THE RELATIONSHIP BETWEEN LEADER-MEMBER EXCHANGE (LMX) AND COWORKER EXCHANGE (CWX) THEORY IN THE IMPLEMENTATION OF ELECTRONIC HEALTH RECORDS


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ABSTRACT

Electronic health records (EHRs) have fuelled more sophisticated leadership models and shorten product lifecycles. Managers must understand how the relationships between biomedical informatics technicians and healthcare providers contribute to the survival and profitability of business operations. However, little research exists regarding this relationship. This study postulates a positive correlation between biomedical informatics technicians and administrators leader-member exchange (LMX) relationship with their supervisor and relationships between biomedical informatics technicians and administrators relationships with healthcare provider co-workers (CWX) they assist in implementing EHRs. An invitation to participate in a survey to measure LMX and CWX was posted by the Health Information and Management Systems Society (HIMSS) Web site, in which 72 usable surveys were analyzed. The research discovered a statistically significant positive correlation between LMX and CWX scores, measured by the LMX7 questionnaire. The research also found younger, more educated employees with less time in their work profession are training more healthcare providers in the implementation of EHRs. These younger workers report having strong co-worker relationships with the healthcare providers they are helping in the adoption of EHRs. This study provides insights for managers in their search for factors that influence the successful implementation of EHRs in their organization.

Keywords: electronic health records, leader-member exchange, co-worker exchange.

INTRODUCTION

To survive the challenge of the highly competitive and quickly changing healthcare market of the 21st century, managers must understand how the quality of relationships between biomedical informatics technicians and administrators and healthcare providers contribute to the survival and profitability of business operations. Fast developing technologies such as electronic health records (EHRs) have fuelled more sophisticated leadership models and shorten product lifecycles. As a primary driver for the implementation of EHRs, biomedical informatics technicians and administrators are on the front lines, responsible for unfreezing beliefs that the status quo is acceptable and motivate healthcare providers to successful implementation. Employees often resist changes, and reducing this resistance may be difficult given healthcare providers’ diverse motives, interests, and needs. This places greater pressure on biomedical informatics technicians and administrators to implement EHRs. The key to implementation is the successful process of biomedical informatics technicians and administrators training and neutering healthcare providers to successfully adopt new systems into their practice.

The purpose of this article is the beginning of research how leader-member exchange (LMX) theory goes beyond the traditional manager-employee relationship by suggesting it also influences the biomedical informatics technicians and administrators and healthcare provider co-worker relationship.
(CWX) when implementing electronic health records. This paper postulates a positive correlation between biomedical informatics technicians and administrators LMX relationship with their supervisor and relationships between biomedical informatics technicians and administrators CWX relationships with healthcare providers they assist in implementing EHRs.

LMX THEORY

LMX is an alternative approach to understanding a leaders’ influence on an individual follower or subordinate effectiveness by focusing on dyadic or paired relationship between leaders and each of their subordinates. Originally termed vertical dyad linkage, LMX theory differs from other leadership theories by its focus on the dyadic or paired relationship and the unique relationships leaders develop with each follower. Before LMX theory, it was thought leaders treated followers in a collective way.

The LMX model suggests that leaders do not use the same style or set of behaviors uniformly across all members. Instead, unique relationships or exchanges develop with each employee that remains relatively stable over time. These exchanges range from low to high quality. Employees with high-quality exchanges have been referred to as in the "in-group" and those with low-quality exchanges as in the "out-group." In-group members do additional things for the leader and the leader does the same for them, while members of the out-group exert minimal effort, do their job and go home.

In strong LMX relationships, employees are more likely to be involved and provide information needed for task accomplishment. These employees are motivated to support rather than resist attempts to influence. Strong LMX relationships are characterized by support, mutual trust, respect, and partiality. Interactions between managers and employees in strong LMX relationships typically reinforce positive change and strengthen the relationship bond. Such relationships include the exchange of material and nonmaterial considerations that extend beyond what is specified in the formal job description. This has important implications for managers, because at high levels of relationships, there is less resistance to change and use of sanctions, and greater probability of successful implementation of EHRs.

Conversely, employees in low LMX relationships are accustomed to antagonistic behaviors and may view consultation tactics as insincere and motivated by opportunistic intentions. For example, leaders with poor reputations who engage in supportive behaviors may be perceived as self-serving attempts to gain employee favor, or even to highjack employee ideas, rather than as an attempt to improve the change initiative. Such perceptions could backfire and prompt employees to oppose the consultative attempt.

