

The buried presence of entrepreneurial experience-based learning in software startups

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Abstract. In less than a decade, software startups gained a lot of attention. Scholars and practitioners got the opportunity to inspect different aspects of software startups, including success, failure, challenges and growth. A startup team is a crucial part of an entrepreneurial endeavour, and learning from experience plays a vital role for both individual entrepreneurs and the team. With experiential learning, an entrepreneur requires less guidance at initial startup stages and can focus better on the objectives. Sharing of the gathered experiential learning with other team members is crucial for building a good team and making meaningful progress towards the vision of the startup. However, startup teams often neglect to reflect on their experience. Based on the gathered literature, this paper proposes a conceptual framework to understand how software startup teams could obtain entrepreneurial experience-based learning. Moreover, the paper highlights the challenges of entrepreneurial experience-based learning confronted by software startups.

Keywords: Experiential Learning · Entrepreneurial Learning · Software Startups · Entrepreneurial Experience · Reflection

1 Introduction

In less than a decade, software startups gained a lot of attention [1]. A startup's goal is to solve customers' urgent problem, and doing so they work under extreme unpredictability and encounter various challenges [2],[3],[4]. Startup teams, while working on various versions of a prototype [5] and busy at satisfying customers' need, often neglect to reflect on their experience[6]. Experience of an entrepreneur in a startup team is a vital aspect for a startup. There are various advantages of reflecting on experience; entrepreneurs can quickly grasp the challenges, coordinate better with the team members, align themselves to others in terms of fixed objectives, and require less guidance at the early stages [7], [8]. An experience that a learner ¹ encounters is basically the complete response to an event. This event could be formal (planned or deliberately done [9]) or informal (unintentionally happens) [10].

In order to obtain the learning from experience, an entrepreneur should reflect on the experience. A reflection is a form of a reaction that is carried out by a

¹ In this article, we refer to an entrepreneur as a learner

learner on an experience. The resulting outcome which is learning [10] can be defined as concept of experience plus reflection [11], [12].

This type of intentional learning [13] in which adult learners [14] are attentive about what they are learning [10], what is performed on the experience [15] or in which the learner aims to preserve [16], is our focus of interest. It is important to promote this experience-based learning in the working environment [17], [18], [19]. Our target is not on the learning which is intended to adult learning in classroom settings [20].

Various authors have mentioned the challenges that occur in software startups. Bosch et al. have argued the challenge of whether it is worth to invest resource to scale the product idea of software startup [3]. Giardino et al. have provided challenges that startups have to face from forming the idea journey to the initial prototype deliver to market [2]. But there is less mentioned about the experiential learning and the challenges involved in the context of software startups. Therefore the research questions this paper addresses are:

RQ 1.) How to obtain the entrepreneurial experience-based learning inside the software startup teams?

RQ 2.) What are the challenges of entrepreneurial experience-based learning inside the software startup teams?

To answer the research questions the article provides a conceptual framework for entrepreneurial experience-based learning inside the software startups. The paper is organized as follows: Section 2 presents related work on experience-based learning. Section 3 describes the conceptual framework formalized based on the gathered literature. Section 4 states the discussion section and finally concludes the paper.

2 Related Work

The existing literature shows that various scholars mentioned the experience-based learning terminology in three ways, “learning from experience”, “experiential learning” and “experience-based learning”. The degree of sameness between these phrases is much higher than a degree of dissimilarity [21]. Irrespective of the terminology mentioned the essence lies in the experience that is encountered by the learner. It is the main source of learning in order to draw the experience-based learning [21],[22],[23],[24]. The other similar terminology to experience-based learning is “entrepreneurial learning” because it is defined as a learning where the entrepreneur establish competence through experience [25],[26], [27].

Based on experiential learning, author Matsuo [17] describes a framework in which five facilitators, that assist the learning process based on experience. Namely, “seeking challenging task”, “critical reflection”, “enjoyment of work”, “learning goal orientation” and “development network” are the mentioned facilitators in his framework. The utmost two facilitators are antecedents of the first three that assist the progress of experiential learning. Also, “learning goal orientation” and “development network” are set as drivers that trigger the initial three facilitators. “seeking challenging task”, “critical reflection” and “enjoy-

ment of work” directly impact on the D.A Kolb’s experiential learning model [28]. Matsuo, proposed the framework to overcome the weak points (social factors, critical reflection, and the meta-learning process [29], [30], [31])of Kolb’s experiential learning cycle [17].

