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VISIBLE MANAGEMENT FOR DESIGN, PROGRAMMING AND OTHER CREATIVE PROCESSES

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ABSTRACT

Productivity in creative, knowledge-based work such as computer programming and software engineering is frequently a concern. Many forms of creative work share the difficulty that the work processes which transform inputs -- mainly human time and effort -- into revenue-generating outputs are largely hidden in the heads of the workers.

Visible Management is an approach to any work process, with existing applications to manufacturing and administrative processes. While few of the elements of Visible Management are new, it combines some of the best practices from quality management, process re-engineering and industrial psychology to provide coherent systems for managing specific situations.

We extend these ideas to creative work, primarily by carefully delineating those parts of the creative activity that are administrative and/or repeated. By segregating such "busy work" from the core creative thinking, our goal is to unclutter the true creative processes, allowing workers more time for their central activity. In addition, we emphasize the need for workers to make their work visible so that they can measure their own productivity and develop better practices.

1. INTRODUCTION

Productivity improvement has occupied both academics and practitioners of industrial engineering for a long time. For example, it has been over a century since Frederick Taylor [1] introduced his ideas of scientific management. Similarly, many more recent movements such as those of total quality management, zero defects, or process re-engineering involve productivity issues [2, 3, 4]. Nevertheless, most of the applications of such efforts have been to manufacturing or related industrial activities. Relatively few have involved administrative functions and still fewer have addressed creative endeavours.

The present ideas have evolved from two sources. First, for many years we have been interested in improving productivity in general, and administrative productivity in particular [5]. Second, our introduction, thanks to a colleague, to Nick Vanderstoop of General Motors Canada brought to our attention his Synchronous Office concepts and practices. This prompted an ongoing project to document Vanderstoop's ideas in a forthcoming book [6]. In addition, both in the book and elsewhere [7] we have been extending and generalizing the suite of ideas and tools we refer to as Visible Management.

In particular, the productivity of workers carrying out creative, knowledge-based assignments is frequently the topic of complaints about low productivity. For example, the productivity of programmers either in writing or debugging code has been the focus of numerous academic and trade articles, e.g., [8, 9].

2. WHAT IS VISIBLE MANAGEMENT?

The essential concept in Visible Management is to render work processes visible so that workers and managers can understand and hence control them. We presume as an axiom that when processes are "invisible", that is, where there is no possibility of detecting their state of completion or correctness, there can be no opportunity for their rational management. In common with many quality practitioners [9], we believe that measurement is critical, though the right variables must be measured and on sensible scales. We do not just want "data", but information leading to Deming's "profound knowledge" so that the processes by which work is carried out can be improved [1].

Visible Management is an approach to any work

process. For manufacturing systems, Galsworth [10] has presented similar ideas. For administrative systems, as already noted, Vanderstoop has developed a number of tools and procedures in systems implemented in General Motors Canada and elsewhere. Vanderstoop incorporates some ideas that have support from the field of industrial psychology.

Design, software engineering, and technical and literary writing share similar difficulties as work processes in that the essentials of the transformation of inputs -- mainly human time and effort -- into revenue-generating outputs are largely hidden in the heads of the workers. In this paper, therefore, we will be attempting to show where and how various aspects of a creative-work assignment can be rendered visible and manageable. Throughout this effort, we recognize that attempts to measure activities that are difficult to visualize can, as with Heisenberg's Uncertainty Principle in the quantum mechanics, alter the very processes we are trying to study.

3. THE NATURE OF CREATIVE WORK

The main differences between "creative work" and general administrative work lie in the time span and conceptual complexity of the tasks. Writing a book or a software package takes a period of time that is measured in months or years rather than minutes. Many conceptual elements must be carefully arranged, clearly expressed and appropriately cross-linked in order to succeed in such projects. In our opinion, the essence of "creativity" in this context is to be able to bring together all the ideas so that the collected ensemble achieves its full function, be it in writing, computer programming, fine arts, music, design, or similar endeavours.

