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AN EXPLORATORY STUDY OF THE FACULTY INFLUENCES ON
STUDENTS' ATTITUDES AND LEARNING USING THE COLLABORATIVE
SOFTWARE SHAREPOINT SERVICES

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ABSTRACT

The research focuses on the impacts of using collaborative software in student project teams. Specifically, an exploratory study of students' perceptions of learning and attitudes and the impact of faculty actions when using Microsoft's SharePoint Services to facilitate student intra-team collaboration is examined. The research objective is to identify meaningful correlations between variables measuring students' attitudes and affective behaviors regarding SharePoint and actions controllable by faculty supporting the use of SharePoint. Students enrolled in a required, core business course that made significant use of student teams supported by SharePoint participated in the web-based questionnaire. The significant correlations among the measures developed using this data indicate that faculty action supporting the use of collaborative software may influence student learning directly as well as indirectly through students' attitudes and intentions to use the software. These empirical results also indicate that social cognitive theory may well provide a theoretical foundation for future research.

Keywords: Collaborative Software, SharePoint Services, Student Teams

I. INTRODUCTION

As a member of a cross-functional team, your boss has asked your team to prepare a presentation to entice a new, potential customer. The challenge is that your fellow team members are physically dispersed from San Francisco to Hong Kong to India. In order to complete this task your team will need to work collaboratively keeping track of the different presentation versions as they are

edited. Microsoft has developed web-based software called SharePoint Services allowing teams to interact and collaborate as well as managing documents.

College students are well versed in some types of collaboration software such as social networking sites like Facebook and My Space. The focus of these sites is to provide a forum where tweens, teens, and college students can blog, gossip, and share music and pictures. These sites are not intended to prepare students for collaborating professionally or to understand the nuances of virtual teaming. College students also use content management sites such as Blackboard and WebCT as part of their college courses. The challenge with these types of sites is their purpose – posting grades, providing an assignment drop-box. These sites are not intended to be for collaborating in a virtual team or managing shared documents.

In order to prepare students for the future of team work in a professional environment, many programs and courses in business make use of student teams to complete class projects and other class assignments. The idea of using these student teams is to simulate a team-based professional environment and thereby providing students with important experiences and skills. The impact of using student teams and their impacts on learning as well as a variety of other outcomes have been studied in some detail. However, what has received significantly less attention is the use of collaborative software to support this student-team project environment.

Given the upward trend in business use of collaborative software, this software needs to be introduced into the classroom if students are to experience an accurate simulated team-based professional environment. Furthermore, research to better understand the impacts and influences of such software on student teams and the classroom environment is important. The research presented below is an initial attempt to better understand these impacts and influences. Formally, we undertook an exploratory research project to better understand the use of collaborative software as it relates to student teams. Additionally, we

wanted to understand how faculty also can influence the attitudes toward the collaborative software.

This research examines students in a required team environment where they interact to develop a variety of written and oral projects using the collaborative software SharePoint Services by Microsoft. The research focuses on the relationships among a variety of variables such as students' attitudes towards using SharePoint Services on team projects and their perceptions of how SharePoint influenced their learning. The hope is to use what was learned from this exploratory study to develop a future, theoretically sound research project examining students' attitudes and learning while using SharePoint Services to complete team projects.

The presentation order for the remainder of the research is as follows. First, the literature supporting the selection of the faculty controllable variables to include in the study is presented. Second, the empirical study is presented in detail followed by conclusions which include directions for future research.

II. THE LITERATURE

In a quest to improve an organizations performance, companies are investing heavily in information technologies. One technology that can affect an employee's performance is collaborative software. Such software provides the ability to coordinate, collaborate, and share documents with other employees and project team members. In order to understand an individual's and a team's attitude toward the technology, we must understand the variables that affect behavior and influences use of the technology. This research study focused on students' use of Microsoft's SharePoint Services. Because SharePoint Services was a new software or technology application for the students, theories regarding technology acceptance were deemed appropriate frameworks for the study. There are several broad threads of research in this area. Among these threads, two are technology acceptance and social cognitive theory.

