Building High-Performance team through effective job design for an early stage software start-up

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Abstract – In this paper we apply techniques of job design to a software design-engineering job in a small start-up environment for building high performance teams. We focus on examining available tools and adapting them to the needs and requirements of a small firm. At the end, we provide recommendations on how to improve the team effectiveness. We begin by analyzing the job of a design engineer in a young technology based start-up firm. The small size of the firm, its young age and lack of adequate financial resources creates a unique mixture of challenges to the team building and job design processes. The goal is to identify areas where small changes can impact the job of the engineer positively and allow him/her to be more productive and satisfied with the work. The scope of the recommended remedies is kept focused to avoid significant financial strains and work interruptions during implementation. This focused approach increases the likelihood that the firm's management and employees adopt the recommendations.

Keywords: high-performance team, Job design, software design, startup.

I. INTRODUCTION

Job design is a concept that goes back to the Industrial Revolution from 1670 to 1830. Although the nature and definition of job have changed significantly, the main principals behind job design remains the same. The goal is to improve worker's productivity and job satisfaction. Those main principles still apply.

Design of a software system is not a streamlined process. Despite the attempts that have been made to apply job division schemes that have been successfully used in manufacturing industry, software design still remains a fairly non-structured process that demands a substantial amount of personal intellectual input on top of the skills that an engineer acquires from training. Figure 1 illustrates the process of software production in a typical well-established software design firm.

Requirement Analysis: A software system is the solution to a specific business and/or scientific problem. The first step in producing a software system is, to identify and analyze the requirements and features.

Features are the areas that the system needs to address. This is usually done by a senior designer with in depth experience in the problem domain as well as the platform that the software system is being developed for.
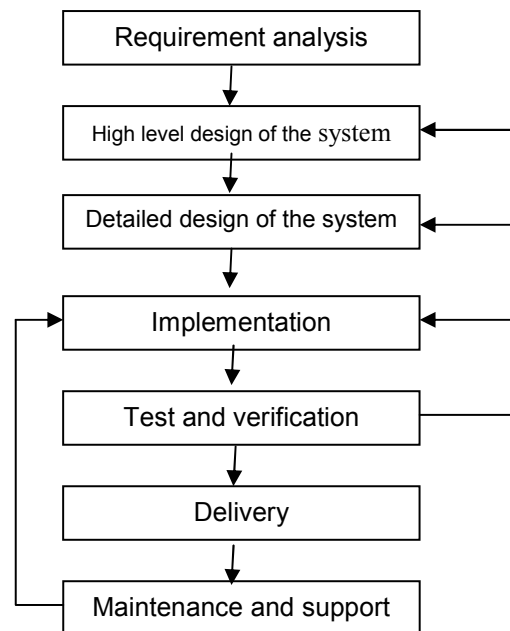

Fig. 1: Process of software production

High Level Design: Once the requirements are captured and defined, the overall architecture of the system ca be designed. This is referred to as high-level design phase. At this stage, the hardware and system software platform are identified. Also the main components of the system are deigned without detailing their internals. The interactions of the high level components are also designed in this phase. This process involves a number of meetings with the product management team who are in direct contact with the client. There is also a

fair amount of design meetings among the design team. Similar to requirement Analysis phase, high-level design requires a vast amount of experience and normally is done by senior designers in the firm.

Detailed design: The next stage is to design the internals of the main components. To do this, each component is assigned to a team of designers. Each team is responsible for creating the blueprint of the components' internals and also to ensure that interactions between all the components in the system are coordinated with other detailed design teams.

Implementation: After completion of the detailed design, the team responsible for the component begins to implement the code. This is the phase that we normally know as software development. This process involves creating (coding) small pieces of software and combining them together according to the detailed design. The outcome of this phase is the components of the system that once augmented together, they form the initial draft release of the system.

Test and Verification: After the detailed design and implementation, the system is shipped to the verification team. Verification team is trained to put the system under a systematic and rigorous testing. As the faults (also known as bugs) are identified, they are reported back to the design and implementation teams to be fixed. Through an iterative process, the software system reaches a state of accuracy and stability that is ready to be delivered to the client. Any further faults found during the client use (also known as field bugs), are reported to designated design support team to be fixed and included in the next release of the system.

