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Information Literacy Supporting Student Motivation and Performance: Course-level Analyses

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Abstract: This study examines the effects of information literacy (IL) on student learning and motivation in university courses. We investigated student course-level learning gains and student perceptions of their learning environments by examining data from over 3,000 students in 102 course sections across seven colleges. Results provide evidence of the following: 1) students who synthesize information and communicate the results tend to perceive higher levels of motivation than students who do so less often; 2) there is a significant positive relationship between synthesizing information and communicating the results and course level learning gains. Our results point to the efficacy of IL being integrated into learning disciplinary course content, as well as the benefit of prioritizing high-order IL activities, such as synthesizing information, over other the aspects of IL, such as searching or formatting citations.

1. Introduction

Information literacy (IL) has been recognized as an important outcome of undergraduate education (AACU, 2009). However, this does not obviate the need to prove the value of IL to campus leaders. IL is often construed as the skills that students require to find and evaluate information. These skills are recognized as necessary for students to navigate the deluge of information they encounter. However, IL may also be associated with disciplinary learning (Bruce, 2008)—a fundamental goal of institutions of higher education. The specific way learners engage with information as they learn may influence disciplinary learning outcomes (Limberg, 1999; Maybee, et al., in press). In higher education, student learning is often measured through student performance on assessments, like tests or projects. Therefore, showing the impact of IL on undergraduate education also requires understanding the relationship between IL and student performance.

Educators may be better equipped to develop effective IL practices that support disciplinary learning if they have an understanding of the relationship between IL and student performance in university courses. However, the majority of studies in this area focus on how students learn IL skills, rather than how IL fosters disciplinary learning gains. Sometimes IL is examined through disciplinary assignments, such as academic papers or other written work, yet these efforts focus on the application of information skills, not on how those skills foster learning outcomes Hoffmann & LaBonte, 2012; Lowe et al., 2016). At the other end of the spectrum, there are studies that focus on the relationship of information use outside of the curriculum, such as using article databases and checking out library materials, to student success metrics like GPA or student retention (Soria et al., 2013; Massengale, 2016). While contributing to our understanding of IL or use of library resources, these studies do not explore the role that IL may play in disciplinary learning.

Of course, a number of other elements may influence learning in the classroom. One such factor is student motivation, which can, in part, be influenced by how students perceive their learning environment. Students also need to perceive relevance in what they are learning, such as being able to apply what they have learned to a new situation. Scholarship exploring IL and motivation has tended to focus on the application of motivation-related concepts to create motivating IL activities (Chang & Chen, 2015; Jacobson, T. & Xu, 2002). However, IL can be associated with student motivation and disciplinary learning (Maybee & Flierl, 2017). For example, Maybee and Flierl describe an assignment in an introductory statistics course that was designed to motivate students to learn statistical concepts by having them use those concepts to evaluate information found in the news related to a topic of their own interest. Efforts to examine IL's effect on learning should also explore the relationship between IL and student motivation in disciplinary courses.

2. Problem Statement

Given the importance of assessing what best facilitates student learning, as well as the need to demonstrate the value of IL, it is essential to understand how IL supports student achievement. To date, there have not been large-scale investigations focusing on the relationship between IL and student performance or concepts related to performance, such as student motivation, of undergraduate curricula across a higher education institution. Aiming to illuminate the role of IL in the higher education classroom, the research described in this paper analyzes data from over 3,000 students in 102 course sections across various schools and colleges of a large university to examine the relationship between IL, student motivation, and course grades.

3. Literature Review

3.1 IL and Student Performance

Studies examining the relationship between IL and student performance have tended to frame information literacy using the *Information Literacy Competency Standards for Higher Education*, now rescinded by the Association of College and Research Libraries (2000). Such studies focus on measuring student achievement related to mastering information skills (Shao & Purpur, 2016), reporting student perceptions of them (Kim & Shumaker, 2015), or both (Squibb & Mikkelsen, 2016). Some researchers have explored IL in relation to other variables, as well. For example, Detlor et al. (2012) compared the effects of lecturing versus active learning strategies for IL instruction, finding that that active learning techniques, where students analyzed, synthesized, and evaluated information, better supported students' achievement of class learning outcomes.

