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Success Factors for a Classroom Project

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**ABSTRACT**

The goal of this survey research is to explore specific classroom project management issues across a wide variety of projects and project management courses to formulate specific project management success factors (practices) that contribute to student team project success. The identified project management success factors might provide guiding principles for both faculty and students as they venture through the project management course. Using the project management success factors, students can learn to follow best practices and faculty also have a complete understanding of students' limitation of learning. The contribution of this study is to attempt to establish recommended project management success factors aiming to guide faculty and students to better prepare while working on the team project.

**KEYWORDS:** Project Management, Classroom Project, Project Management Success Factors, Students' Project, and Structural Equation Modelling

**INTRODUCTION**

Team projects are commonplace in project management courses offered at postsecondary institutions for both undergraduate and graduate degrees. Despite the implementation of collaborative learning in higher education, teams still present numerous challenges for faculty and students. The nature of a project management course's content and structure pose an increased challenge for project management educators and teams. Project management teams in an academic environment are highly problematic for faculty and students who face various hurdles during a quest for successful project management knowledge acquisition, and transfer (Langley, 2015). Mir and Pinnington (2014) reported that despite the advancement in project management processes and tools, project success in the workplace has not significantly improved.

The goal of this survey research is to explore specific classroom project management issues across a wide variety of projects and project management courses to formulate specific project management success factors (practices) that contribute to student team project success. The identified project management success factors might provide guiding principles for both faculty and students as they venture through the project management course. Using the project

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## LITERATURE REVIEW

Besteiro, de Souza Pinto, and Novaski (2015) conducted an exploratory empirical research on project managers from 28 companies in order to classify critical success factors into 4 driver groups. They proposed 57 variables altogether with 18 for Managerial Abilities group, 19 for Critical Success Factors group, 13 for Monitoring and Control group and 7 for Lessons Learned group. Besteirio, de Souza Pinto, and Novaski (2015) asserted that knowledge management, leadership, and experience help the project to be successful. Anderson et al, (2006) studied the relationship between critical factors and project success and proposed the success factors with three success scales: managerial delivery ability, impacts of the project, and experiences captures. They proposed nine critical success factors including communication, planning approval by stakeholders, formal and well-structured approach, commitment to the project, influence of stakeholders, understanding and accepting the proposal, restrictions, flexibility in the execution, and influence over the processes of the project. The results showed that communication is a significant contribution in order to establish a trusting relationship between the project team members.

In summary, a great deal of literature has addressed various project management success factors in organizational context. Many studies focus on creating the set of success factors (Besteiro, de Souza Pinto, and Novaski, 2015; Fortune et al., 2013; Lundin and Soderholm, 1995; Soderlund, 2002; Carvalho, 2010; Fortune and White, 2006; and Hyvrari , 2006) and others focus on establishing a relationship between the use of the success factors and project performance (Zmud, 1980; Yetton et al., 2000; McFarlan, 1981; Anderson et al, 2006; Martin, Pearson, and Furumo, 2007; Henderson and Lee, 1992; Jiang, Klein, and Means, 2000; Leung, 2001; and Settle-Murphy and Thornton, 1999). However, there has been little research in the success factors done in the classroom level even though academics have suggested that students' project is as complex and difficult as any projects implemented at the organizational level. Since project management study is a social study in which the complexity and difficulty of a project are introduced by human behaviors; thus, creating interesting research gap. The contribution of this study is to attempt to establish recommended project management success factors aiming to guide faculty and students to better prepare while working on the team project.

## THEORETICAL DEVELOPMENT/MODEL

Instrument development for the success factors and project performance was carried out in three phases: (1) item generation, (2) online data collection study, and (3) data analysis. An extensive literature review was conducted to identify the domain of constructs and generate the initial measurement items. Next, a questionnaire was developed and delivered to students through online survey online platform called Qualtrics. Third, a data set was collected and analyzed to validate the instrument and test the hypothesized model.

### Item generation

Items for each construct were developed based on extensive literature reviews and brain storming with multiple researchers in the project management field. All items are measured on a

six-point Likert type scales where 1 = “Strongly Disagree”, 2 = “Disagree”, 3 = “Somewhat Disagree”, 4 = “Somewhat Agree”, 5 = “Agree” and 6 = “Strongly Agree. After the rigorous sorting procedures were done, three sub-constructs for the success factors and three sub-constructs for project management performance were emerged. Table 1 lists all items in the initial measurement models for the success factors construct. There are 7 items for Project Management Tools construct, 6 items for Project Management Practices construct, and 6 items for Project Management Support construct.

