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R. Prasad Bingsi, Indiana University Purdue University
Deepak Khazanchi, Northern Kentucky University
“An Instrument to Measure the Effectiveness of IS Development Groups”

MIDWEST BUSINESS ADMINISTRATION ASSOCIATION

HISTORY
The Midwest Business Administration Association (MBAA) was conceived at the 1964 meeting of the American Economic Association in Chicago. The MBAA’s inaugural meeting – 1965 – was planned by a committee consisting of Schuyler F. Otteson and L.L. Waters of Indiana University and Charles Saunders and Sidney Feldman of the University of Kansas. Their immediate objective was to ensure that those who wanted to participate in the fledgling disciplines of business administration would have a forum in which to do so. The first meeting was held “on the occasion” of the Midwest Economic Association meeting in Kansas City, Missouri. About 200 attended that meeting and were treated to eight sessions involving ten presenters. Topics included economic development, marketing, quantitative decision making, transportation, and public utilities.

The MBAA has become successful beyond the wildest expectations of its founders. Success was rooted in the philosophy espoused by them: “We are convinced that the organization should function as a coordinating body - a sort of holding company - that would not threaten the identity or autonomy of organized groups in finance, accounting, marketing, etc. The MBAA should provide the forum for a single unifying program in addition to any meetings offered by specialized groups. The MBAA should offer a select number of speakers on topics of equal interest and value to all conferences.” It is clear that from the start the focus of the MBAA was on providing a multidisciplinary experience for the participants.

The MBAA experience is one of the collegiality and fellowship, of renewing friendships and making new ones, and of continuing dialogues about teaching and research projects. It is the warm feeling associated with the annual return “home” to The Palmer House Hilton (since 1978). It is the mixture of attendees from large and small, public and private, two and four year, and teaching and non-teaching institutions. It is Chicago! Chicago is a wonderful city with its many events, varieties of food, and excitement.

In 1998 twelve formal organizations make up the MBAA. The formal organizations are: Academy of International Business, Midwest Accounting Society, Midwest Business Economics, Midwest Academy of Legal Studies, North America Management Society, Marketing Management Association, P/OM/SB/E Division, Society for Case Research, Midwest Society for Human Resources/Industrial Relations,
1998 PROCEEDINGS
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An Instrument to Measure the Effectiveness of IS Development Groups

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Abstract:

Systems development is largely a group activity because of its complexity. IS researchers and practitioners have implicitly assumed that development groups will be effective provided they utilize a good methodology and associated tools. This paper reports on the development of an instrument for measuring IS development group effectiveness. This instrument can be useful in understanding the systems development group process and in turn improving it.

Introduction:

Systems development is a complex activity and, generally, requires a group effort. With the involvement of users and analysts in systems development groups it is important for managers to understand which facets of a group are deficient and how they can assist groups to mature into more effective teams. The issue of group effectiveness in systems development tasks has not been addressed in past information systems research. In fact, there appears to be an implicit presumption that given a good systems development methodology, related tools/techniques and training, a systems development group will be effective in producing a quality system. The purpose of this research is to report on the development and validation of an instrument to measure group effectiveness as it pertains to IS development groups.

Systems Development Groups:

Systems development activities such as understanding and documenting user requirements, designing and implementing new systems demand an enormous amount of effort and require a variety of skills and techniques to accomplish the task. Systems development is a group task because it is very difficult to find a single person with all the requisite skills and the time to complete the project.

A perusal of the IS literature indicates that the focus of IS research has been on examining the variation in software development project performance as a function of the characteristics of the individual developer, variables related to project management issues, the user of the software being developed, and the technological environment itself [4]. Very few studies have concentrated on the effect of group variables on system development performance.
White and Leifer [10] investigated the amount of perceived impact of environmental variables, task variables and personal characteristics of project team members on systems success and found that the single most critical factor for systems success is the group process, which includes all the activities that increase cohesion, communication and morale. Lakhanpal [4] studied the effect of cohesion, total experience in systems development, and capability of the group on system development performance. He found that cohesion and capability had significant influence on system development performance. Of the two significant variables, cohesion had the largest influence on the system development performance. Experience did not significantly influence performance at all.

Research done by White and Leifer [10] and Lakhanpal [4] demonstrates that a better understanding of the group process might provide a means of enhancing systems development performance. It is important that information systems managers and project team leaders understand the dynamics of group effectiveness and identify the means for improving it during the various phases of the systems development cycle.

**Group Effectiveness:**

Two important aspects of groups are, group (task) performance and group effectiveness. Group effectiveness could be related to a broader concept called “human resource maintenance.” Human resource maintenance is the ability of the group to maintain its social fabric and the capabilities of its members to work well together over time. High group effectiveness suggests a greater capability for human-resource maintenance in a group [8].

Group effectiveness could be affected by group structure (group type, group size and group composition), group processes (development, norms, roles, cohesiveness, trust, etc.), and contextual factors (nature of task, level of autonomy, feedback mechanism, etc.) [9]. Schein [7] suggests using eight attributes for measuring group effectiveness at various stages in the maturing of the group. These dimensions of group effectiveness are shared goals, participation, feelings, problem-solving, leadership, decision-making, mutual trust, and creativity. This, he argues, would help the group to learn (and mature) by assessing its own performance on a regular basis. Based on Schein [7] and Schermerhorn [8] we have developed an instrument to measure the group effectiveness of teams1.