Research examining the relationship between IL and student achievement also varies by the scale of the assessment. Studies range from small-scale investigations of assignment-level performance gains (Kim & Shumaker, 2015; McMillan & Raines, 2011) to analyzing data from over 5,000 students, examining which specific library services and resources relate to increased freshmen GPA (Soria et al., 2014). While small-scale studies offer details into how students use information for specific assignments, and large-scale studies illustrate high-level patterns regarding library resources, services and student success metrics, studies targeting course-level grades can provide critical clues about how IL relates to student performance within disciplinary contexts. Some studies examine this relationship between IL and course-level grades (Ferrer-Vinent et al., 2015; Coulter et al., 2007; Shao & Purpur, 2016), yet many portray IL as resource-oriented or generic skills that are not grounded in the disciplinary context being examined.

3.2 IL and Motivation

Motivation is important for student learning, and researchers have explored motivational elements and strategies that affect students learning IL concepts and skills (Jacobson & Xu, 2002; Shenton & Fitzgibbons, 2010; Small et al., 2004). Some studies examine motivation as a general concept (Matteson, 2014), while other research focuses on related elements, such as relevance (Banas, 2009) authenticity of course content (Klipfel, 2014), or students' (perceptions of) self-efficacy (Kiliç-Çakmak, 2010; Ross et al., 2016; Folk, 2016). These studies focus exclusively on motivating students to learn IL, rather than how IL and motivation relate to learning subject content. Very little scholarship has drawn from specific motivational models, such as Keller's ARCS model (Chang & Chen, 2015) and Self-Determination Theory (Maybee & Flierl, 2016) to explore the relationship between IL, motivation, and learning in higher education.

3.3 Self-Determination Theory

Self-Determination Theory (SDT) is a theory of motivation applied to diverse fields including health care, parenting, and education (Deci & Ryan, 2002). SDT suggests that more autonomy-supportive learning environments are cultivated by satisfaction of three basic psychological needs: autonomy, relatedness, and competence. When students perceive that they can make meaningful choices within a structure (autonomy), feel connected to fellow students, the

instructor, and the subject content (relatedness), and believe they are able to accomplish what is asked of them (competence), they tend to feel more intrinsically motivated to learn and are more engaged in their courses. Creating a learning environment conducive to positive student perceptions of these psychological needs has been associated in SDT research with many positive outcomes, including psychological wellness, increased effort and persistence, and various academic achievement factors (Niemiec & Ryan, 2009; Ryan & Deci, 2017).

3.4 Gaps in the Literature

Previous research examining IL in relation to student performance or student motivation have tended to conceptualize IL as a set of general information skills. Therefore, these studies define student performance as the measurable learning of information skills, and explore the role of motivation in allowing students to gain these skills. There is a need for research that examines the relationship of IL to student performance, an indicator of disciplinary learning, and other concepts related to performance, such as student motivation. To address this gap, the study described in this paper investigates the question: What are the measurable relationships between the frequency and type of information engagements with which instructors task students, and: a. student motivation (as measured by instruments based in SDT); and b. course grades?

4. Methods

4.1 Data Collection

Data were collected at a large, public university in the Midwest across two semesters (Fall 2015 and Spring 2016) from students, instructors and university records. Student data were collected through an end-of-semester student perceptions survey sent to all students enrolled in a course section that had completed a large-scale course re-design program. Instructors provided data on how students used information in their sections through an online survey administered by trained staff. Finally, university records were accessed to provide student demographics and grade data.

