An Investigation of the influences of Organization Communication Patterns upon Team Effectiveness among Private Universities in Thailand: A Multivariate Analysis

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ABSTRACT

This research project was established upon current literature and research findings regarding the relationship between communication patterns and team effectiveness among organizations. This project aimed to delve in-depth into reported causal relationships between the three organizational communication patterns namely vertical, horizontal and diagonal communication flows or patterns upon team effectiveness measured in three dimensions: task accomplishment, members' satisfaction with the team, and members' intention to stay on with the team. A questionnaire was utilized to collect data from personnel in the top ten private universities in Thailand. Eight hundred and seventy-six completed sets of usable questionnaires were gathered. A multivariate statistical analysis via Multiple Regression Analysis supported that horizontal, diagonal, and vertical communication patterns had positive influences on overall team effectiveness. An in-depth analysis revealed that horizontal communication had the highest influences on two dimensions: intention to stay with the team and team members' satisfaction. Diagonal communication had the highest influence on task accomplishment. Vertical communication's influence ranked the second regarding task accomplishment but the least on satisfaction and team maintenance.

Keywords: Organization Communication, Teamwork, Vertical Communication, Horizontal Communication, Diagonal Communication

Introduction

Teamwork is essential for the modern-day management of organizations (Daft, 2013). Personnel in higher education institutions have to work in cooperation with each other to deliver quality education to students and other stakeholders. Educators have to cross their comfort boundaries by designing interdisciplinary courses and activities which complement each other to provide an integrated teaching and learning system as in the case of STEM (Science Technology Engineering Mathematics) education (Hom, 2014). In this regard, communication is an essential ingredient that functions as the linkages among personnel in an organization, within a team, across a team, and with the management (Bateman, Snell, and Konopaske, 2016). This research project aimed to investigate the influence of organizational communication patterns classified into vertical, horizontal, and diagonal communication patterns upon team effectiveness in the dimensions of task accomplishment, member satisfaction, and team maintenance or intention to stay with the team. This research project provides an insight into the comparative effectiveness of each communication pattern upon team effectiveness in each dimension.

Literature

Teamwork

Organizations in the modern world emphasize the efficiency of work. Adam Smith describes in his infamous book *Wealth of the Nation* that division of labor could increase operational efficiency (Smith, 2015). The division of labor into smaller specialized work units improved organizations' efficiency. Since then, the organization's efficiency had increased many folds. Unfortunately, the separation of work into small units created gaps among the workforce and eventually deteriorated productivity which was against the original objective of the division of labor. In the past couple of decades, teamwork was introduced into the organizational context to amend these gaps. Efficiency as a team, rather than individual, had become an important organizational practice (Paguio, 2006).

Teamwork is comprised of a group of individuals whose tasks and responsibilities were interdependent (Cohen and Bailey, 1997). The teamwork involved more than one individual working together towards the same goals with the same direction (Hackman, 1987). Working as a team had introduced various advantages such as shared experience and world view, combined strength, and others. (Rushmer, 1997). Teamwork could promote organizational processes (Teare et al., 1998; Woodcock, 1989). Some advantages of teamwork included more work accomplishment and members' satisfaction. Gemuenden and Hoegl (2001) reported the relationship between teamwork quality and team performance, work satisfaction, and learning among software developers in Germany. Pineda and Lerner (2006) also supported the relationship between teamwork and goal attainment, satisfaction with the team experience, and

improvement in skills and understanding of teamwork among 4th-year students in the business faculty. However, an analysis of the effectiveness of communication patterns upon teamwork dimension was inadequate.

Teamwork and communication

Communication was an essential tool that connects people. It bridged personnel together and provided various benefits to organizations. Hargie (1996) reported the relationship between communication and organizational innovation. Abu Bakar, Mustaffa, and Mohamad (2009) supported the relationship between communication and team-oriented commitment. Luo, Song, Gebert, Zhang, and Feng (2016)'s research project proved the relationship between a leader's communication style and a subordinate's affective commitment to change. Zuech and Finley (1996) found that customers were satisfied when members of the organization work in a team.