Few authors have mentioned about challenges of experience-based learning while applied in a new environment from previous work experience. Toft-Kehler et al. state that for an individual, one of the challenges is to generalize the previously obtained experience and apply it to the new settings [32]. Gathered knowledge by an individual could vary according to previously encountered events. Generally, the newly formed firms face challenges and if the new environment setting is intricate or tricky, it is difficult to transfer the former experience. The other challenge that article describes is that the earlier obtained learning cannot be predicted as additive and self-regulating with every consecutive effort [32]. Aarstad et al. describe the challenge in regards to a novice and experienced entrepreneur. The way experiences entrepreneur respond to challenges in the firm differs from a novice. This due to the experience that is accumulated in an individual because of the daily learning activities and handling various critical events. Experience of entrepreneur helps to well-defined and lay strategies in order to deal with a critical problem in the firm, while novice entrepreneur faces difficulties to do the same [33]. Few entrepreneurs carry out a project in an improved manner if they have experienced a tough or bad period and some in worsened manner if they have experienced a good period. In general, an entrepreneur is subjected to be over-optimistic about the project. Sometimes, even too intellectual and over-confident behaviour towards the project in their initial ventures [34]. One learning challenge states the reflection of learner own and internal energy interaction with the experience. Experiential learning requires the holistic [21], [15] involvement of the learner. Sometimes a learner is unwilling to reflect upon an experience due to their understanding or assumptions on a subject [12]. The essence could exist in experience but sometimes it does not lead to learning. This is due to that fact that not all humans learn evenly from the same kind of work nominated to them [35], [36]. The table 1 below summarizes the gathered challenges from the literature:

Table 1. Challenges involved with entrepreneurial experience-based learning

No.	Challenges	Reference
1	Generalizing the old experience and applying to new venture.	[32]
2	Previously obtained experience cannot be predicted as self-additive and regulative.	[32]
3	Difference between the experience of novice or experience entrepreneur.	[33],[7]
4	Over optimistic and intellectual behavior in there initial ventures.	[34]
5	Learner unwilling to reflect upon an experience.	[12]
6	Same kind of work does not lead to equal experiential learning.	[35],[36]

3 Conceptual Framework

An entrepreneur do learn from experience [26] and in daily routine horde of experience takes place [37]. It is important that learner should be mentally aware when the events take place. Figure 1 provides the conceptual framework to cast the experience into learning. The framework comprises four elements of learner or entrepreneur, reflection, learning and experience. This framework is the evolution of the previous work done [6]. Based on the gathered literature, various changes were done in order to evolve the framework more concrete. One of the most important reasons to modify the framework was to perform reflection on experience but free from time intervals. Previously, the work was based on agile retrospectives where the obtained learning was at various intervals that is whenever the retrospective was carried out by the team. As experience takes place irrespective of the time [37] boundaries, therefore, reflection should be performed too regardless of specific interval.

Earlier the work showed the process to obtain learning from experience in a team by applying agile retrospectives. According to agile manifesto twelfth principle “At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behaviour accordingly” [38] a team should reflect on various intervals (sprints/iterations). A retrospective is one of the agile practices in order to perform reflection. Various authors have mentioned the ways to perform retrospectives. Commonly adopted by the team is the five-step process [39] by Derby et al.[40]. These steps are “1. Set the stage, 2. Gather Data, 3. Generate Insights, 4. Decide What to Do, and 5. Close the Retrospective” [39]. Three questions are discussed during the retrospective sessions: What went well? What did not go well? and What could be done? [41], [42] to make the enriched future sprints.

As reflection is the process that can be carried out anytime, hence we matured the work by modifying and removing some elements based on the gathered literature. Source and type of experience encountered by the learner are specified in details in the framework. Learning block is added and various kind of entrepreneurs are specified. Reflection done through retrospectives were removed from the framework. In addition, debriefing and reconstruction on experience are combined in the reflection block.

The experience could happen in either through an external agent or through internal emotion or sense [10]. Various authors have mentioned the types of experience present. Few to mention, the past or current experience [43],[26],[44] or the past business experience, experience from other entrepreneur [45], negative or positive experience [43]. Lamont describes the experience that an entrepreneur gather after investing time in earlier business. An entrepreneur can considerably learn from spending time after initiating or developing a company[45]. One of the essential factors which influence the performance of an entrepreneur is dependent on the earlier experience obtained by involvement in the previous business [32],[46]. The experience obtained can also scale in terms of negative or positive experience. An entrepreneur inclines to apply the positive practice again and abandon the negative ones [43].

