

Do Agile Principles and Practices Support the Well-being at Work of Agile Team Members?

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Abstract—In this work-in-progress paper, a preliminary review on the literature of the connections between agile methods and well-being at work is done. The viewpoint of well-being at work is important when considering agile software methodologies and techniques. A stage for an empirical research setting on these issues is also set. The research setting targets to inspecting how applying agile practices are experienced and features of agile methods that enhance and challenge well-being at work, i.e., what kind of implications agile methods are perceived to have for well-being at work. Well-being at work is studied from three different points of view: avoiding excessive strain, feeling of autonomous and meaningful work, and development and change at work. A holistic measure of well-being at work, applying agile practices and managerial implications will be developed further in the empirical research.

Keywords: agile methods; teamwork; well-being; change

I. INTRODUCTION

One rationale behind agile methods is the need to increase the quality of systems development projects. Typical problems relate to timetable, budget, customer needs and market demands, communication and cooperation, and the level of competence. The problems also include different practices of the customer and the developer team, e.g., following waterfall methods vs. agile practices. The software crisis has meant fundamental need for a new paradigm: the need to respond to constant changes [1]. The newest solution to this has been agile methods. Agile methodologies and practices emerged as an explicit attempt to more formally embrace higher rates of requirements change [27]. From the developers' point of view agility means the ability to act according to changing customer needs and continuous change. It enables the project to advance systematically even when stable and perfect product planning cannot be done at the beginning of the project. This aims at higher quality and customer satisfaction.

Technological solutions do not solve all the problems related to software development. So, it makes sense to explore other factors related to quality, like project management and organizing of work. Despite agile methods are widespread there has been relatively little scientific research on their application and organizational gains

[4][17]. Agile methods have often been studied from the point of view of system productivity and efficiency, but well-being at work has not been studied that much systematically. Agile principles hold many promises in relation to well-being at work in theory but there has been little scientific research on how they are applied in practice [16][22]. There has been research on, e.g., around agile methods and teamwork aspect, though. Indeed, in their systematic review Dybå and Dingsøy [8] found human and social factors as one thematic group of agile literature.

The objective of this preliminary literature review is to inspect the connections between agile work practices and well-being at work and based on this provides a case research setting. Through this research setting a model for adopting practices that enhance the well-being at work in agile environment can be developed. The questions of this preliminary literature review are: 1) Do agile working practices support the well-being of agile team members and if so, how; and 2) What kind of challenges agile practices bring to maintaining well-being at work and sustainable productive work.

Next, in Section 2 A., our view of agile methods is presented. After that, in Sections 2 B and 2 C., the frame of well-being at work in planning and implementation phases of agile practices is presented. In Section 3, the case research setting is presented and in Section 4, the future work is described.

II. THEORETICAL FRAMEWORK

A. Agile Principles and Practices

Four agile values have been stated in the Manifesto for Agile Software Development [29]. The most important one related to the well-being at work is valuing individuals and interaction over processes and tools. Principles behind the Agile Manifesto include the values broken down to 12 [30]. Of these principles the most important ones in relation to well-being at work are: 1) Build projects around motivated individuals, give them the environment and support they need and trust them to get the work done; 2) Promote sustainable pace: be able to maintain a constant pace indefinitely; 3) Best results emerge from self-organized teams; and 4) Teams reflect regularly when and how to improve. Self-organizing teams on one hand require and on the other produce motivated personnel.

The agile principles have been implemented through different practices. It is the way agile practices are applied that determines whether they are beneficial or harmful to well-being at work. Porchen [12] states that opportunities of agile methods have been in focus, but now, the view is shifting to risks.

In the Shine Technologies' survey [24], "people over processes" was the most liked feature of agile processes and "lack of authority" one of the least liked. According to Smith and Oltmann [25] the environment for flexibility requires putting the people and team first: the right people, commitment and dedication and adequate authority. Within Crystal people, interaction, community, skills, talents, and communication are considered as most important [27].

Also, for example XP states its own values (e.g., communication, feedback, courage and respect) and principles (e.g., embracing change). Courage may mean, e.g., the development team's courage to resist pressure to make unrealistic commitments [27]. Informal communication channels in agile methods include co-located teams, pair programming and daily stand-ups [7]. XP promotes teamwork by the fundamental that all software is produced in pairs, two programmers at one screen [3]. The goal is also not to force team members to specialize – every XP programmer participates in all of activities. Also, differences exist, e.g., Scrum prescribes cross-functional teams while Kanban allows specialist teams [12].

