

Reforming Performance Appraisal for Agile Software Development Projects

Mawarny Md Rejab^{1*}, James Noble²

^{1*}School of Computing, Universiti Utara Malaysia

²School of Engineering and Computer Sciences, Victoria University of Wellington, New Zealand

*Corresponding Author Email: mawarny@uum.edu.my

Abstract

Changes in software development methods should lead to changes in an organization's performance appraisal system. Several organizations, however, have adopted Agile software development methods without reforming their performance appraisal. Performance appraisal should be aligned to Agile values, principles, and practices, which advocate interactions, collaborations, teamwork, and knowledge transfer. Through a Grounded Theory study involving 48 Agile practitioners and external specialists, we discovered two major changes to performance appraisal for Agile teams: integrating individual and team performance assessment criteria, and shifting from quantitative to qualitative measurement of performance. Our findings indicate that reforming performance appraisal tends to influence successful expertise coordination in Agile teams. This study can be a baseline in generating an Agile-compliant performance appraisal to assess Agile team members in a fair and consistent manner. This indirectly increases motivation amongst team members and tends to produce capable workforce to perform at a higher level.

Keywords: Agile-compliant performance appraisal, Agile Software Development, Grounded Theory.

1. Introduction

A good performance appraisal enables team members to clearly understand Key Performance Indicators (KPIs) that need to be achieved [7]. Based on KPIs, team members are able to identify their strengths and capabilities, as well as opportunities for improvement and development of required skills. Some Agile Software Development organizations still apply traditional performance appraisal solely based on individual assessment [5]. According to Alnaji and Salameh [2] and Coyle et al. [5], it is vital to have an Agile-compliant performance appraisal as Agile Software Development is team-oriented. An Agile-compliant performance appraisal should be aligned to Agile values, principles, and practices, which advocate interactions, collaborations, teamwork, and knowledge transfer.

There is a paucity of empirical studies that focus on Agile-compliant performance appraisal [2, 5, 31]. Most studies proposed metrics, measurements, and how to assess the job performance of Agile team members. Even though the literature describes several improvements leading towards Agile-compliant performance appraisal, we strongly believe there are more criteria that need to be dug out. A further investigation is needed to understand performance appraisal in Agile software development companies, either compliance with Agile values, principles, and practices or not.

Through Grounded Theory, we discovered the need for performance appraisal in identifying gaps in an employee's skills or competencies, as well as opportunities for improvement and

development of related skills. As Agile Software Development is team-oriented, team members need to rely on each other in developing their expertise and team knowledge. This is the focal point where expertise coordination is needed in Agile teams.

Expertise coordination is defined as "the management of knowledge and skills dependencies" [6]. This definition shows how team members should depend on each other in managing and utilizing their expertise resources. Expertise coordination requires a team to recognize who has particular expertise, when and where they are needed, and how to access that expertise effectively [6]. Hence, locating and recognizing the source of expertise is a pivotal step in coordinating the expertise, as well as expertise outside Agile teams [34, 35, 36].

This paper aims to discuss two major reforms to performance appraisal: integrating individual and team performance assessment criteria, and shifting from quantitative to qualitative assessment. We found that reforming performance appraisal indirectly tend to influence the successful expertise coordination in Agile teams.

The rest of this paper is structured as follows: the next section describes Grounded Theory; the third section presents the findings of this study; the fourth section discusses these findings; and the last section puts forward conclusions.

2. Grounded Theory

Grounded Theory is widely used as a research method for developing a theory in many fields of study including software engineering [15,18,33]. Grounded Theory is an inductive research

method that aims to infer new theories from observed data [17]. There are several reasons why Grounded Theory is applicable as a research method for this study. Firstly, Grounded Theory is appropriate for exploring human behaviour and social interactions [16]. This study focuses on how to assess the work performance of Agile team members. Secondly, Grounded Theory is appropriate to be used in areas that are underexplored which require further investigation [8]. Further investigation is needed to conceptualize and theorize about the underpinnings of performance appraisal for Agile teams members.

2.1. Data Collection

Glaser and Strauss [17] emphasize the importance of collecting data with multiple methods, which promise the construction of a novel theory. Although interviews appear to be the primary data collection method used in Grounded Theory studies [8,13], researchers can employ other methods. This study employed interviews as the predominant source of data collection, in conjunction with observations and document analysis.