Experiential learning could also variate in terms of the type of entrepreneurs. For example, depending on the difficulty of the task, an entrepreneur could experience differently [35]. Ucbasaran et al. classify four type of entrepreneurs habitual, portfolio, serial and novice entrepreneur [47]. These entrepreneurs can obtain the experience by practising [25] the events. This is due to the fact that when there is diversity in the environment or flow of an event, an entrepreneur can identify them. This raises the forthcoming concern and hence entrepreneur should notice it and increase there experience about the environment [25].

They occur in a learner's life by the earlier or current events or activities [21]. It is vital to recognizing those events, type of events and their meaning [48], [35]. The experience could also be obtained by the experience from others, observing other entrepreneur and their gathered information. In this way, entrepreneur lowers the own competence to learn directly. But this is useful in the case when the experience to be learned from others is available in sufficient amount in the entrepreneurial learning environment [49]. Some entrepreneur having experience with previous failures or negative experience in the business are less likely to encounter negative events in future business [50],[44],[51] and positive experience help to start a new business faster [51].

Learners reflection on the experience is a crucial component of this framework. In order to learn from experience, experience is not just enough, debriefing and reflecting on the experience is crucial too [21], [52], [54], [55], [14]. Debriefing in terms to experience is specifying the events in every detail or keeping the note for actions. It assists the reflection in formatted or structure manner, through which experience is used for learning. Debriefing is a stage which could occur either shortly after the experience was encountered or sometimes later [37]. If the learner encounters the immediate experience, commonly it is associated with deliberate or planned event [9]. In order to have a planned experience, there are three stages: preparation, engagement in the event and transforming into what has been experienced [10]. Three questions that could be done during the debriefing stage are: What happened?, How did the learner feel? What does it mean? [37]. Critical analysis and synthesis on the experience is also enumerated at the debriefing and reflection [52] stage.

The meaning of reflection here with debriefing is to specify the buried thought on experience which learner wants to take into consideration, in return to obtain learning. Reflection is deliberately viewing and thinking about the experience and then analyzing them [10], [53]. To reflect, the four styles of reflection the learner could consider are telling, writing, multimedia and activities. Telling could be done by storytelling, presentations, discussions and talking informal way with other. Writing, on the other hand, includes directed writing, a case of sheets (with a script, drawings and maps), a diary of tacking the thoughts with respect to a period of time. Multimedia incorporates videos, photos, a collage of illustrations or images or some visual representations. Finally, the activities could be accomplished by interviewing someone or spending time for some particular activity [9]. According to [9] some ways which help a learner to reflect on experience are listed in the table where a learner should spend:

- time alone and in silence environment, thinking quietly [10]
- be aware off and carefully observe the current event [10]
- examine the event [10] or task with deep understanding and the objective why it is carried out
- thinking and making sense of earlier experience [10] and connecting dots with the current experience
- should allow oneself to be emotional while reflecting on thoughts

To complete the learning process after debriefing and reflection, a learner should then evaluate and reconstruct in the light experience [21]. While reconstructing the experience, a learner can do it individually, collectively or both[21]. The main objective for this step is to make the experience ongoing and persuasive. A learner should define the reflected experience, agree and deal with the emotion and attitude. Basically to be compatible, clear and more understanding of the new experience or information, a belief which was reflected [10]. The learning element here involves three crucial elements of the learner's involvement (capability of his mind, awareness, sensitivity) [21]. Experience-based learning includes various elements. Learning occurs once the learner has pursued these elements [56]. Furthermore, a learner should continuously reflect upon the experiences encountered which help to enumerate and reconstruct them into the buried understanding [21]. To obtain and share the learning inside the team