**Data collection:**

Undergraduate MIS students enrolled in a semester-long systems analysis course at two midwestern, U.S. universities were the subjects of this study. The study was conducted over three long semesters (Fall and Spring) in the past few years. Overall, forty three groups participated in the study. Table 1 summarizes the frequency of number of team members in the groups that participated in the study.

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1 Complete instrument can be obtained from the authors
Table 1: Frequency Distribution of Group Size

<table>
<thead>
<tr>
<th>Group Size</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>9</td>
<td>20.9</td>
<td>20.9</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>32.6</td>
<td>53.5</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>37.2</td>
<td>90.7</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>9.3</td>
<td>100.00</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>100.00</td>
<td></td>
</tr>
</tbody>
</table>

In order to provide hands-on experience to students, it is customary in most universities to include a semester-long systems analysis project involving real clients as a part of the systems analysis course. The project generally involves preparing the "system requirements specification" for a new information system by studying the existing business system and identifying the inadequacies or drawbacks of the existing system and understanding new user requirements. Students used a traditional structured analysis methodology, data collection techniques, and system documentation techniques learned in the course. The students closely interacted with faculty for trouble-shooting and direction. At the end of the semester, the student subjects were asked to answer a short questionnaire to assess their perceptions of group effectiveness during the systems analysis effort. The subjects were explicitly told that their data and system documentation would be kept strictly confidential and that their personal and client company information would not be used to identify responses after the data had been collected. Students were also informed that the information they provide would be used for research only.

Data Analysis:

Reliability and Validity: Data collected from the survey was used to evaluate the validity and reliability of the instrument. Construct validity is concerned with whether the measure reflects true dimensions of the concept or is influenced by the methodology [1]. Factor analysis has been utilized in several IS studies to examine this aspect of construct validity [5]. An exploratory principal components factor analysis was conducted to assess the construct validity of the IS group effectiveness instrument. The factor analysis was run without specifying the number of factors to be extracted. The result was a solution with one factor that exhibited an eigenvalue of 5.44 and the solution explained 68% of the systematic covariance among the items. The factor loadings are presented in Table 2. It is important to note that the minimum factor loading is 0.77.

Reliability refers to the lack of measurement error in the items on a scale [3]. The reliability of the instrument in this study was determined by computing the internal consistency coefficient, Cronbach's alpha. The alpha coefficient for the group effectiveness factor is 0.93. Nunnally [6] advises that an alpha of 0.8 is desirable.

Table 2: Factor Loadings

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creativity</td>
<td>.83308</td>
</tr>
<tr>
<td>Decision Making</td>
<td>.89975</td>
</tr>
<tr>
<td>Feelings</td>
<td>.77183</td>
</tr>
<tr>
<td>Goals</td>
<td>.83821</td>
</tr>
<tr>
<td>Leadership</td>
<td>.84675</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>.78723</td>
</tr>
<tr>
<td>Trust</td>
<td>.77070</td>
</tr>
<tr>
<td>Participation</td>
<td>.84292</td>
</tr>
</tbody>
</table>
Influence of Demographics: Demographic variables including age, gender, grade point average, full-time and part-time experience (both IS related and non-IS related) were collected and their impact on the group effectiveness factor analyzed. Since, group is the unit of analysis, all the variables were aggregated to group means [2]. Table 3 summarizes the descriptive statistics of demographic variables of groups.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>32</td>
<td>2</td>
<td>5.00</td>
<td>2.84</td>
<td>0.89</td>
</tr>
<tr>
<td>Full Time Experience</td>
<td>43</td>
<td>0</td>
<td>208.67</td>
<td>59.72</td>
<td>49.94</td>
</tr>
<tr>
<td>Full Time Experience in IS</td>
<td>43</td>
<td>0</td>
<td>140.67</td>
<td>19.24</td>
<td>30.50</td>
</tr>
<tr>
<td>GPA</td>
<td>36</td>
<td>2.65</td>
<td>3.60</td>
<td>3.00</td>
<td>0.21</td>
</tr>
<tr>
<td>Part Time Experience</td>
<td>43</td>
<td>0</td>
<td>117.00</td>
<td>45.62</td>
<td>21.31</td>
</tr>
<tr>
<td>Part Time Experience in IS</td>
<td>43</td>
<td>0</td>
<td>87.00</td>
<td>9.17</td>
<td>15.76</td>
</tr>
<tr>
<td>Gender</td>
<td>36</td>
<td>0</td>
<td>1.00</td>
<td>0.27</td>
<td>0.28</td>
</tr>
</tbody>
</table>

Table 3: Descriptive Statistics of Demographic variables

The group effectiveness factor was positively correlated with group size (Correlation = 0.316 at 0.05 level). Groups with larger size (up to five) had better effectiveness than small groups. No other demographic variable had any significant correlation with the group effectiveness factor.

Concluding Remarks:

The dimensions proposed by Schein [7] form a single factor with high reliability and validity in the context of IS development groups. It may be beneficial to administer the instrument on a regular basis to measure the group effectiveness and to plan a corrective course of action to remedy any problems. Ideally, the project manager should share the ratings with the team members to create an open environment that promotes active participation of group members. This could, ultimately, result in highly effective groups. Further, the instrument could be used in a full-scale investigation of group effectiveness of systems development teams from analysis to the implementation phases of the development life cycle.

References:


