# LALA

## Building Capacity to Use Learning Analytics to Improve Higher Education in Latin America

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# LALA Framework

## Version 2.0 (English)

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# SECTION 1. INTRODUCTION

Learning Analytics (LA) strives to develop different methodologies, techniques and technological tools for the analysis of educational data (Siemens & Baker, 2012). This line of work has grown strongly in the last decade (Arnold et al., 2014, Ferguson et al., 2016), both due to the progressive accumulation of data and the urgent need to optimize teaching and learning processes (Gašević & Dawson, 2015). In fact, in recent years, higher education institutions have begun to explore how learning analytics can be integrated as part of their processes - from methodologies for data capture and management, to the technological tools needed for their manipulation.

In the current literature, most of the studies published in this line have been oriented toward the development of models and technologies to visualize descriptive or predictive data in relation to student performance (Arnold et al., 2014; Ferguson et al., 2016; Gašević & Dawson, 2015). However, the reality is that the adoption of these models and technologies is still scarce. On the one hand, existing methodologies and tools do not always present relevant information to provide feedback for the teaching and learning processes (Bodily & Verbert, 2017; Gašević & Dawson, 2015), or institutional management processes in higher education or on other educational levels (Ferguson et al., 2016). On the other hand, the studies that evaluate and validate this type of methodologies and tools are scarce, and their evaluations are limited to specific aspects for a limited period of time (Arnold et al., 2014, Ferguson et al., 2016, SOLAR, 2017), without necessarily assessing the needs of its users (Bodily & Verbert, 2017).

Therefore, higher education institutions must work to further the adoption and incorporation of LA tools in their processes. For example, institutions must transform their data capture and processing processes to take into account ethical and privacy considerations that affect the use of educational data at the institutional level (Drachsler & Greller, 2016; Y. Tsai, Moreno-Marcos, Tammets, & Gasevic, 2018). To facilitate these processes, institutions must have practical guides and methodologies, as well as exemplary case studies that can guide them on how to benefit from existing learning analytical tools (Colvin, Dawson, & Fisher, 2015; Ferguson et al., 2016).

In Europe, there has been work done in this line and frameworks have been developed to guide institutional policies in higher education so that they anticipate the implications of adopting LA in different areas (Y. Tsai & Gasevic, 2017). One of these frameworks has been developed by the SHEILA project, a project funded by the European Union that aims to propose a framework to support higher education institutions in the adoption of LA (Y. S. Tsai et al., 2018). In Europe, there are already initiatives that advocate the good management of data in terms of ethics and privacy. In this area, the Great Britain's Joint Information System Committee (JISC) published a code in 2015, addressing the aspects such as: legal responsibility and ethics on data, transparency criteria, and consent policies for

the purpose of protecting privacy, validity, and access to educational data for effective interventions.

However, in Latin America, efforts to adopt LA have been isolated. Although some initiatives have been implemented with the objective of measuring and optimizing teaching and learning processes, it is necessary to create a community that promotes the exchange of ideas, methodologies and tools in the region (Lemos dos Santos et al., 2017). It is therefore necessary to generate guiding frameworks that facilitate the development and adoption of LA in this region. Given the current context of LA adoption in Latin America, and the difference in maturity in this area compared to Australia and Europe, these guidelines should contemplate different aspects ranging from the creation of institutional strategies (as was done in the SHEILA project for Europe), to technological aspects to support the integration of analytical tools, aspects on data treatment ethics, and communal aspects to generate interest groups in the region.

In order to support the development and implementation of learning analytics in Latin America, this document presents the LALA framework: a methodological framework to guide the design, implementation and use of learning analytics tools in higher education institutions in Latin America. Specifically, the framework is composed of four fundamental dimensions: (1) the institutional dimension, which considers the current and desired state of the institution in relation to the adoption of LA; (2) the methodological dimension, which considers the technical needs for the design and implementation of LA tools in the institution; (3) the ethical dimension, which considers the necessary guidelines for the ethical use of the data; and (4) the community dimension, which proposes a series of guidelines for the institution to join an international LA community to access support for research and development in this area. Each of these dimensions is addressed in a manual, and each manual describes the methodologies and instruments to support different processes.

This framework has been developed in a joint work with Latin American and European universities, taking as a reference the framework proposed by the SHEILA project and other European works. This collaboration has made it possible to benefit from the knowledge acquired by European institutions and adapt it to the Latin American needs to promote the implementation of LA in this region.

To date, there is no report that offers a general and specific overview of the steps to be followed by a Latin American institution interested in adopting a tool based on LA. Therefore, this document is the first practical guide in this line. It should be noted, however, that the scope of this work is to present the LALA framework without providing cases for its validation. The validation of the framework is proposed as future work, in the form of an extension of this manual.

Because its development is based on the experiences of institutions in Chile and Ecuador, this guide is oriented to the management of higher education institutions in Latin America. However, this work has been protected by Creative Commons (CC) with the objective of facilitating its adaptation and use for other contexts.

# SECTION 2. OBJECTIVES OF THE DELIVERABLE AND DOCUMENT STRUCTURE

The **general objective** of this deliverable is to provide guidelines for higher education institutions in Latin America in the design, implementation and adoption of learning analytics tools. In addition, it promotes the membership of institutions in a regional LA community to exchange good practices regarding the use of data and tools.

To ensure both objectives are achieved, the LALA framework has been developed. This framework has been conceived as a set of methodologies and instruments to facilitate and promote the design, implementation and adoption of learning analytics tools at institutional level. These methodologies and instruments are organized in 4 manuals that correspond to 4 fundamental dimensions for the adoption of this type of tools: (1) the institutional dimension, related to the political and strategic aspects of the institution; (2) the technological dimension, related to the technical aspects associated with the design and implementation of technological tools; (3) the ethical dimension, related to the ethical aspects of data treatment and management; and (4) the community dimension, related to the generation of a research community and good practices regarding learning analytics in Latin America. In addition, a series of case studies from 4 different Latin American institutions are presented to exemplify its application as a complement to the framework. Unlike other projects, such as the European project SHEILA, this deliverable contemplates the construction of a framework that goes beyond the institutional dimension, including important dimensions such as technology and ethics, both not yet considered in the region. In addition, through the communal dimension, the construction of an LA community for Latin America is contemplated, a region in which there are still no scientific initiatives and good practices in this area of knowledge. The objective is to start building this community from the countries represented in the project, and then extend it to other countries in the region.

This document describes the LALA framework, detailing each of the dimensions and the relationships that exist among them. First, an overview of the LALA framework is offered, highlighting its objective and structure. Second, the four manuals related to each dimension are presented. Each dimension is presented in the form of a practical manual that indicates the objective of the manual, the methodology used for its design, a step-by-step description of the activities to be followed to take into account the aspects related to this dimension, and information on how to use the manual. In addition, each manual describes the methodologies and instruments necessary for its use, all located in the APPENDIX of this document and the online folder. The manuals of each dimension are presented in a practical way, as a set of activities and instruments, all in the APPENDIX of this document and the online folder: https://drive.google.com/drive/folders/10Df7x5TmRQkkeMQzbW6Eg1sNYgEUHKg1?usp=sharing. Finally, in the conclusions section, the main contributions of the LALA framework are highlighted, as well as the following steps proposed to continue iterating on the manual. Among the next steps is the possibility of making

this manual accessible, in conjunction with cases of use of this framework developed throughout the project, so that they can serve as a guide to other Latin American countries.

# SECTION 3. LALA FRAMEWORK: OVERVIEW

## 3.1. LALA Framework Objective

This section presents an overview of the LALA framework and its four dimensions, with the objective of supporting the development of the culture of learning analytics in higher education institutions in Latin America.

## 3.2. LALA Framework Dimensions

The framework is structured in four dimensions to be considered in the process of design, implementation and adoption of learning analytics tools:

1. The **Institutional** dimension. It considers a series of phases and activities to understand what the current state and the desired state of the institution are in relation to policies and strategies for the incorporation of learning analytics tools in the institution.
2. The **Technological** dimension. It addresses technological aspects of the process of adopting a learning analytics tool at institutional level, taking into consideration the detection of a need, the design of a model or prototype, its testing and its evaluation for its final scaling. In addition, this dimension incorporates a series of guidelines to ensure adequate collection and management of educational data, as well as the management of adequate infrastructure and technological capabilities to support the implemented tools.
3. The **Ethical** dimension. It proposes a series of considerations to protect the privacy of students and teachers, maximizing the benefits associated with the use of educational data and minimizing the possible risks of their manipulation.
4. The **Community** dimension. It provides guidelines to promote the exchange of results and experiences with other higher education institutions, encouraging collaboration without compromising internal information and promoting a community for research and development of this area in the region.

These dimensions have been covered in 4 manuals, which have been created independently and following different methodologies.

## 3.3. How to Use the LALA Framework

Each of these manuals can be used independently depending on the needs and interests of each institution. However, they can also be used in an integrated manner, and for this second case, we propose a process in different phases, in which each phase contemplates the use of a manual, and the generation of a result that provides information for the following phase.

**Figure 1** shows the set of manuals that form the LALA framework and the relationships that are established. In the first phase, it is proposed to use the institutional dimension manual, whose use will allow the institution to obtain a

perspective of the current state of adoption of learning analytics and of the processes related to the learning analytics currently installed, and thus establish the ideal state which they want to reach from the perspective of all the actors involved (students, teachers, and managers). The result of this phase is a list of the needs of the institution and its main actors in the form of strategic lines to reach a desired state.
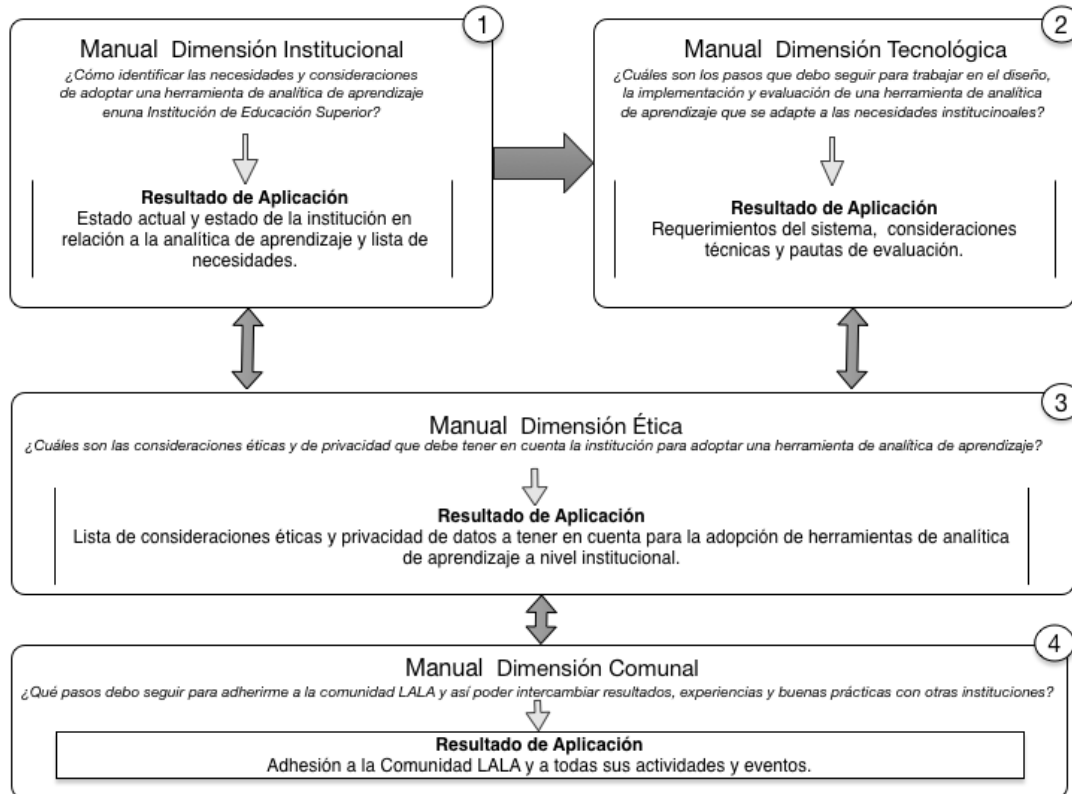


*Figure 1 LALA framework manuals, considering the four main dimensions: institutional, technological, ethical and community. An order is proposed for the use of the manuals if they are used together, although each manual can be used independently*

In the second phase, a series of guidelines are proposed to design, implement and evaluate learning analytics tools that can solve the list of needs identified in the first phase. With the intervention of developers and researchers - in addition to students, teachers and/or managers – a series of activities are proposed to identify the main requirements that these tools must meet to cover the identified needs. In addition, some guidelines are provided to: 1) identify what type of technological considerations are required to implement these tools (considering institutional resources), and 2) conduct a pilot evaluation of the tools designed. The result of this phase is a pilot tool evaluated in a real context.

The first and second phases can be executed iteratively. That is, after incorporating a learning analytics tool in the institution, the activities corresponding to the institutional dimension can be performed again in order to observe how the institution and its processes have been transformed, and thus identify new needs.

In addition to the institutional and technological dimensions manuals, two manuals are proposed for the two dimensions that influence and support the first and

second phase transversally: the ethical dimension and the community dimension. On the one hand, the manual of the ethical dimension proposes a series of ethical considerations in relation to the data use and its policies. This manual includes templates for informed consent and data use agreements that can serve as an example to the institutions that use it. On the other hand, the community dimension manual provides information on how an institution can join the LALA Community. This community, consisting at the moment of 57 institutions and more than 120 members from 15 countries in Latin America, aims to generate a space for discussion and debate in Latin America around the design, implementation and adoption of learning analytics tools. By belonging to this community, the institutions will have access to documents, examples, good practice cases, courses and a research community that will serve as support to advance in the design and implementation of learning analytics projects in their institution.

This deliverable presents the first proposal of the LALA framework excluding its validation. The objective of this deliverable is to provide an initial document on which to build the different contributions of the LALA project that will serve, in turn, as the framework validation mechanism. Based on the tests and developments performed throughout the project, the framework will be reviewed continuously and iteratively in order to improve and adapt it to the needs detected throughout the project. Therefore, until 2020, adjustments to the framework will be presented as an appendix to this deliverable.

# SECTION 4. INSTITUTIONAL DIMENSION MANUAL

This section presents the manual for the institutional dimension (**Figure 2**). It describes the objectives of the manual, its general vision, the methodology used to define the manual, and the way in which this manual is applied, including the description of the instruments needed for its application and the expected results.
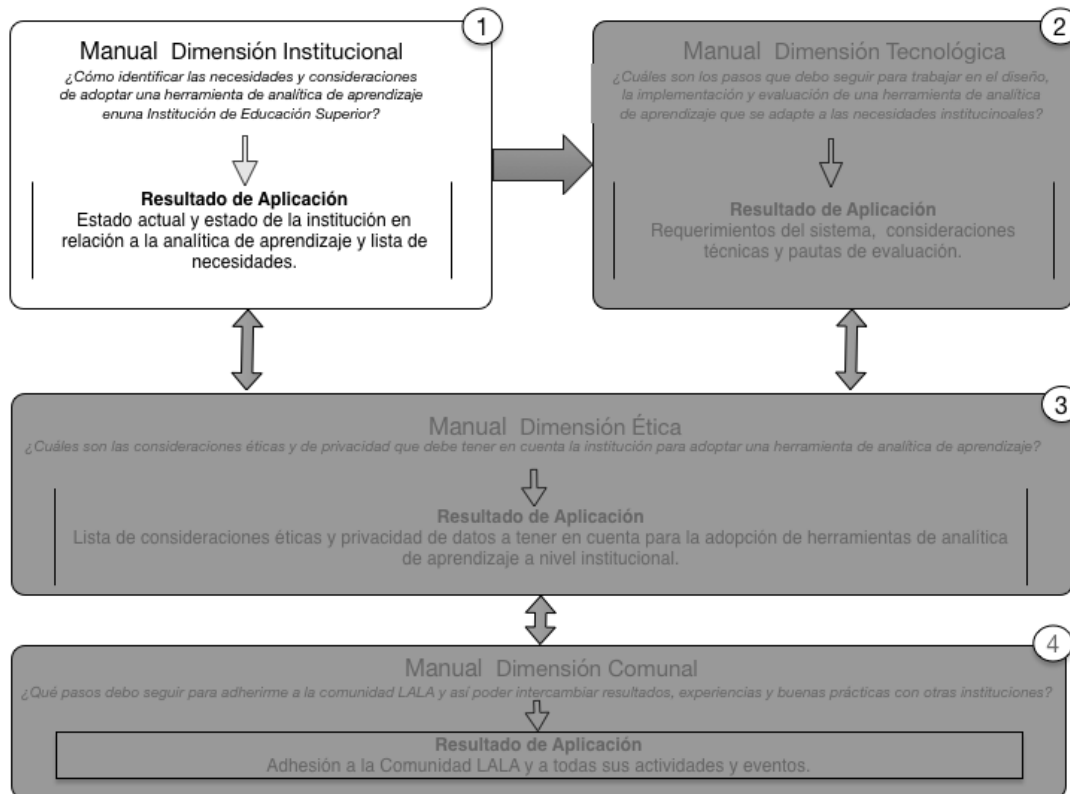


*Figure 2 Institutional Dimension manual in the LALA framework.*

## 4.1. Objectives

The institutional manual of the LALA framework aims to promote the participation and commitment of key actors - or stakeholders - (students, academic staff, and leaders) in the adoption of LA tools, anticipating political and strategic aspects. Specifically, it proposes activities to understand what the current state and the desired state of the institution is in relation to the incorporation of LA tools, as well as the policies and strategies established for the management of educational data.

The application of the manual will answer the question: *What are the institutional considerations to adopt a a learning analytics tool or process?* More specifically, it will allow the key actors of the higher education institution to:

- To detect needs that could be covered by a recurrent analysis of data on the performance of students and their teachers.
- Assess whether these needs require the design and/or implementation of an LA tool.
- Establish the objectives to be addressed in the institution with the application of LA.
- Define a strategy to design and implement an analytical tool, as well as promote its use from training courses to students and teachers.
- Anticipate the expectations and ethical considerations necessary for the use of an analytical tool at the institutional level, establishing objectives for the institution and involving key actors.

The result of the application of this manual will be a list of needs of the main actors of an institution in the form of strategic guidelines to reach a desired state in terms of adoption of LA.

# 4.2. Institutional Manual: Overview

The application of the Institutional manual involves four phases: 1) performing an institutional diagnosis, 2) understanding the political context and institutional needs, 3) identifying what is expected from the use of educational data, 4) developing a change strategy. Each phase is composed of one or more activities (**Figure 3**).



## Institutional Dimension
How to identify the needs and considerations of adopting a tool based on learning analytics in a higher education institution?

**Phase 1. Perform an institutional diagnosis**
- Apply LALA Canvas

**Phase 2. Understand the political context and the institutional needs**
- Interview institutional leaders
- Interview professors and students

**Phase 3. Identify what is expected from the use of educational data**
- Survey professors and students

**Phase 4. Develop a change strategy**
- Complete LALA Template

*Figure 3 Institutional manual application phases and the respective activities.*

As in the SHEILA project, the steps proposed in the ROMA (Rapid Outcome Mapping Approach) framework are approached at the dimensional level, but in different order and depth. This is because it has been adapted to the reality of the Latin American context, where something more guided by the level of development of the institutions is required. At the same time, each activity consists of one or several tasks accompanied by a series of instruments. **Table 1** summarizes the phases, instruments, and dimensions of the ROMA framework that have been

adapted, as well as the instruments used, their nature (quantitative or qualitative, group or individual) and whether applied in person or online. The following sections detail the activities, as well as the instruments that are used.

*Table 1* **Institutional manual activities, with its corresponding instruments and the dimensions that are analyzed**

| Phase | Instrument | Dimensions Analyzed | Instrument Type | Result |
|---|---|---|---|---|
| 1. Perform institutional diagnosis | LALA Canvas | • Change strategy<br>• Desired behaviors<br>• Internal capabilities<br>• Political context<br>• Influential actors<br>• Measurement and evaluation plan | Qualitative/ Group (application in person) | A document identifying key actors to be considered in phase 2 |
| 2. Understand the political context and institutional needs | Protocol for interviews with institutional leaders, professors, and students. | • Current state of LA adoption<br>• Desired state of LA adoption<br>• Challenges for LA adoption | Qualitative/ Individual and in person (institutional leaders)<br><br>Qualitative/ Group and in person (professors and students) | A description of the state of data, actions, policies necessary to adopt LA |
| 3. Identify what is expected from the use of educational data | Online questionnaires for students and professors | • Normative expectations about privacy and the use of educational data<br>• Predictive expectations about privacy and the use of educational data | Quantitative/ Individual (online application) | Frequency tables regarding what professors and students expect from the use of their data |
| 4. Develop change strategy | LALA Template | • Change strategy<br>• Desired behaviors<br>• Internal capabilities<br>• Political context<br>• Influential actors<br>• Measuring and evaluation plan | Qualitative/ Group (application in person) | Document that summarizes the LA adoption strategy |

# 4.3. Manual Creation Methodology

This guide was created using as a reference the ROMA-RAPID Outcome Mapping Approach framework which was developed more than a decade ago by the Overseas Development Institute (ODI) to improve the development of policies and influence the change of institutions (Young et al. al., 2014). This framework proposes an iterative six-step process: 1) draw up a map of the political context, 2) identify key actors, 3) identify desired behaviors, 4) develop a change strategy, 5) analyze internal capacities and 6) establish a plan of measurement and evaluation of what has been learned (Overseas Development Institute, 2009). These steps were

designed so that any institution can implement them, regardless of the degree of progress of a certain institutional policy (Young et al., 2014).

In the current bibliography, we can find several examples in which the ROMA framework has already been adapted with the purpose of promoting or motivating the adoption of learning analytics tools at the institutional level. Ferguson et al., (2014) used ROMA to analyze three cases of adoption in Australia and Great Britain, identifying some implications of the use of analytics tools on a large scale. Later, Tsai, Moreno-Marcos, Tammets, and Gasevic (2018) used ROMA to analyze the cases of use in different higher education institutions in Europe, and thus elaborate SHEILA-Supporting Higher Education to Integrate Learning Analytics – a framework to guide the development of institutional policies for the adoption of learning analytics in European institutions.

The **SHEILA Framework** (**Figure 4**) defines three axes to be considered in the development of these policies: action, challenges and policies. These axes guide the definition of a series of adopted dimensions of ROME:

1. **Map the political context of the institution.** In this dimension, the needs of the institution and the legal, economic and cultural aspects that affect the adoption of learning analytics are identified.
2. **Identify the main influential actors or stakeholders.** This dimension identifies the main actors involved in the collection and analysis of educational data, as well as the benefits and risks that the adoption of LA tools implies for them.
3. **Identify the desired institutional behaviors.** In this dimension, the expected changes in terms of the stakeholders involved must be analyzed.
4. **Develop a change strategy.** This dimension aims to define what actions are relevant to ensure the adoption of LA tools by the influential actors, and thus generate desired institutional behaviors.
5. **Analyze the internal capacity for change.** This dimension focuses on analyzing the institutions' capacity for change, considering their financial capacities, their infrastructure and the available human resources.
6. **Establish a form of monitoring and continuous improvement frameworks.** This dimension focuses on establishing strategies for monitoring change and continuous analysis of established change proposals to analyze their impact.
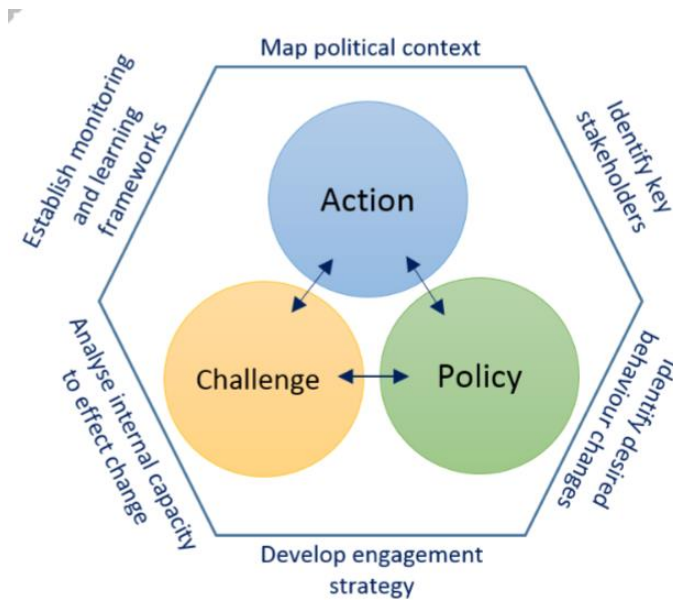
*Figure 4 SHEILA Framework, based on the ROMA Framework. This framework is taken as reference for the construction of the institutional dimension manual for the LALA framework.*

In the LALA Project, the process performed in the SHEILA project in relation to the use of the ROMA framework has been taken as a methodological framework. The objective of using this same methodology is to take advantage of the lessons learned from the SHEILA project to propose a manual that identifies the institutional needs in relation to learning analytics in Latin American institutions.

Specifically, there is reference made to the ROMA framework and the process of drafting the SHEILA project framework, and it is proposed to treat each of the 5 steps defined in the ROMA framework as dimensions to be analyzed in order to define an iterative methodology organized in four phases: 1 ) perform an institutional diagnosis, 2) understand the political context and institutional needs 3) identify what is expected from the use of educational data, and 4) develop a change strategy. Each of these phases has one or more instruments to guide managers of higher education institutions during the execution of the proposed methodology. Subsection 3.3 describes the activities associated with each of these phases.

# 4.4. Application of the Institutional Dimension Manual

## 4.4.1. Phase 1. Perform Institutional Diagnosis

**Phase 1 Objective**: To obtain a general diagnosis about the current state of the institution regarding learning analytics around the 6 dimensions of the ROMA Framework: (1) Strategy for change; (2) Desired behaviors; (3) Internal capabilities; (4) Political context; (5) Influential actors; and (6) Measurement and evaluation plan.

**Activity 1**: Application of LALA Canvas
- **Instrument used:** LALA Canvas (APPENDIX A.1.1)
- Time for the activity: 1.5 hrs.

**The Instrument: the LALA CANVAS**

The LALA Canvas is a template used to guide a group discussion about the current state of a higher education institution in terms of learning analytics. The template has six dimensions adapted from the ROMA framework:

1. **Desired behaviors:** Refers to the analysis of the behaviors necessary to improve the expected results of an intervention at the institutional level. In the context of learning analytics, the expected results could be improvements in the students' performance based on a change in the behavior of the students, professors or some directors or professionals in the area of management.