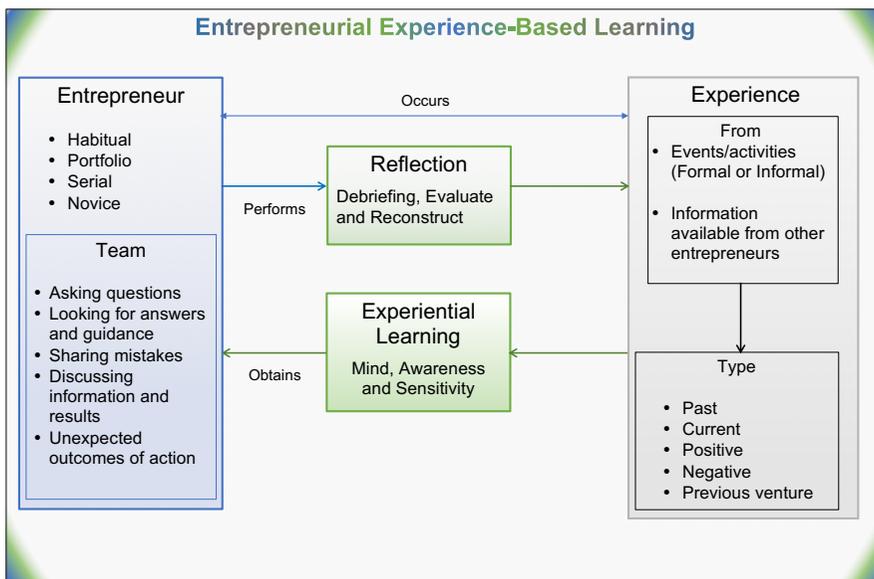


Fig. 1. Conceptual framework for entrepreneurial experience-based learning

it is important to perform the reflection with the team members. This process of reflection and action upon it could be carried out by a group of individual learners in teams by asking questions, looking for answers, sharing mistakes and unexpected outcomes and discussing them [57]. While doing so, learners share their reflected experience. At few instances, learners learn from others shared experience, but if the information available is in abundance [49].

4 Discussion and Conclusions

This study describes the entrepreneurial experience-based learning in software startups. Previous studies on software startups have neglected the importance of entrepreneurial experience-based learning inside the software startups teams. We have proposed a conceptual framework in order to obtain the entrepreneurial experience-based learning inside the software startup teams. The proposed framework is the evolution of the past work done [6] based on the gathered literature. The previous work included agile retrospectives in order to reflect on the experience. Currently the framework is free from time-dependent retrospectives. Reflection can be performed at any instance of time in order to obtain experiential learning. Also, the article suggests the tips and techniques of performing reflection on experience. The threats to validity that are worth to discuss [58]. One of the most important threat is the validity of the framework. In order to mitigate this risk, we will do the validation of the framework with several software startups. It is an ongoing work and the future literature review would contribute to the framework, by making learning from experience a continuous loop. Moreover, we will also update the literature with other experiential learning challenges in the context of software startups. Finally, we would provide an empirical tested conceptual framework for entrepreneurial experience-based learning in software startups.

References

1. Unterkalmsteiner, M., Abrahamsson, P., Wang, X., Nguyen-Duc, A., Shah, S., Bajwa, S. S., ..., Edison, H.: Software startups—a research agenda. In: *e-Informatica Software Engineering Journal*, 10(1).(2016)
2. Giardino, C., Bajwa, S.S., Wang, X., Abrahamsson, P.: Key challenges in early-stage software startups. In: *International Conference on Agile Software Development*, Springer, Cham., pp.52–63. (2015)
3. Bosch, J., Olsson, H.H., Björk, J., Ljungblad, J.: The early stage software startup development model: a framework for operationalizing lean principles in software startups. In: *Lean Enterprise Software and Systems*, Springer, Heidelberg, pp.1–15. (2013)
4. Paternoster, N., Giardino, C., Unterkalmsteiner, M., Gorschek, T., Abrahamsson, P.: Software development in startup companies: A systematic mapping study. In: *Information and Software Technology*, 56(10), pp.1200–1218. (2014)
5. Khanna, D., Nguyen-Duc, A., Wang, X.: From MVPs to pivots: a hypothesis-driven journey of two software startups. In: *International Conference on Software Business*. (2018) arXiv preprint arXiv:1808.05630