Semi-structured interviews were carried out with 48 Agile practitioners from different software organizations mainly based in New Zealand and the United States [37]. The participants engage in different business domains such as education, finance, and human resources. This study was open to Agile practitioners who apply Agile practices in their software development projects.

This study requires a broad range of Agile roles including external specialists in order to enable the triangulation of findings. Theoretical sampling is a way to ensure the validity of this study by selecting subsequent participants for data collection based on existing data analysis [17]. Theoretical sampling should ensure that other perspectives are gained from the identified participants and drawn indirectly from a broad range of other participants. Different roles provide different insights and perspectives toward external expertise coordination. We interviewed Agile team members as well as external specialists such as User Experience Designers, Software Architects, and DevOps (Development and Operation). We stopped the data collection once we reached theoretical saturation, i.e when no new data emerged [17].

This study employed observations and document analysis in conjunction with interviews. Observations and document analysis are classified as secondary data collection methods of this study. The main purpose of these methods is to confirm the accuracy of interviews data and enhance the validity of that data [21]. Observations provided a great opportunity to view the actual participants' behaviour when they were engaging in Agile Software Development. Moreover, observations allowed us to gain a deeper understanding of the participants' settings [22,28]. The advantages of observations led us to identify new findings and also enabled data triangulation.

Document analysis is another alternative for us to collect and elicit more data [11,17]. Document analysis involves reviewing or evaluating printed or electronic documents, that have been produced without researchers' intervention [10]. We collected relevant documents during interviews and observation, including a sample of performance appraisal forms.

During analysis, we looked for consistency between interviews, documents, and observations. Sometimes, document analysis sparked new ideas that led to further data collection and the emergence of new findings.

2.2. Data Analysis

Data analysis begins as soon as the first interview has been conducted and continues until the emergence of a core category [4].

We used key point coding to analyze the interview transcripts in detail. We collate the key points by examining phrases, words, and sentences from the interview transcripts¹ [1]. Then, we construct codes by rephrasing key points with meaningful labels. In order to look for similarities and differences, we continuously compare every emerging code with the previous codes. We group together similar codes with common themes to form a concept. Many concepts emerge, and constant comparison is repeated until concepts form a category. A category is a group of similar concepts that is used to generate a theory. Several categories have emerged from our data analysis such as locating and recognizing expertise [35], distributing expertise [36], and coordinating outside expertise [34]. This paper presents the category reforming performance appraisal which is discussed in the next section.

3. Research Findings

Traditional performance appraisal is based on an individual assessment, which measures an employee's work against measurable objectives. This type of assessment focuses on the skills exercised in the current tasks and skills that must be acquired for the next project. For instance, one of the participants claimed that his performance appraisal was based on the point of velocity or amount of work that he can accomplish in a certain sprint:

"One organization that I worked at previously, the idea [of performance appraisal] was measuring developer's velocity. How many capacity points does the developer deliver per sprint?" - P16, Agile Coach.

A major drawback of the traditional performance appraisal is gaming the system. The findings of this study indicated that some Agile team members tend to choose the easiest task or user story in order to perform well in their team, without considering other team members' capabilities and expertise. There is a possibility for Agile team members to be selfish, inconsiderate, and intolerant in achieving their key performance indicators. These attitudes have a negative impact on teamwork culture, because it is not aligned with Agile practices:

"It doesn't make any sense to me because people game the system. They try to get as many easy stories as they can to make their matrix look really good. It doesn't enforce the whole team spirit." - P16, Agile Coach.

Performance appraisal solely based on individual assessment is not really applicable for Agile teams. Surprisingly, the findings of this study affirmed the existence of software organizations that shifted to using Agile methods without changing their performance appraisal:

"We haven't changed our performance appraisal since we moved to Agile methods. We should do at some point. Our current system is individual performance or behaviour. If we want good team behaviours, I think we have to change." - P46, Agile Coach.

Therefore, reforming performance appraisal is vital for Agile Software Development projects. Based on the findings of this study, reforming performance appraisal of Agile teams requires two major changes: integrating individual and team performance assessment criteria, and shifting from quantitative to qualitative performance appraisal. The next subsections describe the implementation of these changes in detail.

3.1. Integrating Individual and Team Performance Assessment Criteria

In order to align with Agile practices, it is important to integrate team performance appraisal in relation to certain pre-established criteria and organizational objectives. Team performance appraisals

assess the performance of teamwork including an individual's contribution to the team.

