

## Applying Social Networks to Workflow System to Improve Worker's Motivation

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#### Abstract

The concept of social networks has been applied to asynchronous workflow in a business company to improve worker's motivation. In this work, we describe some problems of asynchronous workflow caused by human that affected to performance and product quality. We implement a method to apply social communications to workflow system. The case of software development including problem analysis, defining relationship of workers in an organization, implementing software and testing are used to validate our proposal. We found that the critics from managers can be a big motivation factor for workers.

Keywords: social network; motivation; asynchronous workflow; worker relationship

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#### 1. Introduction

Many business companies have experienced problems of working with sequential passing of work between departments so called workflow system. The advance of software [1] can improve workflow but many companies still found the "gap" that disrupt their workflow especially in asynchronous workflow. The gap caused by workers with unacceptable behaviors such as carelessness or lack of attentiveness that affected to their performance and product quality. This gap affects more to companies that have not enough resources such as employee to support additional jobs of monitoring or reinforcing the work in workflow. Many companies put efforts to find ways to improve their human resource such as training, provide monitoring management or using key performance indicators [1, 2, 3].

The advance of social network applications [1, 3] brings about many new techniques to improve human resources. Some method such as "Like" in social network applications has advantages. It is expected to solve problem of asynchronous workflow [4]. We think a "Like" can increase motivation of workers to improve their work. To apply this method, the activity in internal social network in companies [5, 7] must be studied. However, the history of company must be understood first because many companies were different in culture, size and management [4, 6].

We studied the concept of social networks [3, 5], the motivation of workers, the asynchronous workflow and apply them together. The main aim is to use social critics to motivate workers.

## 2. Asynchronous Workflow

Asynchronous workflow [8] is a workflow containing the decision process that managed by human. For example, manually input data, verify, approve or reject data. If a worker cannot complete his/her job, the subsequent process cannot be started (Fig 1). A gap can effect to lead time, product quality etc.

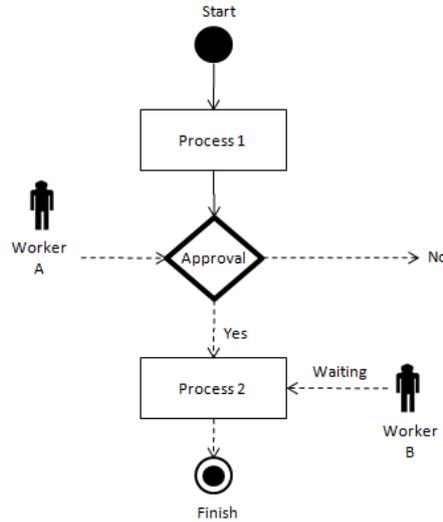


Fig 1. Gap of Asynchronous workflow

There are many ways to manage asynchronous workflow such as given training to workers, using management software to monitor job's status, send notification, distribute jobs [9, 11] and using key performance indicators to measure worker's productivity. However, we focused in worker's behavior and attitude. There are many tools that only used for convenience, for information gathering, for calculation of the results or for estimation [1]. For example, Microsoft SharePoint is used to control workflow processes that give useful information but it cannot persuade a worker better than human especially a human that is at higher level or in higher position. Using key performance indicators is good, but it is also negative if that company cannot understand the hidden activities of workers. The result of analysis can be wrong. The effect of wrong key performance indicators can decrease worker's motivation. The challenge of our work is to improve tools that change worker's behavior and attitude. The main key is not using a punishment for worker who has low performance and at the same time promotes good attitude for worker who has high performance. A low performance worker should be cheer up instead.

## 3. Motivation

There are many ways to increase worker motivation, for example, giving promotion, bonus and money. These methods do not work in many situations. In some company, the bonus is confidential. The promotion is good because all workers can see it but it cannot be done easily [9]. Our challenge is to increase worker motivation without increasing cost too much for company. We determine an indicator, lead time, to measure motivation of worker. We assume that if many workers have enough of motivation,

lead time should be improved. For the other indicators, we observe the increasing or decreasing of relationship of workers, including the number of blaming or the number of notice report.