6. Khanna, D.: Experiential Team Learning in Software Startups. In: International Conference on Agile Software Development. Springer, Cham. (2018)
7. Kim, P.H., Longest, K.C.: You can't leave your work behind: Employment experience and founding collaborations. In: *Journal of Business Venturing*, 29(6), pp.785–806. (2014)
8. Wasserman, N.: *The founder's dilemmas: Anticipating and avoiding the pitfalls that can sink a startup*. Princeton University Press. (2012)
9. Collier, P.J., Williams, D.R.: Reflection in action. *CR Cress*, PJ Collier, (50), pp.83–97. (2005)
10. Boud, D., Keogh, R., Walker, D.: *Reflection: Turning experience into learning*. Routledge. (2013)
11. Dewey, J.: *Experience and Education* Kappa Delta PI Lecture Series. In: Collier-Macmillan Books 1963, London, (1938)
12. Fowler, J.: Experiential learning and its facilitation. In: *Nurse Education Today*, 28(4), pp.427–433. (2008)
13. Tough, A.: *The Adult's Learning Projects. A Fresh Approach to Theory and Practice in Adult Learning*. (1979)
14. Lewis, L.H., Williams, C.J.: Experiential learning: Past and present. *New directions for adult and continuing education*, (62), pp.5–16. (1994)
15. Boud, D., Pascoe, J.: Conceptualizing experiential learning. D. Boud & J. Pascoe. *Experiential Learning: Developments in Australian Post Secondary Education*. Sydney: Australian Consortium on Experiential Education. (1978)
16. Knapper, C., Cropley, A.J.: *Lifelong learning in higher education*. Psychology Press. (2000)
17. Matsu, M.: A framework for facilitating experiential learning. In: *Human Resource Development Review*, 14(4), pp.442–461. (2015)
18. Illeris, K.: What do we actually mean by experiential learning? In: *Human Resource Development Review*, 6(1), pp.84–95. (2007)
19. Yamazaki, Y., Kayes, D. C.: An experiential approach to cross-cultural learning: A review and integration of competencies for successful expatriate adaptation. In: *Academy of Management Learning & Education*, 3(4), pp.362–379. (2004)
20. Coleman, J.S.: *Differences between experiential and classroom learning*. Keeton and. (1976)
21. Andresen, L., Boud, D., Cohen, R.: Experience-based learning. *Understanding adult education and training*, (2), pp.225–239. (2000)
22. Kolb, A.Y., Kolb, D.A.: Experiential learning theory: A dynamic, holistic approach to management learning, education and development. *The SAGE handbook of management learning, education and development*, pp.42–68. (2009)
23. Clark, R.W., Threton, M.D., Ewing, J.C.: The Potential of Experiential Learning Models and Practices in Career and Technical Education and Career and Technical Teacher Education. In: *Journal of Career and Technical Education*, 25(2), pp.46–62. (2010)
24. LealRodríguez, A.L., Albort-Morant, G.: Promoting innovative experiential learning practices to improve academic performance: Empirical evidence from a Spanish Business School. In: *Journal of Innovation & Knowledge*. (2018)
25. Zheng, W., Xu, M., Chen, X., Dong, Y.: Who is shaping entrepreneurial experience? A multiple case study of Chinese entrepreneurial learning. In: *Management Decision*, 55(7), pp.1394–1409. (2017)
26. Sardana, D., Scott-Kemmis, D.: Who learns what? A study based on entrepreneur from biotechnology new ventures. In: *Journal of Small Business Management*, 48(3), pp.441–468. (2010)