"We set management [of performance appraisal] by objectives. It is a combination of individual performance and shared goals. We have shared goals and also individual goals." - P31, Scrum Master.

The findings of this study indicated that the weight of individual and team performance appraisal varies and depends on the organization's goals and objectives. Balancing the measurement of individual and team performance, however, tends to help organizations to address individual skill development as well as focusing on achieving team goals.

"We emphasize team performance rather than individual performance." - P32, Scrum Master.

Performance is measured based on the employee's achievements and reflects the significance of the tasks within the organizational goals. Performance relies on the behaviour of individuals in the team. As Agile Software Development projects emphasize effective teamwork by concentrating on people, behaviour is an important indicator of performance appraisal.

"In our performance review, we measure two key things. First is performance and second is behaviour." - P32, Scrum Master.

Behaviour can be appraised on how well Agile team members work with others in maintaining a good social and organizational network. Figure 1 shows an excerpt of a performance appraisal that indicates the assessment of behaviour in Agile Software Development teams. The performance appraisal applied at the participant's organization (P32) is specific for Agile Software Development teams. Good behavioural skills also tend to improve knowledge transfer in Agile teams.

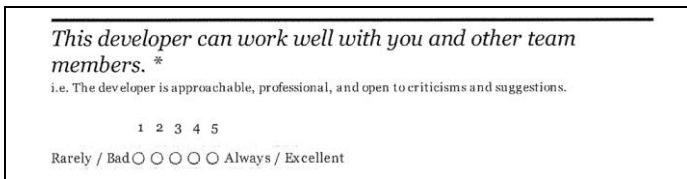


Fig. 1: Excerpt of Performance Appraisal on Assessment of Behaviour (Provided by Participant P32).



Fig. 2: Excerpt of Performance Appraisal on Sharing and Transferring Knowledge (Provided by Participant P32).

Willingness to share knowledge is the key point of success in transferring knowledge among Agile team members. This is clearly shown in the excerpt of performance appraisal depicted in Figure 2, which indicates the importance of peer code review as a key point of success in sharing and transferring knowledge.

Expertise coordination relies on the ability of Agile team members to share, preserve and access team knowledge through knowledge transfer (refer to Chapter 5). Knowledge transfer indirectly tends to improve the individual or team skills matrix. Therefore, knowledge transfer criteria should be reinforced in performance appraisal for Agile teams.

"We also have communication and knowledge transfer criteria in our performance review. These are important points in our skills matrix. That's why we focus on that." - P28, Developer.

"We have different category skills, such as knowledge sharing, networking, communication skills, and others." - P28, Developer.

The findings of this study indicated that many possible assessment criteria are used in performance appraisal of Agile teams. The choice of assessment criteria, however, should consider the integration between individual and team performance assessment specific for Agile teams. The selection of assessment criteria should reflect the significance of Agile team members' tasks and responsibilities within the framework of the team's and the organization's objectives.

3.2. Shifting to Qualitative Performance Appraisal

Traditional performance appraisal method is based on quantitative measurement, which is represented by using numbers or scores:

"The scale is 1 to 5. There is a description for each category and the score. It is like a goal. We can look at what we should improve and what we need to change." - P28, Developer.

A score enables a superior to indicate the level of their subordinates' achievement or performance, however, it is not adequate to provide feedback on how the subordinates can improve themselves. Thus, it is important to integrate a feedback section into performance appraisal for Agile teams. The score indicates the alignment of employees' performance with the defined key performance indicators (KPIs), whereas the feedback works as an indicator as to what needs to be improved:

"The purpose of feedback is for people to improve. The performance appraisal contains feedback." - P34, Agile Coach.

Feedback can be obtained in a number of ways such as observation and peer-review. Observation enables superiors to see and confirm the behaviour and performance of their subordinates before completing the performance appraisal. Superiors can also identify where and how the subordinates can improve themselves.

The findings of this study indicated that the accuracy of observation relies on how superiors pay attention to subordinates. Superiors should be aware the relationship between subordinates, how they are working together as a team, and their commitment to achieving desired goals.

"So, we get a picture through talking to everyone in the team and watching them. Which people are helping the team performance and which people are doing things that hinder the team performance. That's kind of talking to people and observing in action." - P34, Agile Coach.