When applying agile methodology there are two main changing forces: continuous development of agile team's work processes and introducing agile to the organization. When considering the inception of agile methods it is important for managers to understand the factors that affect the adoption and its consequences to well-being at work. Also, in the operation phase it is important to know how to promote their use in a way that supports well-being at work.

B. Well-being at Work when Using Agile

Agile principles promote well-being in theory and it is commonly believed they increase the well-being of the developers. Agile methods hold many promises in relation to well-being at work, for example human centricity, interaction, and steady workload. However, they may also implicate strain, such as lack of recovery time and unfit management culture. Customer-drive, continuous reacting, changing goals, flexibility, culture change and new practices challenge well-being and expose to strain. In this paper, we understand well-being at work through three viewpoints defined by Gerlander and Launis [9]: avoiding excessive strain at work, feeling of autonomous and meaningful work, and change and development in work. Related ways of understanding well-being at work that have been studied within software engineering include motivation, job satisfaction, and employee retention, for example.

Avoiding excessive *strain* is one aspect of well-being at work. It means a balance between one's tasks and capabilities, work that matches the capabilities both

qualitatively (not too challenging or too easy) and quantitatively (not too much or too little work) [11]. The balance theory evaluates the potential positive and negative impacts that could alter the balance of work system elements and result in stress load experienced by agile teams [28]. For example, when operating with XP practices, like 40-hour work weeks, it enables teams to work and maintain a sustainable pace [14]. Working overtime for a short time is accepted, but productivity collapses if teams work overtime for long periods. XP teams do not work excessive overtime for long periods of time [27].

Mann and Maurer's [15] results indicate that after the introduction of a Scrum process into an existing software development organization the amount of overtime decreased. This allows the developers to work at a more sustainable pace. Risks of agile methods still include self-intensification, overworking oneself and the threat to work-life balance [20], even though agile methods explicitly try to avoid them. There is evidence that balancing resources and workload (optimal resource allocation) is a labor-intensive and error-prone task [26]. Sherehiy [23] also found that a combination of job demands and job uncertainty have a significant effect on workforce agility. She suggests that a high level of uncertainty may increase perceived job demands and impede adaptivity at work.

The second core aspect of well-being at work is the *subjective experience of meaningfulness and autonomy of work* [cf. 2]. Within this aspect the focus is on the individual experiences and feelings of work, work practices and community. According to Mah and Lunt [12] creating quality with clean code means taking pride in what you do, without compromising one's professionalism. Sherehiy's [23] results revealed that the autonomy at work is one of the most important predictors of workforce agility, as well as well-being.

C. Considering of Well-being at Work when Planning to Implement Agile

Work organization is a main factor to anticipate meaningfulness and autonomy: governing practices (e.g., objectives, purposes, meanings), coordination procedures (e.g., work distribution methods, processes), and surveillance routines (e.g., monitoring rituals, standards) [6]. Sherehiy [23] suggests that if the management implements agile strategies in a way that positively affects job autonomy, job uncertainty, and employees' collaboration, it is more likely that employees will be able to perform a job in an adaptive and flexible way. Also, Maruping, Venkatesh and Agarwal [17] argue that the most effective control models are those that provide teams with autonomy in determining the methods for achieving project objectives.

It has also been shown that agile team could attain its flexible way of working only with the autonomy of the team. That bundles up agile way of working and well-being at work. For example, in a study of video game programming, agile project practices were found to be more

empowering and flexible than other management methods emphasizing more management control [6]. In a related study, when shifting over to more centralized control of projects in a corporate R&D function of an IT company, engineers generally reacted to the attempted introduction of a new regime by increasingly presenting themselves as distinct from management [10]. Developers may sometimes view using of agile processes as an attempt to micromanage [6]. The risks of agile methods include ignoring self-determination, rigid organizational structures and possibilities of selection and control [20].

The third aspect of well-being at work considered is the *development* and *change* of work. Developing capabilities are essential in becoming agile [13]. Qualitative changes at work and in its environment occur faster and faster, non-stop and take place simultaneously. The challenges to well-being at work emerge as discontinuous work flow and unexpected interruptions [19].