27. Politis, D.: The process of entrepreneurial learning: A conceptual framework. In: *Entrepreneurship theory and practice*, 29(4), pp.399–424. (2010)
28. Kolb, D. A.: *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice Hall. (1984)
29. Holman, D., Pavlica, K., Thorpe, R.: Rethinking Kolb's theory of experiential learning: The contribution of social constructivism and activity theory. In: *Management Learning*, (28), pp.135–148. (1997)
30. Reynolds, M., Vince, R.: Organizing reflection: An introduction. In: M. Reynolds & R. Vince (Eds.), *Organizing reflection*, Aldershot: Ashgate Gower, pp.1–14. (2004)
31. Vince, R.: Behind and beyond Kolb's learning cycle. In: *Journal of Management Education*, (22), pp.304–319. (1998)
32. Toft-Kehler, R., Wennberg, K., Kim, P.: Practice makes perfect: entrepreneurial experience curves and venture performance. In: *Journal of Business Venturing*, 29(4), pp.453–470. (2014)
33. Aarstad, J., Pettersen, I.B., Henriksen, K.E.: Entrepreneurial experience and access to critical resources: a learning perspective. In: *Baltic Journal of Management*, 11(1), pp.89–107. (2016)
34. Parker, S.C.: Do serial entrepreneur run successively better-performing businesses?. In: *Journal of Business Venturing*, 28(5), pp.652–666. (2013)
35. Matsuo, M.: *The Experiential Learning Process of Japanese IT Professionals*. (2006)
36. Beard, C., Wilson, J. P.: *The Power of Experiential Learning*. In: *A Handbook for Trainers and Educators*. (2002)
37. Pearson, M., Smith, D.: Debriefing in experience-based learning. *Reflection: Turning experience into learning*, pp.69–84. (2005)
38. Beck, K., Beedle, M., Van, B.A., Cockburn, A., Cunningham, W., Fowler, M., Grenning, J., Highsmith, J., Hunt, A., Jeffries, R., Kern, J.: *Manifesto for agile software development*. (2001)
39. Andriyani, Y., Hoda, R., Amor, R.: Reflection in Agile Retrospectives. In: *International Conference on Agile Software Development*, Springer, Cham., pp.3–19. (2017)
40. Derby, E., Larsen, D., Schwaber, K.: *Agile retrospectives: Making good teams great*. Pragmatic Bookshelf. (2006)
41. McHugh, O., Conboy, K., Lang, M.: Agile practices: The impact on trust in software project teams. In: *IEEE Software*, 29(3), pp.71–6. (2012)
42. Ringstad, M.A., Dingsøy, T., BredeMoe, N.: Agile process improvement: diagnosis and planning to improve teamwork. In: O'Connor, R.V., Pries-Heje, J., Messnarz, R. (eds.) *EuroSPI 2011. CCIS*, Springer, Heidelberg, (172), pp.167–178. (2011)
43. Minniti, M., Bygrave, W.: A dynamic model of entrepreneurial learning. In: *Entrepreneurship Theory and Practice*, 25(3), pp.5–16. (2001)
44. Rerup, C.: Learning from past experience: Footnotes on mindfulness and habitual entrepreneurship. In: *Scandinavian Journal of Management*, (21), pp.451–472. (2005)
45. Lamont, L. M.: What entrepreneur learn from experience. In: *Journal of Small Business Management*, 10(3), pp.36–41. (1972)
46. Stuart, R.W., Abetti, P.A.: Impact of entrepreneurial and management experience on early performance. In: *Journal of Business Venturing*, 5(3), pp.151–162. (1990)
47. Ucbasaran, D., Westhead, P., Wright, M.: *Habitual Entrepreneurs*, Edward Elgar Publishing, Northampton. (2006)

48. Krogstie, B.R., Divitini, M.: Shared timeline and individual experience: Supporting retrospective reflection in student software engineering teams. In: *Software Engineering Education and Training, CSEET'09. 22nd Conference*, pp.85–92. (2009)
49. Lévesque, M., Minniti, M., Shepherd, D.: Entrepreneurs' decisions on timing of entry: Learning from participation and from the experiences of others. In: *Entrepreneurship Theory and Practice*, 33(2), pp.547–570. (2009)
50. Ucbasaran, D., Westhead, P., Wright, M., Flores, M.: The nature of entrepreneurial experience, business failure and comparative optimism. In: *Journal of Business Venturing*, 25(6), pp.541–555. (2010)
51. Long, D., Dong, N.: The effect of experience and innovativeness of entrepreneurial opportunities on the new venture emergence in China: The moderating effect of munificence. In: *Journal of Entrepreneurship in Emerging Economies*, 9(1), pp.21–34. (2017)
52. Seaman, J.: Experience, reflect, critique: The end of the “learning cycles” era. In: *Journal of Experiential Education*, 31(1), pp.3–18. (2008)
53. Atkins, S., Murphy, K.: Reflection: a review of the literature. In: *Journal of advanced nursing*, 18(8), pp.1188–1192. (1993)
54. Jordi, R.: Reframing the concept of reflection: Consciousness, experiential learning, and reflective learning practices. In: *Adult education quarterly*, 61(2), pp.181–197. (2011)
55. Fenwick, T.: *Experiential learning: A theoretical critique from five perspectives*. Columbus: Ohio State University. (2001)
56. Wurdinger, S., Paxton, T.: Using multiple levels of experience to promote autonomy in adventure education students. In: *Journal of Adventure Education & Outdoor Learning*, 3(1), pp.41–48. (2003)
57. Edmondson, A.C.: Psychological safety and learning behavior in work teams. In: *Administrative science quarterly*, 44(2), pp.350–383. (1999)
58. Runeson, P., Höst, M.: Guidelines for conducting and reporting case study research in software engineering. In: *Empirical software engineering*. 14(2), pp.131. (2009)