The complexity of the combined tasks has the unfortunate consequence that there can be a great diversity in worker ability, even when paper qualifications are identical. Where workers processing invoices may differ by factors of two or three in efficiency, some programmers are more than ten times faster than others. Furthermore, the conceptual complexity of creative work, where the knowledge worker wrestles order out of a genuine chaos of ideas, makes it very difficult to codify the understanding of how to accomplish the tasks into procedures and protocols that can be straightforwardly expressed in documentation of the

tasks. In consequence it is also difficult to measure what is going on. Nevertheless, we believe the challenges must be accepted and met. The alternative is anarchy.

Administrative tasks, by virtue of their relatively short time-in-process, are easier to schedule than creative processes. Scheduling is at the heart of project management, and the coarse "grain" of creative work can be a problem for project managers. Where most administrative tasks can be dealt with via quite simple scheduling rules, creative work may need to use some of the ideas that have been developed in the management of large engineering projects. Indeed, some of these tools have evolved for software development projects [11]. We present a brief outline of these ideas below.

We extend the central ideas of Visible Management to creative work, primarily by carefully delineating those parts of the creative activity that are administrative and/or repeated. By segregating such "busy work" from the core creative thinking, our goal is to unclutter the true creative processes, allowing workers more time for their central activity. In this, there is an essential and unavoidable truth in Thomas Edison's quip: *Genius is one percent inspiration and ninety-nine percent perspiration* [12]. We want workers to make their work, or at least its outputs and stages, visible, so that they can measure their own productivity and develop better practices. While creative work is special in its overall purpose and product, the vast majority of its components are mundane. The manager, who may also be the creative worker, must still strive for predictable output.

4. CREATIVE PERSONALITIES

Are creative people special? We're all special! But some folk have sufficiently persuaded themselves of how special they are that they expect undeserved favours. The glamorous jobs in today's working world are certainly not in administration, but are associated with phrases such as "hi-tech", "software engineering", or "information technology". Glamour, as in Hollywood moviemaking, often lets people get away with behaving badly. Managers must get things done, so must find ways to direct workers to do their jobs to achieve the organization's objectives. While recognizing the advantages one worker may have for particular sub-tasks, the manager should be trying to

transfer at least the essential capabilities of that worker to others. At the very least, the exceptional worker should be able to pass the non-inspirational mass of sub-tasks to other workers. Although we can prescribe how to implement these technical aspects of Visible Management for creative work, the handling of difficult personalities is an art less easily codified. We consider some approaches to building consensus and defining organizational goals below.

5. SETTING GOALS

Every organizational activity should occur because it moves us toward goals. We want to ensure that the sub-tasks of creative work projects are on the right path to satisfying organizational goals. Here the manager is faced with competing objectives:

- To preserve knowledge of how things are done, we want to write down and codify the sub-tasks that make up the creative activity;

- The effort to do this can be costly and distract from getting the project finished;

- Projects may be considered as "one of a kind", with the perception that the sub-tasks are unlikely to reoccur, at least in the same fashion.

Management may retreat to a position of giving only the most general and vague directions for a project. Workers may be left to interpret customer requirements from incomplete specifications and personal assumptions.

Good managers of creative enterprises recognize that sensible goals can be set. The manager has responsibilities, often only vaguely recognized, to establish standard methods for working, to attain a predictable output from work effort, and to continuously improve processes and output. These responsibilities should give direction to activities. At a minimum, we believe that staff and management must achieve agreement on:

- A list of the main effort-consuming sub-tasks in the creative project;

- Willingness to measure, even crudely, the effort such sub-tasks require;

- Recognition that most of the sub-tasks are not "new", even if the overall project is innovative;

- Mechanisms to communicate progress toward completion of a project as well as difficulties or obstacles to progress;

- Mechanisms to resolve conflicts or inconsistencies that may arise between the parts of the project carried out by separate workers.