Mayfield [18] found that in the transition to an agile development methodology there was an initial period of decision uncertainty and anxiety but that it was only temporary. Since agile adoption involves a significant process and organizational change, it is critical to success to focus initially on the human and cultural issues involved [21]. Boisnier and Chatman [5] propose that organizations may still benefit from simultaneously managing strong, stable cultures while maintaining the flexibility and adaptability necessary to survive the ebbs and flows of turbulent environments. When introducing agile methods, management practices and tools, motivated business experts, and common methods of managing change are needed in order to realize change and avoid the chaos caused by unpredictability and complexity [1].

Briand and Hodgson [6] identify agile methods as flexible, empowering and post-bureaucratic and non-hierarchical – as an attempt to mitigate the formal inflexibility of traditional project management to fit the demands of software creation. Agility literature emphasizes the importance of the development of a flexible, adaptable and highly knowledgeable workforce that is able to deal with unexpected and uncertain situations [23]. Teams operating within the context of agile are characterized as multifunctional, dynamic, and cooperative [28].

III. RESEARCH SETTING

In this section, a case research setting – planned for studying the connections between agile methods and well-being at work – is presented. The research targets are the experiences of the reality of agile practices and their perceived implications for well-being at work. The topic is analyzed through the following questions: 1) How do agile working practices in project management advance well-being at work? Do agile management principles support the well-being of agile team members? 2) What kind of challenges agile practices bring to maintaining well-being at work and sustainable productive work? The objective is to

analyze the connection between agile work practices and well-being at work, and based on this analysis provide a model for adopting practices that enhance the well-being at work in product and service development.

Our preliminary hypotheses are, that when the agile practices are applied correctly: 1) they help to keep work strain steady during a working period (e.g., sprint), 2), they maintain and promote meaningfulness and autonomy of work and 3) they diminish discontinuity and interruptions at work and make development of work more fluent and natural part of work.

Factors of agile methods that produce and challenge well-being at work of the team are studied in three case companies. The research methods include a web based survey of well-being at work, physiological stress indicators and interviews of team members and supervisors. The outcomes of the research are the perceptions of applying agile and evidence based new knowledge with objective established methods.

With a web based survey agile methods of software development are explored through team members' experiences. Well-being is studied with established measures and taking advantage of existing well-being and agile surveys. By physiological stress measurements stress levels felt during the agile projects can be measured. In interviews of team members there are questions of applying agile practices, perceived well-being at work in general, experiences of well-being at work when applying agile practices, and expectations and needs to develop of agile practices.

IV. CONCLUSION AND FURTHER WORK

Through the methods described a holistic measure of well-being at work, applying agile methods, and managerial implications will be developed. The development of these issues takes use of a literature review, collection existing measures and results from the case study. In the future, the validation of the holistic measure also needs a wider statistical background from different kinds of agile teams.

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REFERENCES

- [1] P. Abrahamsson, Agile software development introduction: Introduction, current status & future. Jyväskylä, Finland: VTT Electronics, 2005.
- [2] A. Antonovsky, Unraveling the mystery of health? How people manage stress and stay well. San Francisco: Jossey-Bass Publishers, 1987.

