in creative thinking skills, explaining 12.6% of the variance even after controlling for other factors. However, creative coursework was also able to explain just as much of the variance in confidence in networking skills (12.8%), as well as non-trivial amounts for critical thinking (11.0%) and entrepreneurial skills (8.7%). These transferable skills are all important for students

to have and can promote success in their future careers. Not only will students be more marketable to employers (Stasz, 1997), with an ability to adapt to the changing needs of a fast-paced economy, but those taking the more non-traditional routes of self-employment and owning their own business can directly benefit from these skills as well (Watson, 2012). The significant findings for the other variables in the models also provide further support for the use of comprehensive models when exploring these types of constructs within higher education settings and beyond.

More recently, there has been a call for enhanced entrepreneurial training for arts majors, and a strong argument for curricular revisions has led to some changes in policies (Hong et al., 2012). Given their future career plans, this addition to the curriculum should have positive impacts on career outcomes for those majoring in the arts. However, exposure to creativity training can be beneficial for all majors, not just those in the arts. As creativity is an increasingly vital skill, colleges and universities have taken explicit steps to promote it both across disciplines (American Association of Colleges and Universities, 2010) as well as within specific fields such as engineering where it is seen as essential but potentially lacking (ABET, 2011). Exposure to creative coursework is a significant predictor of confidence in not only creative thinking, but also critical thinking, entrepreneurial skills, and networking skills. Changes in the global job market and in the relationships between employers and employees have made these skills even more necessary, and today's students (who are tomorrow's workers) may find themselves in need of these diverse and adaptable abilities (Cornfield, Campbell, & McCammon, 2001). Advances in the speed and type of communications have global implications, and workers may be reliant on others from all around the world to inform their work. Even those students that take a more traditional career route after graduation can derive value from participating in creative coursework and applying these skills in their non-work lives, as research suggests a link between creative engagement and well-being (Csikszentmihalyi, 1996).

Limitations

Although there are many informative aspects of this study, there are some limitations to note. First, although the sample includes a wide range of students attending multiple institutions, it may not be representative of all students at all universities. Since participation in NSSE is voluntary for institutions, they are neither selected randomly nor do they create a representative sample of institutions, although they generally mirror the national picture of U.S. higher education (NSSE 2015 Overview, 2015; NSSE 2016 Overview, 2016). The lower response rate could also be a potential source of bias in the sample, although previous research suggests that studies with lower response rates can still maintain adequate response representativeness (Fosnacht, Sarraf, Howe, & Peck, 2017; Lambert & Miller, 2014). Furthermore, given the research design, this study was unable to test for causal relationships between creative coursework exposure and skill confidence. The results can only confirm whether or not these constructs are associated. Finally, while this research has the advantages of large sample size and ease of online data collection, it does rely on self-reported measures, which may not always be objective. However, most studies looking at self-reports of students in higher education suggest that self-reports and actual abilities are positively related (Anaya, 1999; Hayek, Carini, O'Day, & Kuh, 2002; Pike, 1995), and social desirability bias does not play a major role in student responses for surveys of basic cognitive and academic behaviors (Miller, 2012).

Future Directions & Conclusions

Despite these limitations, there are many noteworthy contributions of this study. These findings provide a springboard for future research on the topic. Longitudinal research might explore the continued benefits of creative coursework for these graduating students, following up to investigate both their own and their employers' (or clients') perceptions of how they are using transferable skills in their careers. Additionally, it is important to replicate this research with samples outside the United States, as educational systems and curricular structure vary greatly across the globe. The field may also benefit from case studies or action research that focus on selected institutions that are performing well when it comes to creative coursework and the development of transferable skills, noting specific practices that others who are seeking to improve in these areas might adopt.

In general, the results suggest that increased integration of creativity into coursework is beneficial for students across academic disciplines. Arts majors are currently at an advantage for exposure to creative coursework, but even students in non-arts fields can gain from elements of creativity in the curriculum. Faculty in all departments could be encouraged to include more open-ended research and inquiry projects on topics of interest (Renzulli, 1986), as research indicates that these have a variety positive outcomes, not only in elementary and secondary education but also at the undergraduate level (Syer, Chichekian, Shore, & Aulls, 2013). Additionally, institutions could begin to develop innovative interdisciplinary curricula that encourage creative potential (Dohn, Pepper, & Sandgren, 2005). A first step in these curricular adaptations might be "retraining" students on the idea of having more than one single right answer, emphasizing that more than one right answer can exist and that learning takes place during the process of trial and error. Incorporating elements of creativity into coursework for all disciplines can have further impact on confidence in skill development, as the results of this study suggest, and this will assist students as they graduate, enter the workforce, and begin contributing to the economy.

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