The validity of peer-review can be strengthened through observation, which allow superiors to see the consistency between peer-review result and real-situation. Peer-review requires Agile team members to assess their peers. Maintaining confidentiality throughout the peer-review process is vital and only superiors or the management of organization should know the content of the assessment. The assessment should be qualitative by providing verbal or written reviews and comments on how every member works together in the team:

"So, my preference is everyone should be giving each other feedback, but qualitative feedback, not number based. [For example] 'you really help me when you do X or you really frustrate me when you do Y.' This information enables someone to act for improvement." - P34, Agile Coach.

Through our observations at company XYZ, a retrospective meeting was a platform that enabled Agile teams to informally observe and review one another. A retrospective meeting allows the team to reflect on what happened during the current sprint and how to improve the next sprint (see section 2.3.1). Our observations showed the existence of peer-review during the retrospective meeting, when each team member was required to do the following exercise from the observation notes:

The retrospective meeting was attended by a Scrum master, who facilitated the meeting, three developers and one product owner as

depicted in Figure 3. During the meeting, the Scrum master asked everyone to write constructive feedback on what the other Agile roles need to improve for the next sprint. As developers, they had to give feedback to the product owner on what he needs to improve the sprint.

The same thing was done by the product owner to indicate what the developers need to do to improve the next sprint. By using sticky notes, they wrote the constructive feedback in the following format: *If I'm a product owner, for the next sprint, I would.* (From the point of view of the developer)

Or

If I'm a developer, for the next sprint, I would. (From the point of view of the product owner)

After five minutes, they placed the written sticky notes on the wall as shown in Figure 4. The wall was divided into two columns separating feedback for the product owner and developers. The Scrum master gave an opportunity for everyone to ask questions for clarification on the feedback. Then, everyone was asked by the Scrum master to write actions in order to react towards the given feedback. For instance, the product owner stated that the developers need to deliver consistent documentation even though written by different developers (see Figure 5). The developers agreed with the product owners and mentioned that they will use a consistent documentation style and also use GitHub to facilitate the consistency in preparing documents.



Fig. 3: A Retrospective Meeting of Team A.

Based on the developer's feedback on the product owner's progress, the product owner decided to write more notes in order to ensure the developers understand and track the user stories easily (see Figure 6). Besides identifying holes or gaps in the current sprint, the retrospective meeting also enabled the team to indicate positive feedback through appreciation, as shown in our notes:

The Agile coach asked everyone to express appreciation towards the person who is sitting right next to them. They had to mention positive and supportive feedback, and also accomplishments of that team member. Everyone had a chance to give positive comments to others and also be evaluated by others. This activity was repeated for each retrospective meeting as a conclusion remark of the retrospective meeting. [Observation notes]

Although this activity focused more on specific Agile roles rather than individual assessments, it indirectly exposed constructive feedback to the particular individual for improvement. Hence, the team had a space to observe and assess the progress development of their team members' expertise. This information can be used as an

input for peer review, which might be relevant to be included in the performance appraisal.

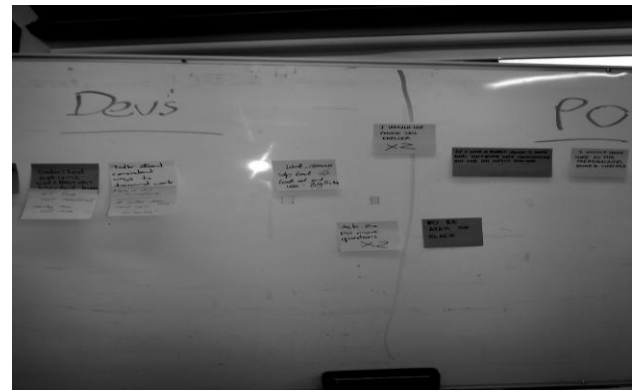


Figure 4: Constructive Feedback on the Wall.

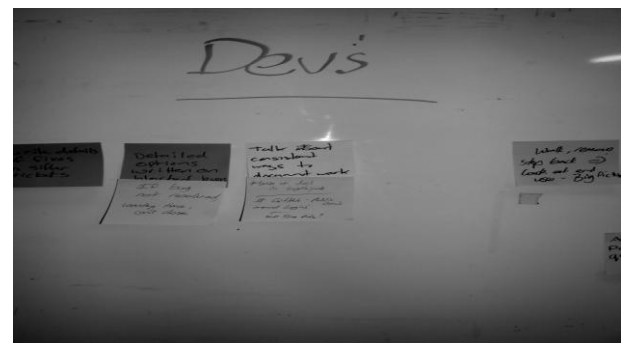


Fig. 5: Constructive Feedback and Actions for the Developers.