CWX THEORY

CWX, exchanges among coworkers, has been ignored in empirical research. Little research has been conducted concerning CWX relationships at the dyadic (paired) level and the relationship between LMX and CWX. Graen and Uhl-Bien suggest that understanding CWXs may be an important part of understanding how leadership processes work. CWX has also been suggested to be an alternative influence on followers’ work attitudes and performance. Finally, it has been proposed that within-group leadership exchanges may affect CWXs with other groups. This forms the basis of our proposed correlation.

ELECTRONIC HEALTH RECORDS

The first EHRs began to appear in the 1960s. By 1965, at least 73 hospitals and clinical information projects and 28 projects for storage and retrieval of medical documents and other clinically-relevant information were underway. The major value of an integrated EHR is they enable the capture of clinical data as a part of the overall workflow. An electronic health record system enables the administrator to obtain data for billing, the physician to see trends in treatment plans, and nurses to input notes for later retrieval.

The U.S. health care system faces challenges on multiple fronts, including rising
costs and inconsistent quality of care. Health information technology, especially EHRs, has the potential to improve the efficiency and effectiveness of health care providers. Methods to speed the adoption of health information technology have received bipartisan support among U.S. policymakers, and the American Recovery and Reinvestment Act of 2009 authorized incentive payments from 2011 to 2014 through Medicare (a total up to $44,000 per eligible professional) and Medicaid Rural Health Clinics (a total up to $63,750 per eligible professional) to providers that implement certified EHRs that demonstrate their “meaningful use.” The U.S. Department of Health and Human Services (HHS) meaningful-use criteria ensures doctors and hospitals use health information technology (IT) to improve the quality, efficiency, safety, and other aspects of care.

Implementing electronic health records seems simple, but is much harder than it appears. The meaningful use of EHRs requires not only knowledge about the system and how to install it, but knowledge about clinical practice, workflow design, and use of quality improvement tools. Training requires organizational redundancy and reserve, often not present in a busy medical practice. Biomedical informatics technicians and administrators must put into place a complex computer network that neither administrators nor providers know how to support, maintain, or operate. Identifying the cause of system failures is well beyond administrators and healthcare provider skills. System crashes are particularly problematic at in-patient facilities because healthcare providers will not know what treatments are needed or when medications are due. Because an EHR system provides core clinical functions such as telephone calls, prescriptions, etc, small technical problems create major operational problems.

The problems are especially acute for small practices, which employ most physicians. Small practices need much more training and technical assistance from administrators and vendors. Torda & Scholle found some efforts to adopt electronic health records in small practices were a “Stunning failure without meaningful help.”

A decline in productivity during and after implementation of EHRs is inevitable. Some facilities report patient scheduling is reduced by one-half for the first one to three weeks following implementation of medical health records. In some cases, implementation of EHRs doubles or quadruples hospital IT budgets. The financial stress of acquiring an EHR system can preclude the hiring of much needed physicians and nurses.

**METHODODOLOGY**

**Sample and Procedure**

An invitation to participate in a survey was posted by the Health Information and Management Systems Society (HIMSS) Web site. Participants were directed to an online survey site. In a three month period 72 usable surveys were collected. Each participant was asked to complete a questionnaire that included demographic questions and measures of LMX and CWX.

**Measures**

Each participant was asked to rate the quality of the relationship they have with their current manager (LMX) and healthcare provider coworkers (CWX) they currently assist in the implementation of EHRs. The LMX7 and CWX questionnaires were developed similar to Sherony and Green. The 7 question, 5-point Likert scale LMX7 questionnaire measures important dimensions of LMX such as trust, respect, and obligation. LMX7 also provided a one-item rating of the member’s working relationship with their current immediate supervisor on a scale of 1 (extremely ineffective) to 5 (extremely effective). The CWX was measured using the LMX7 scale rephrasing each question to reflect the respondent’s most significant relationship with a healthcare provider they are currently assisting in the adoption of electronic health records. One question from was omitted, “How well does your leader recognize your potential.”