#### **4. Social Network**

Social network contains relationship of people in workflow that shared information in organization and some qualification of social network application. An internal website or any social network application for sharing information inside company is used to create social network in organization [1, 3].

Out of many qualifications, "Like" is used in most of social network software. "Like" is a promotion activity of people who are interested in someone's behavior. "Like" was introduced by Facebook and it caused a huge impact to social network activity. This activity can give impression for people who got a "Like". They will feel impressed, proud or happy. Sometimes we can see many people want to know who liked him. This activity can be used to increase motivation of worker. We assume that workers are likely to attempt to improve their performance if they know they can get "Like" by someone.

#### **5. Relationship of Workers in An Organization**

Workers have asynchronous workflow with many processes connected to many departments. We use the information about workers' lead time to measure performance. Another important information is the relationship of workers with different level in position. Our study of behavior in social network is also supported by [6, 7, 10].

##### *5.1. Workers to Workers*

Interesting information in an organization is the behavior between workers with different departments. This can be important when there are jobs delay. Any department usually has its own manager or leader and they cannot interfere to the other department. For example, a worker "A" of the sale department is waiting for an express job from a worker "B" of the marketing department. The worker "A" cannot influence the worker "B" because he has no permission to instruct him. The worker "A" can only notify the manager of worker "B" because sometimes the worker "B" is doing other job, which is more important. There is probably other work that needs to attend to that has a higher priority. It is undesirable for any worker to blame others in company. In a long term, it is preferable for the worker "B" to improve himself. This is better than using any measure to punish him.

This problem can be solved by the manager of worker "B" who can influence his workers in a controllable way. The problem is occurred when the manager of worker "B" is not in direct line of command or having a communicable status. As we know, management of managers can solve problems but this will also cause a waste of time to managers [9].

##### *5.2. Influence of Higher Positioning*

Important information is that a person who is at higher level such as a CEO or a director is highly influent to workers when he came into monitoring a job. A worker will try to response immediately. However, it is not often that a high level manager came into monitoring. This kind of feedback should be made easy for a manager. It should be made into a software application for monitoring. It is even better if all workers know that their managers see and feel happy for worker's performance. This information is important to our design. The main key is the relationship between workers. We design three levels of

relationship including level1-worker, level2-manager and level3-CEO/director. Each level has different influence. The number of level can be dependent on the size of an organization.

## 6. Applying Concept to Workflow

We study the company profile and its culture. We find the gap of asynchronous workflow of that company which caused by human. We collect the information about the size of organization, how many departments in workflow, how many people respond in workflow. We record the key performance of workers in order to measure any improvement in performance after we introduce the social critic mechanism into the workflow in terms of software applications.

### 6.1. Design Application

This step, we create new functions and combine them into the legacy application. For our studied, we choose workflow management application that is an internal website in a company. This website has many information and status of a workflow. In addition, this website is used to report performance of workers and of departments. One of the indicators in the key performance report is “point” (Fig 2). Point is calculated from every activity in a job.