4.2 Sample

The sample included 102 course sections from 44 different courses taught at a large public institution in the Midwest. Course sections were included in the sample if at least 15 students and at least 25% of the students enrolled in the course responded to the student perceptions survey (threshold based on Gillmore et al., 1978). The course sections varied in level, class size and college (see Table 1). A total of 6,874 students over the age of 18 were enrolled in the course sections; of those students, 3,152 students (46%) completed a student perceptions survey at the end of the semester which included measures of learning climate, basic psychological needs, self-determined motivation and perceived knowledge transfer scales. See Table 2 for demographics information of the enrolled students.

4.3 Measures

4.3.1 Information Literacy Questions

The questions related to information literacy were included on the survey for instructors who redesigned their courses through the program. The questions were created based on a list of key skills comprising the criteria for courses meeting the university's core curriculum information literacy outcome ([SCHOOL] Senate Educational Policy Committee, 2012). Drawing from the Association of American Colleges and Universities' (2009) *Value Rubric* for information literacy, the list of skills define foundation-level information literacy at the university. With the core curriculum approved by the [SCHOOL] Senate in 2012, the list of skills provides a shared definition of information literacy agreed upon by the university's faculty. The five information literacy questions (see Table 3) asked instructors to identify the frequency that they expected students to experience the following on a scale from 1 ("Never") to 5 ("Very Often: More than 16 times a semester"):

- IL1: Pose questions or problems that require further investigation.
- IL2: Access information outside of assigned readings and tasks.
- IL3: Evaluate information sources.
- IL4: Synthesize information and communicate the results through a deliverable (e.g. project, paper, homework, etc.).
- IL5: Apply conventions of attribution (e.g. cite, reference, paraphrase, quote, etc.).

4.3.2 Learning Climate Questionnaire (LCQ)

The short scale of the LCQ (Williams & Deci, 1996) was used to measure classroom environment. The short scale included six statements to which students responded using a 7-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"). Two example statements are "My instructor encouraged me to ask questions" and "My instructor listens to how I would like to do things." Internal consistency for the LCQ was very high (α=.95). A mean LCQ score was calculated for each course section to give an overall score for each section.

4.3.3 Basic Psychological Needs Scale (BPNS)

An adapted version of the BPNS (Levesque-Bristol et al., 2010) was used to measure students' basic psychological needs of autonomy, competence and relatedness. The BPNS included 21 items rated on a 7-point Likert scale (1 = "strongly disagree", 7 = "strongly agree"). Sample items included "I am free to express my ideas and opinions in this course" (autonomy, 7 items; α=.69), "Most days I feel a sense of accomplishment from this course" (competence, 6 items; α=.71) and "People in this course care about me" (relatedness, 8 items; α=.82). Mean scores for each of the three psychological needs were calculated for each course section.

4.3.4 Situational Motivation Scale (SIMS) and Self-Determination Index (SDI)

The SIMS (Guay et al., 2000) was used to measure students' self-determined motivation. The scale includes six subscales (each comprised of three items) based on self-determination theory (Deci & Ryan, 1985; 2000). A self-determination index (SDI) was calculated for each student based on appropriate weightings for each motivation subscale (see Levesque-Bristol et al., 2010 for the SDI formula). Mean SDI scores were then calculated for each course section. Higher SDI scores indicate more self-determined and intrinsic motivation, while lower SDI scores indicate more external, and extrinsic motivation.

4.3.5 Perceived Knowledge Transfer Scale (PKTS)

The PKTS was used to assess students' perceptions of the relevance of course material to their future courses and careers. Some sample items from the 8-item PKTS (α=.97) include: "I feel confident in my ability to apply the course material in other classes that I have" and "Given the future career that I have chosen, it is important for me to learn the information covered in this class." A mean PKTS score was calculated for each course section.

4.3.6 Course Grades

Course grades were converted to a numeric scale ("A" = 4.0, "A-" = 3.7, "B+" = 3.3, "B" = 3.0, etc.). A mean course grade for each course section was calculated.