2. **Change strategy:** Refers to the analysis of existing policies and actions to ensure that an intervention contributes to the generation of the expected results. In the context of learning analytics, actions could involve the definition of data management policies under technical and ethical considerations, as well as the generation of new internal abilities.

3. **Internal abilities:** Refers to the analysis of processes, human resources and available tools to generate the expected results from an intervention in an institution. In the context of learning analytics, this dimension could represent the processes of collecting educational data, infrastructure and the availability of competent people for analysis and dissemination.

4. **Political context:** Refers to the analysis of the structures or processes (external or internal) that currently affect the management of the change of an institution. In the context of learning analytics, there may be regulations that affect the management of educational data (external legal structure), or internal processes for evaluating academic or teaching performance (internal processes).

5. **Influential actors:** Refers to the identification of people and organizations that currently intervene directly and indirectly in the management of an institution. In the context of learning analytics, these

actors are the ones who intervene in the management of educational data, either as beneficiaries or managers.

6. **Measurement and evaluation plan:** Refers to the indicators, instruments and information collection instances that are used to evaluate whether an intervention at the institutional level has generated the expected results. In the context of learning analytics, these indicators could be metrics obtained from the use of educational data in the instances established by the institution.

**Activity - Application of LALA CANVAS**

The LALA CANVAS is completed in groups of 3 to 5 people guided by a moderator. To ensure that the discussion allows a diagnosis to be made at the institutional level, it is recommended to use it on a convenience sample of at least three people from the institution which is the focus of the discussion. To enrich the discussion, you can incorporate learning analytics experts or stakeholders from other higher education institutions.

The procedure is as follows:

1. The moderator introduces the objective of applying the LALA CANVAS and briefly presents what each of the dimensions means.

2. Each group analyzes different dimensions. It is advisable to offer a limited time, between 10 and 15 minutes, to complete each dimension. Participants can add ideas in the canvas quadrant corresponding to the dimension analyzed using post-its. Ideally, the canvas can be printed in large format to facilitate discussion and exchange of ideas among group members. This process is repeated for each of the dimensions of the LALA CANVAS.

3. The moderator invites participants to discuss about the main conclusions of each of the dimensions analyzed. If there is more than one group, each group can make a brief introduction of the conclusions of each dimension and reach a consensus. This activity can last between 10 to 15 minutes.

**Analysis of the results of the Activity 1**

After applying the LALA Canvas, an analysis should be performed to detect the current status of the institution in terms of LA adoption, identifying desired behaviors and internal capacities to perform interventions. This qualitative analysis should be performed at the end of the activity with the participants of the discussion group and the moderator of the activity. The result will be used as a basis for the second phase of the manual and should specify at least: (1) the desired behaviors from the adoption of LA, (2) the current policies related to learning analytics; and (3) the key players.

## 4.4.2. Phase 2. Understanding the political context and institutional needs

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**Phase 2 Objective**: To understand the political context and identify the key needs of the key actors according to phase 1), taking into consideration the current state of LA adoption, the desired state, and the main challenges.

**Activity 2:** Application of interviews to the main stakeholders (identified in phase 1). The minimum of stakeholders interviewed should be: institutional leaders, professors, and students.
- **Instruments used** (Appendix A1.2):
    - Interview guidelines for each of the stakeholders (Appendix A1.2)
    - Consent for to inform the subjects of the conditions when participating in the study: Ensures the voluntariness of the participants in a process from whom private data is obtained, giving them the opportunity to be aware of the use that will be given to the information collected, as well as of its treatment.
        - Institutional leaders (Appendix A1.3)
        - Academic staff (Appendix A1.4)
        - Students (Appendix A1.5)
- Time for the activity: 30 minutes per personal interviews and 60 minutes per group interviews

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**The Instrument: Interview Protocol**

The interview protocol contains guidelines for interviewing the minimum of three stakeholders that should be considered at the institution that is the focus of analysis: authorities or institutional leaders, professors and students. This protocol addresses the six dimensions worked on in a group manner in the first phase of this manual based on the application of LALA CANVAS. The interview protocol, although based on those used in the SHEILA project, has been adapted to the reality of the Latin American context, trying to capture its particular idiosyncrasy.

Specifically, in the interviews, information will be collected on the main stakeholders' perception about:

- The current use of the institution's educational data (the data on students' and professors' performance that was collected and analyzed, administration and management of that data, actions that are made based on these data, existing analytical tools, technological infrastructure, policies on access and privacy).
- The expected use of the institution's educational data (the data about the students' and teachers' performance that should be collected, administration and management of this data, actions that should be carried out based on this data, analytical tools that should be incorporated into the

institutional management, technological infrastructure required, and necessary access and privacy policies).

**Activity – Conducting Interviews**

The interview protocol is of a semi-structured nature, so it should only be used as a guide to collect information during the conversations held with the different stakeholders. The steps for conducting these interviews are:

**1. Reviewing and adapting the protocols.** In this phase you should review the protocols to identify words or questions that need to be changed based on the results found in Phase 1 of this manual.

**2. Selecting the sample of key actors.** The sample of each one of the actors is done in a different way. Below, we specified what would be the recommended steps to select the sample of the minimum of three stakeholders to consider:

- **Authorities and institutional leaders:** Adopt a snowball type sample design (Creswell 2012). This consists of scheduling conversations with an initial sample, and in each conversation the authority is asked to suggest someone to interview, leaving the number of interviews subject to the saturation of information – that point is reached when the interviews no longer report new data regarding the topic of conversation (Creswell 2012).
- **Professors and students:** It is proposed to adopt a stratified design that allows different academic units of the institution to be represented in each group conversation (Creswell 2012). It is suggested to organize at least two group interviews with professors and at least two with students, ideally with five participants in each instance.

**3. Scheduling meetings for each of the actors.** A schedule should be prepared to conduct the interviews, contemplating between half an hour and an hour per interview. It should be considered that interviews with authorities or institutional leaders should be individual, while those with professors and students should be in groups, with an approximate number of between 5 and 8 participants.

**4. Conducting the interviews.** Follow the protocol designed for the interviews. To record the information collected in the interviews, there should be: 1) a moderator who asks the protocol questions, and 2) a support person who takes notes of the main comments of the interviewees. There should also be a person in charge of recording the audio or video of the conversation, an action for which the written consent of the interviewees must be obtained.

**IMPORTANT NOTE:** Before conducting the interviews, the informed consent protocols must be signed by all participants. This document must be scanned and stored. Without this protocol, the data extracted from the interviews should not be used.

**Analysis of the interviews for the extraction of results**

After conducting the interviews, a qualitative analysis should be performed. It is recommended to have this done by an expert in the collection and analysis of qualitative information. To analyze the information collected, a coding process must be used, in which a text is reduced to descriptions of categories and subcategories (Creswell 2012). In this case, the categories (and subcategories) are: 1) Status of Adoption of Learning Analytics (data collected from students and professors; actions based on the data; access, management and collection policies; ethics and privacy policies), 2) Desired state of adoption of Learning Analytics (data that should be subject to consent; expected use of the data for the benefit of professors or students; frequency with which the data is reported; comparative use of the data; visualization of the data) and 3) Challenge in Adopting Learning Analytics at institutional level. The comparison of the information of all the categories should facilitate the preparation of a report with a list of needs that could be covered with the design and/or adoption of an LA tool.

## 4.4.3. Phase 3. Identifying expectations about the use of educational data

**Phase 3 Objective:** To get to know the expectations of students and professors about the collection and analysis of educational data of the institution in aspects related to ethics and data privacy.

**Activity 3:** Application of online questionnaires to professors and students.
- **Instruments used**:
    - Format of the questionnaire to be applied to professors (A1.6)
    - Format of the questionnaire to be applied to students (A1.7)

- **Time for the activity:** Answering each questionnaire takes approximately 10 minutes (preparation and application can take between 1 and 3 months)

**The Instrument: Online questionnaire for professors and students**

The purpose of the questionnaire is to measure the expectations of academic staff and students in different situations related to the use of educational data in higher education institutions. Each situation is summarized in a statement: the professors' questionnaire consists of 16 statements, and the students' questionnaire of 12 statements. For each statement there are two Likert scales from 1 to 7: one scale measures normative expectations, and the other measures predictive expectations. The normative scale measures if what is described by the statement is something that the respondents would like to see happen in their institution, while the predictive measures if what is described by the statement is something that the respondents believe will happen in their institution (see Example 1).

Example 1: "The university will request my consent before using any personal data (for example, ethnicity, age or gender)."

Ideally, I would like it to happen               I think it can actually happen

I disagree                          I agree        I disagree                          I agree

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|

In addition to the statements and their respective Likert scales, the questionnaires have an informed consent section and another section of characterization, in which the participants must answer questions related to their gender, faculty where they are enrolled, nationality, and other aspects that are important to characterize the population of the institution.

**Activity - Application of Online Questionnaires**

The steps to apply the questionnaires are as follows:
**1. Reviewing and adaptation of the questionnaires.** In this phase, the proposed format for the questionnaires should be revised in order to identify words or questions that should be changed according to the language used in the institution.

**2. Preparing the questionnaires in online format.** After having adapted the questionnaires to the context of the institution, one questionnaire should be created for professors and one for students in a survey-developing web service, such as Google Forms, Surveymonkey or Qualtrics. These services have grid-like formats that facilitate the creation of Likert scales under a common statement.

**3. Testing the online questionnaires.** To avoid errors in the online application, the questionnaires should be tested by sending links to academics, professors and students of the institution as appropriate. Those who can review the questionnaires should answer the questions and notify if the options contemplate the possible response options, if there are errors in the text and corroborate the correct sending of the information to the server.

**4. Applying the online questionnaires.** The questionnaires are applied separately to professors and students. For both groups, the best option is to adopt a sample design of census character (i.e. survey all the members of the institution). However, if a census sample is not possible, stratified random designs can also be applied (i.e. a sample of different populations of different faculties). The invitation to answer the questionnaire is usually sent via email by an entity that coordinates the faculty and the student body, for example, a teaching and learning center in the case of professors, and an area of Student Affairs in the case of the student body.

**5. Analysis of the questionnaires for the extraction of results.** After applying the questionnaires, a quantitative analysis must be performed. First, the response rate must be estimated based on the sample, and then the percentage and number of answers with high levels of agreement (options 6 and 7) per statement. The answers must be organized in order from highest to lowest percentage to determine in what situations professors and students have high expectations. Also, the difference between the percentages of the normative and predictive scale can be analyzed per statement, in order to determine situations in which professors and students have high expectations but do not expect them to be covered by the institution.

## 4.4.4. Phase 4. Developing change strategy

> **Phase 4 Objective:** To develop a change strategy to move from the current state to a desired state regarding the adoption of LA.
>
> **Activity 4:** Application of LALA Template
> - **Instrument used:** LALA Canvas (Appendix A1.8)
> - **Time for activity:** two one-hour sessions, approximately.

### The Instrument: The LALA Template

The LALA Template consists of a sheet to document the desired status of a higher education institution for the adoption of a LA tool. The template has the same six dimensions as the LALA Canvas: 1) Desired behaviors, 2) Change strategy, 3) Internal capacities, 4) Political context, 5) Influential actors, and 6) Measurement and evaluation plan. However, this template is completed based on what is expected to occur in the institution as the result of the adoption of an analytical tool, establishing strategic lines. The strategy resulting from this activity will include aspects such as establishing a plan of objectives for the institution, guidelines for involving key actors in the process, guidelines for generating a culture around LA in the institution, and training plans.

### Activity – Application of the LALA Template

The template must be completed by a team of key people in the higher education institution that is the focus of the analysis. The members of the team can distribute the dimensions to complete them individually, or the team can meet and complete the template as a whole. There is no preset time to complete the document, but it is suggested to have at least one session to plan and/or perform the work, and another session to review what is described in each dimension (each session of one hour approx.).

To ensure that the discussion allows the development of a strategy focused on the needs of students, professors and authorities, it is recommended to have LALA Canvas and the results of interviews and questionnaires when filling out the LALA Template. To enrich the discussion, it is also possible to incorporate experts in learning analytics or actors from other higher education institutions.

### LALA Template Analysis

After applying the questionnaires, a quantitative analysis must be performed. First, the response rate must be estimated based on the sample, and then the percentage and number of answers with high levels of agreement (options 6 and 7) per statement. The answers must be organized in order from highest to lowest percentage to determine in what situations professors and students have high expectations. Also, the difference between the percentages of the normative and predictive scale can be analyzed per statement, in order to determine situations in which professors and students have high expectations but do not expect them to be covered by the institution.

# SECTION 5. TECHNOLOGICAL DIMENSION MANUAL

In this section the technological dimension manual is presented (**Figure 5**). This section describes the objectives of the manual, its general vision, the methodology used to define the manual, and the way in which this manual is applied, including the description of the instruments needed for its application and the expected results. This manual will be conditioned by the decisions taken in the institutional and ethical dimension, since both can condition the way in which the tool is implemented and designed.

This manual is closely related to the results obtained from the application of the institutional manual but delves a little more into the more technological aspects that an analytics tool should have. Specifically, this manual serves to obtain a list of requirements for the creation or adaptation of a technological tool for the analysis of learning data that supports the institutional needs detected in the institutional dimension. The technical details on the steps to follow for the development and/or adaptation of a tool will be presented in other project deliverables that will serve as a complement to this manual.


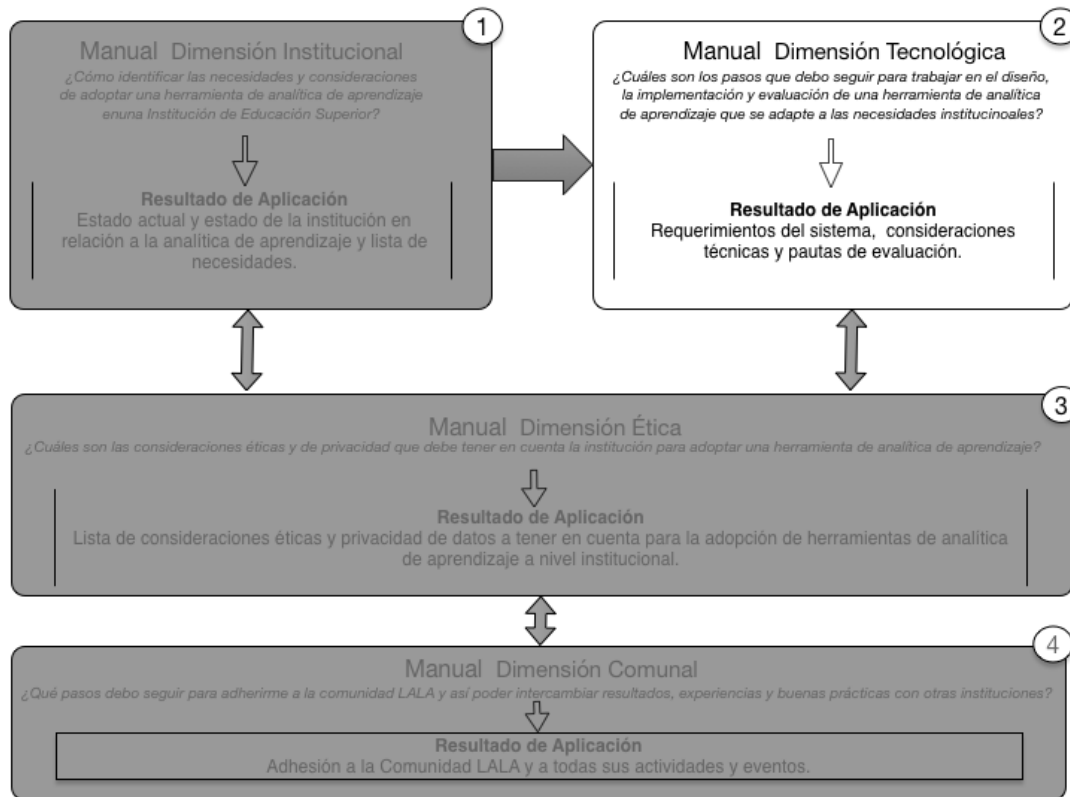
*Figure 5 Technological dimension manual in the LALA Framework.*

## 5.1. Objective

The objective of the manual on the technological dimension of the LALA framework is to provide guidelines for performing a process of designing, implementing and

evaluating a Learning Analytics tool that adjusts to the institutional needs detected in the first phase of the framework. In addition, a series of guidelines are incorporated in this dimension to ensure the adequate collection and administration of educational data, as well as the management of the adequate infrastructure and the technical capacities to support the implemented tools.

The application of the manual will answer the question: *What steps do I need to follow to work on the design, implementation and/or adaptation and evaluation of a learning analytics tool that is adapted to the needs of the main actors in the institution?* More specifically, the application of this manual will allow to:

- Identify key design requirements by institutional leaders or managers, students and professors that should include the learning analytics technology solution to meet the needs identified at the institutional level.
- Identify the technical considerations to be taken into account for the installation of a learning analytics tool regarding the required hardware and software, the data sources to be considered for its installation, as well as the technical personnel necessary for its implementation and evaluation. This tool can be redesigned to be adapted from an existing one, and must take into account the aspects of interoperability with the systems already implemented in the institution.
- Identify the steps to consider when designing a guideline for evaluation and testing of the tool to understand if it meets the needs required by the institution and its main actors.

The result of the application of this manual will be a list of requirements for the design and implementation of the tool, as well as a set of guidelines for its evaluation and testing. The technical details on the steps to follow for the development and/or adaptation of a tool in accordance with these requirements will be presented in other deliverables of the project that will serve as a complement to this manual.

## 5.2. Technological Dimension Manual: Overview

The manual is composed of three phases where a series of activities are performed accompanied by a set of instruments (Figure 6**¡Error! No se encuentra el origen de la referencia.**): (1) Definition of design requirements, in which the design requirements of the learning analytics system are defined; (2) Development and implementation and/or adaptation of the tool, in which the technical considerations for the development and implementation of the tool are identified; and (3) Evaluation and testing of the tool. Each of these phases includes various activities and a series of instruments. Each phase, as well as the defined instruments, were constructed following a different methodology. Consecutively, it is detailed what steps were followed for the creation of the instruments and activities in each one of the phases.

It should be noted that the phases described in this dimension are generic phases for the implementation or adaptation of a tool from scratch. However, there may be cases in which the institutional reality allows the requirements of the tool to

be defined in a more direct way, without the need to go through the indicated phases. In this case, it will not be necessary to follow the entire proposed process, but it will be possible to go directly to the implementation and/or adaptation process.

## Technological Dimension

What steps do I need to follow to work on the design, implementation and evaluation of a learning analytics tool that is adapted to the needs of the main actors of the institution?

**Phase 1. Design requirements definition activity**

- Apply the definition of design requirements guide
- Analysis of requirements obtained

**Phase 2. Activity of tool development and implementation and/or adaptation**

- Apply the guide of technical considerations for the implementation and/or adaptation of the tool.
- Analysis of requirements obtained

**Note:** The technical details on the steps to follow for the development and / or adaptation of a tool will be presented in other deliverables of the project that will serve as a complement to this manual.

**Phase 3. Activity of evaluating and testing the tool**

- Apply the considerations guide for evaluating and testing
- Analysis of requirements obtained

*Figure 6 Technological Dimension Manual. Application phases and related activities.*

# 5.3. Manual Creation Methodology

## 5.3.1. Activity 1 Methodology. Definition of requirements

Within the processes of designing and developing of Learning Analytics tools, we find different methodologies that guide us in the control and collection of requirements flow with the objective of keeping in mind each of the participating profiles and actors who influence and impact the process.

For the definition of requirements, we took as the reference the OrLA framework, OrLA being the acronym of Orchestration of Learning proposed by Prieto et al. (2018). The OrLA framework is proposed as a tool to promote the adoption of learning analytics tools in learning experiences and teaching practices. Specifically, OrLA supports the communication processes from a simple conceptual vision among the three actors that mainly intervene in the process of design, implementation and adoption of learning analytics tools: (1) the "Professor", who happens to be the main client of this process, since he requests the support in LA

techniques to be applied in the classroom; (2) the "Researcher", who performs a conceptual analysis of possible solutions that meet the requirements; and (3) the "Developer", who collects this background information and translates it into a physical tool that allows to perform and fulfill the purpose for which the tool was designed and implemented.

To facilitate communication among the different actors, OrLA defines 3 forms, one for each of the actors. Each form consists of a series of guiding questions that encourage the reflection of each of the actors separately on the design of the tool and its use, as well as the cross-discussion among the actors.

Even though OrLA was designed to support communication among the actors for the adoption of LA tools, it can also be taken as a support tool for the design of other tools. This is the case in the LALA project, where we take as a reference the framework as a tool to design learning analytics tool where all the actors involved in the process are considered. Specifically, we adopted OrLA's idea of using forms as a communication mechanism among the actors, but in this case, we use them as a guide to define and extract the design requirements for a learning analytics tool. In addition, we propose an extension of OrLA to include a new actor that we call Manager. In the LALA project we have observed that a common profile that interacts with learning analytics tools is the manager, in charge of performing institutional processes for decision-making at the institutional level.

Therefore, the technical manual of LALA in its requirements defining phase, will have a guide composed of a set of forms based on the OrLA model, one for each of the actors: (1) the "Professor" or "Manager", who happens to be the main client of this process, since he requests support in learning analytics techniques to be applied in the classroom; (2) the "Researcher", who performs a conceptual analysis of possible solutions that meet the requirements; and (3) the "Developer", who collects this background information and puts it into a physical tool that allows to perform and fulfill the purpose for which the tool was designed and implemented. In the case of not having one of the actors described above, it is recommended to consult a third party external to the project.

## 5.3.2. Activity 2 Methodology. Technical considerations for the implementation of the tool

The Technical Considerations guide aims to inform the actors involved in the process of designing and creating the tool about technical considerations to take into account in the implementation process. In this guide we analyze the technical requirements from 4 dimensions:
(1) *the required hardware*, the objective of this dimension is to analyze what equipment is required for the implementation of the tool;
(2) *required software*, the objective of this dimension is to analyze what software is required for the implementation of the tool;
(3) *technical personnel*, the objective of this dimension is to analyze what skills should the technical personnel responsible for the implementation and administration of the tool have; and

**(4)** *data sources*, the objective of this dimension is to analyze information about the data used by the tool.

This guide was created taking as a reference the results presented in different systematic literature reviews, which analyze tools aimed at the learning analytics (Bodily & Verbert, 2017, Schwendimann et al., 2017, Jivet et al., 2018, Jivet et al. al., 2017; Verbert et al., 2014; Verbert et al., 2013). Although the literature reviews considered do not focus on the implementation and technical requirements of the analyzed tools, they provide an overview of what kind of tools have been developed, what their characteristics are, what type of actors are targeted, what are the data sources that the tools use, with which learning platforms they interact, and what is the students' perception of the tool. For example, Schwendimann et al. (2017) identify 6 types of sources used in interactive *dashboards* to obtain data: **(1)** use of log to track user activity, **(2)** learning materials used or produced by the user, **(3)** information obtained directly from the users for analytical purposes (including interviews and questionnaires), **(4)** institutional register of databases, **(5)** user's physical activity (tracked with physical sensors), and **(6)** external APIs (external platforms data collection). These classifications were considered in the dimension *"Data Sources"*.

In addition, the relevant considerations and suggestions to be taken into account in the design of the tools were taken from the reviews. For example, Bodily & Verbert (2017) suggest a series of questions to be asked for the implementation and reporting of tool results, one question is *"What types of data support your goal?"*. These questions were considered when building the *"Data Sources"* dimension and the *"required software"* dimension.

Moreover, the technical considerations that the 6 partners of the LALA project have had for the implementation of their own learning analytics tools were taken as reference (Escuela Superior Politécnica del Litoral-ESPOL-, Universidad de Cuenca -UCuenca-, Universidad Carlos III en Madrid -UC3M-, Katholieke Universiteit Leuven -KUL-, University of Edinburgh -UEdin-, Pontificia Universidad Católica de Chile-PUC-). The technical considerations of 11 tools were taken into account (LISSA, REX & LASSI, POS, Counseling Tool, Automatic Feedback of Oral Presentations -RAP System-, Assignment prediction tool, Certificate earner prediction tool, On Task, Loop, Sistema Integrado de Gestión Académica, NoteMyProgress). These considerations were analyzed and integrated into the guide.

## 5.3.3. Activity 3 Methodology. Considerations for evaluation and testing

The guide on considerations for the evaluation and testing aims to create awareness about the considerations to take into account for the creation of a guideline for the evaluation and testing of the learning analytics tool designed in the previous phases. The guide is composed of a list of verification items that permit to verify if the most relevant variables are being considered to evaluate and test the tool.

The process of creating this guide followed the methodology used in the guide of technical considerations for the implementation of the tool. The considerations for the evaluation and testing guide was created taking as a reference the results presented in different systematic literature reviews, which analyze tools aimed at the learning analytic (Bodily & Verbert, 2017, Schwendimann et al., 2017, Jivet et al. al., 2018; Jivet et al., 2017; Verbert et al., 2014; Verbert et al., 2013). Unlike the technical considerations guide, this guide was designed to consider the aspects analyzed in the reviews that are related to the evaluation of the tools. The participants to be considered in the evaluations are taken from the different types of participants identified in the reviews. In addition, literature reviews indicate that most tools' evaluation focus on analyzing the usability and usefulness of the tools. In addition, they suggest performing tests that allow evaluating the impact of the tool on the *stakeholders* or actors involved. For example, Jivet et al. (2018) recommend that: "The assessment of the *dashboards* should focus, firstly, on whether the objectives established in the design phase are met, secondly on the impact they have in terms of motivation and finally on usability". These considerations were taken into account as part of the types of evaluations to be performed and the verification of the importance of the pilot tests.

# 5.3. Technological Manual Application

The application of the technological manual is done in three different phases, which correspond to the three previously mentioned guides: (1) Guide for the definition of design requirements; (2) Guide for the technical considerations of the development and implementation of the tool; and (3) Guide for considerations for the design of the procedure for evaluating and testing the tool.

Each phase has an objective within the process of designing and testing a learning analytics tool which is performed from different activities accompanied by different instruments. **Table 2** summarizes the different phases, the main activities, the instruments that accompany each activity and the nature of said instrument.