The Technology Acceptance Model (TAM) is adapted from the theory of reasoned action (TRA). A well-known model, the TRA is concerned with predicting and explaining human intentions and behaviors (Ajzen, I. and Fishbein, M., 1980; Chau, P. Y. K. and Hu, P. J., 2001; Davis, F. D., 1989). The TAM adapts and applies the TRA to predicting and explaining user acceptance of a computer technology.

The TAM traces the impact that external variables have on the beliefs, attitudes, and intention to use a technology (Davis, F. D., 1989; Legris, P., Ingham, J., and Collette, P., 2003). Davis (1989) and Davis, Bagozzi, and Washaw (1989) found that two primary determinants of technology acceptance are perceived ease of use and perceived usefulness. Usefulness assesses a person's perception of how a particular technology will improve performance. Ease of use assesses a person's perception of the effort needed to use the technology (Davis, F. D., 1989; Davis, F. D. et al., 1989; Venkatesh, V. and Davis, F. D., 1996). The model also links the influence of external variables to users' perceptions of a technology's usefulness and ease of use. In the adoption of classroom technology, such external variables include faculty support and encouragement as well as the watching other student teams in the use the technology.

Another theory predicting an individual's belief and perception for the future use of computing technology is self-efficacy theory or social cognitive theory (Bates, R. and Khasawneh, S., 2007). Self-efficacy theory (Bandura, A., 1982, 1986) links an individual's cognitive state to a variety of affective and behavioral outcomes (Staples, D. S., Hulland, J. S., and Higgins, C. A., 1998). Self-efficacy theory has been used in the past to explain individuals reactions to information technologies (Bandura, A., 1986; Baronas, A. K. and Louis, M. R., 1988; Hasan, B., 2003; Havelka, D., 2003; Martinko, M. J., Henry, J. W., and Zmud, R. W., 1996; Meier, S. T., 1985; Potosky, D., 2002). Bandura (1986) separated the affective and behavioral outcomes into two distinct types, self-efficacy and outcome expectancy. An individual's belief that he or she possesses the skills and abilities to successfully accomplish a specific task represents self-efficacy.

Outcome expectancy, on the other hand, is an individual's belief that by accomplishing a task, a desired outcome is attained. Self-efficacy and outcome expectancy have separate impacts on behavior and affect. However, self-efficacy typically has a larger effect than outcome expectancy (Bandura, A., 1986) and generally self-efficacy has a direct impact on outcome expectancy (Stone, R. W. and Henry, J. W., 2003). Bandura's work has also been applied to the adoption and use of information technology. From self-efficacy theory, four classes of constructs directly impact self-efficacy and outcome expectancy and ultimately behavioral and effective outcomes from using new technology. These relate to mastery of the technology, physiological arousal regarding the technology, vicarious experience with the technology, and social norms regarding technology use.

An extension of self-efficacy relating to a team environment is group efficacy or collective efficacy (Baker, D. F., 2001; Fuller, M. A., Hardin, A. M., and Scott, C. L., 2007; Hardin, A. M., Fuller, M. A., and Valacich, J. S., 2006; Wang, S.-L. and Lin, S. S. J., 2007). As defined by Whiteoak, Chalip and Hort (2004) group efficacy is a "group's sense of its capacity to complete a task successfully or to reach its objectives." One method of measuring group efficacy is by an individual's perception of the efficacy of the group. Additional methods of measuring group efficacy involve the group coming to consensus. A group consensus method may result in significant differences in outcomes than an individual method because the group must come to agreement (Jung, D. I. and Sosik, J. J., 2003). Therefore, an individual level of the group's efficacy will be used in this study.