4.4 Data Analysis

Data were analyzed at the course section level. Section means were calculated for each variable to create overall scores for each section; this allowed us to give equal weight to small and large courses. Although some courses had more than one section, the data were analyzed at the section level as course sections were taught by different instructors, with varying levels of autonomy-supportive learning environments.

5. Findings

Table 3 shows the correlations between all course variables. Information literacy questions all had moderate correlations with each other (*r* ranged from .34 to .74); they also all correlated with course grades (*r* ranged from .27 to .38). With one exception (for IL1 and SDI), only two of the information literacy questions (IL4 and IL5) correlated with any of the student perceptions survey data. IL4 (synthesizing and communicating information) positively correlated with student perceptions of autonomy ($r = .19$), competence ($r = .21$), relatedness ($r = .25$), and perceived knowledge transfer ($r = .23$). IL5 (applying conventions of attribution) negatively correlated with a more autonomy-supportive learning environment ($r = -.30$), student perceptions of competence ($r = -.30$), and students' self-determined motivation ($r = -.17$).

A series of standard multiple regressions were performed with the five information literacy questions as the independent variables and course grades, learning climate, basic psychological needs, SDI and PKTS as the dependent variables. Table 4 reports the results of the regression analysis (for bivariate correlations between study variables see Table 5). The five information literacy predictors explained 19% of the variance for students' course grades ($R^2 = .19$, $F(5, 95) = 4.56$, $p < .001$). When all five information literacy variables were included, only IL4 significantly predicted course grades, such that courses that included more synthesizing and communicating information had higher course grades ($\beta = .26$).

Regression results indicated that the five information literacy questions explained 17% of the variance for student perceptions of the learning climate ($F(5, 95) = 3.78$, $p = .004$). Of the five IL questions, only IL5 significantly predicted learning climate; however, the relationship was

negative, suggesting that increased time spent on applying conventions of attribution is related to a less autonomy-supportive learning environment.

Regression results for the basic psychological needs indicated that the five IL questions predicted 13% of the variance of student perceptions' of autonomy ($F(5, 95) = 2.83$, $p = .02$), 23% of the variance of students' perceptions of competence ($F(5, 95) = 5.76$, $p < .001$) and 18% of the variance of students' perceptions of relatedness ($F(5, 95) = 4.03$, $p = .002$). IL4 positively predicted autonomy (β = 26), competence (β = .37) and relatedness (β = .44) while IL5 negatively predicted autonomy (β = -.34), competence (β = -.52) and relatedness (β = -.21). These results suggest that students in courses where they engaged in more synthesizing and communicating information were more likely to have their psychological needs satisfied, while students in courses that engaged more in applying conventions of attributes were less likely to have positive feelings of autonomy, competence, and relatedness.

The regression results for self-determined motivation and perceived knowledge transfer were similar to those of the learning climate and basic psychological needs. The five IL questions predicted 25% of students' self-determined motivation and 14% of students' perceptions of knowledge transfer. IL4 positively predicted students' self-determined motivation (β = .26) and students' perceived knowledge transfer (β =.35) while IL5 negatively predicted motivation (β = -.49) and knowledge transfer (β = -.34). Students in courses which involved more synthesizing and communication of information were more motivated and believed that the skills and knowledge they learned were more related to their ongoing careers. Students in courses that involved more applying conventions of attribution were less motivated and believed that the course material was less relevant to their future activities. Posing problems or questions that require further investigation (IL1) also positively predicted students' self-determined motivation (β = .35) suggesting that students in courses which tasked students to pose more questions or problems that required further investigation were more motivated.

6. Discussion

This project investigated the relationships between IL and student motivation, and IL and course-grades across a broad set of students and disciplines. The results suggest a strong relationship between certain aspects of IL and many positive student outcomes, including student grades at the course level, learning climate, basic psychological needs, motivation, and perceptions of knowledge transfer. How students engage with information in the classroom, and the frequency with which they do so may have many beneficial effects on student motivation and performance.