*Table 2* **Technological manual phases, with their corresponding dimensions and instruments used, specifying their nature and application**

| Activity | Instrument | Technical framework dimensions to consider | Instrument Type | Application |
|---|---|---|---|---|
| 1. Requirements definition | Guide for the definition of LALA design requirements | • Professor/Manager<br>• Investigator<br>• Developer | Qualitative/ Group | In person |
| 2. Tool development and implementation | Technical considerations guide for the development and implementation of the tool. | • Data sources<br>• Required *hardware*<br>• Required *software*<br>• Technical staff | Qualitative/ Group | In person/ Online |
| 3. Tool evaluation and testing | Considerations guide for the design of the tool evaluation and testing procedure | • Types of evaluations<br>• Required resources<br>• Participants<br>• Importance of the pilot<br>• Ethical dimension | Quantitative/ Group | In person/ Online |

## 5.4.1. Phase 1. Requirements Definition

> **Phase 1 Objective:** To identify the key design requirements by institutional leaders or managers, researchers and academic staff that should include the learning analytics technology solution to cover the needs identified at the institutional level.
>
> **Activity:** Application of the guide for the extraction of requirements for an LA tool.
> - Requirements Extraction Guide for a learning analytics tool (Appedix A2.1)
> - Time for the activity: 3 hours

**The instrument: Guide for the extraction of Requirements for the design of LA tools**

The instrument "Guide for the extraction of requirements for the design of learning analytics tools" consists of a series of forms for each of the actors involved in the process (Academic staff/Managers, Researchers and Developers). Each form is composed of a series of questions that make the different actors reflect upon 6 main aspects of the use and adoption that the tool in the process of being designed would potentially have: (1) local limitations and challenges related to the tool; (2) the current practice that is developed without using the tool in the process of being designed; (3) how the current practice would vary the inclusion and use of the learning analytics tool in the process of being designed; (4) the characteristics of the innovation that  the use of the learning analytics tool in the process of being designed would incorporate; (5) ethical and privacy issues to consider and (6) a set of cross-questions among the different actors to jointly assess and decide on the characteristics of the learning analytics tool in the process of being designed and its potential adoption.

1. **Form for Academic staff.** The form for the professor/manager is structured in 4 sections; The first section is to define the context of the tool and the beginning of the discussion with the rest of the profiles of the process. For this, 5 general questions must be answered plus a brief description of the educational context. In the second section, the professor must complete a matrix associated with the activities developed by the professor and how they are carried out in the classroom. For this, 4 dimensions are used within the matrix associated with the teaching activities and 4 dimensions associated with the way to perform these activities. In the third section the professor must recognize some restrictions, problems, challenges and difficulties in performing their defined and planned processes. For this it is necessary to answer 4 general questions within this context. Finally, a fourth section is completed in which ethical aspects are included. For this, the professor will have to answer 3 questions related to the use of the data, the access to them and the way they are collected.

   This form includes a general comment section for the researcher and the developer, who will request or complement information on the tool's requirements based on the academic staff' answers.

2. **Form for Managers.** The manager must define the educational control context to be visualized in administrative terms to control and suggest improvements in the educational process. The form for the manager is structured in 4 sections. The first section aims to define the context of the tool and the complement of the discussion initiated by the professor with the rest of the profiles of the process. For this, 4 general questions must be answered plus a brief description of the educational control context. In the second section, a matrix associated with the activities developed by the manager and how they are performed in the capacity of administrator must be completed. In the third section a series of questions are asked to help the manager to recognize the restrictions and problems that could be found in the activities defined above. The fourth section includes 3 questions in relation to the ethical aspects of the use of data.

   The Manager profile also includes a section to provide general comments by the Professor, the Researcher and the Developer that complement or request more information from the Manager.

3. **Form for researchers.** The researcher must define which is the most innovative part of the tool that is being designed, identifying the aspects that make it different from existing tools. Their form is structured in 5 sections. The first section defines the context in which the tool would be applied. For this, 4 general questions must be answered plus a brief description and a fifth one that asks what aspects will be considered to evaluate or measure the benefits of innovation. In the second section the researcher completes pre-requisites for each one of the actors who will use the tool (academic staff-students-managers) considering the data analysis and the pre-conceived beliefs by each actor. The third section includes questions to understand what the main activities of the actors involved are and how they could be improved with the tool. The fourth section includes general questions on aspects of motivation for the use of the tool by the professor or manager, as well as the support that could be obtained from the use of the tool, and the measuring of impact and success of the designed solution. Finally, the fifth area is included to consider the ethical and privacy aspects.

   This form also includes a comments section that will be completed by the developer and the professor or manager to complement or request more information about the researcher's answers.

4. **Form for developers.** The developer must identify the aspects related to the development implications that the implementation of the tool entails. The form for the developer is structured in 5 sections. In the first section, the purpose and benefits of the tool are defined. In the second section a matrix is completed regarding the activities that the academic staff and/or managers

would develop with the support of the tool in the process of being designed. In a third section, the developer reflects on some questions that help him to recognize alternative tools that could complement the proposed innovation or technological solution. In the fourth section, questions related to the ethical and privacy aspects are included.

The Developer profile also includes a comments section that will be completed by the researcher and the professor or manager in order to complement or request more information on the questions developed.

## Activity - Application of the Requirements Extraction guide

For the application of this instrument, it is necessary to have a group of at least three participants with a profile that corresponds to one of the three actors that interact: one with a professor and/or manager profile, another with a research profile and another with a developer profile.

The application of the guide will be performed in one or several sessions that can be performed by all the actors involved in the design of the tool in a synchronous or asynchronous manner. In both cases, the activity will start by asking the participants of the design group to complete the form corresponding to their profile. Once completed, the discussion session among actors will begin. In case the discussion is performed asynchronously, they will comment on the form of their colleagues. If it is done in a synchronous manner, the discussion among the different actors can take place in person.

It is recommended to organize the activity in three hours: the first hour when the actors complete their forms individually and the following two hours to discuss the different solutions, ensuring the exchange among the different actors involved. The objective of this activity is to promote communication among the main actors in order to define the requirements of a tool that can be designed in the LA context, consequently the activity can be shortened or extended depending on the results obtained.

**Analysis of activity results**

Once the forms have been completed, the researcher or tool development project leader should review the completed forms in order to:

1. Extract separately the requirements specified by each of the actors involved in the project.
2. Identify what requirements coincide among the different actors and ensure that all the minimum requirements are considered in the design of the tool.
3. Identify the type of data that each of the actors manages to ensure that they will be considered part of the database of the tool to be designed.
4. Make a list of minimum requirements organized in order of priority.

## 5.4.2. Phase 2. Development and implementation.

**Phase 2 Objective**: To identify the technical considerations to be considered for the installation of a learning analytics tool from the point of view of the required hardware and software, the data sources to be considered for its installation, as well as the technical personnel necessary for its implementation and evaluation.

**Activity**: The development and implementation team answers the questions planned in the instrument *Guide of technical considerations for the development and implementation of the tool*.
- **Instrument to be used**
   - Guide of technical considerations for the development and implementation/adaptation of the tool (Appendix A2.2)
- Time for the activity:  3 days

**The instrument: Guide of technical considerations for the development and implementation of the tool.**

The technical considerations guide is composed of a set of 25 open questions. The guide contains 4 initial questions to identify the sources of information available for the tool. In addition, a set of question was created for each of the dimensions to be considered: 9 questions for the *Data Sources* dimension; 5 questions for the *required Hardware* dimension; 5 questions for the *required Software* dimension and 2 questions for the *Technical personnel* dimension. The guide collects information on the types of data and data sources used by the tool, which hardware and software equipment are required for the operation of the tool, as well as the technical personnel required for the implementation and maintenance of the tool. Below, we detail the objective of the questions in each of the dimensions:

1. **Data sources.** The questions included in this dimension are aimed at the development and implementation team analyzing factors that affect this phase, such as: what data the tool requires, where that data comes from, who the responsible for the administration of the required data is, and what procedure is required to access the data, what the characteristics of this data are and what data model it uses, where the data required by the tool should be stored, what the process of integrating the data with the tool is, what the process to manipulate the data is, who  the person or people in charge of data management will be and finally, who will have access to this data.

2. **Required hardware.** The questions included in this dimension are aimed at the development and implementation team for them to analyze factors that affect this

phase, such as: the type of equipment that is required to install the tool (workstations, servers), as well as the specifications that the required equipment must have; what kind of physical space the equipment requires; what additional equipment is required for the operation of the tool such as tablets, microphones, cameras, etc.; what equipment is required to maintain and manage the tool.

3. **Required software.** The questions included in this dimension are aimed at the development and implementation team, for them to analyze factors that affect this phase, such as: the programming language in which the tool is developed, what version of the language and libraries should be configured, what operating system the tool operates on, what database managing system the tool uses, what other applications  the tool requires to operate (dependencies) and finally, what type of licensing the tool requires.

4. **Technical personnel.** The dimension of the technical personnel is considered as the last dimension. The questions for this dimension must be answered once the answers of the previous dimensions are clear, in this way the required characteristics of the technical personnel are clear. The questions included in this dimension are aimed at the development and implementation team, for them to analyze factors that affect this phase, such as: what knowledge the technical personnel will need to have to perform the installation and configuration of the tool; and what knowledge is required for the personnel that will be in charge of the administration and maintenance of the tool.

**Activity - Requirements guide application**

The technical considerations guide must be completed by the team in charge of the development and implementation of the tool. It is recommended that in this team should participate at least one member of the team that leads the project that promotes the incorporation of learning analytics tools in the institution.

To complete the guide, the team must answer the sequence of questions included in the guide. It is recommended to follow the sequence of questions and to answer each of them considering the requirements of and information about the tool that is to be implemented. To answer all the questions the team needs to analyze the tool in detail, as well as to investigate and consult sources external to the team to obtain the information required to answer. To complete the guide, several work sessions may be required. In the first session, all the questions that the team can answer are completed and for the questions that cannot be completed in the first session people should be assigned to obtain the information. In the second session, the information obtained is analyzed for the questions that were not answered in the first session and the answers are formulated. The procedure can be repeated until all the questions in the guide are completed. The questions can be adjusted to any type of tool that is to be implemented, so all questions should be answered.

The answers to the questions must be clear and specific to facilitate their interpretation. For example, for the following question:

*What data does the tool to be implemented need?*

An answer could be:

> *The tool requires data on: (1) personal information of the students (age, gender, full name, ID number, address); (2) grades obtained in the evaluations; and (3) evaluations proposed in the course.*

**Activity results**

Once all the questions in the guide have been answered, an analysis must be performed to detect possible problems that may arise during the tool development or implementation process. For example, if the results show that additional equipment is required to implement (webcams, tablets, microphones, etc.), the team should evaluate the aspects such as: what the process that establishes the institution for the acquisition of that equipment is, whether the project has the budget for the purchase of the equipment, in how much time the equipment can be acquired, among others. For each question, the team must make an evaluation of the given response and what processes or activities arise from the response: for example, requesting the permission for access to the data, hiring technical personnel, equipment acquisition, generating agreements with external entities, conditioning of the areas, among others.

## 5.4.3. Activity 3. Evaluation and testing considerations

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**Phase 3 Objectives:** To identify the steps to consider when designing a guideline for evaluation and testing of the tool to understand if it meets the needs required by the institution and its main actors.

**Activity:** The development and implementation team answers the questions planned in the instrument Guide of considerations for the design of the procedure for evaluation and testing of the tool.
- **Instrument**
    - Guide of considerations for the design of the procedure for evaluation and testing of the tool (Appendix A2.3).
- Time for activity: 15 minutes

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**The instrument: Evaluation and testing sheet**

The guide of considerations for the design of the procedure of evaluation and testing of the tool is a revision list that serves as a guideline to verify what elements should be considered to perform the evaluation of the tool. The guide does not explain how to plan and perform the evaluations, since each evaluation of a tool is very particular and will depend on the instruments selected for each test. This guide is composed of 5 sections that are detailed below:

1. **Types of evaluations to consider in the pilot.** This section allows you to verify that the designed evaluation process takes into account different types of minimum evaluations that should be performed on a learning analytics tool, such as: (1) usability, which allows us to detect errors and understand the ease of use of the tool by stakeholders; (2) utility, which allows us to know the stakeholders' perception of the information presented and the functionalities of the tool; (3) system tests, which allow us to understand the performance and response times of the tool; (4) adoption tests, which allow us to understand how *stakeholders* or main actors interact with the tool; and (5) tests to measure the impact, which allow us

to evaluate if the tool has an effect on the established improvements related to learning.

2. **Required resources.** This section allows to verify if the tests have considered what resources are necessary to perform the tests: duration time, personnel, economic resources, measurement instruments, instruments for the data collection and the data sources required for the tests.

3. **Participants.** This section allows to verify if the defined tests are considering all the stakeholders or main actors who will use the tool.

4. **Importance of the pilot.** This section allows to verify the relevance of the tests, what we hope to obtain with the execution of the tests. It allows to verify if the main objective of the tool is being evaluated in the evaluation process. For example, if the objective of the tool is to improve students' learning, it is necessary to verify that our pilot tests provide us with results that allow us to measure the improvement in learning, and not to remain in usability and utility tests.

5. **Ethical consideration.** This section allows to verify if the ethical aspects for the data collection, administration and storage in the designed tool were considered. The institutional manual details the ethical considerations and informed consent that must be considered before starting the evaluation and testing of the tool.

**Activity- Application of the evaluation and testing guide**

This instrument must be completed by the implementation team, which has the task of performing the evaluation tests and pilot tests. As a data cross-control, this instrument must be applied again by a member of the team that leads the project, who has a better understanding of the objectives defined for the tool at the end-user level.

This guide must be completed once the tool evaluation and testing tests have been defined. To complete the guide, it must first be delivered to the team in charge of the tool implementation, who have greater knowledge of the tests that will be performed. The members of the implementation team, as a group, complete a file marking each of the items that were considered in the tests. Subsequently, the member of the team that leads the project asks the same questions to the technical team, but is responsible for marking the item as verified. In addition, in each item the team member who directs the project must ask how each item is being considered in the evaluation tests, in order to verify if the implementation team has clarity of the meaning of each item. If the results of the two guides are different, a third guide should be completed among the implementation team and the member of the team in charge of the project. To complete the third guide, there must be a consensus among all the participants to verify or not an item. If two guides are the same, either one is considered for analysis.

**Analysis of the activity results**

At the end of this activity we obtain a checklist with the items that have been considered in the evaluation tests and those that have not yet been considered. The implementation group must analyze each of the items that have not been included in the tests and define a strategy for them to be considered. For example, if the impact tests have not been considered, an evaluation should be defined that measures the impact of the tool, and the instruments and resources necessary to perform the test.

# SECTION 6. ETHICAL DIMENSION MANUAL

In this section, the ethical dimension manual is presented (**Figure 6**). This section describes the objectives of the manual, its general vision, the methodology used to define the manual, and the way in which this manual is applied, including the description of the instruments needed for its application and the expected results.
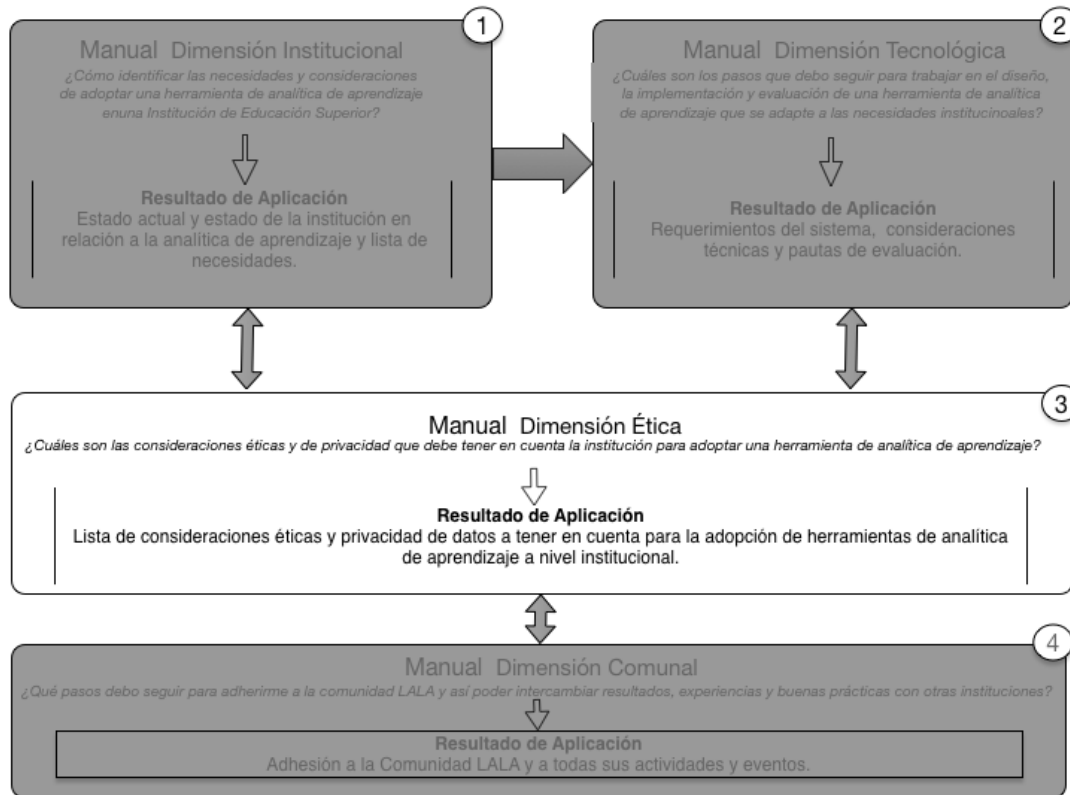


*Figure 7 Ethical Dimension Manual in the LALA framework*

## 6.1. Objective

The ethical manual of the LALA framework aims to promote the adoption of ethical and privacy considerations in the design and implementation of learning analytics tools. Specifically, it describes considerations that have been documented in the literature on learning analytics to guide the management of educational data in higher education institutions, referencing regulations that affect the protection of personal data at the local and international level.

The application of the manual will answer the question: *What are the ethical and privacy considerations that the institution should take into account in order to adopt or implement a learning analytics tool?* Those who review this manual will be able to:

- Learn about ethical and privacy considerations that have been described in the literature and in national and international regulations for the responsible adoption of learning analytics tools.

- Anticipate the ethical and privacy considerations necessary for the design and implementation of an analytics tool at an institutional level.

From the review of this manual, the main actors of a higher education institution will be able to define a strategy to adapt ethical and privacy considerations described in the literature, and thus ensure the responsible adoption of learning analytics tools in their institution.

## 6.2. Manual Creation Methodology

This manual was created in three stages. In a first stage, a systematic review was made in Google Scholar, looking for articles that address privacy and LA issues between 2014 and 2018, which is when a boom is identified in LA area publications. The search terms were "Learning Analytics" and "Ethics". In a second stage, 3 experts participated in the selection of those articles whose objective was to provide ethical and privacy considerations to guide the responsible adoption of LA. Finally, in a third stage, a selection was made of those articles whose main focus was the socialization of ethical considerations. From this search, 4 articles or reports containing information on the most relevant ethical considerations were selected. It should be noted that the regulations referenced in these 4 articles were used, but these regulations not necessarily apply to the Latin American context. However, manual's application should contemplate a revision of regulations at the regional level.

## 6.3. Activities in the manual

The application of the ethical manual involves three sequential activities (see **Figure 6**): (1) review the literature and regulations on ethical and privacy considerations in the design and implementation of learning analytics, (2) anticipate ethical and privacy considerations for the design and implementation of an learning analytics tool at the institutional level (using phases 2 and 3 of the institutional manual), and (3) define a strategy to adapt considerations in the literature and in national and international regulations to the institutional context. This manual mainly covers the first activity, but the second activity can be approached using the instruments proposed in the institutional manual to identify professors' and students' expectations in relation to data ethics with Learning Analytics tools.

# Ethical Dimension

**What are the ethical and privacy considerations that the institution should take into account in order to adopt a learning analytics tool?**

### Phase 1. Review the literature and national and international regulations

- Apply the ethical manual
- Search national and international regulations

### Phase 2. Anticipate professors' and students' expectations

- Interview professors and students (phase 2 in the institutional manual)
- Survey professors and students (phase 3 in the institutional manual)

### Phase 3. Adapt considerations according to the literature, regulations and expectations

- Contrast literature and regulations with expectations

*Figure 8 Phases of the ethical manual application and their respective activities*

## 6.3.1. Activity 1. Review the literature and national and international regulations

**Phase 1 Objective**: To identify existing national and international regulations regarding privacy and ethics in the use of personal data and identify the main needs to be considered in relation to data.

**Activity:** Reviewing the summary of the articles considered to obtain an overview of ethical considerations at the international level.
- **Instrument**
  - Documents and articles related with the data treatment and use for Learning Analytics.
- Time for the activity: 1 h.

### The instruments: Regulations Summary Document

*The Regulations Summary Document contains a summary of the four selected articles (**Table 3 Articles that propose ethical and privacy considerations for the design and implementation of strategies based on learning analytics.***

) based on the manual methodology, and the proposed considerations to address ethical and privacy aspects in the design and implementation of strategies based on indicated learning analytics. In the following sections each of the articles is detailed, describing the proposed considerations in greater detail.

*Table 3 Articles that propose ethical and privacy considerations for the design and implementation of strategies based on learning analytics.*

| Authors | Year | Title/Journal | Proposed considerations |
|---|---|---|---|
| JISC | 2015 | *Code of practice for learning analytics (A3.1.1)* | • Responsibility<br>• Transparency and consent<br>• Privacy<br>• Validity<br>• Access<br>• Facilitate positive interventions<br>• Minimize adverse impacts<br>• Administration |
| Draschler & Greller | 2016 | *Privacy and Learning Analytics – it's a DELICATE issue (A3.1.2)* | • Determination<br>• Explanation<br>• Legitimacy<br>• Involvement<br>• Consent<br>• Anonymity<br>• Technology<br>• External |
| Pardo & Siemens | 2014 | *Ethical and privacy principles for learning analytics (A3.1.3)* | • Transparency<br>• Students' control over data<br>• Access rights<br>• Accountability and measurement |
| Steiner, Kickmeier-Rust & Albert | 2016 | *LEA in Private: A Privacy and Data Protection Framework for a Learning Analytics Toolbox (A3.1.4)* | • Data privacy<br>• Data purpose and ownership<br>• Consent<br>• Transparency and trust<br>• Access and control<br>• Accountability and measurement<br>• Data quality<br>• Data management and security |

### Activity - Familiarization with national and international regulations

Stakeholders related to the implementation/adoption of the learning analytics tool should review the tools provided to propose an ethical guide for the use of data in their institution. This guide should be discussed with the members of the team participating in the initiative in order to verify that all the criteria are considered at all levels of the process of creation/adoption and implementation of the tool.

It is recommended to take the DELICATE Check List (A3.1.2) as a reference to verify that the most relevant aspects are being considered in relation to the ethical treatment of the data. The DELICATE Check List is a translation of the list of considerations proposed by Drachsler & Greller (2016). This document was created

from a comprehensive review of international and European frameworks regarding the use of data for learning analytics. DELICATE consists of 8 action points that should be considered by the different stakeholders involved in the process of implementing and/or adopting Learning Analytics tools.

**Result - National and international references to be considered for the creation of an institutional ethics instrument**

The result of this activity is to educate and raise awareness among the stakeholders involved in the learning analytics project about the existence of national and international frameworks and references regarding data processing.

**Activity results analysis**

At the end of this activity a list of the current status of the institution in relation to the ethical treatment of data is obtained.

## 6.3.2. Activity 2. Anticipating teachers' and students' expectations in relation to data processing

> **Phase 1 Objective**: To anticipate professors' and students' expectations in relation to data processing.
>
> **Activity:** Reviewing the data collected in phases 2 and 3 of the institutional manual, which includes interviews and focus groups with students and professors which deal with aspects related to data processing.
> - **Instrument**
>   - o Instruments related to phases 2 and 3 of the institutional manual of the LALA framework.
> - Time for the activity: -

**The instruments**

The instruments that will be used as a reference in this activity are the same as those used in phases 2 and 3 of the institutional manual of the LALA framework presented in this document.

**Activity - Collecting information on the current status of academic staff's and students' expectations in relation to data processing**

Perform interviews and focus groups with reference to the instruments and indications of phases 2 and 3 of the institutional manual.

**Result - Determining current status on academic staff's and students' expectations in relation to data processing**

The result of this activity is to obtain a realistic view of the current state of the institution in relation to academic staff's and students' expectations regarding ethics and data privacy. This result will be obtained from the review of the systematic analysis performed in phases 2 and 3 of the institutional manual.

**Activity results analysis**

At the end of this activity there will be a list of academic staff's and students' expectations in relation with the ethics and data privacy regarding the data analytics project.

## 6.3.3. Activity 3. Adapting ethical and privacy considerations for the creation of the institutional framework on ethics and data privacy

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**Phase 1 Objective**: To create an institutional framework on ethics and data privacy for learning analytics, as well as the key instruments to ensure their proper use and treatment.

**Activity:** Proposing a framework taking as reference the analyzes in activities 1 and 2 and creating forms to ensure the proper use and treatment of data at the institutional level.
- **Instrument**
  - ○ Sample forms to ensure good treatment and use of data at the institutional level (A3.2, A3.3, A3.4, A3.5, A3.6)
  - ○ Contract for institutional data use and sharing (A3.7)
- Time for the activity: -

---

**The Instruments.** To ensure good treatment and use of data at an ethical and privacy level, many institutions have forms that both students and professors must complete. These instruments serve to ensure that the institution has the informed consent of the participants in the institutional projects related to data, whether or not directly related to the learning analytics project.

In the LALA project framework, the institutions involved have generated documents for the management of some of the ethical considerations highlighted in the articles and reports summarized in the previous sections (**Table 1**). In Appendix A3.2. of this document some examples of these instruments are included: informed consent forms for interviews and informed consent forms for questionnaires.

*Table 1 Examples of informed consents generated within the LALA project.*

| Type | Instrument and Description |
|---|---|
| Informed consent forms for interviews | Informed Consent: Ensures the voluntariness of the participants in a process from which private data is obtained, providing them with the opportunity to be aware of the use that will be given to the information collected, as well as of its treatment.<br><br>Link to the consents used by the Pontificia Universidad Católica de Chile:<br>• Institutional Leaders (Appendix A3.2)<br>• Academic staff (Appendix A3.3)<br>• Students (Appendix A3.4) |
| Informed consent forms for questionnaires | Since the signature of participants/students/users cannot be collected in online questionnaires, consent statements are used through which the participant receives a description that clarifies the purpose and use of the information collected, as well as their willingness to participate. Then, the participant has the option to mark to confirm that he/she has reviewed said description.<br><br>Link to the consents used by the Pontificia Universidad Católica de Chile:<br><br>• Academic staff (Appendix A3.5)<br>• Students (Appendix A3.6) |

**Activity - Reviewing and adapting the sample forms**

Propose a manual for the ethical and private treatment of data at the institutional level, in accordance with the national regulations of the institution's country on the treatment of data.