<p><b>PROJECT MANAGEMENT SUCCESS FACTORS</b></p> <p>The following situations describe the extent to which the <b>project management team is given sufficient project management tools, project management practices, and project management support to carry out a successful project implementation.</b> Please circle the appropriate number to indicate the extent to which you agree or disagree with each statement as applicable to your project.</p>
<p><b>PROJECT MANAGEMENT TOOLS</b>  <b>In our organization, we use the project management tools to achieve the following project management activities.</b></p>
Communicating among team members (Performance reports)
Sharing information
Making decisions (Decision tree)
Evaluating project progress (Critical path)
Balancing budget (Earned Value Management-EVM)
Informing the evolution of the project (Gantt chart)
Clear detailed task list (Work Break Structure-WBS)
<p><b>PROJECT MANAGEMENT PRACTICES</b>  <b>In our organization, we identify the following activities as key factors for project success.</b></p>
Clear scope definition of project
Establishing goals and deliverables
Commitment of stakeholders, decision-makers, project managers and team members
Clear time requirement
Clear resource and budget requirements
Clear contingency plan
<p><b>PROJECT MANAGEMENT SUPPORT</b>  <b>In our organization, we receive help from the following supporters.</b></p>
Upper management
Business partners
IT personnel
Project managers

Team members
Managerial support for project management processes

**Table 1: Items for Project Management Success Factors construct**

## SURVEY METHODS, DATA COLLECTION, AND SAMPLE CHARACTERISTICS

A cross-sectional self-administered online survey was conducted. The sample frame was obtained from the list of students who either took or has taken the undergraduate level project management course (ISOM300). 111 started the survey, only 94 completed the survey, and 17 questionnaires were empty. Table 2 shows sample demographic information.

1.	<b>Role in the project team</b>	
	Project manager	13 %
	Member	48 %
	Team leader	22 %
	Organizer	17 %
2.	<b>Highest level of education</b>	
	High school	56 %
	Two-year college	22 %
	Bachelor's degree	28 %
	Master's degree	1 %
	Doctor's degree	0 %
	Other	2 %
3.	<b>Important skills for the project success</b>	
	Leadership	68 %
	Responsibility	67 %
	Teamwork	84 %
	Resources	27 %
	Clear goals	66 %
	Communication	81 %
	Reward	15 %
	Punishment	7 %
4.	<b>Length of project in days</b>	
	1-5	3 %
	5-10	11 %
	20-30	13 %
	30-50	21 %
	Over 50	52 %
5.	<b>Number of members in the project team</b>	
	1	1 %
	2-4	57 %
	5-10	41 %
	Over 10	0 %
6.	<b>Mode of content delivery</b>	
	On campus	87 %
	Online	13 %

7.	<b>Nature of project collaboration</b>	
	On campus	90 %
	Online	10 %
8.	<b>Primary use of technology applications</b>	
	E-mail	88 %
	Word processing	67 %
	Spread sheet	80 %
	Database	30 %
	Programming tools	17 %
	Project management software	44 %
	Social media	22 %
	Cloud space	37 %
Others	18 %	

**Table 2: Sample characteristics**

### **Instrument Refinement in Measurement Models – Construct Validity and Reliability**

To establish content validity, items for the various constructs were reviewed by three academicians. Based on the feedback from the academicians, ambiguous items were either modified or eliminated. New items were added when necessary. A confirmatory factor analysis (CFA) using structural equation modeling method in Analysis of Moment Structures (AMOS) was conducted to refine the measurement models (Hair, et al., 2006).