Applying this literature to student teams using collaborative software, there are several variables that are at least partially controllable by faculty which can be theoretically linked to students' attitudes, learning, and team self-efficacy with respect to SharePoint Services. These faculty controllable variables are faculty support as well as faculty encouragement for the use of SharePoint Services. In addition, having the teams observe the use of SharePoint Services by other

student teams can also be justified. The remainder of the research examines the empirical interrelationships among these variables.

III. THE EMPIRICAL STUDY

The focus of the empirical study was exploratory in nature to evaluate the presence of meaningful relationships among the measures of the constructs. The data were produced using a questionnaire designed to collect items to measure the conceptual constructs of interest (i.e., faculty support, faculty encouragement, watching other teams, behavioral intentions, self-efficacy, attitudes, and learning) regarding students' use of SharePoint Services. The questionnaire was developed with feedback from students consistent with the target population. In addition, it was also pretested with another group of the target population of students.

THE SAMPLE

The final questionnaire was entered into Websurveyor and posted on the Internet. The URL for the questionnaire location was distributed to students enrolled in a section of the second semester of the junior level business core courses as a link in SharePoint Services. These courses, called the Integrated Business Curriculum (IBC), are completed by students as a cohort over a two semester sequence. IBC students complete numerous projects and presentations and other activities within student teams across both semesters. As a result, IBC students have significant experiences working in teams to complete projects and other team activities.

The students enrolled in one particular section of the first semester of IBC were sampled. These students were invited to complete the questionnaire. A total of 43 responses were received out of a total of 59 enrolled students. The resulting response rate was 73%. On the distributed questionnaire, a few items gathering demographic information on the responding students were included. The average age of the respondents was 21.29 years old. Twenty-six percent of the respondents were female and 74% were male. Most of the respondents were

juniors in terms of class standing (84%) and the remaining 16% of the respondents were seniors. These demographic variables are shown in Table 1.

Table 1 Sample Demographics

Variable	Frequency	Percentage
Gender		
Female	11	26%
Male	32	74%
Class		
Junior	36	84%
Senior	7	16%
Age (in Years)		
Mean	Standard Deviation	Minimum/Maximum
21.29	1.81	19/28

RESPONSE BIAS

As in any study based on a sample produced using a questionnaire, nonresponse bias is a concern. In order to examine the possible presence of nonresponse bias, the sample demographics of age and gender described above were compared to the corresponding population (i.e., College) values. The class demographic was not examined since the target population is formed by students enrolled in a course that is designed to be at the junior-level. As a result, any nonresponse bias test of the sample percentages of class to the corresponding College values would not be meaningful. The average age of students in the College is 21.6 years old while in the sample the average age was 21.29 years old. Comparing the sample's average age to the average age in the population, a large sample test of sample mean was used. The calculated standard normal variable, based on the sample size of 41 and a sample standard deviation of 1.81, was 1.11. This value was not significant and thus the average age in the sample did not differ from the corresponding population mean.

Similarly, the proportion of females in the sample, and implicitly the proportion of males, was compared to the corresponding proportion of females in the target

population. The proportion of females in the College was 39%. In the sample of 43 respondents, eleven were female. Based on the size of the sample and the proportion of females in the target population, it would be expected to observe 16.77 females in the sample. The standard deviation of the test statistic was computed as 10.23. The resulting standard normal variable was calculated to be -0.56. This value was not significant and thus the proportion of females and hence males did not differ from the corresponding population proportions. Based on this result and the test regarding the differences in respondent age between the sample and the target population, it is concluded that nonresponse bias is not a problem for this study (Hair, J., Jr., Anderson, R. E., Tatham, R. L., and Black, W. C., 1992).

THE MEASURES

As mentioned earlier, the research study is preliminary in nature. The hope is to investigate several relationships among faculty controllable variables and student's attitudes, group or team self-efficacy as these relate to the learning and using of the technology when working in teams using collaborative software. Given this hope and the small sample size, the individual questionnaire items measuring these variables were summed to form the measures used in the empirical study. The specific questionnaire items and how they were collected into the summated measures are shown in Table 2. For all the items, the response scale and weights were 1-Strongly Disagree; 2-Disagree; 3-Neutral; 4-Agree; and 5-Strongly Agree.