Reviewing and adapting the forms provided as an example. It is important to remember that the forms must be adapted according to the internal regulations of the institution and validated by the ethics committee to ensure their validity. In addition, it is recommended for the institutions to have a data administrator to ensure that the forms are digitized and stored for recovery if necessary.

**Result - Ethical manual and forms for data use and processing**

The result of this activity will be a manual on the ethical and private treatment of data validated by the governing bodies of the institution, as well as a set of forms to ensure the proper use and treatment of data.

# SECTION 7. COMMUNITY DIMENSION MANUAL

In this section the community dimension manual is presented (**Figure 9**). The objectives of the manual, its overview, the methodology used to define the manual, and its current status are described in this section.
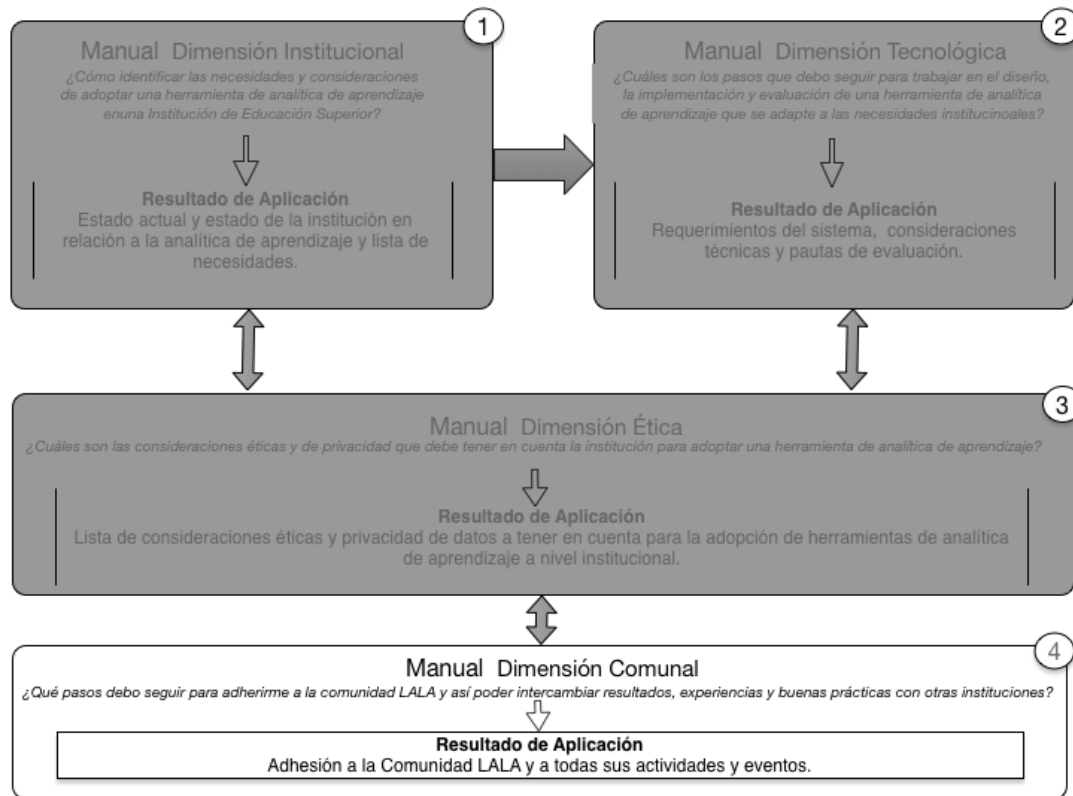


*Figure 9 Communal Dimension Manual in the LALA framework*

## 7.1. Objective

The community dimension manual provides the guidelines for the creation of LALA community that promotes the exchange of results and experiences with other higher education institutions, favoring collaboration without compromising internal information and promoting a research and development community regarding the area of the learning analytics in the region.

The application of the manual will answer the question: *What steps should I follow to join the LALA community?* More specifically, the application of this manual will allow to:

- Adhere an institution and/or researchers to the Latin American learning analytics community - LALA.
- Define the degree of institutional participation and active or passive involvement within the community
- Access a collaboration network among the researchers from the LALA community, with other agents such as companies, public and private

educational institutions and with other Latin American and international collaboration networks that will help identify potential partners for the preparation and presentation of joint research projects with a greater scope and impact.

- Understand how to disseminate your initiatives related to Learning Analytics at a Latin American scale and establish contact with European or American institutions or networks.
- Promote research and the exchange of knowledge through conferences already established as the CLEI - Latin American Computation Conference - or the LACLO - Latin American Conference on Learning Technologies - to develop local capacity in HEIs in Latin America to create, adapt, implement and adopt Data Analytics tools to improve academic decision-making processes.

The result of the application of this manual will mean that the institution joining the LALA community (and therefore the researchers associated with the institution) will have access to a series of benefits that will allow them to promote long-term sustainable cooperation, creating lasting relationships among its members, who contribute to the replication of the results obtained by the LALA project. All of the above will permit responding to the new challenges of the digital society that emerge from the incorporation of ICTs in education.

## 7.2. Community Manual: Overview

Learning Analytics (LA) has been widely developed in the Anglo-Saxon countries, with the USA, the United Kingdom, Canada and Australia being the main contributors to this field. Their contributions in the area have been presented at the most important conference that is the Learning Analytics & Knowledge Conference - LAK, which has been organized since 2011.

In Latin America, although measuring and optimizing teaching and learning processes through LA has begun; the existing attempts in this direction are very isolated given the lack of a regional community that encourages the exchange of ideas, methodologies, tools and local results in the field. This is evident from a recent review of the literature developed by Dos Santos et al. (2017), where the little contribution made by means of scientific articles written by Latin American researchers to the LAK conference is established.

The first contribution registered by Latin American researchers to the LAK Conference was made in 2011. As of that date, 3 contributions have been registered in 2013, 6 contributions in 2014, 18 contributions in 2015 and only 2 contributions in 2016. All the contributions were written in English which gives little visibility of the work done for the Latin American community. On the other hand, from a questionnaire that was disseminated through email lists, social and academic networks in 2016, it was possible to gather information on about 28 research groups working in the LA area, identifying 20 groups in Brazil, 5 in Colombia and 1 group in Chile, Mexico and Paraguay respectively.

Currently, in Latin America there are two important conferences that attract the attention of researchers from Latin America, these are: 1) CLEI - Conference on Latin American Computing and 2) LACLO - Latin American Conference on Learning Technologies. The first does not currently have a line on learning analytics in

Spanish and the second one included for the first time in 2017 a line on learning analytics in Spanish. These two conferences will be organized jointly for the first time in 2018, which provides an ideal setting to gather researchers, professors and students interested in working with learning analytics. Therefore, it is essential to create a community that has representation at the Latin American level and that can be present at these regional as well as at international conferences.

The LALA Community has an open subscription policy, so without differentiation, organizations, companies or academic entities can be added to the network. Similarly, researchers can subscribe individually to be a part of the network of LALA researchers. The mechanism for incorporating new members into the LALA Community is the approval of the membership application, made through the Membership Letter published on the web, addressed to the coordinators of the LALA Community. The coordinators inform the other members of the advisory committee about the request received, who then decide whether to approve or not the applicant's incorporation into the Community. Said decision is made through direct voting using any electronic means available, and by simple majority. To incorporate the researchers individually they must access a form where they record their data. To be a member of the community you must follow the phases in **Figure 10** and the steps associated to them:

## Community Dimension

What steps should I follow to join the LALA community?

**Phase 1. Learn about the LALA Community**

•   Access the information about the LALA project

| **Phase 2. Register an Institution** | **Phase 3. Register a researcher** |
|---|---|
| • Download Community Statutes and adhesion letter<br>• Complete the membership letter<br>• Send an email to coordinators: lalaproject@cti.espol.edu.ec | • Complete an online registration form |

*Figure 10   Community Dimension Manual. Application phases and activities related to each step.*

**Table 4** summarizes the phases of the community manual, and the corresponding activities to register an institution and a researcher as a part of the LALA community. In the following sections each one of the phases is detailed, describing the considerations of each one in greater detail.

*Table 4 Steps of the Community manual, with their corresponding dimensions and instruments used, specifying their nature and form of application*

| Phase | Instrument | Community framework dimensions to be considered | Instrument type | Application |
|---|---|---|---|---|
| 1. Access the information about the LALA project | Web Site: https://www.lalaproject.org/es/inicio/ | • Institutional<br>• Researcher | Qualitative | Online |
| 2. Registration as an institution | Statutes : https://www.lalaproject.org/es/estatutos/<br><br>Membership letter: https://www.lalaproject.org/wp-content/uploads/2018/02/carta.docx | • Institutional<br>• Researcher | Qualitative | Online |
| 3. Register as a researcher | Form: https://es.surveymonkey.com/r/ComunidadLALA | • Researcher | Quantitative/ Group | Online |

# 7.3. Manual creation methodology

This manual was built in three stages. In the first stage, information was collected from researchers and academic staff who currently work or who wish to work with learning analytics in their daily practice. For this, and through the members of the LALA project, an open questionnaire was sent through mailing lists and academic and social networks. We identified more than a hundred researchers who are working or interested in working in LA. In the second stage, the statutes of the LALA community were developed, where the general dispositions about the functioning of the community, the objectives and integration of the LALA community, the rights and obligations of the members, and the structure of the community were established. Finally, in the third stage, a web portal was implemented to disseminate and communicate the results of the LALA project, and community initiatives.

# 7.4. Application of manual activities

## 7.4.1. Phase 1. Accessing the information about the LALA project

**Phase 1 Objective:** To provide information on the context of the development of the LALA project, which seeks to develop the local capacity to create, adapt and use learning analytics tools in Higher Education Institutions.

**Activity:** Accessing the project website.
- Link to the site: **https://www.lalaproject.org/es/inicio/**

**The instrument: Web Site**

The LALA project website contains information related to the project. For this purpose, the site is organized in 5 well-defined sections on the website's home page. These sections are: 1) About LALA, 2) LALA Community, 3) News, 4) Contact us and 5) LALA Workshops. Section 1) presents information related to the project, a general description the objectives and the different deliverables of the project will be available. Section 2) presents the members that currently make up the community, the statutes of the community and the steps to follow to join the community. Section 3) presents news about the different activities performed by the members of the project and the LALA community. Section 4) presents a form to contact the members of the LALA project consortium. And finally, in section 5) information related to the conferences that the LALA community will organize to promote the exchange of ideas and strengthen networks of researchers in Latin America is presented. Currently, work is being done on gathering information from different researchers to add a list of researchers and learning analytics projects to this page. This information will be made throughout the project and will be added as other information to the network.

## 7.4.2. Phase 2. Registration of an institution

**Phase 2 Objective:** To register an institution and/or organization in the LALA community.

**Activity:** Downloading and filling out Statutes and Membership Letter
- Statutes: https://www.lalaproject.org/es/estatutos/
- Membership Letter: https://www.lalaproject.org/wp-content/uploads/2018/02/carta.docx

**The instrument: Community statutes**

The statutes of the LALA community establish the general dispositions on the functioning of the community, the objectives and onboarding of the LALA community, the rights and obligations of the members, and the structure of the community. Likewise, one of the most important points of the statute refers to the membership levels of each member, which establishes different rights and obligations.

The membership letter is a request that is completed by the higher education institution interested in joining the LALA community. The statutes will be available as a document in .pdf format while the membership letter will be available as a document in .doc format.

The membership letter must specify the country and the date on which it is submitted. After this, a higher education institution's interest in forming a part of the LALA community should be briefly described. Then, the statutes must be read carefully and the level of membership in the community that the institution wishes to obtain must be marked in the membership letter. Next, in the membership letter information related to the institution and the person who will sign the membership letter must be provided. This person's signature must be representative at the level of a research group, a faculty, a school or a university. The membership letter may or may not have an official stamp of the institution. Finally, the document must be printed and signed by hand, to then be scanned and converted it to pdf format before sending.

Once the document has been converted in pdf format, it must be sent by email to the community coordinators, on the following email address: lalaproject@cti.espol.edu.ec

Within 30 business days, the community coordinators will send an email to the interested institution with the response to their request.

### 7.4.3. Phase 3. Registration as a researcher

**Phase 3 Objective:** To register as a researcher in the LALA community

**Activity:** Registering as a researcher
- Link to the site: https://es.surveymonkey.com/r/ComunidadLALA
- Time for the activity: 5 minutes

**The instrument: Researcher registration form**

Each researcher interested in receiving news, information and more about the project activities and the LALA community can register individually, without having to have their institution registered through a registration form. This form registers institutional data of the interested researcher, as well as his academic activity related to the learning analytics.

## 7.5. Current state of the LALA community

In July 2018, the LALA community had 126 registered researchers, 75% belong to public universities, 22% to private institutions and 3% to other types of institutions such as government. The researchers come from 26 different countries such as: Argentina, Costa Rica, Granada, Jamaica, Peru, Venezuela, Bolivia, Cuba, Guatemala, Mexico, Puerto Rico, Brazil, Ecuador, Guyana, Nicaragua, Dominican Republic, Chile, El Salvador, Haiti, Paraguay, Suriname, Colombia, French Guiana, Honduras, Panama and Uruguay.

In relation to higher education institutions, currently the LALA community was joined by 59 institutions, which have expressed their interest in being part of this cooperation network. The list of member institutions can be viewed through the following link: https://www.lalaproject.org/es/miembros/

Finally, as one of the first initiatives of the LALA community, on July 9 and 10, 2018, the first workshop on learning analytics in Latin America and the first summer school were held, organized by the partners of the LALA project consortium in collaboration with CEDIA network and SOLAR. The link to the conference site is: https://www.lalaproject.org/workshop/

In relation to the workshop, 35 research articles were received and sent through the easychair system, of those works, 15 papers were accepted as complete articles and 10 articles were selected to be presented at a special poster session.

In relation to the summer school, 9 tutorials by specialists in the area of learning analytics were offered and renowned researchers were present, such as PhD. Xavier Ochoa, members of the SOLAR executive committee. The link to the topics of the summer school is available at: https://www.lalaproject.org/workshop/programa/

In addition, and as part of the activities of the project in relation to the community, an annual conference will be organized to share and disseminate the results of the project. The next conference will be held at UACh, in Valdivia (Chile) in March 2019.

# 8. PRELIMINARY DATA APPLICATION LALA FRAMEWORK (Institutional Manual)

This section presents the preliminary results of the application of the institutional manual of the LALA framework. Specifically, the data collected between January and August 2018 in the four Latin American partner institutions of the project - the Pontificia Universidad Católica de Chile (PUC), the Universidad Austral de Chile (UACh), the Escuela Politécnica del Litoral de Ecuador (ESPOL) and the Universidad de Cuenca (U. Cuenca) are presented, following the guidelines indicated in the institutional manual, as well as the preliminary results of this first application.

During the course of the project, these four institutions will pilot analytical learning tools according to the needs detected from the data collected according to the institutional manual. Consequently, this document will continue to be updated as the project progresses, presenting the results of the application of the other manuals that are part of the LALA framework (technological, ethical, and communal).

The analysis below seeks to answer two main research questions:

- Q1. What are the adoption needs of learning analytics in different institutions?
- Q2. What are the ethical considerations to be taken into account for the implementation of learning analytics in the institution?

## 8.1. Data collection for institutional analysis

In order to collect data from the four Latin American institutions that are project partners, the different techniques stipulated in the institutional manual were used. **Table 5** shows the data collected in each institution during the application of each of the phases. First, for the institutional diagnostic phase, LALA Canvas was used to provide an overview of LA adoption in the institution. Second, for the phase of understanding the political context and institutional needs, semi-structured interviews were conducted with institutional leaders, and focus groups with professors and students. Third, for the phase corresponding to the raising of expectations about the use of educational data of the different actors in the institution, an online questionnaire was applied to teachers and students of the indicated institutions. Finally, preliminary analyses of the data collected were carried out to inform the LA strategy of the different universities. It should be noted at this point that the strategy defined by the different universities will not be reported in this document, since it is expected that it will be defined in the final phase of the project.

*Table 5* **Activities of the institutional manual applied during the second semester of the project. The acronyms of the different universities are: Pontificia Universidad Católica de Chile (PUC), Universidad Austral de Chile (UACh), Escuela Politécnica del Litoral de Ecuador (ESPOL) and Universidad de Cuenca (U. Cuenca).**

| Phase | Instrument | Application |
|---|---|---|
| 1. Institucional diagnosis | LALA Canvas | Workshop held in March 2017 with the participation of 16 LA experts from different Latin American universities:<br><br>• PUC: 5<br>• UACh: 3<br>• ESPOL: 3<br>• U. Cuenca: 5 |
| 2. Understand the political context and the needs of the institution-karaoke | Protocol of interviews with institutional leaders, professors, and students. | Interviews conducted between January and August 2018 with **37 institutional leaders**:<br><br>• PUC: 7<br>• UACh: 11<br>• ESPOL: 8<br>• U. Cuenca: 11<br><br>Focus Groups (FG) held between January and August 2018 to **45 students**:<br><br>• PUC: 14 (2 FG)<br>• UACh: 5 (1 FG)<br>• ESPOL: 3 (2 FG)<br>• U. Cuenca: 24 (3 FG)<br><br>Focus Groups (FG) held between January and August 2018 to **51 teachers**:<br><br>• PUC: 5 (1 FG)<br>• UACh: 15 (2 FG)<br>• ESPOL: 8 (2 FG)<br>• U. Cuenca: 23 (3 FG) |
| 3. Raise expectations about the use of educational data | Online questionnaires for students and teachers | Online questionnaires applied to 1,921 students and 342 teachers:<br><br>• PUC: 849 students, 124 teachers<br>• UACh: 160 students , 52 teachers<br>• ESPOL: 177 students , 25 teachers<br>• U. Cuenca: 735 students , 141 teachers |
| 4. To Develop change strategy | LALA Template | Preliminary results to inform the future strategy of change towards the adoption of LA in the different institutions. (Section 8.3). |

# 8.2. Methodology of analysis

For the first three phases of the institutional manual, a different analysis methodology was carried out. The methodology developed for each is described below.

**(1) Institutional Diagnosis**

The same experts who worked in the LALA Canvas of each institution summarized the elements of each dimension, with the aim of reaching a consensus on their observations of the six dimensions in their own institutional context. All these elements were documented in a Microsoft Word version of the LALA Canvas template (PUC, UACh, ESPOL, U. Cuenca).

**(2) Political context and institutional needs**

An expert from each institution summarized the results of the interviews according to the protocol questions provided as part of the manual (PUC, UACh, ESPOL, U. Cuenca). They then elaborated conclusions in a report focusing on the desired state of LA adoption in their institution, addressing LA tool needs, considerations for the design and implementation of LA methods, the required ethical and privacy elements, and the sustainability and scalability of LA initiatives in the region.

In addition, the experts from each institution identified the gaps between the current state and the desired state in terms of LA adoption, contrasting the elements listed in the LALA Canvas with the summarized results of the interview protocol. They then used this contrast to determine how LA could be used in their universities, as well as to anticipate issues for the future design of LA tools and methods.

In addition, from the review of the interviews and focus groups, a qualitative analysis was carried out to respond to **Q1 on the needs for the adoption of learning analytics**. For the analysis, we defined a series of nodes relating to the need for learning analytics from the point of view of students, teachers and administrators (See **Table 6**). Four researchers participated in the analysis according to the nodes listed using the NVIVO tool.

*Table 6 Description of analysis nodes defined to answer questions P1 (Needs)*

| Cathegory/Node | Description |
| --- | --- |
| *Students Needs* | |
| Learning environment | Students' need for appropriate physical environments and cultural elements for learning. |
| Quality Feedback | Students' need for timely and personalized feedback to understand their learning process. |
| Study Strategies | Students' need for study strategies in order to approach their learning process successfully (e.g. time management). |
| *Teachers' needs* | |

| Cathegory/Node | Description |
|---|---|
| Course Planning | Information to review the objectives of the course, to select and organize the content of the course, to choose teaching or evaluation methods, etc. |
| Teaching Evaluation | Challenges related to teacher performance evaluations at the institutional level. |
| Student's Diversity | Teachers' need to understand different subgroups of students (for example, first year students, students with special needs, students with different learning styles, etc.) |
| Teaching Skills | The need for teachers to understand different subgroups of students (e.g., first-year students, students with special needs, students with different learning styles, etc.). |
| *Management Needs* | |
| Curricular Management | Challenges faced by managers related to curriculum design, management and planning (e.g., course planning, assigning teachers to courses, developing course-level mapping results, etc.). |
| Information | Need for managers to have information for decision making and the formulation and evaluation of improvement actions. |
| Resources | Need for managers to have information to optimize existing resources, such as time, budget, infrastructure, etc. |
| Student's support | Responsibilities of managers to implement corrective actions to support students (e.g. counselling) |
| Teachers' support | Responsibilities of managers to implement corrective actions and time to support teachers (tutoring, notifications, evaluation) |

**(3) Expectations about the use of educational data**

A data analysis expert carried out a statistical analysis of the questionnaires applied to students and teachers in the 4 institutions. On the one hand, the student questionnaire had 2 scales, one on normative expectations ('what I would like to happen', and another on predictive expectations ('what I think might happen'). Each scale consisted of 12 statements related to expectations about analytic and learning services, as well as ethical and privacy expectations associated with the use of educational data. On the other hand, the teachers' questionnaire also had the same two scales, but each scale consisted of 16 questions. For both questionnaires, the expert reported the average per question for each institution, as well as doing a latent class analysis to compare the results of the four institutions - taking the UACh results as a baseline ([expert analysis](#)).

**Methods of analysis**

In order to answer questions P1 and P2 on LA needs in the different institutions, we triangulated the data collected from the LALA Canvas, focus groups and interviews. In addition, we conducted a statistical analysis of the surveys sent to teachers and students of the different institutions to provide an overview of their perception of their institution's capacity to adopt LA. The statistical data obtained from the analysis of the questionnaires were not used in the triangulation, but offer results that will be considered in future analysis.

# 8.3. Preliminary results

This subsection presents the preliminary results of the LALA Canas analysis, interviews and focus groups conducted in each institution around the two research questions: P1 on LA adoption in institutions and P2 on ethical considerations for LA capacity building in the institution. These results are summarized below.

**(1) Adoption needs**

Table 7 presents the LA adoption needs identified in each of the institutions from the analysis of the LALA Canvas. As can be seen, most institutions consider LA to be a promising tool for obtaining clear information about students' progress and their academic and psychosocial-emotional profile. However, not all universities have the same needs. For example, PUC places specific emphasis on feedback, ESPOL on counseling, and UACh and UACh on monitoring high failure rates and dropout risks. Therefore, and as Gasevic (2018) argues, the "one-size-fits-all" approach does not work for data models and, according to our results, may not work for LA adoption models either. In the next phases of the project, and once the pilots are done, more conclusions can be drawn on this point.

*Table 7 Preliminary results on the analysis of the institutional needs for the adoption of LA in the 4 Latin American universities of the project.*

|  | Needs for the adoption of LA |
|---|---|
| PUC | • Timely and personalized feedback to improve the teaching and learning process. |

| | |
|---|---|
| | • Academic support for subgroups of students (such as freshmen and students with special needs). |
| | • Information about the academic progress of students at one level of the curriculum. |
| | • Clear information about the academic burden on students. |
| UACh | • Punctual and personalised monitoring of the performance of students and teachers. |
| | • Information on students' academic progress at the curriculum level. |
| | • Information on the academic load of students. |
| | • Information on students' academic and psycho-social-emotional profiles. |
| | • Indicators of failure rates and risk of academic abandonment. |
| ESPOL | • Improvements to existing LA tools at the institutional level (e.g. an advisory tool). |
| | • Exploitation of educational data collected from both teachers and students. |
| | • Integrated systems to obtain information on the academic and psycho-social-emotional profile of students. |
| U. Cuenca | • Punctual and personalized monitoring of the performance of students and teachers. |
| | • Indicators of high failure rates and risk of academic abandonment. |
| | • Information on students' academic progress at the curriculum level. |
| | • Information on student satisfaction at the course and program level. |
| | • Information on students' academic and psycho-social-emotional profiles. |
| | • Information on the academic load of students. |

**(2) Ethical considerations for LA capacity building in the institution**

Table 8 shows the preliminary results on the ethical considerations detected in the different institutions for the future design of LA tools and methodologies respectively. As can be seen in the table, most institutions referred to the need to develop ethics-related policies to address issues related to informed consent of data, its access and transparency in its use. This result is in line with what is suggested in the current bibliography, which highlights the need to develop clear data and information processing policies in institutions that ensure privacy and transparent use (Gasevic, 2018; Steiner et al., 2015). In addition, most institutions placed special emphasis on the need for procedures to ensure data transparency, which is an important issue when adopting LA at the institutional level. In addition to common considerations, different ethical needs were also identified in some universities. For example, PUC emphasized the institutional establishment of informed consent for students about the use of their data. On the other hand, the UACh and U. Cuenca universities emphasized the need for institutional training in the areas of privacy and data use.

*Table 8 Ethical Considerations Identified*

| | Ethical considerations |
|---|---|
| PUC | • Need for rigorous processes for informed consent. <br> • Need for procedures for data transparency. <br> • Development of policies to maintain ethical practices in the handling of educational data. |
| UACh | • Importance of information security compliance. <br> • Need for staff training on privacy. |
| ESPOL | • Development of policies to maintain data access, data transparency and informed consent practices. |
| U. Cuenca | • Need for rigorous processes for informed consent. <br> • Need for procedures for data transparency. <br> • Development of policies to maintain ethical practices. <br> • Importance of information security compliance. <br> • Need for staff training on privacy. |

Figure 11 shows that the three main actors of the institutions analyzed have different needs that converge on some points. **Students emphasize that LA solutions should serve their learning process both at the feedback level and at the institutional support level**. On the one hand, they highlight the need for solutions that are able to provide quality and timely feedback during their learning process. When referring to quality feedback, students use words such as "personalized" and "on time", that is, able to inform them about their performance and curricular progress at the appropriate time. In addition, they also mention that it is important to offer services able of informing them about their emotional state in relation to the rest of the students in order to avoid dropouts and maintain their motivation throughout the course.