The final 94 responses were used for further data analysis. As per the guidelines of Bagozzi (1980), the important properties for a measure to be reliable and valid include content validity, internal consistency of operationalization (unidimensionality and reliability), and construct validity (discriminant and convergent). Content validity was determined through a comprehensive review of the literature, pilot tests, assessment by a panel of practitioners and academics to ensure that measurement items covered the domain of the variable (Nunnally, 1978; Churchill, 1979). Convergent validity criteria require that there be one single latent variable underlying a set of measurement items (Anderson and Gerbing, 1988). The degree of convergent validity is tested through CFA (using SEM) to assess the measurement model properties indicated by the Goodness of Fit Index (GFI) and the Adjusted Goodness of Fit Index (AGFI). The GFI indicates the relative amount of variance and covariance jointly explained by the model. The AGFI differs from the GFI in adjusting for the number of degrees of freedom (Byrne, 1989). Both range from 0 to 1. Values of 0.90 or more are considered a good fit (Hair et al., 1998). The normed fit index (NFI) and comparative fit index (CFI) indicate a relative comparison of the proposed model to the null model. NFI and CFI's values above 0.90 are acceptable (Hu and Bentler, 1999). The next set of fit statistics focus on the root mean square error of approximation (RMSEA). The RMSEA takes into account the error of approximation and is expressed per degree of freedom, thus making the index sensitive to the number of estimated parameters in the model; values less than 0.05 indicate good fit, values up to 0.08 represent reasonable errors of approximation (Browne and Cudeck, 1993), values up to 0.10 indicate mediocre fit, and those greater than 0.10 indicate poor fit (MacCallum et. al., 1996). The original measurement items were tested according to these indices and items contributing to an unacceptable model fit were deleted. Items in *italic* were deleted due to low factor loadings or error term correlations. Cronbach's alpha was also used to assess the reliability of each construct. Values of 0.70 and higher are considered acceptable (Hair et al., 2006). Tables

3 and 4 list the items shown in the final measurement models' result. The results show that all constructs are valid and reliable according to the minimum requirements.

<b>PROJECT MANAGEMENT TOOLS</b>	Final Model Fit
Communicating among team members (Performance reports)	GFI = .98
<i>Sharing information</i>	AGFI = .92
Making decisions (Decision tree)	CFI = .99
Evaluating project progress (Critical path)	NFI = .98
Balancing budget (Earned Value Management-EVM)	RMSEA = .06
<i>Informing the evolution of the project (Gantt chart)</i>	$\alpha = .82$
Clear detailed task list (Work Break Structure-WBS)	
<b>PROJECT MANAGEMENT PRACTICES</b>	Final Model Fit
<i>Clear scope definition of project</i>	GFI = .99
Establishing goals and deliverables	AGFI = .93
Commitment of stakeholders, decision-makers, project managers and team members	CFI = 1.00
Clear time requirement	NFI = .99
<i>Clear resource and budget requirements</i>	RMSEA = .05
Clear contingency plan	$\alpha = .87$
<b>PROJECT MANAGEMENT SUPPORT</b>	Final Model Fit
<i>Upper management</i>	GFI = 1.00
Business partners	AGFI = .96
IT personnel	CFI = 1.00
Project managers	NFI = .99
<i>Team members</i>	RMSEA = .00
Managerial support for project management processes	$\alpha = .79$

**Table 3: Model fit indices and reliabilities for Project Management Success Factors**

<b>INDIVIDUAL PERFORMANCE</b>	Final Model Fit
Achieve the scope objectives	GFI = 1.00
Meet time requirements	AGFI = 1.00
<i>Manage cost effectively</i>	CFI = 1.00
Sense of accomplishment	NFI = 1.00
Quality of work	RMSEA = .00
	$\alpha = .85$
<b>PROJECT PERFORMANCE</b>	Final Model Fit

Achieve the scope objectives	GFI = .98 AGFI = .89 CFI = .98 NFI = .97 RMSEA = .11 $\alpha = .79$
Meet time requirements	
Manage cost effectively	
Quality of deliverables	
<i>Customer satisfaction.</i>	
<b>TEAM PERFORMANCE</b>	Final Model Fit
<i>Achieve the scope objectives</i>	GFI = .98 AGFI = .93 CFI = 1.00 NFI = .97 RMSEA = .03 $\alpha = .82$
Meet time requirements	
Manage cost effectively	
Team dynamics	
Alignment of project activities (for example, the outcomes from one activity should be tightly matched with the project's objectives)	
Balance of obligation.	

**Table 4: Model fit indices and reliabilities for Project Management Performance**

**CONCLUSIONS**

The conclusion section of this study is currently not available. The research is still a work-in-progress.

**References available upon request**