

AN EXPLORATORY EXAMINATION OF THE VARIABLES INFLUENCING A TEAM'S SELF-EFFICACY REGARDING COLLABORATIVE SOFTWARE USE

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ABSTRACT

The influences on teams' self-efficacy to use collaborative software are explored. The teams are student teams who collectively complete numerous, meaningful tasks using Microsoft's SharePoint Services to facilitate these collaborations. Questionnaire responses from these students were used to develop measures of team experience, team self-efficacy, team computer self-efficacy, and team SharePoint self-efficacy. The interrelationships among these measures were examined using correlation. While some meaningful relationships were found among the other measures, none were found with team SharePoint self-efficacy. Implications and conclusions are also provided.

INTRODUCTION

There have been a variety of popular press discussions regarding the use of social media. One estimate is that over 40 million individuals use Facebook and typically spend an average of 3 hours a day on the site [7]. Facebook and similar social networking sites have become integrated into the daily lives of many people. One way for business to capitalize on social networking use is to develop software in the spirit of social networking allowing business colleagues and team members to collaborate on business tasks [7].

Collaborating while working in business groups is a professional requirement for most organizations [11] [12]. Exposing students to the use of software and websites that encourage and enhance business collaboration prepares them for the work environment [14]. As a result, educating college students in the use and expectations of collaborative tools facilitating social networking and networking with professional colleagues is becoming increasingly important. Ideally, undergraduates would develop skills allowing them to seamlessly transition into a professional work environment. An important aspect of these skills is the student's confidence in their ability to successfully use their skills to complete professional work tasks. Such confidence is reflected in the student's self-efficacy regarding their professional tasks. Self-efficacy is frequently defined as the individual's perception of possessing the requisite abilities to successfully perform specific tasks [2], [3], [4], [6].

Self-efficacy has an important role in explaining many behaviors and attitudes of individuals. Among these is the effort expended to change behaviors. Self-efficacy theory is based on social cognitive theory and links an individual's cognitive state to a variety of affective and behavioral outcomes [2], [3], [4], [5], [6], [8], [13]. Individuals with low self-efficacy feel a lack of control over their actions and are less motivated and persistent at changing behavior and seeing value in such a change [9].

Additional implications of self-efficacy include an individual's willingness to attempt new tasks or activities as well as their persistence to continue performing a task or activity, particularly when facing

adversity. An example is self-efficacy's influence on computer technology use and adoption [10]. Self-efficacy has also been applied to cohesive groups such as teams and team self-efficacy has been used to explain the team's willingness and persistence to perform specific team tasks [1].

Business education frequently makes use of both student teams and team collaboration, often facilitated by software. Within this context, it is helpful to understand the interrelationships among team member perceptions of team experience, team self-efficacy, team computer self-efficacy, and team self-efficacy to use collaborative software. For an instructor, a key question is do these interrelationships or the absence of meaningful interrelationships provide insights regarding the successful or unsuccessful team use of collaborative software? Furthermore, are there aspects to these interrelationships which an instructor may manage to influence team success? Additionally, do these interrelationships, if meaningful, vary based on the characteristics of the individual providing the perceptions? If so, can the instructor use this knowledge to influence student team success via team composition?

The research presented in this manuscript is exploratory in nature. It is focused on teams and their use of collaborative software. Specifically, the teams are student teams and the collaborative software is Microsoft's SharePoint Services (SharePoint). The unit of analysis is the individual, examining the individual's perceptions of team experience, team self-efficacy, team SharePoint self-efficacy, and team computer self-efficacy and their interrelationships. The influences of the individual's characteristics on these interrelationships (i.e., age, amount of computer use, academic class, and gender) are also examined.

The remainder of the manuscript is organized as follows. First the population and the sample are presented. This includes a discussion of the sample's characteristics. The formation of the measures for each construct (i.e., team experience, team self-efficacy, team SharePoint self-efficacy, and team computer self-efficacy) is presented next. The analysis and results are next. The manuscript ends with implications and conclusions including a discussion of directions for future research.

THE POPULATION AND THE SAMPLE

The data were collected from students at a mid-sized university in the western United States. The students were enrolled in the junior-level core curriculum in the College of Business & Economics. Students complete this core curriculum as a cohort over a two semester sequence of classes. They are required to form student teams in which they complete at least one major project, several smaller projects, and an in-class presentation each semester. As a result, students spend a significant amount of time working on class activities in their teams. It is not uncommon for student teams to interact socially as well as academically. In order to support student team activities, faculty in one section of the junior-level core curriculum made available to each student team a SharePoint site to facilitate the team's collaboration.