**Teachers point out that LA's solutions should offer support to improve their performance as teachers both in their daily practices and in their skills.** On the one hand, teachers emphasize that they need solutions capable of providing them with information that accounts for their teaching performance in a more meaningful way than current teacher surveys, in order to adjust their teaching practices. One of the aspects that stands out as something important is that this information must arrive in time to react during the development of the course and not at the end, as is usually the case in most current evaluation instances. In addition, they also coincide with the students' perspective on the use of LA solutions to provide information on the learners' emotional situation, in order to detect students at risk of dropping out and act in time.

Finally, **managers see LA solutions as a tool to provide actionable information to support decision making related to students, faculty and institutional strategy.** On the one hand, they consider that these solutions should offer actionable information to anticipate problems with professors and students. Information about professors is relevant for evaluating their performance and launching improvement policies, while information about students helps to understand where they encounter greater difficulties in the development of their studies. On the other hand, administrators see LA solutions as a tool to have an overview of the institution capable of crossing data to support the definition of institutional strategies related to curriculum, accreditations, or course improvement.
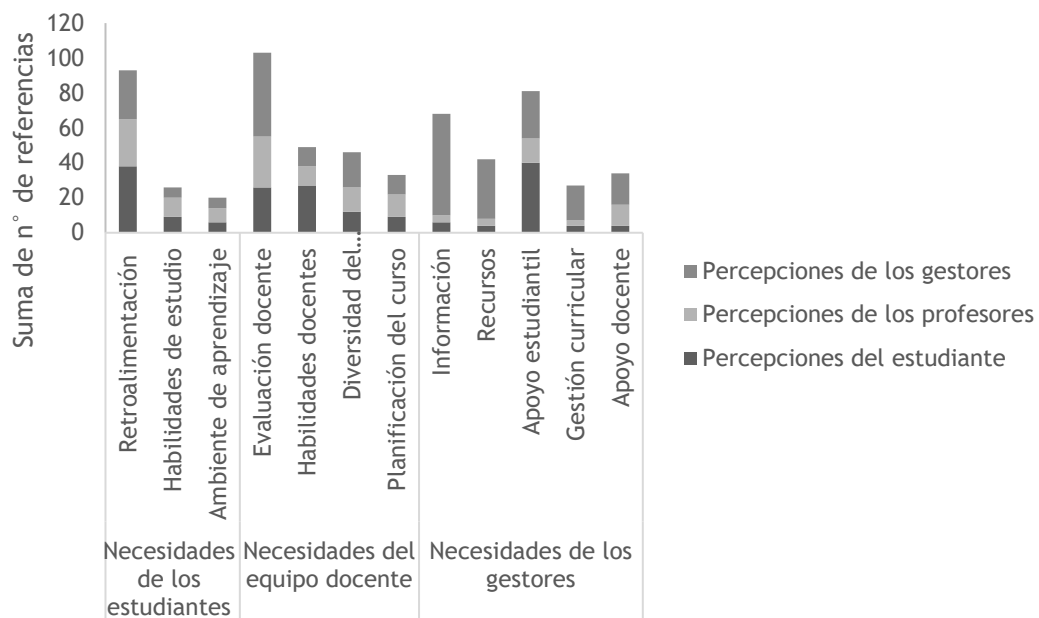


*Figure 11 Results of the coding of interviews and focus groups in relation to the adoption needs of LA for each of the actors of the institution: students, teachers and administrators.*

# 8.4. Results of questionnaires to students and teachers

Figure 12 and Figure 13 show the averages of the responses to the student and teacher questionnaires, respectively. According to the results shown in these figures, both students and teachers have higher expectations of LA data management standards and services than predictive expectations. This suggests that both actors already have an awareness of the use of institutional data and its potential for LA services.
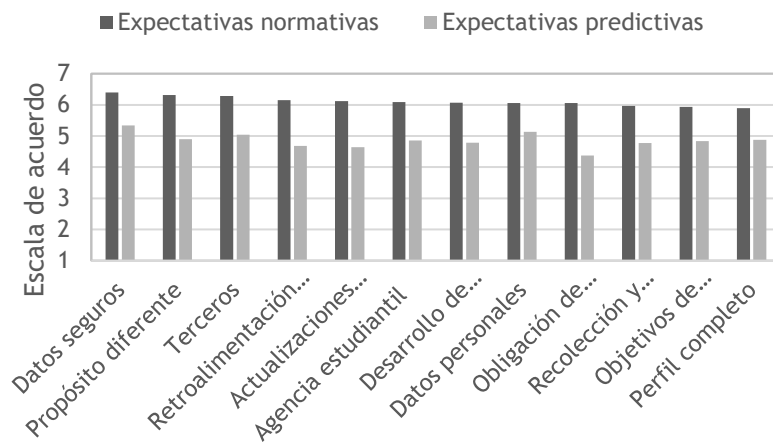


*Figure 12 Averages of student responses to statements that account for normative and predictive expectations with learning analytics services and ethical considerations of their implementation.*

■ Expectativas normativas ■ Expectativas predictivas
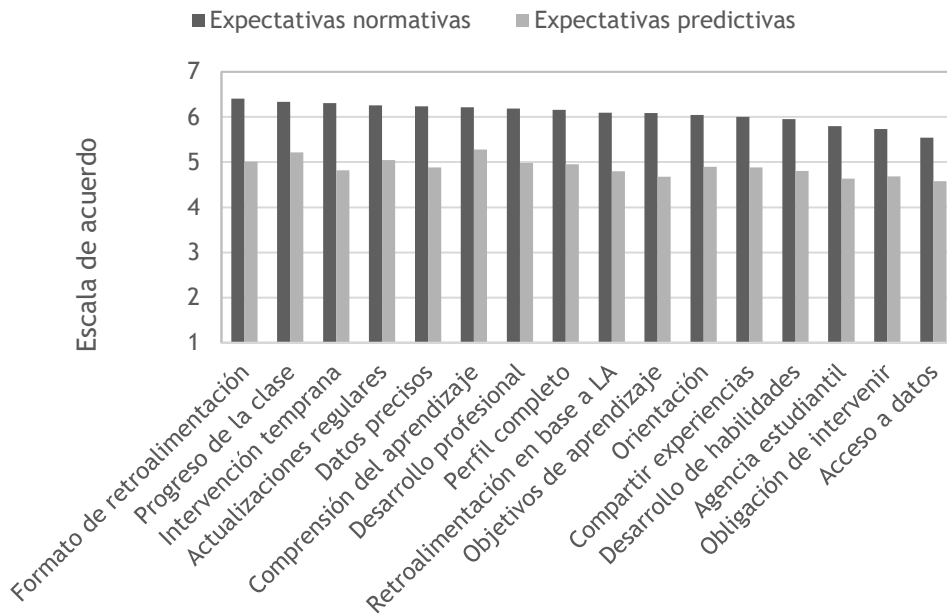
*Figure 13 Averages of teacher responses to statements that account for normative and predictive expectations with learning analytics services and ethical considerations of their implementation.*

## Student Questionary responses

A total of 1884 responses were collected from four institutions using the SELAQ (the Student Expectations of Learning Analytics Questionnaire). From each individual higher education institution the responses were as follows: 205 (ESPOL), 878 (PUC), 228 (UACH), and 573 (UCuenca). The average of the whole sample of students was 22.50 years (SD = 4.59), with a maximum age of 63 and a minimum age of 17.  With regards to gender, 958 (50.60%) students were male, 918 (48.70%) students were female, and 12 (.64%) students responded with prefer not answer. Majority of the overall student sample were Undergraduates (n = 1708, 90.70%), followed by Masters (n = 91, 4.83%) and PhD (n = 51, 2.71%). 29 students reported that they were studying both an Undergraduate and Masters course (n = 29, 1.54%), one student (.05%) stated they were doing an Undergraduate and PhD course, one student (.05%) stated they were doing both a Masters and PhD course, and three students (.16%) stated they were doing an Undergraduate, Masters, and PhD course.

Five items of the SELAQ refer to Ethical and Privacy Expectations, these were abbreviated as follows: Identifiable Data (Item 1), Keep Secure (Item 2), Third Parties (Item 3), Consent to Use (Item 5), and Alternative Use (Item 6).

With regards to the expectation of seeking consent to use identifiable data, majority of students strongly agreed to this action across all universities on the ideal expectation scale (49.27%, 62.41%, 67.11%, and 58.99% for ESPOL, PUC, UACH, and UCuenca, respectively). As for the predicted expectation scale, the proportion of students strongly agreeing dropped to 31.71% (ESPOL), 23.23% (PUC), 29.39% (UACH), and 30.37% (UCuenca). Even though responses showed expectations to not be comparable with the predicted scale, majority of students still expressed some level of agreement (somewhat agreed, agreed, or strongly agreed) with this item (68.30% for ESPOL, 69.36% for PUC, 61.55% for UACH, and 71.56% for UCuenca).

Majority of students also strongly agreed that they ideally expected the university to ensure any collected data remain secure (66.83%, 74.03%, 78.07%, and 73.30% for ESPOL, PUC, UACH, and UCuenca, respectively). As for the predicted expectation scale, 66.83% of the ESPOL student sample strongly agreed to the Keep Secure item. As for PUC, UACH, and UCuenca the respective percentages for strongly agreeing were 26 .88%, 28.07%, and 37.00%. Irrespective of this drop in the proportion of students expressing strong agreement with item 2, 91.71% (ESPOL), 75.85% (PUC), 74.56% (UACH), and 75.92% (UCuenca) of students expressed some form of agreement (somewhat agreed, agreed, or strongly agreed).

As for the expectation that consent should be sought before data is passed onto third parties (item 3), majority of students again ideally expected this to happen (ESPOL = 58.54%, PUC = 74.94%, UACH = 78.07%, and UCuenca = 68.24%). As for whether these students expected this to occur in reality, the majority of the sample (ESPOL = 66.35%, PUC = 66.41, UACH = 64.04%, and UCuenca = 75.05%) expressed some form of agreement (somewhat agreed, agreed, or strongly agreed) to this item.

For the item asking whether consent should be sought before data is collected and analysed by the university (item 5), majority of students ideally expected this to happen (ESPOL = 51.71%, PUC = 57.06%, UACH = 64.91%, and UCuenca = 55.15%). In relation to the predicted expectation scale, the responses again showed most students to agree to some extent (somewhat agreed, agreed, or strongly agreed) with the Consent to Use item (ESPOL = 71.22%, PUC = 53.99%, UACH = 60.09%, UCuenca = 70.33%).

The remaining Ethical and Privacy Expectations item (item 6) refers to obtaining consent before data is used for an alternative purpose. On the ideal expectation scale, majority of students strongly agreed to this item (ESPOL = 60.98%, PUC = 74.49%, UACH = 74.56%, and UCuenca = 67.71%). For the predicted expectation, fewer students responded with strongly agree, but majority of students (ESPOL = 71.71%, PUC = 61.05%, UACH = 53.39%, and UCuenca = 71.37%) agreed to some extent (somewhat agreed, agreed, or strongly agreed).

Seven items of the SELAQ refer to Service Feature Expectations, these were abbreviated as follows: Regular Updates (Item 4), Student Decision Making (Item 7), Learning Goals (Item 8), Complete Profile (Item 9), Teacher Feedback (Item 10), Obligation to Act (Item 11), and Skill Development (Item 12).

When asked about receiving regular updates from the university about their learning (item 4), majority of students strongly agreed that they ideally expected this to happen (ESPOL = 59.02%, PUC = 56.95%, UACH = 67.11%, and UCuenca = 57.59%). As to whether students expected to receive regular updates in reality, 32.68% of the ESPOL student sample strongly agreed, compared to 11.05%, 17.11%, and 26.88% for PUC, UACH, and UCuenca, respectively. As with ESPOL, the largest response for UCuenca was for strongly agree (26.88%). Whereas, for PUC and UACH the highest percentage was for the somewhat agree category (PUC = 25.40% and UACH = 25.00%). Despite this, 15.83% (PUC) and 13.60% (UACH) of students somewhat disagreed that the university would implement this feature in reality; 10.48% (PUC) and 7.02% (UACH) students also disagreed with item 4.

Ideal expectation scale responses to item 7, which stated that learning analytics services should promote student decision making, received strong agreement from majority of students (ESPOL = 52.68%, PUC = 56.83%, UACH = 54.82%, and UCuenca = 54.62%). As for the predicted expectation scale, the percentage of students strongly agreeing to item 7 did drop (ESPOL = 27.80%, PUC = 13.44%, UACH = 17.54%, and UCuenca = 24.96%; nevertheless, majority of the sample still agreed to some extent (Agree: ESPOL = 25.85%, PUC = 18.34%, UACH = 17.98%, and UCuenca = 20.59%; Somewhat Agree: ESPOL = 19.02%, PUC = 28.93%, UACH = 18.86%, and UCuenca = 21.12%). With regards to students disagreeing to the expectation conveyed in item 7, 11.05% (PUC), 15.35% (UACH), and 10.47% (UCuenca) students somewhat disagreed that it would occur in reality.

Across each of the four higher education institutions, a high proportion of students strongly agreed that they ideally expected to know how progress compared to a set set goal (ESPOL = 44.88%, PUC = 45.79%, UACH = 52.19%, and UCuenca = 49.56%). Although the proportion of students strongly agreeing on the predicted expectation scale did drop (ESPOL = 27.32%, PUC = 12.76%, UACH = 16.67%, and UCuenca = 22.69%), the majority of students (ESPOL = 77.57%, PUC = 56.38%, UACH = 57.90%, UCuenca = 68.94%) in the sample expressed some form of agreement (somewhat agreed, agreed, strongly). For PUC and UACH, 11.96% and 11.40% of students reported that they somewhat disagreed (on the predicted expectation scale) that the university would allow them to compare progress to a set goal, respectively.

Receiving a complete learning profile (item 9), on the ideal expectation scale, had a large proportion of students responding with strongly agree (ESPOL = 46.34%, PUC = 48.41%, UACH = 55.70%, and UCuenca = 52.01%). As with other variables, the proportion of students strongly agreeing to this expectation dropped on the predicted expectation scale (ESPOL = 25.85%, PUC = 14.58%, UACH = 21.05%, UCuenca = 24.96%). Irrespective of this decline, a high proportion of students (ESPOL = 75.09%, PUC = 58.20%, UACH = 60.08%, UCuenca = 68.59%) continued to express some form of agreement (somewhat agreed, agreed, or strongly agreed) to item 9. As for students disagreeing to this item on the predicted expectation scale, two of the largest proportions of students were for PUC (11.96%) and UACH (13.16%) for somewhat disagree.

Teaching staff having the skills needed to incorporate learning analytics into their feedback (item 10) did receive a large proportion of students strongly agreeing on the ideal expectation scale (ESPOL = 51.71%, PUC = 58.77%, UACH = 59.65%, and UCuenca = 56.89%). For the predicted scale, the proportion of strongly agree responses did drop (ESPOL = 24.39%, PUC = 12.98%, UACH = 18.42%, and UCuenca = 23.21%), but the overall expression of agreement (somewhat agreed, agreed, or strongly agreed) with this item was high for each institution (ESPOL = 69.76%, PUC = 54.21%, UACH = 56.14%, and UCuenca = 63.53%). With regards to students expressing some form of disagreement (somewhat disagreed, disagreed, or strongly disagreed), the largest proportion was for PUC (30.18%), followed by UACH (27.63%), UCuenca (23.56%), and then ESPOL (14.63%).

Expectations towards teaching staff having an obligation to act (item 11) were quite varied across the four institutions. With regards to the ideal expectation scale, a large proportion of students strongly agreed to this item (ESPOL = 55.12%, PUC = 55.69%, UACH = 61.84%, and UCuenca = 62.48%). On the predicted expectation scale, the proportion of students disagreeing was found to increase considerably in comparison to the ideal expectation scale. For instance, on the ideal expectation scale the responses across strongly disagree, disagree, and somewhat disagree were as follows 2.62%, 1.48%, and 3.30%, respectively. Whereas, for the predicted expectation scale this increased to 10.59% (strongly disagree), 12.30% (disagree), and 15.38% (somewhat disagree). Similar changes in response proportions were also noted for ESPOL (ideal expectation scale: strongly disagree = 4.89%, disagree = 2.44%, and somewhat disagree = .98%; predicted expectation scale: strongly disagree = 7.32%, disagree = 6.34%, and somewhat disagree = 7.32%), UACH (ideal expectation scale: strongly disagree = 3.51%, disagree = 1.75%, and somewhat disagree = 3.51%; predicted expectation scale: strongly disagree = 10.09%, disagree = 7.89%, and somewhat disagree = 16.67%), and UCuenca (ideal expectation scale: strongly disagree = 3.84%, disagree = 1.57%, and somewhat disagree = 2.79%; predicted expectation scale: strongly disagree = 9.95%, disagree = 8.55%, and somewhat disagree = 10.47%).

The remaining item refers to whether students expect the learning analytics service should be used to promote skill development (academic and professional; item 12). With regards to the ideal expectation scale a high proportion of students strongly agreed with this item (ESPOL = 55.12%, PUC = 54.56%, UACH = 61.84%, and UCuenca = 57.77%). As for the predicted expectation scale, responses were varied. For one, the proportion of strongly agree responses declined (ESPOL = 27.32%, PUC = 13.78%, UACH = 20.18%, and UCuenca = 26.18%). In addition, there was an increase in the number of students that expressed some form of disagreement to the item compared to the ideal expectation scale for PUC (ideal expectation scale: strongly disagree = 2.96%, disagree = 1.37%, and somewhat disagree = 1.94%; predicted expectation scale: strongly disagree = 5.35%, disagree = 6.83%, and somewhat disagree = 11.28%), UACH (ideal expectation scale: strongly disagree = 3.07%, disagree = 1.75%, and somewhat disagree = 1.32%; predicted expectation scale: strongly disagree = 6.14%, disagree = 9.65%, and somewhat disagree = 11.40%), and UCuenca (ideal expectation scale: strongly disagree = 3.49, disagree = 2.09%, and somewhat disagree = 1.22%; predicted expectation scale: strongly disagree = 5.24%, disagree = 4.89%, and somewhat disagree = 9.60%).

**Staff Questionary responses**

A total of 429 responses were received across the four institutions (ESPOL, PUC, UACH, and UCuenca). The number of responses per institutions were as follows: 25 (ESPOL), 124 (PUC), 79 (UACH), and 201 (UCuenca).

The staff questionnaire contains 16 items that cover an array of themes including data access, how the data will be used to improve student learning, and how the university can support staff being involved in learning analytics.

When asked whether academic staff expect to have access to the data collected about their students, responses were quite positive on the ideal expectation scale. For ESPOL, 60% of staff strongly agreed to this item; whereas, 29.03%, 45.57%, and 45.71% strongly agreed for PUC, UACH, and UCuenca. As for whether this would occur in reality (predicted expectation scale) only 4% of ESPOL staff somewhat disagreed with this expectation item, no other disagreement was expressed. As for PUC, 8.87%, 12.90%, and 12.90% members of staff respectively strongly disagreed, disagreed, or somewhat disagreed. For UACH, 31.65% of staff disagreed to some extent (Strongly Disagree = 3.80%, Disagree = 11.39%, and Somewhat Disagree = 16.46%) and this was 28.57% for UCuenca (Strongly Disagree = 5.71%, Disagree = 7.86%, and Somewhat Disagree = 15%).

In regards to whether staff expected to access guidance on how to access the analytics related to their students, a large proportion strongly agreed that they would like this to happen (ESPOL = 64%, PUC = 50%, UACH = 55.70%, and UCuenca = 52.14%). As to whether this would occur in reality (predicted expectation scale), the amount of staff strongly agreeing did decrease (ESPOL = 28%, PUC = 15.32%, UACH = 10.13%, and UCuenca = 19.29%). As for staff disagreeing in some way (Strongly Disagreeing, Disagreeing, or Somewhat Disagreeing) that this would occur in reality, 12% responded this way in ESPOL, 11.30% in PUC, 22.79% in UACH, and 26.43% in UCuenca.

Majority of respondents strongly agreed that they ideally expected the university to provide accurate data in any learning analytics feedback (ESPOL = 68%, PUC = 56.45%, UACH = 64.56%, and UCuenca = 55.71%). As for the predicted expectation scale, 36% of staff strongly agreed to this item, with only 12.90%, 16.46%, and 20% doing so for PUC, UACH, and UCuenca, respectively. Disagreement was expressed in some way (Strongly Disagree, Disagree, Somewhat Disagree), on the predicted expectation, by 16% (ESPOL), 20.98% (PUC), 22.78% (UACH), and 23.57% (UCuenca) of staff members.

Using learning analytics for the purpose of better understanding students' learning performance received a large response in terms of staff strongly agreeing that they would ideally like it to happen (ESPOL = 60%, PUC = 56.45%, UACH = 62.03%, and UCuenca = 55%). For the predicted scale, staff did not express much disagreement with regards to this item in terms of strongly disagreeing, disagreeing, or somewhat disagreeing (ESPOL: Strongly Disagree = 0%, Disagree = 4%, and Somewhat Disagree = 0%; PUC: Strongly Disagree = 1.61%, Disagree = .81%, and Somewhat Disagree = 2.42%; UACH: Strongly Disagree = 2.53%, Disagree = 2.53%, and Somewhat Disagree = 11.39%; UCuenca: Strongly Disagree = 4.29%, Disagree = 7.14%, and Somewhat Disagree = 7.14%). Teaching staff were, however, more positive that learning analytics would provide a deeper understanding of their students' learning performance (ESPOL: Strongly Agree = 20%, Agree = 32%, and Somewhat Agree = 20%; PUC: Strongly Agree = 28.23%, Agree = 27.42%, and Somewhat Agree = 24.19%; UACH: Strongly Agree = 24.05%, Agree = 27.85%, and Somewhat Agree = 20.25%; UCuenca: Strongly Agree = 21.43%, Agree = 25%, and Somewhat Agree = 23.57%).

Majority of respondents from ESPOL strongly agreed (72%) that they would ideally like the university to have early alert systems in place. Large responses for strongly agree were also found for PUC (58.87%), UACH (59.49%), and UCuenca (53.57%). In relation to the predicted expectation scale, the proportion of respondents strongly agreeing dropped to 36% for ESPOL, 17.74% for PUC, 11.39% for UACH, and 19.29% for UCuenca. For ESPOL, there were no negative responses on the ideal expectation scale; however, this increased to 20% (Strongly Disagree = 4%, Disagree = 12%, and Somewhat Disagree = 4%) on the predicted expectation scale. In relation to the three remaining institutions, the proportion of staff disagreeing that early alert systems would be implemented in reality was moderate (PUC: Strongly Disagree = 1.61%, Disagree = 5.65%, and Somewhat Disagree = 7.26%; UACH: Strongly Disagree = 2.53%, Disagree = 15.19%, and Somewhat Disagree = 12.66%; UCuenca: Strongly Disagree = 5.71%, Disagree = 7.14%, and Somewhat Disagree = 12.14%).

A large response to the strongly agree category for the learning analytics feedback being understandable and easy to read item was found for the ideal expectation scale (ESPOL = 68%, PUC = 66.94%, UACH = 68.35%, and UCuenca = 62.14%). For the predicted expectation scale this dropped to 28%, 17.74%, 21.52%, and 21.43% for ESPOL, PUC, UACH, and UCuenca, respectively. Majority of respondents still agreed to some extent that this would occur in reality (ESPOL: Agree = 24% and Somewhat Agree = 20%; PUC: Agree = 20.97% and Somewhat Agree = 26.61%; UACH: Agree = 21.52% and Somewhat Agree = 18.99%; UCuenca: Agree = 27.86% and Somewhat Agree = 20.71%).

In terms of whether academic staff ideally expect students to received feedback on how their progress compares to set goals, a large proportion strongly agreed (ESPOL = 56%, PUC = 53.23%, UACH = 54.43%, and UCuenca = 49.29%); the proportion strongly agreeing on the predicted expectation scale dropped (ESPOL = 20%, PUC = 14.52%, UACH = 11.39%, and UCuenca = 17.86%). The proportion of academic staff disagreeing in some way (Strongly Disagreed, Disagreed, or Somewhat Disagreed) did increase on the predicted expectation scale in comparison to the ideal expectation scale (ESPOL: ideal expectation scale = 0% and predicted expectation scale = 20%; PUC: ideal expectation scale = 3.23% and predicted expectation scale = 25.01%; UACH: ideal expectation scale = 7.60% and predicted expectation scale = 25.32%; UCuenca: ideal expectation scale = 5% and predicted expectation scale = 27.14%).

For the expectation that students would receive a complete profile of their learning, a large proportion of staff strongly agreed that they ideally expected this to happen (ESPOL = 48%, PUC = 50%, UACH = 59.49%, and UCuenca = 57.14%). For the predicted expectation scale this response to the strongly agree category dropped to 28%, 17.74%, 15.19%, and 17.86% for ESPOL, PUC, UACH, and UCuenca, respectively. A large proportion of respondents still responded positively, however (ESPOL: Agree = 16% and Somewhat Agree = 28%; PUC: Agree = 24.19% and Somewhat Agree =23.39%; UACH: Agree = 24.05% and Somewhat Agree = 21.52%; UCuenca: Agree = 25% and Somewhat Agree = 25.71%). Disagreement to this item on the predicted expectation scale was low (ESPOL: Strongly Disagree = 4%, Disagree = 4%, and Somewhat Disagree = 4%; PUC: Strongly Disagree = 2.42%, Disagree = 3.23%, and Somewhat Disagree = 10.48%; UACH: Strongly Disagree = 2.53%, Disagree = 5.06%, and Somewhat Disagree = 8.86%; UCuenca: Strongly Disagree = 5%, Disagree = 5.71%, and Somewhat Disagree = 9.29%).