Scoring is not relevant in peer-review because there is a high tendency of Agile teams members to deal with each other in obtaining high scores:

"As soon as people are rating other team members, there is a potential of gaming behaviour. For example, 'I will give you a good score if you give me a good score'." - P34, Agile Coach.

Therefore, peer-review acts as an input for superiors to make decisions on the performance appraisal. Peer-review provides a clear picture of the relationships among subordinates in accomplishing tasks. The final decision, however, is solely from superiors:

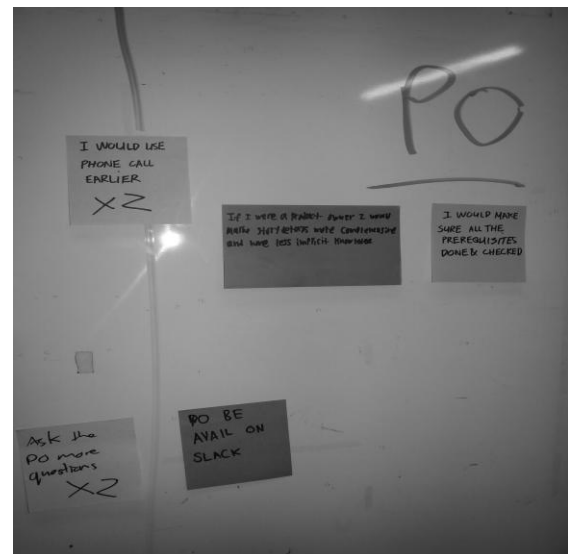


Figure 6: Constructive Feedback for the Product Owner

"They may get input from other people, but the decision is still from the management." - P34, Agile Coach.

After obtaining feedback, discussion between a superior and subordinate is vital. Participant P34 pointed out that verbal feedback based on point form note is better than providing notes directly to subordinates. The session provides a space for superiors to clearly explain their assessment on subordinates' performance, including their feedback for improvement:

"I focus more on conversation. If I write the feedback down, it doesn't give an opportunity for clarification. If I give them the form and they read by themselves, they might misunderstand what I intended." - P34, Agile Coach.

Providing scores during assessment of performance hinders the effectiveness of feedback sessions. For instance, Participant P34 claimed that her subordinates tended to focus more on the score rather than listening to the feedback.

"As soon as people hear the number, they stop listening to the rest of feedback. When we take the number away, we can focus on the conversation of feedback." - P34, Agile Coach.

Despite the benefits of qualitative feedback, there is no doubt that scoring systems can be used in performance appraisal of Agile teams. Scoring systems indicate the generic progress development of subordinates and also assist the Human Resources Department in justifying salary increments for Agile team members:

"I just use a score to justify the salary. The team has no idea about the score and [the score] couldn't contribute to anything." - P34, Agile Coach.

A reward system is often related to performance appraisal. We found peer-review is important for rewarding team members through nonmonetary compensation such as, prizes and team members' recognition. Participant P45 claimed that her team implemented a gold star chart for representing peer appreciation in her team:

"So, when the developer gave me something where I couldn't find errors, I gave him the gold star. Or we have a couple of junior developers and they finished coding on specific things for the first time, so the senior developers gave them the gold star. So you know, it is really cool to do that." - P45, Software Tester.

As part of self-organizing teams, Agile team members could recognize each other for their help, assistance, expertise, and other significant contributions. This recognition promotes and encourages team members to help each other and indirectly fosters expertise coordination, particularly in sharing expertise:

"It is like a peer reward, and motivating each other and recognizing others in the team who have done really good work." - P45, Software Tester.

"So, that's why we set up opportunities like a prize that we called a pony prize. We reward people in terms of expertise." - P31, Scrum Master.

Even though an Agile development is team-oriented, an individual award is appropriate for acknowledging an individual who has made a significant contribution to the team. As non-monetary compensation, it is impossible for individual rewards to lead to unhealthy competition such as jealousy and resentment. The chosen type of reward, however, depends on the management decision and the acceptance of team members to inspire and motivate them in sharing expertise.