**Demographics**

Thirty-six percent of the respondents were administrators, 33% were administrative support staff, while 28% were biomedical
informatics technicians. Thirty-three percent were high school graduates, 27.8% had a bachelor's degree and 26.4% reported having a master's degree. Of the 69 responses to the question of age, the average age of respondents was 33.47 (SD=7.933). The majority of respondents (44.3%) had worked in their present job more than five years (µ= 4.09, SD=.944). Thirty-two percent worked between 5 – 10 years in their present line of work, while 26.8% worked more than 10 years. When asked how long they have worked supporting the adoption of electronic health records, 43.7% responded 1 – 6 months, 35.2% 7 – 12 months, and 14.1% between 1 – 2 years. Almost 38% were supporting more than 15 healthcare providers, 33.3% supported 2 – 5 healthcare providers, 15.3% between 11 – 15 healthcare providers, and 11.1%, 6-10 providers.

Hypothesis

The question under investigation asks if there is a correlation between LMX and CWX. Sparrowe and Liden, in linking LMX to social network analysis, argued that LMX quality influences the development of subordinates’ relationships with others. The literature provides evidence that LMX influences attitudes with coworkers (CWX). Liden, Sparrowe, and Wayne (page 67) stated that “consistent support has been found for a positive association between LMX and organizational commitment,” citing eight studies. Hence, we might gain insights into successful implementation of electronic health records by assessing the impact of LMX on attitudes and exchange experiences a follower is having with healthcare professionals outside their group.

Hypothesis: There is a statistically significant direct correlation between the leader-member exchange (LMX) relationship of biomedical informatics technicians and administrators and their supervisor and the co-worker (CWX) relationship between biomedical informatics technicians and administrators and healthcare professionals they assist in the implementation of electronic health records.

RESULTS

Consistent with the hypothesis, and Sherony and Green 15, LMX was positively and significantly related to CWX (r=.415, F=14.340, p < .05). This offers evidence that a managers relationship with their followers who are assisting providers implementing electronic health records is associated with the same followers’ relationships with healthcare providers they assist in the implementation process.

Table 1 shows the results of the relationships between demographic variables and the leader-member exchange (LMX) score.

Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>LMX</th>
<th>Age</th>
<th>Education</th>
<th>Job</th>
<th>Years in Work</th>
<th>Years in Job</th>
<th>Length of Support</th>
<th>Number of Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMX</td>
<td>-</td>
<td>-0.078</td>
<td>0.159</td>
<td>-0.042</td>
<td>0.187</td>
<td>0.295*</td>
<td>0.143</td>
<td>-0.076</td>
</tr>
<tr>
<td>Age</td>
<td>-0.078</td>
<td>-</td>
<td>-0.258*</td>
<td>0.012</td>
<td>-0.134</td>
<td>-0.290</td>
<td>0.066</td>
<td>-0.028</td>
</tr>
<tr>
<td>Education</td>
<td>0.159</td>
<td>-0.258*</td>
<td>-</td>
<td>0.328**</td>
<td>0.635**</td>
<td>0.394**</td>
<td>0.136</td>
<td>-0.042</td>
</tr>
<tr>
<td>Job</td>
<td>-0.042</td>
<td>0.012</td>
<td>0.328**</td>
<td>-</td>
<td>0.444**</td>
<td>0.253**</td>
<td>-0.001</td>
<td>-0.218</td>
</tr>
</tbody>
</table>
Table 1 shows a significant positive correlation between age and education as curvilinear. This is explained by younger employees earning master’s degrees earlier in their career, while older employees returning to school after some years in the work force. This supports the large body of research that has found a significant positive correlation between tenure and mature partnerships that an LMX score would measure. As would be expected, the study found a significant positive correlation between respondent’s education and job, years in their work profession, years in their present job, and years in their present job. This suggests that respondents are progressing in both their professional and academic careers. There was a significant negative correlation between age and education. However, there is research using the General Social Survey, e.g. Smith, which explains the relationship between age and education as curvilinear. This is explained by younger employees earning master’s degrees earlier in their career, while older employees returning to school after some years in the work force. Table 2 shows the results of the regression analysis between demographic variables and Co-Worker Exchange (CWX) score.