When asked whether they expect the university to have an obligation to act when students are identified as at-risk or underperforming, a large proportion of staff strongly agree that they would ideally like this to happen (ESPOL = 52%, PUC = 44.35%, UACH = 46.84%, and UCuenca = 45%). As for whether they expected this to happen in reality (predicted expectation scale), the proportion of respondents strongly agreeing did drop but a agreement with this item was still moderate (ESPOL: Strongly Agree = 16%, Agree = 20%, and Somewhat Agree = 32%; PUC: Strongly Agree = 16.94%, Agree = 16.94%, and Somewhat Agree = 25%; UACH: Strongly Agree = 12.66%, Agree = 15.19%, and Somewhat Agree = 25.32%; UCuenca: Strongly Agree = 15.71%, Agree = 22.14%, and Somewhat Agree = 22.86%). As for respondents disagreeing in some way on the predicted expectation scale, this was moderate (ESPOL: Strongly Disagree = 0%, Disagree = 12%, and Somewhat Disagree = 8%; PUC: Strongly Disagree = 1.61%, Disagree = 4.84%, and Somewhat Disagree = 15.32%; UACH: Strongly Disagree = 5.06%, Disagree = 7.59%, and Somewhat Disagree = 13.92%; UCuenca: Strongly Disagree = 6.43%, Disagree = 7.86%, and Somewhat Disagree = 13.57%).

Respondents appeared to strongly agreed with providing staff with opportunities for professional development on the ideal expectation scale (ESPOL = 48%, PUC = 52.42%, UACH = 58.23%, and UCuenca = 56.43%). The proportion of responses to the agreement categories were still large on the predicted expectation scale (ESPOL: Strongly Agree = 20%, Agree = 20%, and Somewhat Agree = 36%; PUC: Strongly Agree = 16.94%, Agree = 33.06%, and Somewhat Agree = 29.03%; UACH: Strongly Agree = 16.46%, Agree = 13.92%, and Somewhat Agree = 22.78%; UCuenca: Strongly Agree = 20%, Agree = 22.14%, and Somewhat Agree = 8.57%). The level of disagreement for this item on the predicted scale was moderate (ESPOL: Strongly Disagree = 0%, Disagree = 4%, and Somewhat Disagree = 12%; PUC: Strongly Disagree = 1.61%, Disagree = 1.61%, and Somewhat Disagree = 3.23%; UACH: Strongly Disagree = 0%, Disagree = 13.92%, and Somewhat Disagree = 16.46%; UCuenca: Strongly Disagree = 2.86%, Disagree = 9.29%, and Somewhat Disagree = 15%).

Staff had strong ideal expectations that the learning analytics service would regularly update students (Strongly Agree: ESPOL = 64%, PUC = 54.84%, UACH = 60.76%, and UCuenca = 60%). This did decline for the predicted expectation scale (Strongly Agree: ESPOL = 28%, PUC = 20.97%, UACH = 20.25%, and UCuenca = 25.71%). In terms of staff disagreeing in any way that this would happen in reality, the largest response was for the somewhat disagree category (ESPOL = 4%, PUC = 7.26%, UACH = 15.19%, and UCuenca = 11.43%).

Staff being able to share their experiences of learning analytics services did receive strong agreement from a large proportion of respondents on the ideal expectation scale (ESPOL = 56%, PUC = 45.16%, UACH = 46.84%, and UCuenca = 50%). With regards to the predicted expectation scale, respondents still generally agreed with being able to share their experience with others (ESPOL: Strongly Agree = 24%, Agree = 16%, and Somewhat Agree = 32%; PUC: Strongly Agree = 17.74%, Agree = 22.58%, and Somewhat Agree = 25%; UACH: Strongly Agree = 11.39%, Agree = 18.99%, and Somewhat Agree = 20.25%; UCuenca: Strongly Agree = 20.71%, Agree = 23.57%, and Somewhat Agree = 22.14%). With regards to disagreement on this item on the predicted expectation scale, responses were low to moderate (ESPOL: Strongly Disagree = 4%, Disagree = 4%, and Somewhat Disagree = 12%; PUC: Strongly Disagree = .81%, Disagree = 4.03%, and Somewhat Disagree = 10.48%; UACH: Strongly Disagree = 1.27%, Disagree = 11.39%, and Somewhat Disagree = 15.19%; UCuenca: Strongly Disagree = 2.14%, Disagree = 10.71%, and Somewhat Disagree = 7.14%).

With regards to providing staff with opportunities of professional development, a large proportion of respondents strong agreed that they would ideally like this to happen (ESPOL = 48%, PUC = 52.42%, UACH = 58.23%, and UCuenca = 56.43%). Responses on the predicted expectation were positive yet not as a comparable to the ideal expectation scale (ESPOL: Strongly Agree = 20%, Agree = 20%, and Somewhat Agree = 36%; PUC: Strongly Agree = 16.94%, Agree = 33.06%, and Somewhat Agree = 29.03%; UACH: Strongly Agree = 16.46%, Agree = 13.92%, and Somewhat Agree = 22.78%; UCuenca: Strongly Agree = 20%, Agree = 25%, and Somewhat Agree = 19.29%). In relation to respondents disagreeing on this item on the predicted expectation scale, responses were low to moderate (ESPOL: Strongly Disagree = 0%, Disagree = 4%, and Somewhat Disagree = 12%; PUC: Strongly Disagree = 1.61%, Disagree = 1.61%, and Somewhat Disagree = 3.23%; UACH: Strongly Disagree = 0%, Disagree = 13.92%, and Somewhat Disagree = 16.46%; UCuenca: Strongly Disagree = 2.86%, Disagree = 9.29%, and Somewhat Disagree = 15%).

The largest response on the ideal expectation scale for students being able to make their own decision on the data provided was for strongly agree (ESPOL = 40%, PUC = 36.29%, UACH = 41.77%, and UCuenca = 42.86%). As for whether this would occur in reality (predicted expectation scale), responses still remained largely positive (ESPOL: Strongly Agree = 24%, Agree = 36%, and Somewhat Agree = 12%; PUC: Strongly Agree = 12.10%, Agree = 20.16%, and Somewhat Agree = 23.39%; UACH: Strongly Agree = 6.33%, Agree = 16.46%, and Somewhat Agree = 31.65%; UCuenca: Strongly Agree = 17.14%, Agree = 20.71%, and Somewhat Agree = 21.43%). As for disagreement with this particular item and whether it would realistically happen, this was fairly low (ESPOL: Strongly Disagree = 4%, Disagree = 12%, and Somewhat Disagree = 4%; PUC: Strongly Disagree = 3.23%, Disagree = 8.87%, and Somewhat Disagree = 12.90%; UACH: Strongly Disagree = 5.06%, Disagree = 12.66%, and Somewhat Disagree = 8.86%; UCuenca: Strongly Disagree = 5%, Disagree = 6.43%, and Somewhat Disagree = 12.42%).

Knowing how students were progressing within a course received strong ideal expectations across each institution (Strongly Agree: ESPOL = 72%, PUC = 60.48%, UACH = 60.76%, and UCuenca = 60.71%). Agreement was still large on the predicted expectation scale (ESPOL: Strongly Agree = 36%, Agree = 16%, and Somewhat Agree = 32%; PUC: Strongly Agree = 26.61%, Agree = 29.84%, and Somewhat Agree = 16.94%; UACH: Strongly Agree = 20.25%, Agree = 17.72%, and Somewhat Agree = 29.11%; UCuenca: Strongly Agree = 27.14%, Agree = 21.43%, and Somewhat Agree = 25%). Disagreement as to whether this would occur in reality was found to be low (ESPOL: Strongly Disagree = 0%, Disagree = 0%, and Somewhat Disagree = 8%; PUC: Strongly Disagree = 1.61%, Disagree = 5.65%, and Somewhat Disagree = 5.65%; UACH: Strongly Disagree = 1.27%, Disagree = 7.59%, and Somewhat Disagree = 10.13%; UCuenca: Strongly Disagree = 5%, Disagree = 3.57%, and Somewhat Disagree = 9.29%).

Teaching staff having the skills necessary to incorporate learning analytics into the feedback they provide did receive a large proportion of respondents strongly agreeing with the item on the ideal expectation scale (ESPOL = 48%, PUC = 49.19%, UACH = 56.96%, and UCuenca = 50.71%). The amount of respondents strongly agreeing on the predicted expectation scale did drop (ESPOL = 24%, PUC = 12.10%, UACH = 16.46%, and UCuenca = 15.71%); however, teaching staff still generally agreed to some extent (ESPOL: Agree = 28% and Somewhat Agree = 24%; PUC: Agree = 19.35% and Somewhat Agree = 28.23%; UACH: Agree = 16.46% and Somewhat Agree = 22.78%; UCuenca: Agree = 25.71% and Somewhat Agree = 25%). As for disagreement as to whether this would occur in reality, the proportion of responses for these categories was low (ESPOL: Strongly Disagree = 0%, Disagree = 8%, and Somewhat Disagree = 4%; PUC: Strongly Disagree = 3.23%, Disagree = 4.84%, and Somewhat Disagree = 14.52%; UACH: Strongly Disagree = 2.53%, Disagree = 8.86%, and Somewhat Disagree = 10.13%; UCuenca: Strongly Disagree = 5%, Disagree = 5.71%, and Somewhat Disagree = 12.14%).

# 8.4. Preliminary conclusions and next steps

The preliminary of the institutional needs for LA adoption in the 4 Latin American partner universities shows that the "one-size-fits-all" approach may not work when models for large-scale LA adoption are proposed. Although the results show that most institutions viewed LA as a promising tool for obtaining information on student progress and their academic or psychosocial-emotional profiles, there were different institutional needs among universities, even among institutions in the same country. In addition, there are a number of ethical concerns, such as the need for ethics-related policies and procedures to ensure data transparency, which must be taken into account to ensure that LA tools are used appropriately at the institutional level.

A more in-depth analysis of reported data is currently underway in order to broaden the reported conclusions. The findings will inform the development of an institutional strategy that will be validated internally and externally as LA tools are designed and implemented in different institutions.

# 9. CONCLUSIONS

## 9.1. About the LALA Framework proposal

This document presents the LALA framework, a framework that aims to provide guidelines to guide higher education institutions in Latin America in the design, implementation and adoption of learning analytics tools. The framework is composed of a series of manuals around four different dimensions:

- the institutional dimension, which proposes a series of manuals to understand and analyze the current state of a higher education institution in relation to the adoption of learning analytics;
- the technological dimension, a set of manuals that provides an overview of the technological needs that an institution must consider for the adoption or implementation of a learning analytics tool;
- the ethical dimension, which provides a series of manuals and sample forms on the aspects that an institution should consider in relation to the treatment and use of data for learning analytics projects; and
- the community dimension, which provides guidelines on how an institution or organization, as well as an individual researcher, can be integrated into the LALA community.

The manuals of each dimension are presented in a practical way, as a set of activities and instruments, all accessible in the APPENDIX document and the online folder: https://drive.google.com/open?id=1ak2QiW1vU9yBiGsXlB-we5B_4J0Wtmc1. The manuals can be used independently or jointly, according to the needs and interests of each institution.

The LALA framework represents the first initiative that proposes a practical and step-by-step material to guide the design, installation and adoption of learning analytics tools for Latin America. Although there are European initiatives with similar objectives, such as the SHEILA project or the document published by JISC in Great Britain in 2015, none of them propose a manual format, based on previous studies, that considers all the necessary aspects to achieve a realistic and integrated adoption in Higher Education institutions. The LALA framework is, therefore, an initiative that provides a new vision on how to develop the adoption and installation capacities of learning analytics skills in higher education institutions.

## 9.1. Following steps

So far, the LALA framework presented in this document is a first proposal that will be iterated throughout the project. Although some of the manuals proposed here have already been validated with the LALA partners, as is the case of the manuals related to the institutional and ethical dimensions, the rest of the dimensions will be validated in the following years of project execution. Below we present the future work for each of the dimensions of the framework:

(1) Institutional dimension. After conducting the interviews and focus groups with the different institutions in the project, as well as with other institutions in Latin America, work is being done on the analysis of the data collected. The objective is to offer an overview of the current state of learning analytics in Latin America. In addition, during this process, adjustments have been made to the instruments developed. The result of these adjustments will be sent to international conferences with the aim of obtaining an international validation of the proposed instruments.

(2) Technological dimension. The current manual offers a series of instruments that allow identifying the technological needs of an institution for the implementation of a learning analytics tool, as well as the requirements that it should have. So far, this manual does not provide any specific guidelines on the most technical aspects to consider, from the design of the interfaces to the implementation and security of the databases. However, this document will be complemented with a deliverable related to the process of adaptation and/or implementation from the most technical point of view based on the lessons learned during the development and implementation of the project's pilot tools.

(3) Ethical dimension. Currently, many of the partners have developed their data use forms and contracts. These documents, adapted to the needs of each of the countries involved, have already been made available in an open manner so that other institutions can use them as a reference. This is a first step towards the generation of a document sharing repository adapted to the regulations and laws of the different Latin American countries.

(4) Community dimension. Currently, the community dimension has a statute and the membership documents for the LALA community both for institutions and for individual researchers. Throughout the project, and within the framework of the community dimension, summer workshops and schools will be held in order to provide material and resources to higher education institutions, organizations and researchers to join the area of learning analytics at both the national as well as international level. From the partners who are already members of this community, an observatory of learning analytics for Latin America will be developed, which will offer an overview of what is being developed in the region regarding this area of study. Finally, work is also being done so that the LALA project and its community lead lines on learning analytics in some of the conferences already established in the Latin American region, such as LACLO or CLEI.

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# A1. APPENDIX INSTITUTIONAL DIMENSION

**All the documents of this appendix can be found at the following link:**
**https://drive.google.com/drive/folders/1f5tD_JsV9d7Yw1YXnc-mDzAmnWG4spAu?usp=sharing**

## A1.1. LALA Canvas

The LALA Canvas is a template for guiding a group discussion about the current state of a higher education institution in terms of learning analytics.

# A1.2. Interview Guidelines

Guidelines for interviewing different actors involved in the analysis for the institutional dimension.

**Suggestions for the protocol application**

- **It is suggested to consider two people to lead each interview: a moderator (who asks the questions) and an observer (who takes notes).**
- **The moderator should be familiar with qualitative information collection methodologies.**
- **The time for the activity should be about an hour.**
- **The idea is to start by *framing* and ask for informed consent in writing.**

| Authorities | Academic staff | Students |
|---|---|---|
| **Methodology:** Snowball until obtaining redundant information (start with key actors and suggest that they refer someone else to talk to).<br><br>**Number of participants:** At least one (unless the authority decides to add more).<br><br>**Examples of key players:**<br><br>- **Vice Chancellor**<br>- **Deans/Teaching Directors**<br>- **Deans of faculties**<br>- **Career Coordinators**<br>- **Student welfare**<br>- **Director of Information Technology** | **Methodology:** Sampling by convenience in different Faculties relevant for the institution (ideally at least one per faculty)<br><br>**Number of participants:** At least three (it is suggested citing six to eight people). | **Methodology:** Sampling by convenience in different Faculties relevant for the institution (ideally at least one per faculty)<br><br>**Number of participants:** At least three (it is suggested citing six to eight people). |

**General framing**

The learning analytics involves the collection and analysis of educational data, such as grades and class attendance, with the objective of obtaining information on how students approach their studies and implementing services to improve their learning processes. For example, alert systems can be developed to offer support to students who are at risk of failing a course or abandoning their studies. Systems that analyze the hours invested by a student in an online or face-to-face learning environment can also be developed, to determine the time spent on a course or module. In this way, the use of educational data in services based on learning

analytics provides information to identify any type of problem that may affect the learning process of a student.

Taking into account that [your management/ your teaching/your learning] can benefit from the use of educational data, it is very important to consider your opinions and expectations during the design and implementation of the different services. For this purpose, you have been invited to participate in this interview that will last approximately one hour. Its objective is to get to know your opinion about the use of your educational data by the university, and your expectations about the services that could be developed from this data.

The information collected in this interview will be used to inform about the development of policies associated with the use of educational data in different Latin American universities through the European LALA project, which is a collaborative project funded by the European Commission. This interview will be recorded but this recording may be interrupted at any time a participant requests it.

[Authorizing signature]

1.- Warm-up

| AUTHORITIES | ACADEMIC STAFF | | STUDENTS |
|---|---|---|---|
| 1. Mention the position you currently hold and years of experience. | 1. Mention the position you hold, the faculty/ school you belong to and years of experience. | | 1. Mention the career you are pursuing and in what semester/year you are currently. |
| 2. What data is relevant to understand how students and teachers are performing? | 2a. What data is relevant to understand how your students are performing in their studies? | 2b. What data is relevant to understand how you are doing *as a professor*? | 2. What data is relevant for you to know how you are doing in your studies? |
| 3. What data is provided to students and teachers to give feedback on their performance? How effective is it? | 3a. What data do you provide to students to give feedback on their academic performance? How effective is it? | 3b. What data does the institution provide to give feedback on your teaching performance? | 3. What data do the teachers and the institution provide to give you feedback on your academic performance?<br><br>How effective is it? |

| | | How effective is it? | |
|---|---|---|---|

<br>

**2- Exploring discussion points**

**Topic: Transparency, ethics and data privacy**

| AUTHORITIES | ACADEMIC STAFF | | STUDENTS |
|---|---|---|---|
| 4. What types of data does the university collect about students and academic staff? | 4a. What types of data do you think the university has been collecting about you? | 4b. What types of data do you think the university has been collecting about students? | 4. What types of data do you think the university has been collecting about you? |
| 5. Do academic staff and students sign any consent forms where they are told that their data will be used? When? | 5a. Have you signed any consent form where you were told that your data will be used? When?? | 5b. Do you know if the students have signed a consent form where they are told their data will be used? When? | 5. Have you signed any consent form where you are told that your data will be used? When? |
| 6. Are there policies available on how the university collects and analyzes the data of academic staff and students?? | 6a. Are there policies available about how the university collects and analyzes your data and that of your students?? | 6b. Do you know if students are informed about the way the university collects and analyzes their data? | 6. Is there clear information available about how the university collects and analyzes your data? |
| 7. Is there a policy to determine who has access to the data that the university collects about students and academic staff? Who has access to the data? | 7a. Do you know who has access to your data? Who should be granted the right to access your data? Should you be informed about who can access your data? | 7b. Do you know who has access to student data? Who should be granted the right to access their data? Should you be informed about who can access their data? | 7. Do you know who has access to your data? Who should be granted the right to access your data? Should you be informed about who can access your data? |

| 8. Is there some type of data for which the university should explicitly ask for academic staff' and students' consent (for example, data about their religious beliefs)? | 8a. Is there some type of data for which the university should explicitly ask for your consent (for example, data about your religious beliefs)? | 8b. Is there some type of data for which the university should explicitly ask for the students' consent (for example, data about their religious beliefs)? | 8. Is there some type of data for which the university should explicitly ask for your consent (for example, data about your religious beliefs)? |
|---|---|---|---|

**Topic: Academic Use of Data**

| Authorities | Academic staff | Students |
|---|---|---|
| 9. What use does the institution give to the data collected from students and academic staff to improve their academic and teaching performance? Examples? | 9. These are some examples of the use of data to help students in their learning. Which of these examples would you prefer to implement? Organize them in order of importance. <br><br> a. Improving the advice they receive from the academic staff or with the academic tutors. <br> b. Improving their learning experience as a whole, and their well-being. <br> c. Detecting weak points in their learning and suggesting ways to improve it. <br> d. Alerting the academic staff as soon as possible, if tthey are at risk of failing a module, course), or if they could improve their learning. <br> e. Identifying, based on their curriculum, the optimal path for their studies (for example, suggesting optional subjects). <br> f. Offering them their complete learning profile in each module. | 9. These are some examples of the use of your data to help you learn. Which of these examples would you prefer to implement? Organize them in order of importance. <br><br> g. Improving the advice you receive from the academic staff or with the academic tutors. <br> h. Improving your learning experience as a whole, and your well-being. <br> i. Detecting weak points in your learning and suggesting ways to improve it. <br> j. Alerting the academic staff as soon as possible, if you are at risk of failing a module, course), or if you could improve your learning. <br> k. Identifying, based on your curriculum, the optimal path for your studies (for example, suggesting optional subjects). |

| | | |
|---|---|---|
| | | l. Offering you your complete learning profile in each module |
| 10/11 How else could student and professor data be used to improve understanding of their academic and teaching performance at the university?? | 10. How else could student data be used to improve understanding of their academic performance at the university? | 10. How else could your data be used to improve understanding of your academic performance at the university?? |
| | 11. How could the data you get from students be used to improve understanding of your teaching practice at the university? | 11. How could the data you get from the teachers be used to improve the understanding of your performance at the university? |
| **Topic: Data Feedback** | | |
| *Authorities* | *Academic staff* | *Students* |
| 12. What would be the best way to show the results of the educational data analysis? | 12. What would be the best way to show the results of the educational data analysis? (academic staff and students) | 12. How would you like to receive the results of the analysis of your educational data?<br><br>a. In person (for example, from your academic tutor).<br>b. As a text (for example, by email).<br>c. Through visualizations (for example, through a graphic interface in a software tool).<br>d. Of these three options, which one do you think is the most useful for your learning? |
| 13. How often should the results be sent? For example, every day, once a week, etc. | 13. How often would you like to receive the results? For example, every day, once a week, etc. (*academic staff and students*) | 13. How often would you like to receive the results? For example, |

| | | | every day, once a week, etc. |
|---|---|---|---|
| 14. Should the results include a comparison of the professor's/student's progress with respect to the progress of the rest of their colleagues? | 14. Should the results include a comparison of your progress with respect to the progress of the rest of your colleagues? | | 14. Should the results include a comparison of your progress with respect to the progress of the rest of your classmates? |

**Topic: Intervention based on results**

| Authorities | Academic staff | | Students |
|---|---|---|---|
| 15. How are the results of academic staff' and students' data approached? What actions are taken? What actions should be taken? | 15. How are the results of your data approached? What actions are taken? What actions should be taken? | 15. How are the results of students' data approached? What actions are taken? What actions should be taken? | 15. How do they approach the results of your data? What actions are taken? What actions should be taken? How should the institution approach the analysis of your data?<br><br>a. Should they have an obligation to act if they detect that you are at risk of failing a module, or if they detect that you have low performance in a module?<br>b. Should the academic staff receive some type of training to understand the analysis of your educational data, and to provide you with results that are useful?<br>c. Should the university offer students the possibility to refuse the support? |

**3.- Closing activities**

| AUTHORITIES | ACADEMIC STAFF | STUDENTS |
|---|---|---|
| 16. Is there any additional information that would be important to obtain from students and academic staff? Why? | 16. Is there any additional information that would be important to obtain from students and you? Why? | 16. Is there any additional information that would be important to obtain academic staff and you? Why? |
| 17. Would you like to add anything else? | | |

# A1.3. Questionnaire format to be used with professors

Format of the questionnaire used to ask academic staff about the institutional aspects of data use.

**Academic staff's expectations about the use of educational data**

Different higher education institutions have implemented services to support the learning process of their students from the collection and analysis of different educational data, such as grades, class attendance, or access to electronic resources (i.e. a alert system for students who are at risk of failing a subject).

In this context, the purpose of this survey is to get to know the opinion of a university's academic staff about the collection and analysis of educational data in their institution. Answering the survey takes approximately 10 minutes and your participation is voluntary.

The following statements describe situations that could occur in the future given the progress of research on the use of educational data in higher education institutions. For each of the statements, indicate the degree of agreement or disagreement by marking an option from 1 to 7 on each scale, where 1 indicates disagreement and 7 indicates agreement.

A set of questions represents whether you would like what is described in the statement to happen at your university. <u>Note:</u> If what is described in the statement is something that you consider highly desirable, select the maximum value on the scale (7).

Another set of questions represents your perception of what could actually happen at your institution (in relation to what is described in the statement). <u>Note:</u> If the description in the statement is something already implemented at your institution or you think it is highly likely to happen, select the maximum value on the scale (7).

The results of the survey will be used to develop policies associated with the collection and analysis of educational data at different Latin American universities through the project *Building Capacity to Use Learning Analytics to Improve Higher Education in Latin America (LALA)* (**https://lalaproject.org/**), which is financed by the European Commission and has Latin American and European universities participating. Your answers will be anonymous and will only be disclosed at the aggregate level.