Individuals working in a team need to coordinate to attain the organizational objectives. In this regard, communication was an important tool for good coordination. Gemuenden and Lechler (1997) and Hoegl and Gemuenden (2001) supported that communication positively and significantly influenced the quality of teamwork. Ejohwomu, Oshodi, and Lam (2017) suggested effective communication as one of the determinants for performance. Communication was an important ingredient of team operation (Gemuenden and Lechler 1997; Hoegl and Gemuenden, 2001) and influenced construction project's team performance (Ejohwomu, Oshodi, and Lam, 2017). Hunt (2014) reported that communication directly affected nurses' satisfaction, morale, and effectiveness. Poor communication created negative feelings and misunderstanding, and eventually bad services among practice nurses. Carrière and Bourque (2009) found that communication satisfaction mediated the relationship between internal communication practices and job satisfaction and affective organizational commitment. Effective communication enabled exchanges of data and knowledge among personnel. Hence, it helped to promote and enhance collective contributions which improve the productivity of organizations.

Cohen and Bailey (1997) synthesized a couple of hundred articles and suggested team effectiveness involves three dimensions: task results, the attitude of team members, and behavioral results. Adams, Simon, and Ruiz (2002), DiSilverio (2002), and Huusko (2007) also supported the notion of performance, attitude, and behavioral dimensions as the results of teamwork. Working in a team resulted in more task attainment, members' satisfaction, and team maintenance (Cohen and Bailey, 1997; Pina, Martinez, and Martinez, 2008). Communication referred to the process that individuals transmit and understand shared meaning (Robbins and Coulter, 2017). There were various models of communication but most suggested communication comprises of 6 components namely senders, messages, channel, receiver, feedback, and noise as shown in figure 1.
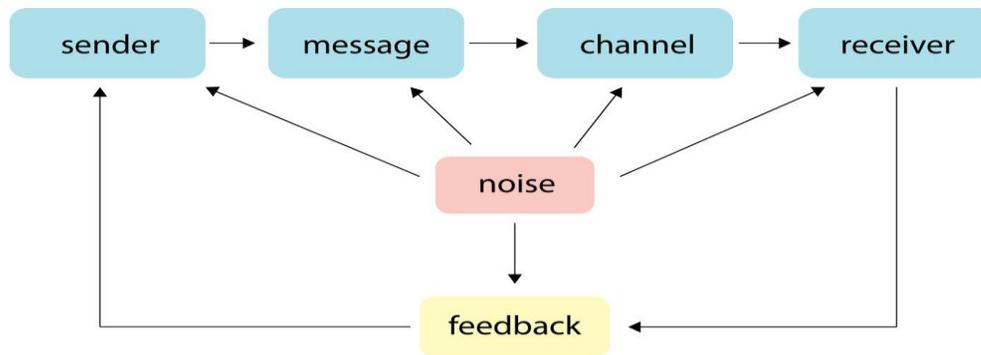
Figure 1: Communication model
Adapted from: Robbins and Coulter (2017)

Organizational Communication

Organizational communication referred to the communication within an organization whereby hierarchical position plays an important part ineffective communication. In this regard, the hierarchical positions of senders and receivers of the message as well as the direction of the communication needed to be carefully studied (Bartels, Peters, Jong, Pruyn, and Molen, 2010). Communication in an organization served 4 major functions: control members' behavior, share information, express emotion, and motivation (Scott and Mitchell, 1976).

The organizational communication flow pattern which was the framework of this research project was categorized into three patterns: vertical, horizontal, and diagonal communication (Robbins and Coulter, 2017).

Vertical communication (figure 2a) included downward and upward communication flow. It referred to the transmission of messages from top management downward to subordinates following the chain of command in the organization and vice versa. The flow of communication could be both downward and upward. Top management communicated strategies, policies, rules, and other commands to their middle managers and subordinates to instruct subordinates to operate. Subordinates reported work results and other information upward to their higher-level managers and eventually to the top management. In the certain organizational context, such as repeated tasks, one-way communication occurred when top management closed down the upward communication channel. They instructed subordinates on what to do and expect obedience. In some organizations, top management was open and listened to comments and feedback from subordinates, hence, the communication direction became two-way. Upward communication had various advantages (Gary Crap, 1990). The management obtained feedback of the operation regarding the policy and plans. Furthermore, the management obtained information regarding the effectiveness and obstruction in subordinates' work. Next, upward communication assisted as ventilation for employees to relieve their stress through sharing their problems with their leaders. Finally, upward communication allowed employees to participate and commit to the organizations' activities.