Clearly, a common goal in most projects involves a completion date. Setting such a goal requires commitment from management and workers. If you do not have this commitment, and have it from all the main players in the project, you are unlikely to meet the deadline [9, 11].

6. MAKING CREATIVE WORK VISIBLE

Even a crude list of staff activities will show that many sub-tasks occur frequently and can be standardized and improved. The activity index may also suggest tasks we can eliminate, automate, or profitably contract out. In writing a book, we often need to set font-sizes, footers, headings, bullets, etc. Rather than insert such features on every occasion, we can (and have) defined them as a style. The complete style sheet of just a dozen styles serves for the majority of situations during the writing. Moreover, changing a style changes it everywhere in the book. Furthermore, the style sheet file serves as documentation of what we have decided. Note that we are not trying to prescribe for every situation; some control over 80% of the sub-tasks is a huge success.

In this example, the style sheet is the mechanism for recording the process "knowledge". For software writers, there are prototypes, templates and "objects". All are simply computer files. To make them most effective for the organization, we should store them in an agreed location and protect them from alteration except by general agreement of a project team. It also helps to print out a summary to aid new team members and provide visibility. Copies taped to monitors or on walls near workstations help make the "knowledge" visible and available.

Despite the move to the "paperless office", we are

strong believers in a moderate use of printouts of computer files. Clearly it is silly to print everything, since too many pieces of paper are simply a source of confusion. However, with projects such as books or software, a printout showing the main structure and important details renders progress visible at key milestones.

Another approach, which we have used once more for book writing, is to put the latest printed version of the work in a loose-leaf binder. Changes, or the existence of changes, are recorded simply by writing on the pages. Also we like to time/date-stamp the material, so that the time/date-stamp of computer files can inform us that edits have been done. Work that needs to be done is recorded by use of stick-on notes or pages that are put in the binder sideways or offset from the regular position (e.g., using only two of three holes for a three-ring binder).

7. USING SOFTWARE TOOLS

Modern creative work frequently involves the use of computer software as tools. Indeed, most offices are well-ballasted with the never-opened volumes of software manuals. Increasingly, computer users want the documentation for software built into the programs themselves. We strongly support this development, as long as the interface to the "help" is easily used. Countering the benefits of the online help is the plethora of "features" most software packages offer. Why is it that we often seem to need to use the feature that is difficult or impossible to find in the "help"? To overcome this situation, we believe in local countermeasures:

- "Note" files stored with the software, describing how to do some particular task or overcome a special type of obstacle;

- Command files (called BATch files in Microsoft MS-DOS, Shortcuts in Windows 95, Active Links in Unix, Aliases in the Macintosh Finder) that run programs for us, sometimes in customized ways;

- Instructional notes included as commentary in computer software source code or book manuscripts.

Using such ideas, we are essentially providing the documentation needed so new workers can take over

if we are away. We do not expect our substitutes to be as fully-functional or efficient as we are, but they should still be able to keep essential tasks moving to completion. Additionally, customized "help" as mentioned above allows us to document the specific processes of our own work rather than accept general and untargeted documentation for software that usually will have many little-used features.

8. MEASURING

Estimating the completion date for creative projects is a highly subjective exercise. The major difficulty is that we may successfully complete a sub-task, such as writing a chapter in a book then, on reflection, realize that the order of presentation of topics requires us to move the chapter forward or backward in the book. This will upset various links and references. Even with modern software that can assist in adjusting such references, we recognize this as an awkward activity. However, experience of actually doing such adjustments will eventually tell us how much time to allow for them.

In order to decide which sub-tasks are worthy of improvement, we must measure the amount of effort they consume. The difficulty is in keeping track of the time that is actually associated with a task, especially in situations where the creative worker may interrupt one task to deal with another matter that also demands attention. Recording the amount of time may actually take a significant time itself; this is the Heisenberg Uncertainty Principle applied to task management.