Table 2 The Questionnaire Items and Measures

SharePoint Self-Efficacy (mean: 18.89 standard deviation: 3.38)
I believe my team....
Fully understands how to use SharePoint.
Can successfully use SharePoint to complete our work.
Really does not understand how to use SharePoint (reverse coded).
Feels incompetent when trying to use SharePoint (reverse coded).
Is able to use all the features in SharePoint.
SharePoint Attitude (mean: 20.17 standard deviation: 5.55)
My team finds using SharePoint to be
Stimulating.

Interesting.
Exciting.
To be user friendly.
Effective.
Efficient.
Productive.
SharePoint Behavioral Intentions (mean: 8.71 standard deviation: 2.48)
I intend to
Spend more time working with SharePoint.
Find more ways to use SharePoint in my work.
Use SharePoint more fully in my work.
Faculty Support of SharePoint (mean: 20.19 standard deviation: 3.94)
For my team's use of SharePoint, the faculty....
Provide sufficient training in its use.
Gave us someone to turn to for help.
Encourage us in its use.
Were interested in our satisfied use of it.
Helped us successfully use it.
Demonstrated how to successfully use it.
Faculty Encouragement to Use SharePoint (mean: 11.33 standard deviation: 1.60)
The faculty....
Explained the advantages of using SharePoint.
Explained that using software like SharePoint was inevitable in our professional career.
Using SharePoint helped convince my team that we needed to use SharePoint.
Watching Other Teams Use SharePoint (mean: 6.33 standard deviation: 1.51)
Watching other student teams use SharePoint convinced my team that we needed to use
Talking to past students who had used SharePoint convinced my team that we needed to use
Learning Using SharePoint (mean: 5.83 standard deviation: 1.77)
In general....
Using SharePoint improves the quality of learning.
Using SharePoint makes it easier to learn.

THE ANALYSIS

Due to the exploratory nature of the study and the small sample size, and because the study was geared to identifying relationship among these measures, the correlations among the measures were computed using PC SAS version 9.1. The resulting correlations are displayed in Table 3.

The correlations indicate seven significant relationships. These significant correlations are between the following pairs of measures: SharePoint Self-Efficacy and SharePoint Attitudes; SharePoint Attitudes and SharePoint

Behavioral Intentions; SharePoint Attitudes and Watching Other Teams; Watching Other Teams and Faculty Encouragement to Use SharePoint; Faculty Encouragement to Use SharePoint and Faculty Support for SharePoint; Faculty Support for SharePoint and Learning Using SharePoint; and SharePoint Attitude and Learning Using SharePoint.

	SharePoint Self-Efficacy	SharePoint Attitude	SharePoint Behavioral Intentions	Faculty Support of SharePoint	Faculty Encouragement to Use SharePoint	Watching Other Teams Use SharePoint	Learning Using SharePoint
SharePoint Self-Efficacy	1.00						
SharePoint Attitude	0.57**	1.00					
SharePoint Behavioral Intentions	0.21	0.51**	1.00				
Faculty Support of SharePoint	0.20	0.16	0.29	1.00			
Faculty Encouragement to Use SharePoint	0.25	0.17	0.27	0.45**	1.00		
Watching Other Teams Use SharePoint	0.16	0.36*	-0.01	0.22	0.44**	1.00	
Learning Using SharePoint	0.10	0.43**	0.29	0.38**	0.23	0.31	1.00

Table 3 The Correlations Among the Measures

* Significant at a 5% level.