Horizontal communication (figure 2b) was the communication among personnel in the same hierarchical level in the organization. This pattern of communication did not follow the chain of command but was embedded in the organizational structure. Those who reported to the same

boss were allowed to communicate with each other. For example, managers at the same level in the organization structure such as production manager and procurement manager reported to the same boss, i.e., factory manager, horizontal communication occurred if the organization promote communication among managers who had the same boss. However, this pattern of communication did not allow the individual to communicate across organizational levels. Lateral or horizontal communication was the exchange of information among subordinates across their functional department. Employees used this channel to coordinate their tasks across departments. Lateral communication helped to reduce the time used in transmitting information by crossing the chain of command. The coordination among departments could be performed quickly. Moreover, sharing of information helped to create efficiency in tasks. Employees shared common understanding through lateral communication

Diagonal communication (figure 2c) involved communication across organizational levels and work units. Some organizations promoted communication among personnel without regard to the organization's structure. This type of communication was generally performed through an informal channel. The management supported the communication across work units. Relationships within the organization were promoted.
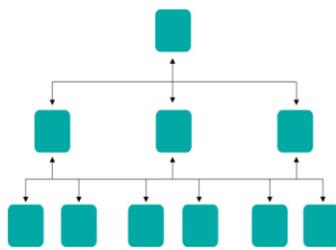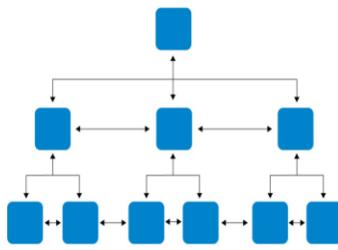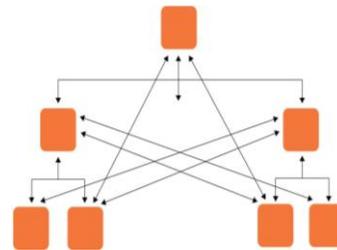
Figure 2a   Figure 2b   Figure 2c

Figure 2 Communication patterns

Barriers to communication

The transmission and understanding of messages could be disrupted in all components of the communication process. Robbins and Coulter (2017) suggested communication barriers included filtering, participants' emotions, information overload, selective listening, and perception capability of communicators.

Filtering was the manipulation of information to make it appears favorable. Filtering was common in organizations. Subordinates had to screen and transfer only information the management would like to know. Sometimes, they chose to communicate only information that made them look good in the eyes of the supervisors. In the meantime, the management might also deliberately filtered some information they think would create negative reactions from the subordinates.

Emotion could affect the interpretation of the messages. An upset receiver tended to interpret messages negatively while a happy receiver tended to interpret messages positively. Hence, the intended meaning of the messages might be distorted.

Human brains had a limited capacity to receive and digest information. When receivers have too much information they could digest, they would just ignore the information. There was a tremendous amount of information flowing in organizations on any single day of work. Too much information obstructed the communication process in the workplace.

Some receiver selected to receive and interpreted parts of the messages that he/she wanted to receive but ignored to process other parts that he/she was not interested in.
The messages might be distorted or misunderstood based on the differences between senders' and receivers' frames of reference. People did not have perfect perceptual organs, for example, some might be short-sighted, some might tend to interpret the meanings of messages in certain manners. The mismatch between senders' and receivers' tendency to perceive things around them could distort the interpretation of the message sent and received.

Research methodology

This research project aimed to elicit empirical data to test the influence of each type of communication pattern upon teamwork efficiency dimensions among the top ten private universities in Thailand.