A new direction for performance appraisal of Agile teams will require integration of qualitative feedback in performance assessment. The findings of this study indicated a bidirectional relationship between the expertise coordination process and management support. Feedback tends to support expertise coordination, where Agile teams use the feedback to improve the skills gaps and develop an individual and team's skills matrix. On the other hand, reliable peer-review relies on successful expertise

coordination, as inter-dependencies among team members help them to know each other, particularly their expertise area and level.

4. Discussion

Through this study, we found two major changes for reforming performance appraisal: integrating individual and team performance assessment criteria, and shifting from quantitative to qualitative measurement of performance.

The initial step in constructing performance appraisal is the determination of performance criteria. Besides individual assessment criteria, our findings indicated that team performance criteria should be included in Agile performance appraisals, to reflect the team-level performance. This is aligned with Alnaji and Salameh's study [2], which posits the importance of individual and team performance assessment criteria in performance appraisal, in order to fit into an Agile Software Development environment.

Our findings support Noori et al.'s study [7] which indicates the need for selecting and updating performance criteria. The performance criteria should be aligned with Agile values, principles, and practices, as well as an organization's goals and objectives. Furthermore, balancing the right weight for individual and team performance assessment criteria is vital to reflect the true abilities of individual and Agile teams as well. Developing team-based performance criteria, however, should reflect Agile core values, principles and practices.

Although there are various team performance assessment criteria, this article discusses only two assessment criteria in detail: behaviour and knowledge transfer. These criteria emerged from the findings of this study and are essential for assessing expertise in Agile teams. This study indicated the importance of evaluating behavioural skills that reflect the abilities of Agile team members in coordinating expertise. Coyle et al. [12] and Alnaji and Salameh [2] claim that the criteria for performance appraisal often focuses on technical skills, whereas Agile Software Development requires a greater emphasis on behavioural skills. According to Shakir [29] and Jackling and Sullivan [19], behavioural skills (also known as soft skills or people skills) include communication skills, conflict resolution, personal effectiveness, creative problem solving, and team building. As expertise coordination involves inter-dependencies among team members, Agile team members should demonstrate good behavioural skills in coordinating expertise. Balancing technical and behavioural skills is essential in Agile performance appraisal.

Our findings revealed the need to reinforce knowledge transfer criteria in performance appraisal. Noori et al. [7] state that good behavioural skills also lead to an increase in the ability to transfer knowledge in Agile teams. Knowledge transfer facilitates the process of generating a "T-shaped person" [9, 20] in Agile team members, who have breadth in a number of areas, and depth in a few areas of expertise. Knowledge transfer requires the expertise coordination process for identifying and recognizing the needed expertise, and retrieving the expertise.

This study indicated the importance of qualitative feedback in Agile performance appraisal. Tripp and Riemenschneider [31] also indicate the importance of qualitative feedback in providing the employee with clear information about his or her performance. Qualitative feedback enables Agile team members to identify areas of strength and weakness, analyse their performance gaps, and take action for improvement.

Our findings are aligned with Ahmad and Bujang's study [3], which posits that qualitative feedback does not replace the scoring appraisal, but it can be used as an additional method of appraisal. Through our observations, feedback can also be gained during

retrospective meetings. These meetings allow Agile teams to reflect on the work process used and how to improve the process for the next iteration. The outcome of retrospective meetings is feedback, which tends to influence the performance appraisal. Our findings, however, contradicted Shankarmani et al.'s study [30], which claims that Agile teams do not need performance appraisal other than retrospective meetings. Based on our observations, relying only on the retrospective meetings is not adequate for gaining feedback and ensuring the reliability of performance assessment.

This study indicated that peer-review can be used to gain reliable feedback for performance appraisal. Based on Coyle et al. [12], 360-degree feedback appraisal involves peer-review, where team members can act as evaluators as well as being evaluated. Reliable peer-review relies on good team bonding. Peer-review tends to support expertise coordination in Agile teams, which requires inter-dependencies among team members for getting to know each other, particularly their expertise area and level.

Furthermore, feedback also tends to influence successful expertise coordination. As feedback identifies performance gaps and actions for improvement, Agile teams need to coordinate expertise in order to improve or develop an individual and team's expertise. Through expertise coordination, Agile team members are able to locate, recognize, and retrieve available expertise for improving an individual and team's expertise.

