Agile Development of Learning Analytics Tools in a Rigid Environment like a University: Benefits, Challenges and Strategies

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Abstract. Because academic and learning analytics tools aim to inform and improve the teaching and learning process, users have a fundamental role in their conception and design. The early involvement of end-users helps to ensure the delivery of a valuable and understandable tool. Consequently this eases adoption by an educational institution. In this regard, the development of learning analytics tools has many reasons to benefit from agile practices but paradoxically they are usually inserted in traditionally rigid environments such as higher education institutions. This inherent rigidity poses challenges in conflict with the usual agile software development lifecycle (SDLC) practices and principles (eg. increased discomfort with late requirement changes). This work presents, through the experience of the Austral University of Chile with the SDLC of the TrAC and VERA tools, how to reconcile the necessary agile practices to overcome these challenges to create useful analytics tools and incorporate them into a higher education institution. Both tools are in pilot phase in the university and the partial findings show that it is possible to reconcile agile development in a rigid environment with appropriate strategies.

Keywords: Learning analytics · Agile methodologies · User modelling

1 Introduction and Related Work

Academics and Learning Analytics provides a model for university leaders to improve teaching, learning, organizational efficiency and decision making [4]. Nonetheless learning analytics (LA) initiatives often have difficulty to move out of their prototype setting into the real educational practice. It has proven to be challenging to create scalable implementations of LA in authentic contexts that go beyond a particular course or setting [1,2]. According to [6], the involvement of the relevant stakeholders (e.g., learners, instructors, instructional designers, information technology support, and institutional administrators) is necessary in all stages of the development, implementation, and evaluation of LA and the culture that the extensive use of data in education carries.

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Agile methodologies are largely used in the software industry. According to [7], 52% of companies stated that more than half of the teams in their organizations are using agile practices, in 97% of them at least one team practiced agile. The most cited reasons for adopting agile are: Accelerate software delivery (75%), Enhance ability to manage changing priorities (64%), Increase productivity (55%), Improve business/IT alignment (49%), Enhance software quality (46%), Enhance delivery predictability (46%) and Improve project visibility (42%).

Therefore, LA tools software development lifecycle (SDLC) has many reasons to benefit from agile approach but paradoxically they are usually inserted in traditionally rigid environments such as a university. This inherent rigidity poses challenges in conflict with the usual agile SDLC values and practices.

This work describes the agile approach employed in the development and adoption of TrAC and VERA tools in the context of the LALA project (Building Capacity to Use Learning Analytics to Improve Higher Education in Latin America - https://www.lalaproject.org).

2 Materials and Methods

(a) VERA
Visualizador de Encuestas para Reflexión Académica

(b) TrAC
Trayectoria Académica y Curricular

Fig. 1. Screenshots of VERA (a) and TrAC (b) dashboards

2.1 TrAC and VERA in the LALA Context

TrAC (Curricular Academic Trajectory) and VERA (Surveys Display for Academic Reflection) are tools developed in the context of the LALA project. Figure 1 shows a screenshot of each platform. Both tools were implemented and are being piloted mainly in Austral University of Chile (UACh). The pilot phase of TrAC started the first semester of 2019 and the VERA pilot starts its second semester. TrAC will be adopted too by another Chilean University: Catholic University of the Most Holy Conception. Detailed information about design is available at https://bit.ly/2WHPZtx

2.2 Agile Collides with the Academic Rigidity: How to Succeed

Despite the benefits of agile, it is not possible to apply directly every practice of any specific methodology. It happens because the academic environment