**Please, check the box to confirm that you have read the previous information**.

**CHARACTERIZATION**

| Gender | Male | Female |
|---|---|---|
| **Years of teaching experience** | | |
| **Faculty** <br><br> **(Check <u>one</u> option)** | **Agronomy and Forestry Engineering** | |
| | **Architecture, Design and Urban Studies** | |
| | **Arts** | |
| | **Biological Sciences** | |
| | **Economic and Administrative Sciences** | |
| | **Social Sciences** | |
| | **Communications** | |
| | **Literary Arts** | |
| | **Law** | |
| | **Education** | |
| | **Philosophy** | |
| | **Physics** | |
| | **History, Geography and Political Science** | |
| | **Engineering** | |
| | **Mathematics** | |
| | **Medicine** | |
| | **Chemistry** | |
| | **Theology** | |

| Academic category | Assistant Professor | |
| --- | --- | --- |
| | Deputy Assistant Professor | |
| | Associate Professor | |
| | Adjunct Associate Professor | |
| | Tenured Professor | |
| | Attached Titular Professor | |
| Management position | Chair of Undergraduate Program | |
| | Chair of Postgraduate Program | |
| | Chair of Research Program | |
| | Dean | |
| | Director at the level of Vice-chancellor | |
| | Vice-Chancellor | |
| | Other | |
| | Does not apply | |
| Chilean or international professor? (check one option) | Chilean | |
| | International | |

**ACADEMIC STAFF'S EXPECTATIONS ABOUT THE USE OF EDUCATIONAL DATA**

1. **The university will provide me with a manual on how to access the analysis of my students' educational data.**

Ideally, I would like it to happen          I think it can actually happen

I disagree                    I agree      I disagree                    I agree

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| --- | --- | --- | --- | --- | --- | --- |
| | | | | | | |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| --- | --- | --- | --- | --- | --- | --- |
| | | | | | | |

2. **The university will provide the academic staff with opportunities for professional development in the use of educational data for teaching.**

**Ideally, I would like it to happen**     **I think it can actually happen**

**I disagree**                **I agree**     **I disagree**                **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

3. **The university will facilitate open discussions in which the experiences related to the services associated with the use of educational data can be shared.**

**Ideally, I would like it to happen**     **I think it can actually happen**

**I disagree**                **I agree**     **I disagree**                **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

4. **I will be able to access the data related to my students' progress, in any of the courses in which I am teaching or providing tutoring services.**

**Ideally, I would like it to happen**     **I think it can actually happen**

**I disagree**                **I agree**     **I disagree**                **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

5. **I will be able to access the data of any student who is in a program.**

**Ideally, I would like it to happen**          **I think it can actually happen**

**I disagree**                    **I agree**    **I disagree**                    **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

6. **The services related to the use of educational data will allow students to make their own decisions based on the information provided.**

**Ideally, I would like it to happen**          **I think it can actually happen**

**I disagree**                    **I agree**    **I disagree**                    **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

7. **The university will provide support to the student as soon as possible (for example, advice from the tutor) if the analysis of the student's educational data suggests that they may be having some difficulty or problem (for example, if the student is found to have poor performance, or a high risk of dropping the course).**

**Ideally, I would like it to happen**          **I think it can actually happen**

**I disagree**                    **I agree**    **I disagree**                    **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

8. **The university will regularly inform the students about their educational progress, based on the analysis of their educational data.**

**Ideally, I would like it to happen**          **I think it can actually happen**

**I disagree**                    **I agree**    **I disagree**                    **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| | | | | | | |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| | | | | | | |

9. **The services related to the use of educational data will collect and show accurate data (error-free data, for example, data without erroneous evaluation results).**

**Ideally, I would like it to happen**          **I think it can actually happen**

**I disagree**                 **I agree**          **I disagree**                 **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| | | | | | | |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| | | | | | | |

10. **The services related to the use of educational data will show a comparison between the student's progress in their learning and the learning objectives of their courses.**

**Ideally, I would like it to happen**          **I think it can actually happen**

**I disagree**                 **I agree**          **I disagree**                 **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| | | | | | | |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| | | | | | | |

11. **The information provided by the services related to the use of educational data will be displayed in an understandable and easy-to-read format.**

**Ideally, I would like it to happen**          **I think it can actually happen**

**I disagree**                 **I agree**          **I disagree**                 **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| | | | | | | |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| | | | | | | |

12. **The services related to the use of educational data will show students a complete profile of their learning in each of their courses (for example, number of accesses to online materials, attendance data or results obtained).**

**Ideally, I would like it to happen**          **I think it can actually happen**

**I disagree**                    **I agree**      **I disagree**                    **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

13. **The academic staff will be able to incorporate the results obtained through the analysis of the educational data in the information and support that they provide to the students.**

**Ideally, I would like it to happen**          **I think it can actually happen**

**I disagree**                    **I agree**      **I disagree**                    **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

14. **The academic staff will have the obligation to support the students if the analysis of the student's educational data shows that they have a low performance, that they are at risk of suspension, or that they can improve their learning.**

**Ideally, I would like it to happen**          **I think it can actually happen**

**I disagree**                    **I agree**      **I disagree**                    **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

15. **The information obtained through the services related to the use of educational data will be used to promote the development of students' academic and professional skills for future employability (for example, effective communication).**

**Ideally, I would like it to happen**

**I think it can actually happen**

**I disagree**          **I agree**      **I disagree**          **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

16. **The analysis of educational data will allow me to better understand the learning process of my students and their academic results.**

**Ideally, I would like it to happen**

**I think it can actually happen**

**I disagree**          **I agree**      **I disagree**          **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

# A1.4. Questionnaire Format to be applied to students

Format of the questionnaire used to ask students about the institutional aspects of data use.

**Students' expectations about the use of educational data**

Different higher education institutions have implemented support services for the learning process of their students from the collection and analysis of different educational data, such as grades, class attendance, or access to electronic resources (i.e. an alert system for students who are at risk of failing a course).

In this context, the purpose of this survey is to get to know the students' opinion about the collection and analysis of educational data in their institution. Answering the survey takes approximately 5 minutes and your participation is voluntary.

The <u>following statements</u> describe situations that could occur in the future given the progress of research on the use of educational data in higher education institutions. For each of the statements, indicate the degree of agreement or disagreement by marking an option from 1 to 7 on each scale, where 1 indicates disagreement and 7 indicates agreement.

A set of questions represents whether you would like what is described in the statement to happen at your university. <u>Note:</u> If what is described in the statement is something that you consider highly desirable, select the maximum value on the scale (7).

Another set of questions represents your perception of what could actually happen at your institution (in relation to what is described in the statement). <u>Note:</u> If the description in the statement is something already implemented at your institution or you think it is highly likely to happen, select the maximum value on the scale (7).

The results of the survey will be used to develop policies associated with the collection and analysis of educational data at different Latin American universities through the project *Building Capacity to Use Learning Analytics to Improve Higher Education in Latin America (LALA)* (https://lalaproject.org/), which is financed by the European Commission and has Latin American and European universities participating. Your answers will be anonymous and will only be disclosed at the aggregate level.

**Please, check the box to confirm that you have read previous information.**

Characterization

| Place of residence before starting your university studies: | | | |
|---|---|---|---|
| | | | |
| Gender | **Male** | **Female** | **I prefer not to respond.** |
| Age | | | |
| At what Faculty are you studying? (Check <u>one</u> option) | **Agronomy and Forestry Engineering** | | |
| | **Architecture, Design and Urban Studies** | | |
| | **Arts** | | |
| | **Biological Sciences** | | |
| | **Economic and Administrative Sciences** | | |
| | **Social Sciences** | | |
| | **Communications** | | |
| | **Literary Arts** | | |
| | **Law** | | |
| | **Education** | | |
| | **Philosophy** | | |
| | **Physics** | | |
| | **History, Geography and Political Science** | | |
| | **Engineering** | | |
| | **Mathematics** | | |
| | **Medicine** | | |
| | **Chemistry** | | |
| | **Theology** | | |
| What degree are you studying for? (check one option) | **Undergraduate** | | |
| | **Master's** | | |
| | **Doctorate** | | |
| Chilean or international student? (check <u>one</u> option) | **Chilean** | | |
| | **International** | | |

## EXPECTATIONS ON THE USE OF EDUCATIONAL DATA AT MY UNIVERSITY

**1.** The university will request my consent before using any personal data (for example, ethnicity, age or gender).

Ideally, I would like it to happen                    I think it can actually happen

**I disagree**                    **I agree**                    **I disagree**                    **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|

**2.**       The university will make sure to keep my educational data safe.

Ideally, I would like it to happen                    I think it can actually happen

**I disagree**                    **I agree**                    **I disagree**                    **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|

**3.** The university will request my consent before sharing my educational data with other institutions or companies.

Ideally, I would like it to happen                    I think it can actually happen

**I disagree**                    **I agree**                    **I disagree**                    **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|

**4.** The university will inform me regularly about the progress of my learning, based on the analysis of my educational data.

Ideally, I would like it to happen | I think it can actually happen

**I disagree** | **I agree** | **I disagree** | **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**5.** The university will request my consent to collect, use and analyze any of my educational data (for example, grades, attendance data or access to e-learning environments).

Ideally, I would like it to happen | I think it can actually happen

**I disagree** | **I agree** | **I disagree** | **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**6.** The university will request a new consent if my educational data will be used for a purpose other than the original one.

Ideally, I would like it to happen | I think it can actually happen

**I disagree** | **I agree** | **I disagree** | **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**7.** The services related to the use of educational data will be used to promote students' decision-making (for example, by encouraging the student to adjust their own learning objectives through the feedback information provided to them).

Ideally, I would like it to happen

I think it can actually happen

**I disagree**          **I agree**          **I disagree**          **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

**8.** The services related to the use of educational data will compare my progress to my learning objectives or to the objectives of my courses.

Ideally, I would like it to happen

I think it can actually happen

**I disagree**          **I agree**          **I disagree**          **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

**9.** The services related to the use of educational data will show me a complete profile of my learning in the courses (for example, number of accesses to an electronic resource or attendance data).

Ideally, I would like it to happen

I think it can actually happen

**I disagree**          **I agree**          **I disagree**          **I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

**10.** The academic staff will be able to provide me with information and support based on the results obtained through the analysis of my educational data.

Ideally, I would like it to happen

I think it can actually happen

**11.** The academic staff will have the obligation to support me if the results obtained from the analysis of my educational data show that my performance is below average, that I am at risk of being suspended, or that I can improve my learning.

Ideally, I would like it to happen　　　　　I think it can actually happen

**I disagree**　　　　　　**I agree**　　　　**I disagree**　　　　　**I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|

**12.** The information obtained through the services related with the use of my educational data will be used to promote the development of academic and professional skills for my future employability (for example, effective communication).

Ideally, I would like it to happen　　　　　I think it can actually happen

**I disagree**　　　　　　**I agree**　　　　**I disagree**　　　　　**I agree**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|

# A1.5. Format of the questionnaire to be applied to students

This template allows to document the expected status from the adoption of a learning analytics tool. Please complete the following Table with the information previously collected through the application of LALA Canvas, interviews with key actors and online questionnaires for professors and students.

| | |
|---|---|
| **Institution** | |
| • **Team that participated in the Template** | |
| **Needs that require adopting a learning analytics tool** | |
| • | |
| • | |
| • | |
| **Considerations for adopting a tool** | |
| • **Technological** | |
| • **Ethical** | |

# A2. APPENDIX TECHNOLOGICAL DIMENSION

All the documents from this appendix can be found at the following link:
https://drive.google.com/drive/folders/10QeeHyC7LQxF6dgvOjh3-TgM8J2YhFsT?usp=sharing

## A2.1. OrLA Design Requirements Guide

> The OrLA Design Guide aims to identify key design requirements by institutional leaders or managers, researchers and professors that the learning analytics technology solution should include to meet the needs identified at the institutional level.

Desarrolladores, comenzad aquí...

**Comentarios del docente**

| | | | | | Las representaciones de datos te resultan claras? ↓ | Sabrías qué acciones tomar cuando veas este tipo de análisis? ↓ | Conoces otros docentes que han usado la herramienta, recomiendan su uso o lo desaconsejan? ↓ | Otros comentarios ↓ |
|---|---|---|---|---|---|---|---|---|
| Nombre de la herramienta (de analítica de aprendizaje) → | | | | | | | | |
| Breve descripción → | | | | | | | | |
| **Propósito y beneficios** | | | | | Tienen estos propósitos y beneficios valor para ti? [puntúa 1-5, añade comentarios si fuera necesario] ↓ | Te suena fácil de utilizar? [score 1-5, add additional comments if needed] ↓ | Te ves a tí mism@ usando esto en tu práctica diaria? Por qué? [puntúa 1-5, añade comentarios si fuera necesario] ↓ | |
| Propósito de la herramienta → | | | | | | | | |
| Beneficios de la herramienta para el aprendizaje → | | | | | | | | |
| Otros beneficios de la herramienta → | | | | | | | | |
| Pre-requisitos y presunciones de la herramienta (en términos de habilidad tecnológica del docente o los alumnos, capacidad para interpretar datos, creencias pedagógicas...) → | | | | | | | | |

**Functionalities**

| Actividades docentes \ Soporte | Cómo soporta la herramienta esta actividad, o el aprendizaje durante esta fase? ↓ | Quién usa la herramienta en esta fase? (aprendices, docentes, padres, administración...) ↓ | Cómo se usa la herramienta en esta fase? (Qué acciones deben tomar los usuarios con la herramienta) ↓ | Cuánto tiempo lleva usar la herramienta en esta fase? ↓ | Tiene este tipo de soporte valor para ti? [puntúa 1-5, añade comentarios si fuera necesario] ↓ | Implica este tipo de uso de la herramienta cambios en tu práctica docente actual? [puntúa 1-5, añade comentarios si fuera necesario] ↓ | Tienes esta cantidad de tiempo disponible en tu práctica docente habitual? [Sí/No, añade comentarios si fuera necesario] ↓ | |
|---|---|---|---|---|---|---|---|---|
| Diseño/Planificación/Preparación de las actividades de aprendizaje → | | | | | | | | |
| Gestión de las actividades y adaptación en caso de eventos inesperados → | | | | | | | | |
| Seguimiento del proceso de aprendizaje y evaluación del aprendizaje → | | | | | | | | |
| Reflexión posterior sobre el éxito of fracaso de las actividades de aprendizaje (p.ej., para futuros cursos) → | | | | | | | | |

**Herramientas alternativas**

| | | | | | Te parece que esto es útil? [puntúa 1-5, añade comentarios si fuera necesario] ↓ | Qué otros indicadores y datos te gustaría tener? ↓ | Qué otras funcionalidades te gustaría tener en una herramienta de este tipo? ↓ | |
|---|---|---|---|---|---|---|---|---|
| Existen ya herramientas comparables? Cuáles? → | | | | | | | | |
| En qué aspectos es la herramienta mejor que las alternativas? → | | | | | | | | |
| En qué aspectos es la herramienta peor que las alternativas? → | | | | | | | | |
| Qué soporte adicional existe para el uso de la herramienta? (ayuda en línea, formación, soporte técnico, ...) → | | | | | | | | |

**Disciplina, ética y privacidad**

| | | | | Te parece esto aceptable en tu contexto de clase concreto? [Sí/No, añade comentarios si fuera necesario] ↓ |
|---|---|---|---|---|
| Cómo saben los usuarios qué tipo de datos se están recogiendo y procesando en la herramienta? → | | | | |
| Cómo saben los usuarios qué tipo de procesado de datos se han usado para generar las representaciones de datos mostradas en la herramienta? → | | | | |
| Cómo se puede validar la exactitud o fiabilidad de los algoritmos/procesado utilizados en la herramienta? → | | | | |
| Quién es responsable de interpretar los datos y chequear la validez de la información proporcionada por la herramienta? → | | | | |
| Dónde se almacenan los datos de la herramienta? (ya sean datos de estudiantes, datos personales, etc.) → | | | | |
| Cómo pueden los estudiantes (u otros actores) hacer mal uso de la herramienta? → | | | | |

**Comentarios de investigadores**

| | | | | |
|---|---|---|---|---|
| Está la herramienta alineada con las presunciones pedagógicas/teóricas de la innovación que tienes en mente? → | | | | |
| Otros comentarios a raíz de las respuestas proporcionadas arriba → | | | | |

# A2.2. Technical considerations guide

The OrLA Design Guide aims to identify key design requirements by institutional leaders or managers, researchers and professors that the learning analytics technology solution should include to meet the needs identified at the institutional level.

**Technical considerations guide for the development and implementation/adaptation of the tool**

The technical manual is a guide on the technical considerations that should be taken into account for the installation/adaptation of a Learning Analytics tool in my institution. In this guide we analyze the technical requirements from 4 dimensions (Figure 1): (1) the required hardware, (2) required software, (3) technical personnel and (4) data sources. When you finish reading the manual and answer the questions in each section, you will have a notion of what types of data the tool uses, how to access the data, how the data is managed, the equipment required to collect and store the data, personnel required for the implementation and the necessary software to complement the tool.
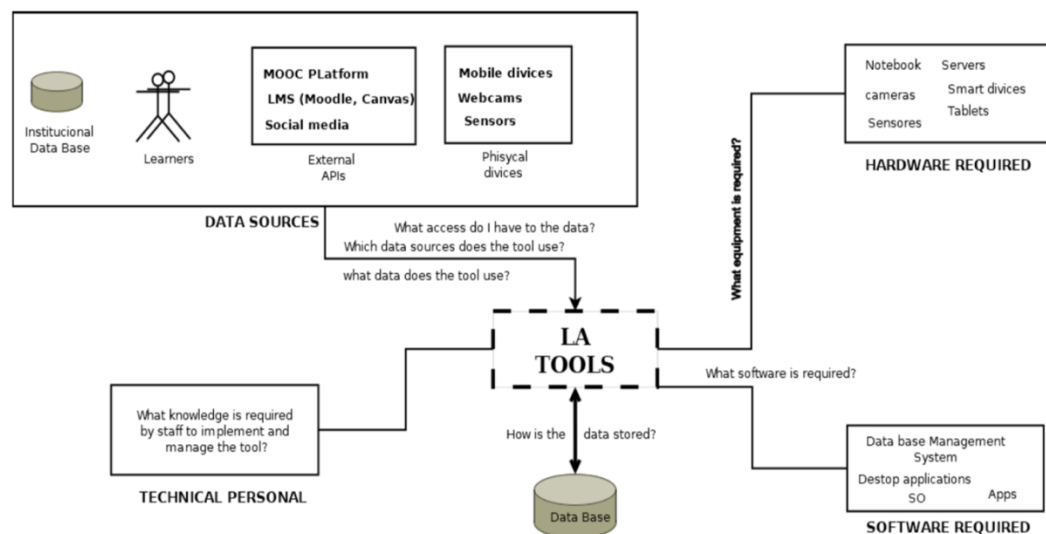


**Figure 1. Dimensions to be considered for the implementation of the tool**

**How does the manual work?**

During your progress through the manual you will find a series of questions related to the 4 dimensions defined for the implementation. You must follow the sequence of asking and answering each of them based on the information for the tool you wish to implement. If you do not have the information required

to answer some of the questions, it is necessary to find that information before starting the implementation of the tool. The questions are adjustable to any type of tool that you want to implement, so you should be able to answer all the questions.

The first step to be done for the process of implementing the tool is to identify the sources of information offered by the tool. For that purpose, we answer the following questions:

1. What is the official site or URL that provides information about the tool?
2. What link or repository is available to download the tool?
3. Who owns the tool or the rights for the development of the tool?
4. Who is the person in charge of providing technical support for the tool and their contact?

The following steps are intended for the analysis of each of the dimensions.

1. Data and data source dimension

The objective of this dimension is to analyze information about the data used by the tool. The tools for learning analytics base their purpose on the monitoring, analysis and reporting of data to the different actors that use the tool (Professors, students, administrative staff, technicians). For this reason, this dimension is the first to be analyzed in the implementation of the tool. In this dimension a series of questions are proposed that must be established before starting the development/implementation or adaptation of the selected tool.

| Question | Instructions |
| --- | --- |
| a. What data does the tool need to be implemented? | The first is to get to know what data the tool uses, for example, students' personal information, grades obtained, evaluations, information about professors, courses, schedules, geographical location of users, among others. |
| b. What is the source of data that the tool uses? | Once the data is identified, we must analyze the source or sources of the data that the tool uses, that is, where the required data come from. As shown in Figure 1, the system can use the information stored in the institutional database, information collected by physical devices such as sensors or cameras, information collected by other applications such as MOOC or LMS platforms. On the other hand, the source of information may be the users themselves or the log files that the tool registers. |
| c. Who manages access to the required data? | Once the data source is located, we must know who manages the required data. This case applies mainly when the data source is an external application or the institutional database. MOOCs platforms, for example, may require a procedure to request access to the data, in which case we must know who the person of our institution with privileges to request the data is. In the case of the institutional data bases we must know who is in charge of the database and what procedures are required to access the data. |

| | |
|---|---|
| **d. What are the characteristics of the data?** | Once we have access to the data, we must analyze the characteristics of the data, both at the source of origin and at the database used by the tool. At this point we analyze the model of data used at both extremes, data structure, data types, relationships among the data, etc. |
| **e. Where is the data managed by the tool stored?** | The next step is to know where the tool will store the data, database type, physical location (local server, remote server, in the cloud). |
| **f. How is the data integrated into the tool?** | The integration of the data is the process that is highly relevant for the implementation. The tool to be implemented can be developed to make a direct connection to the data source. However, a configuration process that allows you to integrate the data source with the tool (address or domain of the source, user, password) is always required. In other cases, the use of scripts that are responsible for the extraction, cleaning, transformation and storage of data is required. It is necessary to be clear if the integration of the data is an automated process, or it is necessary to perform a manual process that is executed periodically, such as, for example, downloading the reports from the platform and then executing the scripts manually to update the data. |
| **g. How are these data manipulated?** | Once the data is stored, we must be sure how we can manipulate the data. That is, whether the tool provides features for the data manipulation or the development of scripts is required to manipulate the data. |
| **h. Who manages the data that the tool handles?** | Then it is necessary to define who will be the person or people in charge of the management of the data that the tool handles. They will be responsible for executing the tool integration scripts and the periodicity, among other management activities. |
| **i. Who will have the access to the tool data and for what purpose?** | In addition to the end users of the tool, who will have the access to the stored data and for which purpose. |

## 2. Hardware Dimension

The objective of this dimension is to analyze what equipment is required for the implementation of the tool. In this dimension you should consider the questions in the following table.

| Question | Instructions |
|---|---|
| **a. What are the characteristics of the equipment required to install the tool?** | Regarding the hardware, the first thing to know is what technical specifications the equipment where the tool will be installed (memory, disk capacity, processing capacity) requires. |
| **b. Does the database require an additional server?** | The next step is to know if the database uses the same equipment or requires additional equipment. |
| **c. Where will the equipment where the tool is installed be located?** | Then you should consider the physical space that the equipment requires. We must know if we have a space to locate the equipment, if the equipment needs to be |

| | connected to the institutional network in the server room. In addition, we must ask ourselves what type of access we have to those spaces. |
|---|---|
| d. Is it necessary to acquire additional equipment for the operation of the tool, for example, tablets? | Some tools can use data sources such as mobile devices, sensors, cameras, microphones, among others. It is also necessary to make a list of the required equipment. Analyze which of those the institution already has, which ones should be acquired and the budget available to acquire the equipment. |
| e. What equipment is required for the maintenance and administration of the tool? | Finally, the equipment required for the administration of the tool, such as personal computers, PCs, tablets, among others, should be considered. |

## 3. Software Dimension

The objective of this dimension is to analyze what software is required for the implementation of the tool. In this dimension you should consider the questions in the following table.

| Question | Instructions |
|---|---|
| a. In which programming language is the tool developed? | The first step is to know the technology used for the development of the tool, programming language, version, libraries that the tool uses, required applications, among others. |
| b. What operating system do I need to install the tool? | Then, we must know in which operating system the tool works, version of the operating system and its compatibility with other versions. |
| c. What database management system does the tool require? | The next step is to know which database management system the tool uses (MySQL, PostgreSQL, SQL Server, Mongo, among others). |
| d. What extra applications need to be installed for the operation of the tool? | Then it is necessary to analyze what additional applications need to be installed for the administration and configuration of the extra equipment that the tool can use (sensor control system, cameras, Smart devices) |
| e. What type of licensing does the tool require?? | Finally, analyze the type of licensing defined for the tool we wish to implement, and the type of licensing of the other applications used. |

## 4. Technical personnel dimension

The objective of this dimension is to analyze what knowledge should the technical personnel in charge of the implementation and administration of the tool have. In this dimension you should consider the questions in the following table.

| Question | Instructions |
|---|---|
| a. What knowledge does the technical personnel need to | The technical personnel that must perform the implementation and/or adaptation of the tool must have |

| | |
|---|---|
| perform the installation and configuration of the tool? | previous knowledge about the tool to be used. In some cases, it may be necessary to meet for a technical specialization course. |
| b. What knowledge does the personnel that will maintain the tool require? | It is essential that the technical personnel is familiar with the steps necessary for the maintenance and updating of the tool. For this, it is important to have the use and maintenance manuals. |

# A2.3. Evaluation and testing guide

> This guide aims to create awareness about the elements that must be taken into account to perform the tool's pilot tests. The guide is presented as a checklist to ensure that the most relevant variables for the tool's pilot tests have been considered.

## Guide on considerations for the design of the procedure for evaluation and testing of the tool

This guide aims to create awareness about the elements that must be taken into account to perform the tool's pilot tests. The guide is presented as a checklist to ensure that the most relevant variables for the tool's pilot tests have been considered.

*Types of evaluations to be considered in the pilot test*

☐ Tests were defined to ensure the quality and validity of the data presented by the tool.

☐ Tests were defined to evaluate the correct functioning of the tool (test cases, data entry, incompatibility with other existing tools, among others).

☐ System tests were defined to evaluate the performance of the tool (memory consumption, response time, concurrency, among others).

☐ Tests were defined to evaluate the usability and usefulness of the tool in the real environment where it will be implemented (Ease of use of the tool, importance of the presented information, interpretation of the data by the stakeholders).

☐ Tests were defined to evaluate the adoption of the tool by stakeholders (How stakeholders use the tool, frequency of use, with what objective).

☐ Tests were defined to evaluate the impact of the tool regarding the established improvements related to learning.

*Required resources*

☐ I have considered the duration of each of the tests to be performed

☐ I have considered the resources (personnel, economic) required by each of the evaluation tests to be performed.

☐ I have selected standardized or previously validated instruments to measure the results of each of the evaluation tests to be performed.

☐ I have considered the use of self-reports in evaluations.

☐ I have considered the analysis of the tool log files in the evaluations.

☐ I have considered the data sources required to perform each of the evaluation tests to be performed.

*Participants*

☐ I have considered all the stakeholders in the evaluation tests that were defined:

☐ Academic Staff ☐ Students ☐ Managers ☐ Researchers ☐ Technicians

*Importance of the pilot test*

☐ I have verified that the tests or evaluations defined are aligned with the objectives for which the tool is to be implemented.

☐ I have clearly defined the objective and expected results of each of the evaluations to be performed.

*Ethical consideration*

☐ I have taken into account the ethical aspects to consider for all the evaluation tests to be performed.

# A3. APPENDIX ETHICAL DIMENSION

**All the documents from this appendix can be found at the following link:**
**https://drive.google.com/open?id=1fWkE52ZGaOZlZMISj1FVuxfyDlb7VfiN**

## A3.1. Documents and frameworks on ethical and privacy considerations in the design and implementation of learning analytics

> Documents and frameworks on ethical and privacy considerations can serve as a reference to inform the learning analytics project stakeholders about the aspects to be considered in relation to data processing.

### Reference 1. Code of learning analytics practices

> **Objective**: To establish the responsibilities of educational institutions to ensure that the design and implementation of learning analytics solutions are performed responsibly, adequately and effectively, addressing the legal, ethical and logistic problems that may arise.
>
> **Adopted reference**: JISC (2015). Code of practice for learning analytics,
> **https://www.jisc.ac.uk/guides/code-of-practice-for-learning-analytics**

**Abstract**

This code of practice for the learning analytics aims to define the responsibilities of educational institutions to ensure that the adoption of learning analytics occurs in a responsible, appropriate and effective manner, addressing the main legal, ethical and logistic problems. In the United Kingdom, educational institutions have information management practices and procedures, as well as extensive experience in the handling of confidential and personal data in accordance with the Data Protection Act of 1998. These codes adapt and transfer this experience to regulate data processing for learning analytics in other institutions.

**Ethical and privacy considerations**

- **Responsibility:** Institutions must decide who is responsible for the legal, ethical and effective use of learning analytics in relation to data collection, anonymization of data, analysis, data-based interventions, storage and administration of data.
- **Transparency and consent:** Students should be asked for their informed consent for the interventions based on educational data. This consent must be clear and significant enough to ensure voluntariness and contemplate voluntary exclusion without penalty. In addition, the collection and use of data may

require additional measures, such as assessments of impact on privacy and obtaining additional consent.