- [3] K. Beck, *Extreme programming explained*. Boston: Addison-Wesley, 1999.
- [4] M. S. Bird, "Utilizing agile software development as an effective and efficient process to reduce development time and maintain quality software delivery," *Dissertation Abstracts International: Section B: The Sciences and Engineering*, vol. 71, no. 5–B, 2010, 3329.
- [5] A. Boisnier and J. A. Chatman, "The role of subcultures in agile organizations," in *Leading and managing people in the dynamic organization*, R. D. Day, R. S. Peterson, and E. A. Mannix, Eds. Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers, 2003, pp. 87–112.
- [6] L. Briand and D.E Hodgson, "Management of creative projects or creative project management? Agile projects as micro-emancipation," Paper presented at the 7th international Critical Management Studies Conference, Naples, Italy, July 2011.
- [7] A. Cockburn, "Agile software development joins the "would-be" crowd," *Cutter IT Journal*, vol. 15, no. 1, 2002, pp. 6–12.
- [8] T. Dybå and T. Dingsøy, "Empirical studies of agile software development: A systematic review," *Information and Software Technology*, vol. 50, no. 9–10, 2008, pp. 833–859.
- [9] E.-M. Gerlander and K. Launis, "Työhyvinvoinnin tarkasteluikkunat," *Työelämän tutkimus*, vol. 5, no. 3, 2007, pp. 202–212.
- [10] P. Gleadle, D. E. Hodgson, and S. Storey, "Project managing R&D engineers: Assent and recalcitrance," Paper presented at the 7th International Critical Management Studies Conference, Naples, Italy, July 2011.
- [11] R. A. Karasek, "Job demand, job decision latitude, and mental strain: Implications for job redesign," *Administrative Science Quarterly*, vol. 24, 1979, pp. 285–309.
- [12] H. Kniberg, *Kanban and Scrum – Making the most of both*, 2009 <http://www.crisp.se/file-uploads/Kanban-vs-Scrum.pdf>, 20.8.2013
- [13] V. P. Kochikar and M. P. Ravindra, "Developing the capability to be agile," *Organization Development Journal*, vol. 25, no. 4, 2007, pp. 127–134.
- [14] M. Mah and M. Lunt, *How agile projects measure up, and what this means to you*, The Cutter Consortium Executive Report, 2009.
- [15] C. Mann and M. Maurer, "A case study on the impact of Scrum on overtime and customer satisfaction," *Proc. The Agile Development Conference (ADC '05)*, July 2005, pp. 70–79, doi: 10.1109/ADC.2005.1
- [16] A. Marchenko and P. Abrahamsson, "Scrum in a multiproject environment: An ethnographically-inspired case study on the adoption challenges," *Proc. AGILE '08 Conference*, Aug. 2008, pp. 15–26, doi: 10.1109/Agile.2008.77
- [17] L. M. Maruping, V. Venkatesh, and R. Agarwal, "A control theory perspective on agile methodology use and changing user requirements," *Information Systems Research*, vol. 20, no. 3, 2009, pp. 377–399.
- [18] K. M. Mayfield, "Project managers' experience and description of decision uncertainty associated with the agile software development methodology: A phenomenological study," *Dissertation Abstracts International: Section B: The Sciences and Engineering*, vol. 71 (12–B), 2011, 7772.
- [19] J. Mäkitalo, *Work-related well-being in the transformation of nursing home work*. Oulu, Finland: University of Oulu, D 837, 2005.
- [20] S. Porschen, "Management of the informal by cooperative transfer of experience," in *Innovation management by promoting the informal: Artistic, experience-based, playful*, F. Böhle, M. Bürgermeister, and S. Porschen, Eds. Dordrecht: Springer, 2012, pp. 105–142.
- [21] QSMA, *The agile impact report. Proven performance metrics from the agile enterprise*, A report from QSMA Associates, 2008.
- [22] O. Salo and P. Abrahamsson, *Agile methods in European embedded software development organisations: A survey on the actual use and usefulness of Extreme Programming and Scrum*. Oulu, Finland: VTT Tech. Res. Centre of Finland, vol. 2, no. 1, 2006, pp. 58–64, doi: 10.1049/iet-sen:20070038
- [23] B. Sherehiy, "Relationships between agility strategy, work organization and workforce agility," *Dissertation*, Kentucky, University of Louisville, 2008 <http://louisville.edu/speed/industrial/academics/Bohdana%20Dissertation.pdf> 20.8.2013
- [24] Shine Technology's Agile Adoption Survey, 2003 http://www.shinotech.com/agile_survey_results.jsp 20.8.2013
- [25] P. G. Smith and J. Oltmann, "Flexible project management: extending agile projects beyond software projects," *Proc. PMI Global Congress*, Oct. 2010, <http://strategy2market.com/Preston-Smith/Articles/PMI/Flexible-Project-Management-Congress.pdf> 20.8.2013
- [26] Á. Szöke, "Decision Support for Iteration Scheduling in Agile Environments," *Lecture Notes in Business Information Processing*, vol. 32, 2009, pp. 156–170.
- [27] L. Williams, *A Survey of Agile Development Methodologies*, 2007 <http://agile.csc.ncsu.edu/SEMaterials/AgileMethods.pdf> 20.8.2013
- [28] C. A. Yauch, "Team-based work and work system balance in the context of agile manufacturing," *Applied Ergonomics*, vol. 38, no. 1, 2007, pp. 19–27.
- [29] www.agilemanifesto.org Manifesto for Agile Software Development, 20.8.2013.
- [30] www.agilemanifesto.org/principles.html Principles behind the Agile Manifesto, 20.8.2013.