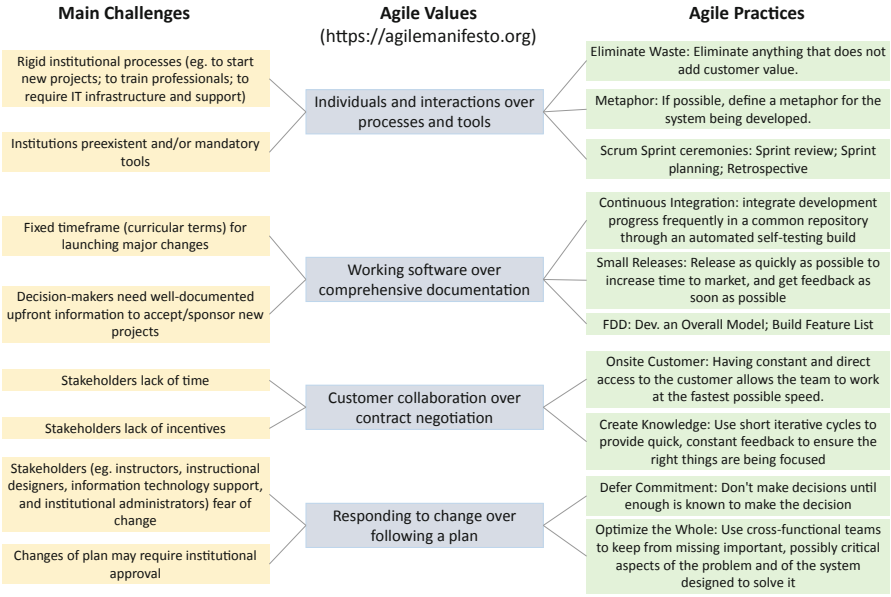

Fig. 2. Agile in a rigid educational environment: a practical guide

imposes some inherent rigidity. As noted by [3], even points relatively trivial, as the fact that the academic year revolves around semesters, requires special awareness, because major platform launches or changes are generally viable just prior the beginning of a particular semester. The left column of Fig. 2 lists the main challenges gathered from literature [3,6] and discussion sessions among our development team members, mainly in the first sprint planning meetings and continuous validation in retrospective sessions. Therefore we decided to revisit the fundamental agile values, as transcribed in the center column of Fig. 2, and look for specific practices from different methodologies (right column) that could be applied together to overcome these challenges.

3 Results

3.1 Main Benefits of Agile in Learning Analytics

Preliminary results show that the easy-of-use achieved was so high that the required training sessions were almost regarded as redundant as the end-users can learn to use the tools by themselves. Then early adopters become ambassadors driving the expansion and continuity of use of the platforms in the university.

3.2 Main Challenges of Agile in Learning Analytics

Even if the list shown in Fig. 2 may not be exhaustive of every challenge faced in this kind of environment, we seem to have prioritized and tested the most relevant challenges found in the literature and analyzed by ourselves towards the sustainable adoption of LA.

3.3 Main Strategies to Overcome the Challenges and Take Advantage of the Benefits of Agile in Learning Analytics

The following list sums up the main strategies derived of the agile practices listed in Fig. 2:

- Prioritize fundamental values and principles over specific methodologies.
- Flexibility even when it paradoxically means to compromise with some inevitable degree of environmental rigidity.
- Partially agile is better than no agile at all.
- Developing and adopting LA tools are about learning as well.

4 Conclusions and Future Steps

This work shows why and how to bring the benefits of agile to the development and adoption of two analytics tools in the inherent rigid environment of a university. These strategies are general enough to guide similar endeavours, as we hope to extend, evaluate and validate in subsequent phases of the LALA project.

Besides that, academics and learning analytics tools are usually developed inside research departments within the universities. As [5] points out, some agile practices are most learned in the industry or are self-taught (i.e., not pervasive yet to the research environment). Future work can assess if it is related to the abundance of failed or abandoned LA projects. Either way, we hope the model emerged in this work can be a simple yet powerful guide to help the agile world meets smoothly with the environment of LA tools.

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References

1. De Laet, T., et al.: Involving stakeholders in learning analytics: opportunity or threat for learning analytics at scale. In: Proceedings 8th International Conference on Learning Analytics & Knowledge, pp. 602–606 (2018)
2. Ferguson, R., Clow, D., Macfadyen, L., Essa, A., Dawson, S., Alexander, S.: Setting learning analytics in context. In: Proceedings of the Fourth International Conference on Learning Analytics And Knowledge - LAK 2014, pp. 251–253 (2014)
3. Doherty, I.: Agile project management for e-learning developments. J. Distance Educ. **24**(1), 91–106 (2010)
4. Howlin, C., Lynch, D.: Learning and academic analytics in the realizeit system. In: E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education, pp. 862–872 (2014)
5. Vargas, T., Chevreux, H., Henriquez, V., Lima, H.: Continuous integration in Chile: knowledge, perception, and interest. In: Jornadas Iberoamericanas de Ingenieria de Software e Ingenieria del Conocimiento - JIISIC 2018, pp. 247–259 (2018)
6. Gašević, D., Dawson, S., Siemens, G.: Let's not forget: learning analytics are about learning. TechTrends **59**(1), 64–71 (2015)
7. One, V.: 12th Annual State of Agile Survey Report (2018). http://stateofagile.versionone.com