6.1 IL and Motivation

Motivating students by creating a more autonomy-supportive learning environment elicits a host of benefits. Ryan and Deci note that across a range of school settings and diverse cultures, more autonomy-supportive learning climates are associated with greater engagement, better performance, higher quality learning, and greater psychological well-being (for a review, see Ryan & Deci, 2017). Our study found positive, significant relationships between tasking students to synthesize and communicate information and various student perceptions, including perceptions of the three psychological needs of autonomy, competence, and relatedness. These psychological needs are associated with more self-determined, intrinsic motivation (Deci &

Ryan, 2000). The data suggest that synthesizing information and communicating the results through a deliverable contributes to a learning environment where students feel more autonomous, competent, and related, which in turn fosters more self-determined motivation in students.

Conversely, the data indicates that other types of engagement with information, viz. applying conventions of attribution, may make students feel less autonomous, competent, and related, thereby becoming less motivated to learn course material. This suggests that instructors wanting to motivate students should strive for more cognitively demanding engagements with information, as opposed to focusing on learning about citation. For instance, tasking students to create their own citation style and justify what metadata they include or exclude is more likely to be autonomy-supportive, and hence motivating, than lecturing point-by-point about what is required for a certain citation style.

The frequency and types of engagements with information can motivate or *de*motivate students. Synthesizing information and communicating the results is particularly important compared to the other aspects of IL measured, as it is positively correlated with data from instruments measuring student motivation (SIMS) and students' psychological needs (BPNS).

6.2 IL and Grades

Our findings also provide evidence for a significant relationship between IL and student performance at the course level. While all five IL variables of: 1) posing questions or problems, 2) accessing information, 3) evaluating information, 4) synthesizing and communicating information, and 5) apply conventions of attribution were correlated with student grades, when looking at all five variables together, only synthesizing information and communicating the results had a statistically significant relationship with course grades. In parallel with our findings concerning IL and motivation, tasking students to synthesize information and communicate the results frequently throughout a semester was positively correlated with course level academic achievement. No other aspect of IL measured in this study was statistically significant independent of other aspects of IL measured. IL educators who want to support student achievement and motivation at the course level should strive to collaborate with instructors to embed higher-order engagements with information (like synthesizing) *frequently* throughout a semester.

6.3 Implications

Our data suggest that the ways students engage with information may play a prominent role in student performance and motivation in the disciplinary classroom. Instructors can facilitate greater student performance in their class by more thoughtfully considering how students use information as they are learning course content. Instructors can also create a more motivating classroom environment by challenging students to interact with information in more cognitively demanding ways, such as synthesizing, rather than less complex tasks like those involving citation or searching. The frequency with which students were tasked with interacting with

information also plays a role. Students who synthesized information more often were more likely to feel motivated and achieve higher course grades.

To cultivate positive student perceptions of autonomy, competence, and relatedness, IL should be addressed through coursework in cognitively complex ways throughout a semester. Instructors should provide sufficient opportunities for students to feel: 1) autonomous in the way or types of information they use to learn subject content; 2) competent with how information is used within a discipline; and 3) connected to fellow students, the instructor, and the subject content through interactions with information. IL should not be additional content that is separate from disciplinary content. Instead, instructors can leverage specific elements of IL to foster a more motivating learning environment and enable greater student performance. Providing students with a structured choice on how to synthesize information from various sources, or scaffolding learning activities for students learn various aspects of information within a subject with consistent low-stakes assessments are possible ways instructors can foster student motivation and student performance.