This process is more or less the *de facto* high-level procedure that is used in most of established software design firms.
Life of a software designer in a start-up company though, is a different story. The requirements of a start-up product are not clear when the design effort begins. The requirements are vague and can change frequently and the design team must adapt to these sudden and frequent changes swiftly.

The structure of the design teams is not very formal. Usually, the design team is comprised of a few designers and one cannot distinguish between high-level design, detailed design and implementation teams. Normally there is not even a separate verification team. A designer, on a daily basis, turns his/her attention from one issue to another. Long hours and working on evening and weekend are the norm.

II. INFLUENCING FACTORS

In order to find points that the job can be improved for a healthier and more productive one, we examine a series of factors in the context of the job. The core assumption here is

that "little changes make a big difference over the long term". The proposed small changes all attempt to give more "sense of control" to the employees and allow them to feel they are part of the firm and can influence it.

1. Workload and pace

It is widely known that an early stage start-up demands significantly higher contributions from its employees compared to an established firm. This means longer hours and more stressful work with different roles and responsibilities. It also means that many of these roles are not completely lined up with skill sets and previous training of the employees. Employees need to go out of their comfort zones to ensure that the work gets done. There is not much time or money for extra on-the-job training. Employees need to learn new skills on the fly, with minimal coaching and apply them to the job.

In an established software design company, there are times that the intensity of work is high but they are usually followed by a slower period so that the employees can recover.

In a start-up though, the high demand work is the norm and there is normally no break for recovery. This eventually can lead to burn out and negative physical and psychological impacts on the employees.

Small Change: Although it sounds un-usual in an early start-up environment, the firm should attempt giving employees some break once in a while and allow them to recover from the high intensity of the job. This helps in preventing the physical and psychological burn out and it can improve productivity in the long run. The employees should be able to schedule their breaks and ask for it if they feel they need it without any financial repercussions. This also enhances their sense of control over their work.

2. Work schedule

In a typical early-stage technology start-up, the work hour is fairly flexible. Employees can and even are encouraged to work from home. Although due to the large amount of work, employees need to put in hours more than a regular work shift, they have more control over starting and finishing a workday when compared to shift employee. This is both satisfying and accommodating. They often can take off from work to attend a personal matter at will. This is certainly a good aspect of the work at this type environment and the firm should be continue to support it and make it an integral part of the work culture.

3. Work roles

Side job is probably the most difficult aspect of the software design job in a startup environment to improve. Because of the financial limitations, there are not enough resources to be

assigned to different tasks. This leads to individuals taking on different unrelated roles that employees are not necessarily trained for them. Sometimes the designers take on the role of verification, sometimes they become IT system administrators and on other occasions, the designer might become the webmaster and handle the company's website. Employees are not trained for many of these side jobs and this leads to an unnecessary work and stress load that the employees need to cope with. The side jobs can also take away employees' focus from their main job. It may seem that this can financially benefit the firm, but the financial benefits of having one individual doing several side jobs along with the main job, might not make up for the loss due to less productivity and more stress that this imposes on the employees.

Small Change: It may be wiser to hire part-time contractors to do some of the side jobs. This will relieve the employee from the overload and stress of working on side jobs that may not be necessarily in line with his/her training and skill set. Employees feel more in control when they work on the main job that they have the right skills and training for it.

4. Job future

Working in an early-stage start-up is a risky business. Job insecurity exists for everybody in the firm. The firm might go out of business for a variety of reasons. It might run out of cash. The lead customer (and usually the only one) might decide to pull out and leave the firm with no compensation for the part of the work that has been done, before it is completed. The product's viability might be compromised due to unforeseen legal challenges such as patent infringements and so on.

On the positive side, employees know that every bit of contribution that they make increases the chance of firm's success. They also have the opportunity to enhance their skills faster and they take on more responsibility. When the firm grows, the early-stage employees get promoted much faster than in an established firm.

Employees also feel that "they are the firm" and they can influence its future significantly. This by itself enhances their moral and motivation. Again sense of having control has a positive impact on their productivity.

Small Change: Even though in its infancy, the firm can put in place some form of career path for the employees to take on more responsibilities as the firm grows. With more responsibility, the employees also should be given more authority and job ownership. This fast track career path can positively impact the employee's moral and motivation.