As an example, when the authors acquired their second PC having a fixed disk in the mid-1980s, it quickly became clear that a lot of time and effort went into carrying diskettes between the machines so files could be aligned. The time required to get the diskette and copy the file was minimal, as was the time to copy the file back to the diskette. However, a couple of unfortunate occasions occured when we found ourselves both working on the "same" document, or in reality different copies of the same document, convinced us that we should network our machines and maintain just one master copy of shared files. Hardware and software are usually much cheaper than the several or many hours of human time trying to bring together two sets of edits. We need to measure the time for the diskette-based operations carefully to include the

overhead to deal with "fix-up" time.

For many tasks, we do not need particularly precise measurements of time or effort. For most uses, a list of tasks completed during a work day with rough time allocations will suffice, providing we can identify the type of task involved. Here a limited set of task-types is more useful than a detailed classification. We are looking for things we commonly do to find ways to make our efforts more efficient and to learn what we do with our own time.

Much effort is perceived to be wasted in creative activities. There is just no replacement for careful editing of writings, software, videos, drawings, etc. Many of the world's most successful authors revise many times. If that is the case in your particular situation, then revision will be an accepted and measured part of the overall projects you carry out. However, the revision may be unnecessary:

- The result does not justify the effort, so there is no "payoff";

- We already did the revision but forgot;

- We already did the revision but mislaid the file;

- Someone else already did a revision.

9. SCHEDULING

We must confess that we find it very difficult to work to command on creative activities such as programming, research and writing. Only with a strong sense of resolve can we fulfil the promise "I'm going to work for two hours today on programming, spend two hours in the library, and two hours writing up the next chapter of the book." Instead, like most humans, we tend to "cherry pick" the creative tasks we feel like doing immediately. Without care this can lead to essential tasks being omitted, and to deadlines being missed.

We reconcile this with good management by setting reasonable deadlines for completion of a package of tasks. This lets us take advantage of the particular circumstances of the day and our own mood to occupy ourselves with those tasks we can most efficiently perform right now. Discipline is still needed to ensure that all required tasks are completed

by an agreed target date, but workers are not micro-managed so that they are forced to work on particular sub-tasks at a given time. We tame the variability introduced by (apparently) random task selection by learning mixture of tasks workers will be able to complete satisfactorily in a given period.

In our own experience, the period of time over which scheduled tasks will be carried out needs to be about two weeks. The fortnight, less common in today's language, provides a long enough period to encompass mood and enthusiasm changes and overcome temporary fluctuations in weather, business cycles, and public holidays. It is also short enough that it can be used reasonably in project planning and management, coinciding with a unit of ten working days. During such a period, we may find that we are "hot" one day and write two or three chapters or subroutines, but "dry" the rest of the time. During the "dry" periods, we may nonetheless be productive in editing, researching material, training or learning, or carrying out ongoing maintenance tasks.

Clearly what each worker can accomplish depends on personal abilities and temperament, and each worker should strive to understand what they can expect of themselves in terms of the tasks and mixture of tasks they can complete in a given time. Management has the responsibility to elicit a fair estimate of capabilities. Regularly scheduled meetings are one venue where this information can be shared with team members. We caution that a no-blame environment is important here: workers themselves provide the capability estimates and refine them by experience. Management will only hear gross underestimates of capability if workers feel the estimates are becoming management-imposed productivity targets.

The scheduling problem becomes more acute as more workers and tasks are included in a project. We can and should then consider the use of project management tools to allow for both initial scheduling of the tasks and also the re-scheduling and adjustment of priorities as tasks are completed at times other than predicted. Visible Management, as we have presented it here, has so far been applied at the level of a few workers. While the principles are still valid for larger organizational structures, we have yet to obtain data on its use at that level. Moreover, the literature of project management is large and the subject beyond the scope of this paper.