Population and Samples

The Office of the Higher Education Commission categorized universities in Thailand into 5 categories: Public universities, Public autonomous universities, Rajabhat Universities, Rajamangala Universities of Technology, and Private universities (Bureau of International Cooperation Strategy, Office of the Higher Education Commission, 2019). Public universities are allocated annual budgets from the government and administered under a bureaucratic system. Public autonomous universities manage their administrative structure and budgets. Rajabhat Universities is a group of former Rajabhat Institutes which were upgraded from teacher training colleges and community development. Rajamangala Universities were upgraded from Rajamangala Institutes of Technology colleges which formerly offered technology and vocational education. The four categories of the university above are, one way or another, under government supervision through parts of the financing and subsidies. The last category of a university in Thailand is the private universities which do not receive a budget allocation from the government and is controlled under the Private Higher Education Act. As of 2018, there were 11 public higher education, 23 autonomous universities, 38 Rajabhat Universities, 9 Rajamangala Universities of Technology, 1 community college with 20 campuses, and 75 private higher education institutions (HEI). Out of these 73 private HEIs, 42 are universities, 11 are institutions and 20 are colleges (Bureau of International Cooperation Strategy, Office of the Higher Education Commission, 2018).

Although beginning to transform, public universities are governed by a strong bureaucratic system, communication patterns tend to be downward and one-way. Moreover, team structure is hardly performed under the government protocol. Hence, this study, attempting to investigate the teamwork effectiveness, focused on private universities. The latest number reported by the Office of The population in this study was 11,775 personnel working in private universities in Thailand (Office of the Higher Education Commission, (2019). The required sample size at a confidence level of 95% was 373 samples. Data were collected from the top 10 private universities in terms of numbers of personnel. Private universities with the top ten highest numbers of personnel were selected. Altogether these ten universities accounted for 6,681 personnel or 56.7% of the total personnel of all 73 private universities. These ten universities had more than 400 personnel so they had a large organizational structure to exhibit various types of communication flow and teamwork. The remaining personnel was scattered in 63 HEIs or about 80 in each HEI which makes their organizational structure too small for the objective of this study. One hundred sets of questionnaires were distributed to personnel in each of these 10 private universities through the human resources department. Eight hundred and ninety-two sets of questionnaires were returned. After the editing and cleaning of data 876 sets were usable.

Data Collection Instrument

The questionnaire consisted of 3 parts.

Part I asked the respondents to provide their demographic data.

Part II elicited the respondents' perceptions regarding the pattern of communication in their work unit. The items were derived from the definitions of vertical, diagonal, and horizontal communication patterns. The scale consisted of 5 items for each pattern of communication. Respondents were asked to rate their perception regarding each item ranging from 5 = highly agree to 1 = disagree. Examples of items in the vertical communication pattern section included "My boss informs me information relevant to my operation" and "My boss clarifies my work unit objectives to me". Examples of items in the diagonal communication pattern section included "My boss motivates me to communicate with other work units" and "My boss organizes activities to unite people in the organization. Examples of items in the horizontal communication pattern section included "I usually exchange opinions with my colleagues" and "My boss shows me the importance of communicating with colleagues in the same level".

Part III elicits the perceived teamwork efficiency. Teamwork efficiency was measured via task accomplished, members' satisfaction with the team, and team maintenance. Each dimension was measured by a 5-item scale ranging from 5 = highly agree to 1 = highly disagree. Examples of items measuring task accomplishment were "Team members meet the standard that the organization requires" and "Team members control the budget effectively". Examples of items

measuring members' satisfaction with the team included "Team members are satisfied with the job" and "Team members are satisfied with the social relationship within the team". Examples of items measuring team maintenance included "Team members respect each other" and "Team members assist each other in work".

The items in part II and part III were assessed by 3 experts in the area of communication and human resources development for content and construct validity. IOC was calculated. Some items were removed. Only items with the Index of Item Objective Congruence (IOC) more than 0.50 were retained. Furthermore, the remaining items were included in a scale and pilot tested with 30 samples. Some items were excluded to improve the reliability of the scales. The final Cronbach's alphas were .834, .839, and .827 for vertical, upward, and diagonal communication respectively. Cronbach's alphas for task accomplishment, members' satisfaction with the team, and team maintenance were .834, .839, and .853 respectively. The reliability tests confirmed that all scales were reliable (Cronbach's alpha > .70).