SharePoint is a set of web tools which use a common technology and structure. It is integrated with the Microsoft Office suite and uses its general interface which facilitates usability particularly by non-technical users. Features provided by SharePoint include intranet portals, document and file management, sharing social networks, extranets, websites, and enterprise search. It also has capabilities in system integration, process integration, and workflow automation.

In the classes examined here, within SharePoint each team had their own team site on a dedicated server with each team member and instructor having access permissions. On this site there was an

announcement window that allowed teammates and the instructor to post announcements for all to read. Each team site also had a discussion forum on which team members could participate in threaded discussions and a document repository allowing team members to “checkout” versions of a document on which they were currently working. This allowed team members to always know they were working on the most recent version of any collaborative document and to track all changes by who made them and when these were made. The final versions of each required document were identified as such and left in the document repository for the instructor to grade. The instructor wrote comments and grade information on the submitted document and returned it to the team repository for the team members to view.

In order to generate a data sample of students’ perceptions regarding SharePoint, an online questionnaire was administered using Web Surveyor. Total enrollment in the course was 55 students and 43 of them completed the questionnaire. This produced a 78.18% response rate. The characteristics of the responding students were summarized by their answers to a few demographic questions. A total of 74% of the respondents were male and 26% were female. The average age of the respondents was 21.29 years with a minimum age of 19 years and a maximum age of 28 years. The majority of the respondents were juniors in terms of year in school at 84% with the only other nonzero group being seniors at 16%. The students reported that on average they spent just over 32% of their time using a computer each week with a reported minimum of 5% and maximum of 80%. The demographic values are shown in Table 1.

TABLE 1
The Sample Characteristics
Class in School

Class in School	Frequency	Percentage
Freshman	0	0%
Sophomore	0	0%
Junior	36	83.72%
Senior	7	16.28%

Gender

Gender	Frequency	Percentage
Female	11	25.58%
Male	32	74.42%

Age

Mean	Standard Deviation	Minimum	Maximum
21.29 years	1.81	19 years	28 years

Percentage of Time Each Week Spent Using a Computer

Mean	Standard Deviation	Minimum	Maximum
32.21% hours	21.50%	5.00%	80.00%

The Measures

The measures were formed by summing individual questionnaire items. Using summated measures was necessitated by the small sample size of 43. These measures were for the constructs of team experience, team self-efficacy, team SharePoint self-efficacy, and team computer self-efficacy. The means for the three item measures were 11.29 for team experience and 12.07 for team self-efficacy. For the two item measures the means were 7.07 for team computer self-efficacy and 7.65 for team SharePoint self-efficacy. These measures, items, and summary statistics are shown in Table 2.

TABLE 2
The Measures and Their Indicators

Measures and Items	Mean	Std. Dev.	Minimum	Maximum
Team Experience	11.29	2.27	6.00	15.00
My team....				
1. Has worked together for a long period of time.				
2. Has had significant training in how to work in teams.				
3. My team's attitude towards working together is positive.				
Team Self-Efficacy	12.07	2.20	6.00	15.00
My team....				
4. Feels self-sufficient in its performance.				
5. Would be successful performing any task.				
6. Feels more competent performing tasks than other, similar teams.				
Team SharePoint Self-Efficacy	7.65	1.48	5.00	10.00
My team....				
7. Fully understands how to use SharePoint.				
8. Can successfully use SharePoint to complete our work.				
Team Computer Self-Efficacy	7.07	1.96	4.00	10.00
I believe my team can....				
9. Solve any computer or software problem it experiences.				
10. Explain how to use any computer program it wants to use.				

THE ANALYSIS

Due to the exploratory nature of this research and the sample size, correlation was used to examine the potential interrelationship among these measures. These correlations are reported in Table 3. There were three statistically significant correlations. Team experience and team self-efficacy were positively correlated as were team experience and team computer self-efficacy. Team computer self-efficacy and team self-efficacy were also positively correlated.

TABLE 3
The Correlations Among the Team Measures

	Team Experience	Team Self-Efficacy	Team SharePoint Self-Efficacy	Team Computer Self-Efficacy
Team Experience	1.00			
Team Self-Efficacy	0.35*	1.00		
Team SharePoint Self-Efficacy	0.16	0.17	1.00	
Team Computer Self-Efficacy	0.60**	0.55**	0.24	1.00

* Significant at a 5% level ** Significant at a 1% level

Since the unit of analysis is the individual, it is worthwhile in this exploratory setting to examine the characteristics of the respondents which might influence their reported values of these team measures. For the two characteristics that are continuous in nature, percentage of time each week spent using a computer and the respondent's age, correlations were calculated. Two statistically significant correlations were observed, both positive. The first was between percentage of time each week spent using a computer and team self-efficacy. The second was between the respondent's age and team computer self-efficacy. The relationships among the categorical variables, class in school and gender, and the four team summated measures were examined using multiple analysis of variance. For class in school and gender, no individual or group effects were found on team experience, team self-efficacy, team SharePoint self-efficacy and team computer self-efficacy. All these results are shown in Table 4.