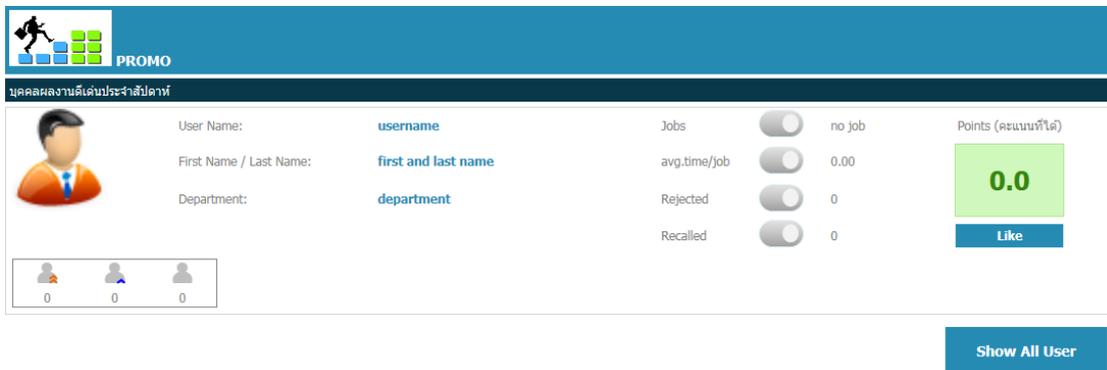


Fig. 2. Worker's point

The reason we choose this indicator because worker's point is analyzed from the time usage, the size of a job, the quality of work, the number of reject, the number of recall or any other assigned activities. The company sets the weight for each factor. This number is one of the parameter that is used to measure worker's motivation. The other ability of this website we added in is the display of the number of “Like” from different position level. Normally, the number of “Like” of any social network application is shown only the total number, but we change that to three groups instead. Each group of “Like” number is the level of users who give a like (Table 1).

Table 1. Comparison of Displaying “Like”

Concept	Types of “Like” Number	Presentation
Other social network application	Total “Like”	Yes
	Level 3-CEO/Director	Include in total “Like”
	Level 2-Manager/Leader	Include in total “Like”
Our application	Level 1-Worker/Operator	Include in total “Like”
	Total “Like”	No
	Level 3-CEO/Director	Yes
	Level 2-Manager/Leader	Yes
	Level 1-Worker/Operator	Yes

This application used our concept about the influence of position level (Fig 3). When a user came in to this report page and press “Like” button, a Like point of him/her will be included in Like score that was grouped by user’s position. The position level of people who gave a Like point has strong influence.

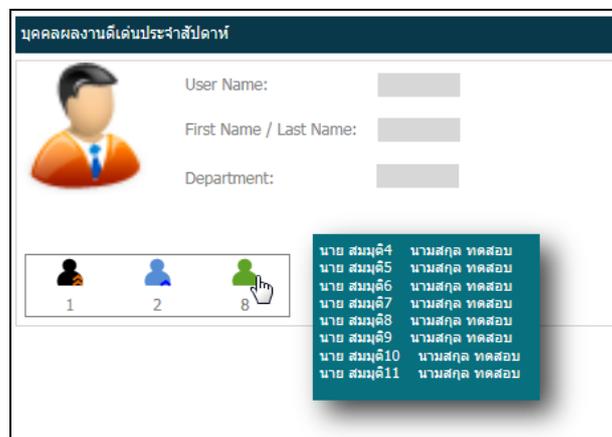


Fig. 3. “Like” score grouping by position level

When a worker saw the number of Like he got, if there is one Like from a high level or CEO position, it could attract workers to feel interested. This can be a positive reinforcement for other workers. This is an increasing of motivation we expected.

In addition, the reason we separate three types of “Like” and give the number of “Like” to each type because when there are many numbers of “Like”, it is hard to show all people’s name on the monitor. When a user hover a mouse on the “Like” score, the people’s names were displayed. Some name is hidden that a user has to press a mouse button to expand all description and find it. Our concept about separation of types of “Like” by level will help user to see someone’s name easier.

The worker who has the best performance will be shown on the first page. Certainly, all workers in workflow have their scores too. They have to do a simple click [3] to get all workers’ information.

However, everybody also see their scores and can give a “Like”. This function will increase of the sense of competition for workers.

## 6.2. Testing and Data Collection

We choose an example workflow from a company to test our concept. This workflow is used to create material code 18 digits and upload to SAP system. Workers of any departments have to input material parameters by their job. There are six departments response in this workflow that consist of product develop, sourcing, production, account, marketing and sales system. This workflow is started by product dev then sends job to following departments until sales system is the final department to finish job in this workflow. Workers of product dev have to input basic parameters of each material such as color, brand, width, length or etc. Workers of sourcing have to input estimated cost. Workers of production have to input weight. Workers of account have to input price. Workers of marketing have to input estimate quantity for ordering. Workers of sales system have to generate final material code and upload to SAP system. If a data form previous department is incorrect, that can risk to following departments to use it. If incorrect data in material code was uploaded to SAP system, it will effect to product quality later.

This workflow based on website application and report worker’s performance. When we applied our concept to this application, we need to use some indicators for motivation’s measurement.