** Significant at a 1% level.

THE DISCUSSION

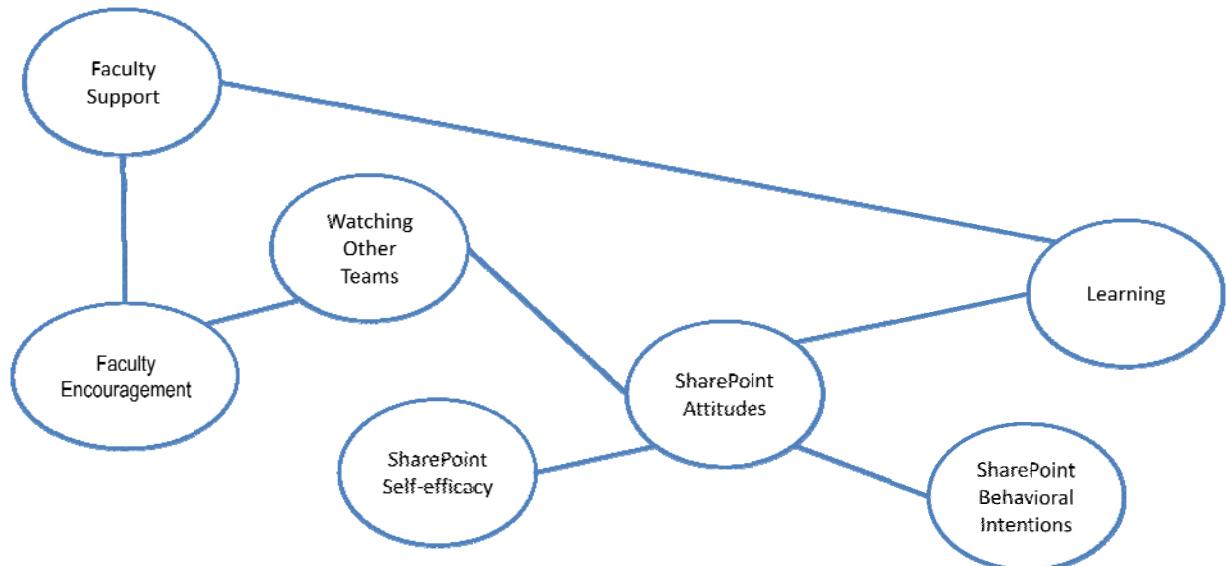
The results from the analysis provide indications of relationships between some of the variables. As expected, there is a relationship between Faculty Encouragement and Faculty Support. Faculty encouraging student teams' on the

use of SharePoint has a significant relationship to Faculty Support. In addition, Faculty Support has a relationship to the students' perspective of SharePoint providing improved quality of learning and makes it easier to learn. Additional relationships occur between Faculty Encouragement and Watching Other Teams. The combination of encouragement and seeing how other teams are using SharePoint also support a relationship to SharePoint attitudes. If it is perceived the faculty are encouraging a team to use SharePoint and seeing how other teams are using the software, the attitude toward SharePoint is influenced. Those attitudes toward SharePoint are also influenced by the perception of learning. Finally, SharePoint Self-Efficacy, based on the team's sense of successfully completing a task using the technology, and behavioral intentions, the intentions to use SharePoint in the future, relate to the attitudes toward SharePoint. The relationship is somewhat expected. If a student's team doesn't feel the software helps their success in completing a task they would be unlikely to continue to use the software in the future.

IV. CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

The empirical results from the study, while preliminary, do indicate a direction for future research. The identification of a direction was the ultimate hope or purpose of performing this research. More specifically, the hope was to develop an appropriate theoretical foundation for future research. Given the significant correlations, it appears that social cognitive theory is an appropriate theoretical model to use in future research in this area. The empirical results show that the selected external variables (Faculty Support, Faculty Encouragement, Watching other Teams) do appear to be related to the student attitudes and learning variables. Social cognitive theory would allow the linking of the faculty controllable variables to students' attitudes, behavioral intentions and ultimately learning using SharePoint Services. A potential model of these relationships for future research is shown in Figure 1. Additional research will investigate the different methods of collecting group efficacy (individual versus group consensus, Jung, D. I. and Sosik, J. J., 2003) and the affect group efficacy has on behavioral intentions and learning.

Figure 1. Relationship model



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