Our findings revealed that Agile teams should also implement peer-to-peer rewards which focus on individuals. This contradicts several studies, which affirm that team rewards are more appropriate for Agile teams rather than individual rewards since Agile Software Development emphasizes cooperation between team members [14, 24, 25]. Lapham [24], however, states that Agile teams often choose to reward someone based on individual recognition.

Besides individual achievement, peer-to-peer rewards recognize peer contributions including expertise contribution. Several researchers have shown that these individual rewards can promote knowledge sharing, when team members contribute their expertise for helping each other [23, 27]. This indirectly supports expertise coordination, when sharing expertise requires team members to rely on each other for locating, recognizing, and accessing expertise.

Chow et al. [26] affirm that a reward system is a success factor for Agile Software Development. Denning [14] and Vinekar et al. [32], however, suggest the need for a reward system that is suitably designed for successful adoption of Agile methods. Implementing a suitable reward system tends to support expertise coordination. A proper balance between individual and team rewards is essential for successful expertise sharing. Non-monetary compensation such as training opportunities and special recognition supply motivation to embrace the knowledge sharing culture in Agile teams and indirectly influence successful expertise coordination.

5. Conclusion

This paper presents two major reforms to performance appraisal for Agile teams: integrating individual and team performance assessment criteria, and shifting from quantitative to qualitative measurement of performance appraisal. Our findings indicated that reforming performance appraisal indirectly tend to influence the successful expertise coordination in Agile teams. These major changes can be used as a guideline to Agile software organizations in assessing their staff. Reforming performance appraisal model enables managers in organization to evaluate software team members in fairly and consistent manner. Motivation amongst members may increase, and this is able to produce capable workforce to perform at higher level.

Acknowledgement

This research is fully supported by University Research Grant from Sultan Idris Education University under the grant number of 2018-0134-109-01.

References

- [1] G.A. Allan, "A critique of using grounded theory as a research method," *Electronic Journal of Business Research Methods* 2, 1, 2003, pp. 1-10.
- [2] L. Alnaji, and H. Salameh, "Performance-measurement framework to evaluate software engineers for agile software-development methodology," *European Journal of Business and Management* 7(2), 2015, pp. 183-190.
- [3] R. Ahmad, and S. Bujang, "Issues and challenges in the practice of performance appraisal activities in the 21st century," *International Journal of Education and Research* 1, 4, 2013, pp. 7.
- [4] J.M. Corbin, A. Strauss, "Grounded theory research: Procedures, canons, and evaluative criteria," *Qualitative sociology* 13, 1, 1990, pp. 3-21.
- [5] S. Coyle and K. Conboy, "People over process: key people challenges in agile development," *IEEE*, 2010.
- [6] S. Faraj, and L. Sproull, "Coordinating expertise in software development teams. *Management Science*," 2000, pp. 1554-1568.
- [7] S.Noori, S.H. Hosseini, and A. Baksha, "Human performance factors in the evaluation of virtual organizations," *International Journal of Business and Management* 4 (2), 41, 2009.
- [8] M. Birks, and J. Mills, "Grounded theory: a practical guide," Sage Publications Limited, 2011.
- [9] B. Boehm, and S.K. Mobasser, "System thinking: educating shaped software engineers," In *2015 IEEE/ACM 37th IEEE International Conference on Software Engineering*, vol. 2, 2015, pp. 333-342.
- [10] G. Bowen, "Document analysis as a qualitative research method," *Qualitative research journal* 9, 2 2009, pp. 27-40.
- [11] K. Charmaz, "Constructing grounded theory: A practical guide through qualitative analysis," Sage Publications Limited, 2006.
- [12] S. Coyle, and K. Conboy, "People over process: key people challenges in agile development," *IEEE*, 2010.
- [13] J.W. Creswell, "Qualitative inquiry and research design: Choosing among five approaches," Sage, 2012.
- [14] S. Denning, "Why agile can be a game changer for managing continuous innovation in many industries," *Strategy & Leadership* 41, 2, 2013, pp. 5-11
- [15] S. Dorairaj, J. Noble, and G. Allan, "Agile software Development with distributed teams: Senior management support," In *Global Software Engineering (ICGSE), 2013 IEEE 8th International Conference on 2013, IEEE*, pp. 197-205.
- [16] B.G. Glaser, "Emergence vs forcing: Basics of grounded theory analysis," *Sociology Press*, 1992.
- [17] B.G. Glaser and A.L. Strauss, "The discovery of grounded theory: Strategies for qualitative research," Aldine de Gruyter, 1967.
- [18] R.Hoda, J. Noble, and S. Marshall, "Developing a grounded theory to explain the practices of self-organizing agile teams," *Empirical Software Engineering* 17, 6, 2012, pp. 609-639.
- [19] B. Jackling, and C. Sullivan, "Financial planners in australia: an evaluation of gaps in technical and behavioral skills," *Financial Services Review* 16, 3, 2007, pp. 211.
- [20] M. Keith, M., Goul, H., Demirkan, J., Nichols, and M.C. Mitchell, "Contextualizing knowledge management readiness to support change management strategies," In *Proceedings of the 39th Annual Hawaii International Conference on System Sciences (HICSS'06)*, vol. 7, IEEE, 2006, pp. 152a-152a.
- [21] J. Kirk, and M.L. Miller., "Reliability and validity in qualitative research," Sage, 1986.
- [22] S. M. Kolb, "Grounded theory and the constant comparative method: valid research strategies for educators," *Journal of Emerging Trends in Educational Research and Policy Studies* 3, 1 2012, pp. 83-86.
- [23] C. Kutay, and A. Aurum, "Knowledge transformation for education in software engineering," *International Journal of Mobile Learning and Organisation* 1, 1 2006, pp. 58-80.