We define and collect information about workers’ performance:

- Average Point
- Number of Improved worker
- Number of Failed Performance
- Number of Like (level-3)
- Number of Like (level-2)
- Number of Like (level-1)
- Number of Like Seen

Average point is performance score of user that was calculated from any activities in workflow process. It is calculated by working result of a worker from any jobs in a period time and averaged it. The number of improved worker is the number of worker who has improved performance when compared with before the experiment. The numbers of failed performance is the average number of failure per job such as reject, recall or return that effects to the product quality or customers. The number of Like seen is counted from visitors who attempted to view “Like” of each level. This measures the level of interested of the workers. For our test, we collected data for three weeks. We collected the data from for sixty persons in nine departments that are in the workflow process (Table 2). We found that the lead time improvement is related to the number of Like and decreasing of failures can improve working time.

Table 2. Data Collection for Three Weeks

Subject	Week 1	Week 2	Week 3
Average Point (average)	6.7	8.1	8.4
Number of Improved Worker	2	8	6
Number of Failed Performance	5	2	1
Number of Like (level-3)	2	4	1
Number of Like (level-2)	4	11	16
Number of Like (level-1)	32	41	43
Number of Like Seen	187	214	288

To measure motivation, we define the following measurements:

- Acceptable lead time target
- Range of lead time usage
- Error from rejected
- Error from recalled
- Average point

Acceptable lead time target is the percent of jobs that satisfied the target. Range of lead time usage is the processing time of workers from receiving a job to its completion. Error from rejected is the number of unacceptable job including incorrect data that was found by another worker in the different department. Error from rejected represents workers who had not responded their job. This is considered as negative attitude of work. Error from recalled is the number of unacceptable job including incorrect data that was found by worker who is in the downstream. This error represents workers who had already sent out their jobs to the next process but the jobs have to be rechecked and then recalled back to be corrected. This activity is considered as good attitude for work because it shows the responsibility of workers even though there is mistake.

Table 3. Comparison performance before and after implementation our concept

Subject	Before implement	After Implement	Unit
Acceptable lead time target	77.89	86.60	%
Range of lead time usage	244 to 4102	256 to 1066	minute
Error from rejected	6.32	3.09	%
Error from recalled	0.00	6.19	%
Average Point	6.31	7.94	-
Total jobs	190	97	piece
Record distance	4	3	week

From Table 3, the average point of the second and the third week are continuously increasing. The result of all measurement is improved. The lead time is shorter, the acceptable lead time is increased, the percent of error from rejected decreased and the error from recalled increased. We found that the worker who got the highest point was the different worker in every week. After the interview with some workers, we got the same answer that some workers had felt a little competition to improve their scores because they would like to show their names on the display. In addition, they know names and positions of who liked them. They told us that it was a little piece of honor and they felt happy. Some workers had low score but when they were given "Like" they felt cheerful and it also helped to improve the mood in the work place. The managers also agreed that the "Like" point is important and that it helped to improve their workers' performance. They told us they are more likely to give a "Like" next time.

### 6.3. Evaluation

We found the performance of workers has been improved and the number of failure has been decreased. The number of Like seen also supports our claim about the influence of social networks. However, we did not expect that all workers to improve themselves because everyone has different characters. We expect the average performance should be increased that will be profitable for the

company. In addition, we think it also improves the mood in the work place according to the feedback we received from users.

## 7. Conclusion

Asynchronous workflow [8] contains “gap”. The process depends on human’s responsibility [10, 11]. Workflow affects many people in different departments. People in workflow are a part of working society in an organization. Many social network applications are only tools to support workers for information, calculation, and communications. From our study we think social network can be used to increase motivation of workers. We create add-on functions into the workflow website application used in a company. This website shows the person who has the highest score of the previous week on the first page. The score represents worker’s performance. The add-on function contains ability to “Like” that everybody can participate. We provide “Like” by three positioning levels (level1-worker, level2-manager or leader, level3-CEO or director). This function gives all people, who have responsibility in workflow, an ability to give a “Like” to someone. A worker, who got a “Like”, could see who was liked him. Certainly all people can see it too. “Like” is a simply promotion that has very little cost. It is easy to give positive encouragement to someone. This application encourages workers to achieve a high score. Many workers want to improve their performance. There is a little competition among workers. We can see that there is motivation for workers to improve their job.

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