Results

The respondents (n = 876) comprised of 485 females (55.5%) and 390 males (44.5%). 322 (36.8%) respondents were between 31-39 years old. 234 (26.7%) respondents aged between 40-49 years old. 230 (26.3%) were less than 30 years old. 90 (10.3%) respondents were more than 50 years old. The positions ranged from non-administrative (402 respondents or 45.9%), middle administrators (370 respondents or 42.2%), and top administrators (104 respondents or 11.9%). The respondents had work experience ranged from less than 2 years (18.5%) to more than 10 years (30.8%). Samples were obtained from private universities with the highest numbers of personnel. The numbers are shown in table 1 below.

Table 1: Universities with Highest Numbers of Personnel and Samples

University	Total no. of Personnel*	Samples frequency	%
Assumption university	871	100	11.43
Bangkok university	535	100	11.43
Dhurakij Pundit university	471	100	11.43
Bangkok Thonburi university	739	75	8.57
Huachiew Chalermprakiet university	521	100	11.43
Kasem Bundit university	519	81	9.26
Rangsit university	1252	100	11.43
Siam university	581	70	7.89
Sripatum university	687	76	8.68
University of the Thai Chamber of Commerce	505	74	8.45
Total	6681	876	100

*Data from Office of the Higher Education (2019)

The means and standard deviation of the patterns of communication are exhibited in table 2.

Table 2: Means and standard deviation of the pattern of communication at the university

Communication pattern	$\bar{X}$	Std. Deviation
Horizontal	4.251	.4703
Diagonal	4.166	.4723
Vertical	4.147	.4623

The respondents reported they perceived their work units mostly utilized horizontal patterns ($\bar{X}$ = 4.251, SD = .4703) followed by diagonal communication pattern ($\bar{X}$) = 4.166, SD = .4723) and vertical communication ($\bar{X}$ = 4.147, SD = .4623) respectively.

Teamwork effectiveness was measured through 3 dimensions: task accomplishment, members' satisfaction with the team, and intention to remain members of the team. The means and standard deviations of team effectiveness and each dimension are shown in table 3 below.

Table 3: Means and standard deviation of team effectiveness

Team effectiveness	$\bar{X}$	Std. Deviation
task accomplishment	4.254	.4712
members' satisfaction	4.205	.4997
intention to remain a member	4.190	.4846
Team effectiveness	4.216	.4534

The personnel perceived that among the three dimensions of team effectiveness, task accomplishment was rated highest ($\bar{X}$ = 4.254, S.D. = .4712) followed by members' satisfaction working with the team ($\bar{X}$ = 4.205, S.D. = .4997) and intention to maintain the membership of the team ($\bar{X}$ = 4.190, S.D. = .4846). The total team effectiveness was 4.216 (S.D. = .4534).

The stepwise multiple regression analysis was utilized to test the ability of the communication patterns to predict team effectiveness. Results revealed that the variances of the three independent variables: horizontal, vertical, and diagonal communication patterns could explain 71.1 % (r^2 = .711) of the variance in the dependent variable, i.e., perceived team effectiveness. The Adjusted R Square was .710, the standard error was .2440. The ANOVA analysis of the multiple regression lines is shown in table 4.

Table 4: ANOVA analysis of the multiple regression line[a]

	Sum of Squares	df	Mean Square	F	Sig.
Regression	127.913	3	42.638	716.082	.000[b]
Residual	51.921	872	.060		
Total	179.834	875			

a. Dependent Variable: totalT
b. Predictors: (Constant), Horizontal, Vertical, Diagonal

The ANOVA analysis tested the significance of the prediction power of the regression line. The result confirmed that the three independent variable, together, could predict the dependent variable significantly (F = 716.082, df = 3, 872, p < .001). The standardized beta coefficients of all three patterns of communication were significant as shown in table 5.

Table 5: Standardized and unstandardized beta coefficients of the regression analysis

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.434	.082		5.268	.000
Diagonal	.324	.030	.338	10.982	.000
Horizontal	.372	.026	.386	14.146	.000
Vertical	.205	.029	.209	7.024	.000

a. Dependent Variable: total Team effectiveness

The standardized coefficients of horizontal communication was .386 followed by diagonal communication (beta = .338), and vertical communication (beta = .209) respectively. All beta coefficients were statistically significant at the .001 level.