- [24] M.A. Lapham, "Dod agile adoption: Necessary considerations, concerns, and changes," Tech. rep., DTIC Document, 2012.
- [25] S. Nerur, R., Mahapatra, and G. Mangalaraj, "Challenges of migrating to agile methodologies," *Communications of the ACM* 48, 5, 2005, pp. 72–78.
- [26] T. Chow, and D. Cao, "A survey study of critical success factors in agile software projects," *Journal of Systems and Software* 81, 6, 2008, pp. 961-971.
- [27] G. Lohan, K. Conboy, and M. Lang, "Beyond budgeting and agile software development: a conceptual framework for the performance management of agile software development teams," In *ICIS*, 2010, pp. 162.
- [28] K.W. Parry, "Grounded theory and social process: A new direction for leadership research," *The Leadership Quarterly* 9, 1, 1998, pp. 85–105.
- [29] R. Shakir, "Soft skills at the malaysian institutes of higher learning," *Asia Pacific Education Review* 10, 3, 2009, pp. 309–315.
- [30] R.Shahkarmani, S. Mantha, and V. Babu, "Performance assessment of ASD team using FPL football rules as reference," In *India Conference, 2011 Annual IEEE*, 2011, IEEE, pp. 1–4.
- [31] J.F.Tripp, and C.K. Riemenschneider, "Toward an understanding of job satisfaction on agile teams: Agile development as work redesign," In *System Sciences (HICSS), 2014 47th Hawaii International Conference on*, 2014, IEEE, pp. 3993–4002.
- [32] V. Vinekar, C.W. Slinkman, and S.Nerur, "Can agile and traditional systems development approaches coexist? an ambidextrous view," *Information systems management* 23, 3, 2006, pp. 31–42.
- [33] M. Waterman, J. Noble and G. Allan, "How much up-front? A grounded theory of agile architecture," In *Software Engineering (ICSE), 2015 IEEE/ACM 37th IEEE International Conference*, 2015, vol. 1, IEEE, pp. 347–357.
- [34] M.Rejab, J. Noble and G. Allan, "Distributing expertise in agile software development projects," In *Agile Conference (AGILE), 2014*, IEEE, pp. 33–36.
- [35] M.Rejab, J. Noble, and G. Allan, "Locating expertise in agile software development projects," In *Agile Processes in Software Engineering and Extreme Programming*. Springer, 2014, pp. 260–268.
- [36] Rejab, M. M., J. Noble, & S. Marshall, "Coordinating expertise outside agile teams," In *International Conference on Agile Software Development*, Springer, Cham, 2015, pp. 141-153.
- [37] M.M. Rejab, "Expertise Coordination for Agile Software Development Projects:" A Thesis Submitted to the Victoria University of Wellington in Fulfilment of the Requirements for the Degree of Doctor of Philosophy in Software Engineering (Doctoral dissertation, Victoria University of Wellington), 2017.