10. SOME EXAMPLES

The ideas in this paper have been used by the authors and their colleagues in a number of projects and ongoing work. Because we have been satisfied from a cursory evaluation that the benefits of Visible Management far outweigh the costs, we have not attempted to measure effort and output precisely. We recognize, however, that long-term acceptance of Visible Management will require such studies. Our plan is to gradually increase the intensity of measurement as each new project is undertaken.

One clear success has been the development of examination and assignment templates for introductory statistics courses [13]. Our informal estimate of the productivity gain in terms of time spent marking is approximately 400%. That is, a set of examination papers that previously took four days to mark can now be graded in one day. There is, of course, some time cost to develop a suitable template into which students can write their answers, though our experience has been that this cost is very modest.

An application of the ideas of Visible Management that predated the name or formal development of the ideas is the writing of the software and monographs by Nash and Walker-Smith [14, 15]. Furthermore, these projects added a working mode that we refer to as "synchronous teamwork" [16]. The material in the software and monographs was prepared by only two part-time workers over a three-year period.

Our final example supports Visible Management by describing the cost of its absence. In 1983, we were contracted to prepare and manipulate a very specialized database. We decided to use "throw-away" computer programs that were written very quickly, often without documentation. We were proud of our speedy and efficient completion of the contract and presented a paper entitled "Justifying one-time use programs for special database applications" [17]. When we got home from the conference, however, there was a follow-up contract waiting to be carried out! We dug through the backup files, recovered some "almost working" codes, and documented and debugged them, spending much more effort than if we had kept adequate notes in the first place. Since then, we have found it worthwhile to annotate computer code and prepare brief operating notes regardless of our expectations for future uses.

11. CONCLUSION AND INVITATION

Visible Management ideas have been in use, albeit under different names, for as long as people have tried to apply careful thought to their work and how it is carried out. Our contributions are intended to organize these ideas and codify their application. In particular, in this paper we have attempted to outline ways that they can be applied to creative activities. While we are convinced from our experience that the ideas work, and work very well, more -- and more varied -- applications will be needed to provide fully convincing evidence that our thesis has merit. We invite commentary and particularly collaboration to test and refine Visible Management and its applications.

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Does the business organization where you work feelâ€¦ a little disorganized? Does it seem like every department and team has their own way of doing things, harming overall efficiency, production, and your work environment? If so, it might be time to start implementing proven project management processes and phases at your organization in order to bring your companyâ€™s workflow under control. At first, the concept of the project management process and its practical adaption can seem a little daunting, but this article will give you everything you need to set up PM processes and phases at your busi Agile project management methodologies (Scrum, extreme programming, Lean Six Sigma, others) also have certifications. Introduction to the Project Management Knowledge Areas. As discussed above, projects are divided into components, and a project manager must be knowledgeable in each area. Â To develop the project schedule, the project team does an analysis of the project scope, contract, and other information that helps the team define the project deliverables. Based on this information, the project team develops a milestone schedule. The milestone schedule establishes key dates throughout the life of a project that must be met for the project to finish on time. PDF | Visual communication designers must possess the intellectual tools to perform creatively and effectively in addressing the complex visual | Find, read and cite all the research you need on ResearchGate. Â dialogue and thinking in the visual design studio for the realisation of the creative process. In this respect the study aims to. unfold what is hypothesized as the design process at the root of design education in the department of visual communication. @inproceedings{Nash1997VisibleMF, title={Visible management for design, programming and other creative processes}, author={J. C. Nash and Mary M. Nash}, year={1997} }. J. C. Nash, Mary M. Nash. Published 1997. A project management technique works as a guideline to plan work, control results, and ensure quality. And project management tools automate your teamâ€™s work. Â Choosing the right approach to managing a project is crucial for successful project delivery. The way you manage work is defined by techniques that you use, and tools that you adopt. In this article, weâ€™ve collected project management tools and techniques that are used in different fields and help create an efficient process. Project Management Methods. Project management methods range from traditional to innovative. Which one to choose for running a project, depends on project specifics, its complexity, teams involved, and other factors.