The unstandardized beta coefficients of all three patterns of communication were significant. The unstandardized coefficients of horizontal communication was .372 followed by diagonal communication (beta = .324), and vertical communication (beta = .205) respectively. All beta coefficients were statistically significant at the .001 level. The prediction formula is:

Team effectiveness = .434 + .372 (horizontal communication) + .324 (diagonal communication + .205 (vertical communication)

The results of an investigation of the influence of the pattern of communication on each dimension of team effectiveness are shown in table 6.

Table 6: A comparison of the standardized beta coefficients of the patterns of communication upon each dimension of team effectiveness

	task accomplishment	satisfaction	maintenance	Team effectiveness
horizontal communication	.186	.334	.438	.386
diagonal communication	.413	.316	.220	.338
vertical communication	.310	.206	.194	.209

Horizontal communication patterns showed the highest influences upon team effectiveness with the standardized beta of .386 followed by diagonal (.338) and vertical (.209) communication patterns accordingly. The standardized beta coefficients of horizontal communication upon task accomplishment, members' satisfaction with the team, and intention to remain a member of the

team were .186, .413, .310 respectively. The standardized beta coefficients of diagonal communication upon task accomplishment, members' satisfaction with the team, and intention to remain a member of the team were .206, .316, .334 respectively. The standardized beta coefficients of vertical communication upon task accomplishment, members' satisfaction with the team, and intention to remain a member of the team were .194, .220, .438 respectively. All beta coefficients were statistically significant at the .001 level.

Discussion

Findings uncovered several interesting new insights about the communication process among the top ten private universities in Thailand. The means of the perceived communication pattern revealed that personnel perceived these universities utilized more horizontal than diagonal and vertical communication patterns. This implied that the management communicated downward and received upward communication less than other channels. It is very likely that, in general, the management preferred work units to operate in cooperation with each other rather than centralizing the tasks. However, the management supported less diagonal and vertical than horizontal communication implied that the person perceived the management wanted them to observe the chain of command rather than freely communicated with a co-worker in other hierarchical levels. In short, personnel communicated with colleagues at the same level rather than others at different levels be it cross or direct in the chain of command.

The multiple regression analysis results revealed that overall team effectiveness could be predicted most by horizontal followed by diagonal and vertical communication patterns respectively. Diagonal was reported as being used less than horizontal. The horizontal communication style had the most effect and universities had utilized it appropriately. The findings conform to research projects of Hunt (2014)'s who reported that communication directly affected nurses' satisfaction, morale, and effectiveness. Furthermore, Gemuenden and Lechler (1997) and Hoegl and Gemuenden (2001) also supported the relationship between communication and team effectiveness.

Further in-depth analysis of the influences of communication patterns on each dimension of team effectiveness revealed another new and interesting insight. Team maintenance was influenced most by horizontal communication patterns. The influence was highest among all influences between communication patterns and the dimensions of team effectiveness. Task accomplishment was influenced most by diagonal communication. Satisfaction with the team was most influenced by horizontal communication. These findings suggested that communication styles had different effects on team effectiveness.

Horizontal communication patterns yielded members' satisfaction and maintenance with the team but the lowest task accomplishment. The overall effect on team effectiveness was the result

of the influences upon satisfaction and maintenance which were the human or soft side of teamwork (Bateman, Snell, and Konopaske, 2016). Working in teams could likely enable personnel to communicate to colleagues in other work units and created a cooperative atmosphere and collaboration within the workplace (Gratton and Erickson, 2007). Colleagues at the same level might act as a comrade who provides supports and consoles for each other (Salas, Shuffler, Thayer, Bedwell, and Lazzara (2014). In this regard, Awad and Alhashemi (2012) and Bakar, Mustaffa, and Mohamad (2009) confirmed the relationship between communication and team members' commitment to the team and organization. Moreover, personnel in different work units could likely provide required supports, information-wise and workflow-wise, beyond the scope of authority of each individual's unit, hence, they feel more content with the coordination. Furthermore, personnel in the same hierarchical level might share common understandings about the organization and have an equivalent level of competency so they feel satisfied communicating to people at the same level and intend to stay with the universities further.