6.4 Limitations and Future Directions

Our analyses are correlational. Therefore, it is possible that instructors that frequently task students to engage with information in higher-order ways may be better at creating an autonomy-supportive and student-centered learning environment as measured by our instruments. Comparing individual instructors before and after implementing new types of IL engagements could better examine the causal relationships between IL, motivation and grades. Additionally, the instructor data concerning when and how much they tasked students to engage with information in the classroom is self-reported. Future studies could triangulate instructor-reported data with student-reported data or observations to get a clearer picture of the actual IL involvement. Lastly, this study frames IL in terms of the core curriculum at [SCHOOL], which was informed by the Association of American Colleges & Universities (2009) VALUE Rubric. While this was due in part to institutional constraints, this limits how IL could be interpreted and expressed by the instructors surveyed. It is plausible that there are more types of high-level engagements with information that instructors assign their students not reflected in our data collection methods.

Further research is warranted to better discern the nuances of the relationship between IL, student motivation, and student performance. For instance, it is unclear how large a role motivation plays in the relationship between IL and student performance. Is the IL-student performance relationship predominantly accounted for by IL's ability to motivate students, or is IL's relationship with student performance more direct? Given the benefits associated with creating autonomy-supportive and motivating classroom environments, more research exploring the relationship between IL and SDT, and the basic psychological needs of autonomy, competence, and relatedness is merited.

Future research should also explore if engagements with information that align with other cognitively demanding activities, as defined by Blooms' Revised Taxonomy (Anderson & Krathwohl, 2001), such as analyzing or creating, are associated with positive student achievement. It is not evident whether a cognitively demanding engagement with information

explains the positive relationship between IL and student performance this study found, or if synthesizing information is an acutely useful cognitively demanding task for student performance. It is possible that other kinds of complex tasks with information can account for this relationship.

7. Conclusion

This study is one of the first to examine the relationships between IL, student motivation and academic achievement in the context of disciplinary learning. The results of the research described in this paper suggest that students who synthesize information and communicate the results, and do so frequently throughout a semester, are more motivated to learn disciplinary content and have a greater chance of achieving higher course grades. The findings suggest that efforts to advance IL in higher education should focus on engaging instructors to integrate IL throughout their courses. Revealing the relationship of IL to student motivation and student performance in the undergraduate classroom highlights the contribution of IL to institutional goals for learning in higher education.

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Table 1. *Number of Course Sections by Colleges, Academic Level and Class Size by Semester*

Colleges	Fall 2015	Spring 2016	Totals
Agriculture	8	2	10
Education	30	3	33
Engineering	4	2	6
Health and Human Sciences	4	1	5
Liberal Arts	9	9	18
School of Management	4	1	5
Science	7	4	11
Technology	7	7	14
Course Level	Fall 2015	Spring 2016	Totals
100	41	3	44
200	19	13	32
300	13	11	24
400	0	2	2
Class Size	Fall 2015	Spring 2016	Totals
≤ 25 students	31	6	37
26-50 students	16	5	21
51-75 students	11	10	21
76-100 students	4	5	9
> 100 students	11	3	14
	73	29	**102**

Table 2. *Demographic Information for All Enrolled Students and Students who Completed the Survey.*

	All students over 18 enrolled in the course sections (N = 6874)	**Students over 18 who completed the survey (N = 3152)**
Gender	46% Female, 54% Male	50% Female, 50% Male
Ethnicity	68% White, 14% International, 5% Asian, 4% Black/African-American, 4% Latino/Hispanic, 5% Other	69% White, 16% International, 5% Asian, 3% Black/African-American, 4% Latino/Hispanic, 3% Other
Underrepresented Minority	9.7% underrepresented minority	8.2% underrepresented minority
Class Level	31% Freshmen, 28% Sophomores, 21% Juniors, 20% Seniors	35% Freshmen, 26% Sophomores, 20% Juniors, 19% Seniors
IMPACT Course Grade	Course Grade ranged from 0 to 4.0 (M = 3.07, SD = .98)	Course Grade ranged from 0 to 4.0 (M = 3.28, SD = .86)