<table>
<thead>
<tr>
<th>Variable</th>
<th>CWX</th>
<th>Age</th>
<th>Education</th>
<th>Job</th>
<th>Years in Work</th>
<th>Years in Job</th>
<th>Length of Support</th>
<th>Number of Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWX</td>
<td>-1</td>
<td>-0.277*</td>
<td>-0.097</td>
<td>-0.034</td>
<td>-0.093</td>
<td>-0.118</td>
<td>-0.292*</td>
<td>-0.088</td>
</tr>
<tr>
<td>Age</td>
<td>-0.277*</td>
<td>-0.097</td>
<td>-0.258*</td>
<td>-0.012</td>
<td>-0.134</td>
<td>-0.290*</td>
<td>-0.066</td>
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<tr>
<td>Education</td>
<td>-0.097</td>
<td>-0.258*</td>
<td>0.328**</td>
<td>0.635**</td>
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<td></td>
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<tr>
<td>Job</td>
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<td>0.328**</td>
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<td></td>
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<tr>
<td>Years in Work</td>
<td>-0.093</td>
<td>-0.134</td>
<td>0.635**</td>
<td>0.444**</td>
<td>0.549**</td>
<td>0.143</td>
<td>-0.269*</td>
<td></td>
</tr>
</tbody>
</table>
Since LMX and CWX were highly correlated, weEHRs, managers may positively impact the would expect similar demographic relationships to implementation process. exist with regard to CWX. It is interesting to note the Biomedical informatics technicians and significant negative correlation between age and administrators and healthcare providers treat CWX. This suggests younger employees have higher co-each other differently at varying degrees and worker relationships with the healthcare providers they represent because both have limited time and are training in the implementation of electronic health records. The difference between the technician and administer exchanges evolve relationships between age and LMX and CWX are beyond transactional exchanges to social congruent with the argument what within a triad of exchanges; healthcare providers will have an dyadic relationships, there will be a tendency to move increased sense of commitment to the toward a balance of relationships. Specifically, organization because they have grown attached when employees experience an average or low-qualityto both their leaders (LMX) and coworkers LMX relationship, they report a high CWX(CWX). The commitment is a way for healthcare providers to demonstrate reciprocation and obligation to what biomedical informatics technicians and administrative coworkers have done for them. Because CWX theory has the same potential to divide coworkers into two groups, and one group receives special attention, mangers should monitor coworker relationships (CWX) with the same awareness as their relationships with employees (LMX).

**IMPLICATIONS FOR MANAGERS**

The basic principle of LMX is that managers develop different types of relationships with their employees and that the quality of these relationships affects follower attitudes and behaviors. As reported in Sherony and Green, coworkers experience a unique relationship (CWX) with each member. Since CWX and LMX theory are similar, one might deduce there is a direct correlation between the two. This direction correlation was confirmed in our study and suggests biomedical informatics technicians and administrators form the same dyadic or paired relationships with physicians, nurses, pharmacy technicians, laboratory technicians and all other healthcare professionals when implementing EHRs, as they experience with their manager. This suggests by maintaining good relationships with followers who work with healthcare providers in the implementation of electronic health records.

**CONCLUSION**

There is little research investigating how the interaction between biomedical informatics technicians and administrative staff and healthcare providers influence the implementation of electronic health records. Our research found a positive correlation between biomedical informatics technicians and administrators leader-member exchange (LMX) relationship with their manager and relationships between biomedical informatics technicians and administrator’s relationships with healthcare providers.

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<table>
<thead>
<tr>
<th>Years in Job</th>
<th>.118</th>
<th>-.290*</th>
<th>.394**</th>
<th>.253*</th>
<th>.549**</th>
<th>-</th>
<th>.215</th>
<th>-.120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of Support</td>
<td>.292</td>
<td>.066</td>
<td>.136</td>
<td>-.001</td>
<td>.143</td>
<td>.215*</td>
<td>-</td>
<td>.032</td>
</tr>
<tr>
<td>Number of Providers</td>
<td>-.088</td>
<td>-.028</td>
<td>-.042</td>
<td>-.218*</td>
<td>-.269*</td>
<td>-.120</td>
<td>.032</td>
<td>-</td>
</tr>
</tbody>
</table>

*p < .05, ** p < .01
provider co-workers (CWX) when implementing EHRs. Specifically, when there is a strong positive correlation between biomedical informatics technicians and administrators and their managers, there is a strong positive correlation between biomedical informatics technicians and administrators and healthcare providers they assist in the implementation of EHRs. This has several implications for managers in their search for factors that influence the successful implementation of electronic health records in their organization. Our findings suggest a manager’s relationships with followers who work with healthcare providers in the implementation of EHRs may impact the process. Managers should also monitor coworker relationships (CWX) with the same awareness as their relationships with employees (LMX).

In conclusion, we are encouraged by the findings. Due to participant selection and sample size we cannot be certain about the generalizability of these results. Further research using a formal participant selection process across a larger population is needed to validate these initial findings. Nevertheless, the interaction between LMX and CMX in our study appears to offer an interesting and important relationship in pursuing a better understanding of the manager’s role in implementing electronic health records.

REFERENCES