Task accomplishment was influenced most by diagonal communication. The results supported that communication with colleagues in other work units enhances cooperation and collaboration (Bateman, Snell, and Konopaske, 2016), hence, resulted in higher task accomplishment. Communication across the work units led to better coordination of resources and efforts, hence, a team could attain task accomplishment more than horizontal and vertical communication patterns. Personnel in different levels and work units might possess viewpoints and information as well as work experience which can assist the work of each other. However, working with colleagues in other work units and hierarchical levels might face diversity problems and some conflicts, hence the effects on satisfaction and team maintenance were lower than utilizing horizontal communication patterns.

Vertical communication has the second-highest effect on task accomplishment. Probably upward and downward communication helped to relay task-wise information appropriately. Personnel in direct higher positions have more knowledge and experience in the work area so they could instruct and supervise to make the accomplishment of the work. Folkman (2016) confirmed that a leader's communication affected the performance of the team. Tasks became clear through this pattern of communication so the person could perform the tasks well. Yrle, Hartman, and Galle (2002) explained that communication supported and enhances leaders' and subordinates' relationships. Contradicting to a horizontal pattern which yielded the highest effects on satisfaction and team maintenance, the vertical pattern yielded the lowest positive influences on satisfaction and team maintenance. It was likely that vertical communication prohibited the relationship between colleagues in the same team and with others. Hence, it could not generate the spirit of a team through satisfaction and maintenance. Moreover, vertical communication might be against the objectives towards integration and collaboration of work with others.

Implication and Recommendations

The findings of this study suggested several implications for private university administrators. Although the results suggested private universities utilize all three communication patterns, an emphasis on horizontal and diagonal communication is proven beneficial to team effectiveness. Horizontal communication showed the highest effects on members' satisfaction and team maintenance. Diagonal communication showed the highest effect on task accomplishment.

Private university administrators should organize work processes that enable direct and informal communication among personnel, in the same and across hierarchical levels rather than communicating only through a formal chain of command. Personnel in different departments should be able and allowed to connect. The organization structure and the system should be modified. Cross-functional communication facilitates coordination among work units. It provides opportunities for discussion and sharing of knowledge which leads to better overall organizational performance.

Apart from face-to-face communication, either in an individual or group meeting context, modern electronic communication channels such as email, Facebook, line, etc. should be considered. Private universities should utilize an effective internet system for personnel so they can communicate through computers or mobile phones easily.

A common ground, both physical and virtual, for an informal meeting is advantageous. Informal communication attained higher effectiveness. Personnel in private universities are knowledgeable and capable of work, stringent supervision in the form of vertical communication might be inappropriate for private universities. A general guideline is more appropriate. Rigid rules and regulations might prohibit or obstruct communication across the chain of command. These rules and regulations should be reconsidered.

Moreover, acquaintances among personnel should be promoted. Coordination between personnel in cross-functional positions can enhance the work process. Administrators should arrange for getting together activities among personnel so they get to know each other better. This becomes the basis for the creation and sharing of information among personnel. Better understanding among personnel can be attained.

Training programs should be organized to train communication and human relation skills for personnel. Personnel might have already used these media but some might overlook or have never used several of its beneficial features. In addition to supporting information and knowledge to personnel, training programs can be used to motivate personnel to use these media. Furthermore, training activities enable personnel to be acquainted and feel more comfortable

communicating with each other. Trainees would obtain each other's contact IDs and can make contact easier. A user-friendly contact ID search system is recommended.

Given the importance of communication, private universities should establish a communication authority. Communication specialists should be recruited to design and implement as well as monitor both internal and external communication. The collection and flow of information should be carefully planned and monitored. A central database should be established to collect data and information for user-friendly retrieval.

Conclusion

Carrière and Bourque (2009) suggested the management should understand subordinates' desires for information and design an internal communication system that matched subordinates' needs. This study found that diagonal communication could influence task accomplishment well. Horizontal promoted members' satisfaction and team members' intention to stay with the team. Verticals had a positive influence on task accomplishment. Currently, the university supported horizontal communication more than other patterns. Open communication with personnel in other departments and levels provide a channel to transfer the knowledge both in the same and different task area among personnel. Hence, the management should promote more diagonal communication flow. Vertical communication should be used when communicating task-wise information.

This project revealed the influence of communication patterns upon team effectiveness, a future research project might apply the qualitative method to create an in-depth understanding of the mechanism of the influences. Moreover, another project to investigate the relationship among public universities might yield an interesting result.

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