Table 3. *Survey Question*

	Never	Rarely: 1-5 times a semester	Sometimes: 6-10 times a semester	Often: 11-16 times a semester	Very Often: More than 16 times a semester
Pose questions or problems that require further investigation	❍	❍	❍	❍	❍
Access information outside of assigned readings and tasks	❍	❍	❍	❍	❍
Evaluate information sources	❍	❍	❍	❍	❍
Synthesize information and communicate the results through a deliverable (e.g. project, paper, homework, etc.)	❍	❍	❍	❍	❍
Apply conventions of attribution (e.g. cite, reference, paraphrase, quote, etc.)	❍	❍	❍	❍	❍

Table 4. *Regression Analysis Examining the Effects of Information Literacy Variables on Course Grades, Learning Climate, Basic Psychological Needs, Motivation and Perceived Knowledge Transfer.*

Dependent Variable	Independent Variable	Unstandardized Coefficients		Standardized Coefficients	SemiPartial Correlations	Model Statistics		
		B	Standard Error	β	Part	F	p	R^2
Course Grade	IL1	.032	.052	.089	.057	4.56	< .01	.19
	IL2	.006	.049	.018	.012			
	IL3	.033	.062	.082	.049			
	IL4	.098	.041	.258*	.221			
	IL5	.041	.045	.106	.083			
Learning Climate	IL1	.071	.076	.136	.087	3.78	< .01	.17
	IL2	-.007	.072	-.012	-.009			
	IL3	.053	.090	.092	.055			
	IL4	.096	.060	.177	.151			
	IL5	-.266	.066	-.484*	-.375			
Autonomy	IL1	.054	.050	.164	.105	2.83	< .01	.13
	IL2	-.017	.046	-.051	-.035			
	IL3	.008	.058	.022	.014			
	IL4	.091	.039	.264*	.236			
	IL5	-.119	.043	-.341*	-.273			
Competence	IL1	.030	.051	.083	.053	45.76	< .01	.23
	IL2	.004	.048	.012	.008			
	IL3	.011	.060	.029	.017			
	IL4	.139	.040	.365*	.312			
	IL5	-.198	.044	-.516*	-.400			
Relatedness	IL1	-.027	.045	-.086	-.055	4.03	< .01	.18
	IL2	.005	.042	.016	.011			
	IL3	-.055	.053	-.163	-.096			
	IL4	.144	.035	.444*	.380			
	IL5	-.070	.039	-.214	-.166			
Self-Determination Index	IL1	1.64	.642	.353*	.227	6.25	< .01	.25
	IL2	-.359	.602	-.076	-.053			
	IL3	-.291	.758	-.058	-.034			
	IL4	1.24	.501	.256*	.219			
	IL5	-2.39	.557	-.493*	-.382			
Perceived Knowledge Transfer	IL1	.006	.088	.010	.006	3.01	< .01	.14
	IL2	.021	.082	.035	.024			
	IL3	.011	.104	.017	.011			
	IL4	.214	.068	.349*	.306			
	IL5	-.213	.076	-.343*	-.275			

Table 5. *Bivariate Correlations Between All Study Variables*

	IL1	IL2	IL3	IL4	IL5	LCQ	Auto	Comp	Rel	SDI	PKTS	Grade
IL1	1.00											
IL2	.58**	1.00										
IL3	.74**	.68**	1.00									
IL4	.47**	.34**	.42**	1.00								
IL5	.48**	.56**	.55**	.41**	1.00							
LCQ	.05	-.08	-.01	.08	-.30**	1.00						
Auto	.11	-.04	.03	.19*	-.17	.87**	1.00					
Comp	.03	-.08	-.03	.21*	-.30**	.78**	.83**	1.00				
Rel	-.09	-.11	-.14	.25*	-.15	.49**	.55**	.61**	1.00			
SDI	.15	-.10	-.01	.17	-.29**	.68**	.72**	.82**	.44**	1.00		
PKTS	.04	-.02	.01	.23*	-.17	.69**	.72**	.85**	.55**	.80**	1.00	
Grade	.33**	.27**	.33**	.38**	.31**	.34**	.35**	.42**	.41**	.31**	.41**	1.00