TABLE 4
The Influences of Student Demographics on the Team Measures
CORRELATION RESULTS

	Team Experience	Team Self-Efficacy	Team SharePoint Self-Efficacy	Team Computer Self-Efficacy
Percentage of Time Each Week Spent Using a Computer	-0.05	0.44**	0.10	0.31*
Respondent Age	0.28	0.18	-0.02	0.53**

* Significant at a 5% level ** Significant at a 1% level

MULTIPLE ANALYSIS OF VARIANCE RESULTS: CLASS IN SCHOOL

Variable	Source	Sum of Squares	Mean Square	F Value (1, 40)
Team Experience	Model	8.40	8.40	1.66
	Error	202.17	5.05	
Team Self-Efficacy	Model	4.29	4.29	0.90
	Error	189.71	4.74	
Team SharePoint Self-Efficacy	Model	2.98	2.98	1.38
	Error	86.00	2.15	
Team Computer Self-Efficacy	Model	3.73	3.73	0.96
	Error	156.17	3.90	
Overall Class Effect Wilk's lambda			Value 0.93	F(4, 37) 0.67

MULTIPLE ANALYSIS OF VARIANCE RESULTS: GENDER

Variable	Source	Sum of Squares	Mean Square	F Value (1, 40)
Team Experience	Model	0.57	0.57	0.11
	Error	210.01	5.25	
Team Self-Efficacy	Model	4.43	4.43	0.94
	Error	189.57	4.74	
Team SharePoint Self-Efficacy	Model	1.43	1.43	0.65
	Error	87.55	2.19	
Team Computer Self-Efficacy	Model	1.53	1.53	0.39
	Error	158.38	3.96	
Overall Gender Effect Wilk's Lambda			Value 0.91	F(4, 37) 0.89

IMPLICATIONS AND CONCLUSIONS

The significant, positive correlations between team experience and team self-efficacy and team experience and team computer self-efficacy imply that team experience and these two self-efficacy measures move together in a meaningful fashion. Based on the work of Bandura [2], [3], [4], these results appear logical as personal mastery is an antecedent class identified for self-efficacy. Following this line of reasoning, team experience could be viewed as a personal mastery variable for the team and hence logically correlated with team self-efficacy and team computer self-efficacy. Additionally, team self-efficacy and team computer self-efficacy were also found to be positively correlated in a meaningful manner. It might well be that the team's confidence in its abilities and skills to complete tasks appears both in a broad, general sense (team self-efficacy) as well as a more specific task domain (team computer self-efficacy). If this is the case, a significant, positive correlation between team self-efficacy and team computer self-efficacy would be expected.

It is also interesting to note the absence of significant correlations between team SharePoint self-efficacy and the other three team measures. Intuitively, one would expect to see team SharePoint self-efficacy to be positively correlated with the other two self-efficacy measures in the same fashion as team self-efficacy and team computer self-efficacy are correlated. One possible explanation for the lack of these interrelationships could be SharePoint itself and the use of students as the subjects from whom data were collected. SharePoint is a web-based technology, meaning that the software builds web sites that are then used by teams to support their collaboration. As a result, current students may be so comfortable and confident building and using web sites, that their self-efficacy in this context of use is so universally high that there are few if any systematic linear variations with the other self-efficacy measures. This particular result needs additional investigation in something other than an exploratory environment as well as making use of a different technology for collaboration and different subjects. It is also the case that these insignificant interrelationships provide no insights regarding the questions asked at the beginning of the manuscript.

Examining the correlations between these four measures and the two continuous respondent demographic variables indicate that percentage of time each week spent using a computer has a positive, significant correlation with team computer self-efficacy. As discussed above, this result appears consistent with personal mastery as an antecedent of self-efficacy. What is less clear is a tentative explanation of why such computer use would be positively correlated with perceptions of team self-efficacy. One very tentative thought might be that the task specific self-efficacy might have generalized to enhance team self-efficacy. Similarly, it is not intuitively clear why the respondent's age would be positively correlated with team computer self-efficacy. If the above tentative argument seems plausible, applied to the age variable, it might indicate that older respondents could have more experiences which could lead to observing age and self-efficacy positively correlated. But if this were the case, one would expect to also see a meaningful, positive correlation between respondent age and team self-efficacy. These findings require additional research and investigation.

The influences of the categorical variables of the respondent (i.e., class in school and gender) on the four measures show no meaningful individual or group effects. The motivation for examining these relationships was to see if in this exploratory setting, team composition could influence the defined measures. The indication from these results is no, however additional research is needed to more fully understand these influences, particular the impacts of age and computer use.

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