5. Job content

The job of a software designer in start-up firm is diverse, versatile and full of change and unexpected turns. The designers, especially in detailed design and implementation phases, deal with variety of different situations that each needs a different approach. Although it might be challenging from time to time, to always face a different situation, it has the benefit of not being routine and boring.

6. Psychological contract

This is again one of the challenging factors for an early-stage start-up. At the time of hiring employees, there isn't always a concrete definition of what needs to be done. The scope and content of the job change significantly, even over a short period of time. It is very difficult to have a clear prior assessment of the job. The requirements change quickly and so do the intensity and difficulty of the job.

Small change: One way to address this issue is to manage expectations proactively. At the time of hiring, it has to be clear for the employee that change in job content and its pace should be expected in this environment. This can avoid surprises and conflict of expectations later down the road.

7. Workplace justice

This is an important factor in any work environment but extremely important for an early-stage start-up. The number of employees is small and any preferential treatment is easily seen and sensed by others. The workload and stress is relatively higher and the tolerance for injustice is significantly lower. The compensation package usually has a big element of risk embedded in it in form of stock options and equity as part of payment. Since it is hard to put a clear dollar value on equity at early days of a company's life cycle, this can easily lead to unfair treatment of employees.

Another hidden area of injustice in a start-up firm is the amount of information that is provided to the employees about firm's situation and its position with their customers, the progress status and conditions in raising financing and the relationship with investors. Making a biased decision from the management – usually founders – can affect the compensation package of the employees negatively and devalue it in favor of a new or existing investor. This is refereed to as dilution of stock options. This hidden barrier of sharing information can potentially create a sense of mistrust in management and can result in a less productive work environment. The employees need to feel that "we are all in it together".

Small change: The management should share maximum possible amount of information about the firm's situation with the employees. To a certain extent, management should allow

employees to contribute on making decisions that affect their job and the firm. This increases the feeling of ownership and being part of the company and having influence on its direction.

8. Extrinsic factors

In an early stage start-up, there are a variety of extrinsic factors that are unique. The company may shares office with another firm to save on real state costs. Similar to having a roommate, this can put extra burden on employees to cope with noise, security issues and sharing resources such as meeting rooms, etc.

The firm's office may not have all the amenities expected from a commercial workplace.

Benefit package is another factor. In an early stage start-up, benefits either don't exist or if they do, they are minimal. This can have adverse effect on employees and their families.

Small change: The firm can offer better benefit package. With the small number of employees, it probably will not cost an unmanageable amount of money. The firm can also encourage employees to work from home if they prefer. This will give more sense of control over noise and other extrinsic factors related to the workplace, if the firm uses shared or less than standard offices.

III. CONCLUSION

Job design in an early stage start-up is a challenging process. Because of the small size of the firm, the amount of uncertainty of its business, and lack of financial strength, many practices in place may appear to be in contradiction with guidelines for a productive and healthy job.

This paper proposes few small changes that can potentially have positive impact on the job and assert more control to the employees. The expectation is that, this can lead to a more productive and healthier work. The firm can choose to:

- Allow for the employees to take spontaneous breaks – such as a day off – as they feel they need it to recover from the high intensity of the work. The break would probably be more effective if it is at the employee's discretion. The intent is to give the employee more control over the high demanding job that s/he is responsible for.

- Allow and encourage flexible working hours and work from home.

- Minimize the side jobs that employees are responsible for. This will decrease the stress of dealing with several work items in parallel, and relieve them from dealing with side jobs that employees are not completely trained for.

- Provision a fast track career path for the early stage employees to take on more responsibility and be given more authority and job ownership, as the firm grows.

- Manage the expectations proactively. The firm should be open, realistic and honest about the challenges and opportunities that are being offered to the employee specially, at the time of hiring.

- Share information with the employees and to allow them to contribute in decision making process that affects their job and the firm.

- Offer better and more extensive benefit package. Considering the small number of employees, this won't be a major cost burden on the firm.

The main intent of these recommendations is, to allow employees be more in control and to feel they can have influence on their job and the firm. This most likely can increase their productivity and make their work environment, healthier.

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