- **Privacy**: Institutions must ensure that student data are protected when they hire third parties to store data or perform learning analytics on them. Access to educational data and its analysis should be restricted to those individuals who have the necessary legitimacy to see them according to institutional criteria. The use of "confidential data" requires additional guarantees.

- **Validity:** Institutions must control the quality, robustness and validity of their data and analytical processes by ensuring and maximizing their understanding and minimizing their inaccuracy. When facing incomplete datasets, institutions should select an optimal range of data sources and avoid false correlations.

- **Access:** Students should be able to access all the analysis of their data in significant and accessible formats, as well as see the metrics and attached labels.

- **Facilitate positive interventions:** Institutions should specify under what circumstances interventions based on learning analytics should be implemented with the focus of supporting students. Institutions must clearly specify the type and nature of these interventions.

- **Minimize adverse impacts:** Institutions should take measures to ensure that standards, categorization or any labeling of students do not bias the perceptions or behaviors of managers and professors. No intervention based on learning analytics should reinforce discriminatory attitudes or increase social power differentials.

- **Administration:** The data for the learning analysis will comply with the existing institutional data policies or other regulations at the regional and national levels. At the request of the students, any personal data used for or generated from a strategy based on learning analytics must be destroyed or anonymized, with the exception of certain, clearly specified data fields required for educational purposes such as qualifications.

# Reference 2. Privacy and learning analytics: they are a delicate topic-DELICATE

**Objetive**: This document analyzes different points of view related to the use of learning analytics to benefit students, and the uncertainty that exists when using educational data. In addition, the proposals made by the learning analytics community to address the fears and conflicts of using educational data to promote student success are addressed.

**Adopted reference**: Draschler, H. & Greller, W. (2016, Abril). Privacy and Learning Analytics – it's a DELICATE issue. Paper presented at Learning Analytics Knowledge, Edinburgh, United Kingdom. https://dspace.ou.nl/bitstream/1820/6381/1/Privacy%20a%20DELICATE%20issue%20%28Drachsler%20%26%20Greller%29%20-%20submitted.pdf

**Abstract**

**This document consists of an eight-point checklist called DELICATE, which can be applied by researchers and managers responsible for institutional policies.**

Its objective is to facilitate the design and reliable implementation of tools based on learning analytics. The authors distinguish between ethics and privacy, with ethics being a moral code of norms and conventions at a social level that impact on a personal level, while privacy is an intrinsic part of a person's identity and integrity. Based on these definitions, the authors raise questions and considerations that the institutions must be able to answer in order to be in line with the European legislation on personal data, and with the principles of fair information practices proposed by the Organization for Economic Cooperation and Development (OECD). Both frameworks are widely accepted, reflecting the laws of many US states, other nations and other international organizations.

**Ethical and privacy questions and considerations**

- Determination:
  - What is the reason for applying learning analytics?
  - What is the added value of learning analytics?
  - What are the rights of its users?
- Explanation:
  - What are the objectives and limitations?
  - What data will be collected and for what purpose?
  - How long will the data be stored?
  - Who has access to the data?
- Legitimacy:
  - Why is there access to certain data?
  - What sources of information are available?
  - Why would someone be authorised to collect additional information?
- Involvement:
  - Involve all key players and users
  - Be open to concern about privacy
  - Inform these actors and users about the information collected
- Consent:
  - Make a contract with data providers
  - Provide data providers with informed consent prior to collecting their information
  - Define a consent with clear and understandable information
  - Provide the opportunity to exclude oneself from the collection without consequences
- Anonymity:
  - Ensure that information at the individual level is not obtainable
  - Anonymize information as much as possible
  - Add data for modeling
- Technology:
  - Develop procedures to guarantee privacy
  - Regularly monitor who has access to the data
  - Update privacy regulations if the analytics changes

- o Ensure that the storage of the data complies with international standards
- External:
  - o Ensure that external analytics providers comply with the regulations that apply
  - o Sign a contract that defines who is responsible for data security
  - o The data must be used only for the proposed functions and not others

# Reference 3. Ethical and privacy principles for learning analytics

**Abstract**

**This document promotes the creation of confidence in the adoption of learning analytics to solve problems such as: proximity with the rest of the users, and/or the user knowing exactly which of their data is being used for learning analytics. Based on a series of frameworks, this document defines privacy as the regulation of how to observe personal digital information and how to distribute it to other observers, and ethics such as the systematization of correct and incorrect behavior in virtual spaces according to all stakeholders. From these definitions, we present a description of the ethical and privacy issues when they manifest themselves in the specific context of the learning analytics investigation.**

**Ethical and privacy considerations**

- **Transparency.** This principle goes beyond the use of student consent to collect data. In general terms, the three stakeholder groups - students, professors and managers - should have access to the description of how the analytics process is performed and should be informed about the type of information that is collected, including the form in which it is collected, stored and processed.
- **Students' control over the data**. This principle is related to the principle of transparency in the sense that, in order for students to have control over the data that is collected, they need to know what is collected, when, how and how the data are manipulated. The main aspect derived from this principle is the right of users (in this case, students or professors) to access and correct the data obtained about them.
- **Access rights.** The data collected must be under a set of clearly defined access rights. Educational institutions should pay special attention to this principle, since the effect of exposing confidential data to the public can

have a profound impact on all interested parties. Due to the variety of tools and users that can access the data, a detailed access policy is recommended.

- **Accountability and measurement.** Each aspect must have a person, department or institution identified as responsible for the correct functioning of the components related to learning analytics. The identification of the entities responsible for the specific data and the areas of analysis is accompanied by the principle of evaluation. By evaluation, we also refer to the responsibility of the institution to constantly evaluate, review and refine data collection, security, transparency and accountability.

# Reference 4. LEA in Private: A Privacy and Data Protection Framework for a Learning Analytics Toolbox

## Abstract

**This document comprises a set of eight principles to derive considerations to guarantee the ethical treatment of personal data in the design and implementation of tools and support services based on learning analytics. The privacy and data protection policy established from this framework of considerations was translated into the tools and analytical learning technologies developed for the LEA's BOX project (www.leas-box.edu). This research and development project is funded by the European Commission for the development of a learning analytics tool, so it had to comply with the current European Union data protection legislation from 1995 that applies to the countries of the European Economic Area. However, they can be adapted and/or adopted for other learning analytics projects.**

## Ethical and privacy considerations

- **Data privacy.** The collection and use of personal data must be fair, providing adequate protection of privacy. Information about privacy policies and data protection should be available and easily understood. Users who feel that their privacy is in danger can show resistance (Greller & Drachsler, 2012). Users, particularly those who may feel that their privacy is at risk, should be assured that their data is used in an acceptable and consistent manner. In addition, institutions must develop and disseminate policies and guidelines to protect data from abuse.
- **Purpose and ownership of the data.** The purpose and limits of any learning analytics application must be clearly defined and available before the processing of educational data begins. The data controller is a physical or legal person or authority that processes personal data and determines the purpose of the processing. The interested party has the right to receive information about the identity of the data controller (including contact data) and the purposes of processing.
- **Consent:** The institution must apply appropriate techniques to obtain the consent of students as a legal basis to process personal data. The institution must compile the students' consent needs, establishing it as a basic ethical principle and procedure. In addition, the institution must inform users about the collection of their data.
- **Transparency and trust.** The people who provide data (that is, generally the students, but also the professors) should receive a notice about what type of

data is collected and recorded. In addition, they should be provided with information on how analytical processing is performed, since transparency also means providing information about data management procedures, the treatment of data after its primary purpose and the dissemination of data outside (or inside) the institution.

- **Access and control.** The institution provides access to the users to the data collected about them, and the opportunity to correct that data if necessary. The principle of access and participation is reflected in the legislation as a right of the interested party.
- **Accountability and measurement.** The institution, the department or the person in charge or responsible for a learning analytics application must ensure its proper functioning. In addition, the process of adopting learning analytics should be evaluated to refine data collection, management and analysis.
- **Data quality.** The data must be representative, relevant, accurate and updated. Information that is not up-to-date cannot be considered reliable as it only reflects the academic situation of a student.
- **Data management and security.** The data must be kept safe and secure at different levels and by different measures according to the legal structures that apply. Accountability, therefore, requires safeguarding data protection; and the data processing must comply with the data protection regulations demonstrably. Institutions must take appropriate measures to protect the data against unauthorized access, loss, destruction or misuse.

# A3.2. Informed Consent Form for Institutional Leaders

Informed consent template that can be adapted to interview institutional leaders in the institutional analysis part.

**DISCLOSURE FOR THE PARTICIPANT**

**Research project:** *Building Capacity to Use Learning Analytics to Improve Higher Education in Latin America (LALA)*

**(1)     What is the project about?**

**The objective of the LALA project is to build capacities for the adoption of learning analytics tools in higher education institutions in Latin America. The learning analytics involves the collection and analysis of educational data, such as grades and class attendance, with the objective of obtaining information on how students approach their studies and implementing services to improve their learning processes. For example, alert systems can be developed to offer support to students who are at risk of failing a course or abandoning their studies. The systems that analyze the hours invested by a student in an online or face-to-face learning environment can also be developed to determine the time spent on a course or module. In this way, the use of educational data in services based on learning analytics provides information to identify any type of problem that may affect the learning process of a student.**

**Based on this context, these interviews are intended to get to know various opinions about the use of the educational data in different higher education institutions, and expectations about the services that could be developed from these data.**

**(2)     Who is developing this project?**

**In the context of the Pontificia Universidad Católica de Chile (UC), the professor in charge of the research is *Name in Charge*, and the Coordinator in charge is *Name in Charge*, Deputy Director of Engineering Education, School of Engineering, Pontificia Universidad Católica de**

Chile. Vicuña Mackenna 4860, Macul, Santiago. Phone: (562) 354-7201. Email: *Add e-mail*. However, researchers and professionals from other European (Catholic University of Louvain in Belgium, University of Edinburgh, and Universidad Carlos III de Madrid) and Latin American institutions (Universidad Austral de Chile, Universidad de Cuenca in Ecuador, ESPOL in Ecuador) are also participating.

**(3) Who is financing this project?**

This project is funded by the Erasmus+ programme by the European Commission.

**(4) What does the study involve?**

The study involves the generation of a framework to favor the adoption of learning analytics tools, in addition to the testing of this framework through the piloting of analytics tools developed by European institutions. In the context of the generation of this framework, interviews will be conducted with institutional leaders, professors and students of the UC and other institutions in Latin America.

**(5) How long will the study last?**

The project lasts three years. Regarding the interviews, each one has a maximum duration of one hour.

**(6) Can I retire early from the interview?**

Participation in this project and its interviews is voluntary, you have the right not to participate if it is not convenient.

**(7) Who will know the results?**

The information collected in this interview will be used in an aggregate form to develop a framework that facilitates the definition of institutional policies associated with the use of educational data. To support the information gathered in this interview and facilitate its subsequent

analysis, this interview will be recorded, but this recording can be interrupted at any time a participant requests it.

**(8)     Who is responsible for all records and data?**

The Directorate of Engineering Education is the entity responsible for all the data collected through the interviews at the Pontificia Universidad Católica de Chile, with Professor Mar Pérez as its director. This Directorate will ensure that the data is protected and analyzed, safeguarding the privacy of the participants.

**(9)     Will I benefit from participating in this study?**

There are no benefits associated with participation in this study.

**(10)   Is there any type of risk associated with participation in this study?**

There are no risks associated with participation in this study.

**(11)   Can I tell other people about the study?**

The LALA project is public, so you can tell other people about the existence of this project and your participation in this interview.

**(12)   What should I do if I need more information?**

When you have read this information, the person in charge of administering the questionnaire will answer any questions you may have. If you wish to delve further into some aspect of the study, you can contact the project coordinator directly at (02) 2354-7201 or by email at **ihillige@ing.puc.cl**.

**(13)   What should I do if I have a complaint or concern?**

> **Anyone with concerns or complaints about the conducting of a research study can contact the Scientific Ethics Committee at Social Sciences, Arts and Humanities of the Pontificia Universidad Católica de Chile, represented by Mr(s). María Elena Gronemeyer, President of the Ethics Committee, by phone (02) 2354-2936 or by email sent to the address eticadeinvestigacion@uc.cl**

**Do not sign this letter until you have read all the information provided and have asked all the questions you want. You will be given a copy of this document.**



**INFORMED CONSENT FORM**

**I, ……………………………………………………………, give my consent to participate in an interview that is part of the collection of information for a deliverable of the European LALA project, coordinated by the Directorate of Education in Engineering of the Pontificia Universidad Católica de Chile**

**By giving my consent, I acknowledge that:**

1. **I have read the Disclosure for the Participant and have been offered the opportunity to review all information about my participation in the project.**
2. **I understand that my participation in this instance is completely voluntary - I am not under any pressure to participate or give my consent.**

3. I understand that my participation is strictly confidential and that no information revealing my identity will be used in any way.
4. I understand that my participation does not imply any type of risk.
5. I understand that my participation does not involve any type of compensation.
6. All the procedures and the estimated time required to participate in the instances of this project have been explained to me, and any questions about the project have been answered to my satisfaction.
7. I understand that I can withdraw from this project at any time, without affecting my relationship with the researcher now or in the future.
8. I understand that if I do not want to continue answering questions in an interview or allowing observations of my classes, I can withdraw at any time. Any information that may have been given to the researcher up to that moment will be destroyed.


**Signature:** ....................................................................................


**Date:**


| *Name* | *Name* |
|---|---|
| **Principal Investigator** | **President** <br><br> **Scientific Ethics Committee in Social Sciences, Arts and Humanities** |
| *Phone number* <br><br> **email:** | *Phone number* <br><br> *email* |

# A3.3. Informed consent form for professors

Informed consent template that can be adapted to interview institutional professors in the institutional analysis part.

**DISCLOSURE FOR THE PARTICIPANT**

**Research project:** *Building Capacity to Use Learning Analytics to Improve Higher Education in Latin America (LALA)*

**(1)    What is the project about?**

**The objective of the LALA project is to build capacities for the adoption of learning analytics tools in higher education institutions in Latin America. The learning analytics involves the collection and analysis of educational data, such as grades and class attendance, with the objective of obtaining information on how students approach their studies and implementing services to improve their learning processes. For example, warning systems can be developed to offer support to students who are at risk of failing a course or abandoning their studies. The systems that analyze the hours invested by a student in an online or face-to-face learning environment can also be developed to determine the time spent on a course or module. In this way, the use of educational data in services based on learning analytics provides information to identify any type of problem that may affect the learning process of a student.**

**Based on this context, these interviews are intended to get to know various opinions about the use of the educational data in different higher education institutions, and expectations about the services that could be developed from these data.**

**(2)    Who is developing this project?**

**In the context of the Pontificia Universidad Católica de Chile (UC), the professor in charge of the research is *Name in charge*, and the Coordinator in charge is *Name in charge*, Deputy Director of Engineering Education, School of Engineering, Pontificia Universidad Católica de Chile. Vicuña Mackenna 4860, Macul, Santiago. Phone: (562) 354-7201. Email: *mail to be included.* However, researchers and professionals from**

other European (Catholic University of Louvain in Belgium, University of Edinburgh, and Universidad Carlos III de Madrid) and Latin American institutions (Universidad Austral de Chile, Universidad de Cuenca in Ecuador, ESPOL in Ecuador) are also participating.

**(3)    Who is financing this project?**

This project is funded by the Erasmus+ programme by the European Commission.

**(4)    What does the study involve?**

The study involves the generation of a framework to favor the adoption of learning analytics tools, in addition to the testing of this framework through the piloting of analytics tools developed by European institutions. In the context of the generation of this framework, interviews will be conducted with institutional leaders, professors and students of the UC and other institutions in Latin America.

**(5)    How long will the study last?**

The project lasts three years. Regarding the focus group it has a maximum duration of one hour.

**(6)    Can I retire early from the interview?**

Participation in this project and its interviews is voluntary, you have the right not to participate if it is not convenient.

**(7)    Who will know the results?**

The information collected in this interview will be used in an aggregate form to develop a framework that facilitates the definition of institutional policies associated with the use of educational data. To support the information gathered in this interview and facilitate its subsequent analysis, this interview will be recorded, but this recording can be interrupted at any time a participant requests it.

**(8)     Who is responsible for all records and data?**

**The Directorate of Engineering Education is the entity responsible for all the data collected through the interviews at the Pontificia Universidad Católica de Chile, with Professor Mar Pérez as its director. This Directorate will ensure that the data is protected and analyzed, safeguarding the privacy of the participants.**

**(9)     Will I benefit from participating in this study?**

**There are no benefits associated with participation in this study.**

**(10)   Is there any type of risk associated with participation in this study?**

**There are no risks associated with participation in this study.**

**(11)   Can I tell other people about the study?**

**The LALA project is public, so you can tell other people about the existence of this project and your participation in this interview.**

**(12)   What should I do if I need more information?**

**When you have read this information, the person in charge of administering the questionnaire will answer any questions you may have. If you wish to delve further into some aspect of the study, you can contact the project coordinator directly at (02) 2354-7201 or by email at ihillige@ing.puc.cl.**

**(13)   What should I do if I have a complaint or concern?**

> **Anyone with concerns or complaints about the conducting of a research study can contact the Scientific Ethics Committee at Social Sciences, Arts and Humanities of the Pontificia Universidad Católica de Chile, represented by Mr(s). María Elena Gronemeyer, President of the Ethics Committee, by phone (02) 2354-2936 or by email sent to the address eticadeinvestigacion@uc.cl**

**Do not sign this letter until you have read all the information provided and have asked all the questions you want. You will be given a copy of this document.**



**INFORMED CONSENT FORM**

**I, ..................................................................., give my consent to participate in an interview that is part of the collection of information for a deliverable of the European LALA project, coordinated by the Directorate of Education in Engineering of the Pontificia Universidad Católica de Chile**

**By giving my consent, I acknowledge that:**

1. **I have read the Disclosure for the Participant and have been offered the opportunity to review all information about my participation in the project.**
2. **I understand that my participation in this instance is completely voluntary - I am not under any pressure to participate or give my consent.**

3. I understand that my participation is strictly confidential and that no information revealing my identity will be used in any way.
4. I understand that my participation does not imply any type of risk.
5. I understand that my participation does not involve any type of compensation.
6. All the procedures and the estimated time required to participate in the instances of this project have been explained to me, and any questions about the project have been answered to my satisfaction.
7. I understand that I can withdraw from this project at any time, without affecting my relationship with the researcher now or in the future.
8. I understand that if I do not want to continue participating in the focus group, I can withdraw at any time. Any information that may have been given to the researcher up to that moment will be destroyed.

Signature: ......................................................................................

Date:

| Mr(s). XXXXX | Mr(s). XXXX |
|---|---|
| Principal Investigator | President<br><br>Scientific Ethics Committee in Social Sciences, Arts and Humanities |
| Phone<br><br>email: | Phone XXXX |

# A3.4. Informed consent form for students

Informed consent template that can be adapted to interview students at the institution in the institutional analysis part.

**DISCLOSURE FOR THE PARTICIPANT**

**Research project:** *Building Capacity to Use Learning Analytics to Improve Higher Education in Latin America (LALA)*

## (1)    What is the project about?

The objective of the LALA project is to build capacities for the adoption of learning analytics tools in higher education institutions in Latin America. The learning analytics involves the collection and analysis of educational data, such as grades and class attendance, with the objective of obtaining information on how students approach their studies and implementing services to improve their learning processes. For example, warning systems can be developed to offer support to students who are at risk of failing a course or abandoning their studies. The systems that analyze the hours invested by a student in an online or face-to-face learning environment can also be developed to determine the time spent on a course or module. In this way, the use of educational data in services based on learning analytics provides information to identify any type of problem that may affect the learning process of a student.

Based on this context, these interviews are intended to get to know various opinions about the use of the educational data in different higher education institutions, and expectations about the services that could be developed from these data.

## (2)    Who is developing this project?

In the context of the Pontificia Universidad Católica de Chile (UC), the professor in charge of the research is *Name in Charge*, and the Coordinator in charge is *Name in Charge*, Deputy Director of Engineering Education, School of Engineering, Pontificia Universidad Católica de Chile. Vicuña Mackenna 4860, Macul, Santiago. Phone: *Phone number*. Email:*mail*. However, researchers and professionals from other European (Catholic University of Louvain in Belgium, University of Edinburgh, and Universidad Carlos III de Madrid) and Latin American

institutions (Universidad Austral de Chile, Universidad de Cuenca in Ecuador, ESPOL in Ecuador) are also participating.

**(3)  Who is financing this project?**

This project is funded by the Erasmus+ programme by the European Commission.

**(4)  What does the study involve?**

The study involves the generation of a framework to favor the adoption of learning analytics tools, in addition to the testing of this framework through the piloting of analytics tools developed by European institutions. In the context of the generation of this framework, interviews will be conducted with institutional leaders, professors and students of the UC and other institutions in Latin America.

**(5)  How long will the study last?**

The project lasts three years. Regarding the focus groups, each one has a maximum duration of one hour.

**(6)  Can I retire early from the interview?**

Participation in this project and its interviews is voluntary, you have the right not to participate if it is not convenient.

**(7)  Who will know the results?**

The information collected in this interview will be used in an aggregate form to develop a framework that facilitates the definition of institutional policies associated with the use of educational data. To support the information gathered in this interview and facilitate its subsequent analysis, this interview will be recorded, but this recording can be interrupted at any time a participant requests it.

**(8)  Who is responsible for all records and data?**

The Directorate of Engineering Education is the entity responsible for all the data collected through the interviews at the Pontificia Universidad Católica de Chile, with Professor Mar Pérez as its director. This Directorate will ensure that the data is protected and analyzed, safeguarding the privacy of the participants.

**(9)     Will I benefit from participating in this study?**

There are no benefits associated with participation in this study.

**(10)   Is there any type of risk associated with participation in this study?**

There are no risks associated with participation in this study.

**(11)   Can I tell other people about the study?**

The LALA project is public, so you can tell other people about the existence of this project and your participation in this interview.

**(12)   What should I do if I need more information?**

When you have read this information, the person in charge of administering the questionnaire will answer any questions you may have. If you wish to delve further into some aspect of the study, you can contact the project coordinator directly at (02) 2354-7201 or by email at ihillige@ing.puc.cl.

**(13)   What should I do if I have a complaint or concern?**

Anyone with concerns or complaints about the conducting of a research study can contact the Scientific Ethics Committee at Social Sciences, Arts and Humanities of the Pontificia Universidad Católica de Chile, represented by Mr(s). María Elena Gronemeyer, President of the Ethics Committee, by phone (02) 2354-2936 or by email sent to the address eticadeinvestigacion@uc.cl

Do not sign this letter until you have read all the information provided and have asked all the questions you want. You will be given a copy of this document.

INFORMED CONSENT FORM

I, .................................................…….…..........., give my consent to participate in a focus group that is part of the collection of information for a deliverable of the European LALA project, coordinated by the Directorate of Education in Engineering of the Pontificia Universidad Católica de Chile

By giving my consent, I acknowledge that:

1. I have read the Disclosure for the Participant and have been offered the opportunity to review all information about my participation in the project.
2. I understand that my participation in this instance is completely voluntary - I am not under any pressure to participate or give my consent.
3. I understand that my participation is strictly confidential and that no information revealing my identity will be used in any way.
4. I understand that my participation does not imply any type of risk.
5. I understand that my participation does not involve any type of compensation.
6. All the procedures and the estimated time required to participate in the instances of this project have been explained to me, and any questions about the project have been answered to my satisfaction.
7. I understand that I can withdraw from this project at any time, without affecting my relationship with the researcher now or in the future.
8. I understand that if I do not want to continue participating in the focus group, I can withdraw at any time. Any information that may have been given to the researcher up to that moment will be destroyed.

Signature: …………………………………………………………………………………

Date:

| Name | Name |
|---|---|
| Principal Investigator | President |
| | Scientific Ethics Committee in Social Sciences, Arts and Humanities |
| Phone number | Phone number |
| Mail | Mail |

# A3.5. Informed consent form for professors for questionnaire

Informed consent template that can be adapted to interview institutional professors in the institutional analysis part.

**DISCLOSURE FOR PARTICIPANTS**

**Research Project:** *Building Capacity to Use Learning Analytics to Improve Higher Education in Latin America (LALA)*

**Academic staff's expectations about the use of educational data**

Different higher education institutions have implemented services to support the learning process of their students from the collection and analysis of different educational data, such as grades, class attendance, or access to electronic resources (i.e. an alert system for students who are at risk of failing a subject).

In this context, the purpose of this survey is to get to know the opinion of a university's academic staff about the collection and analysis of educational data in their institution. Answering the survey takes approximately 10 minutes and your participation is voluntary.

The following statements describe situations that could occur in the future given the progress of research on the use of educational data in higher education institutions. For each of the statements, indicate the degree of agreement or disagreement by marking an option from 1 to 7 on each scale, where 1 indicates disagreement and 7 indicates agreement.

A set of questions represents whether you would like what is described in the statement to happen at your university. <u>Note:</u> If what is described in the statement is something that you consider highly desirable, select the maximum value on the scale (7)).

Another set of questions represents your perception of what could actually happen at your institution (in relation to what is described in the statement). <u>Note:</u> If the description in the statement is something already implemented at your institution or you think it is highly likely to happen, select the maximum value on the scale (7).

The results of the survey will be used to develop policies associated with the collection and analysis of educational data at different Latin American universities through the project *Building*

*Capacity to Use Learning Analytics to Improve Higher Education in Latin America (LALA) (*[https://lalaproject.org/](https://lalaproject.org/)*)***, which is financed by the European Commission and has Latin American and European universities participating. Your answers will be anonymous and will only be disclosed at the aggregate level.**

☐

**Please, check the box to confirm that you have read the previous information.**

# A3.6. Informed consent form for students for questionnaire

Informed consent template that can be adapted to interview institutional students in the institutional analysis part.

**DISCLOSURE FOR PARTICIPANTS**

Research Project: *Building Capacity to Use Learning Analytics to Improve Higher Education in Latin America (LALA)*

### Students' expectations about the use of educational data

Different higher education institutions have implemented support services for the learning process of their students from the collection and analysis of different educational data, such as grades, class attendance, or access to electronic resources (i.e. an alert system for students who are at risk of failing a course).

In this context, the purpose of this survey is to get to know the students' opinion about the collection and analysis of educational data in their institution. Answering The survey takes approximately 5 minutes and your participation is voluntary.

The following statements describe situations that could occur in the future given the progress of research on the use of educational data in higher education institutions. For each of the statements, indicate the degree of agreement or disagreement by marking an option from 1 to 7 on each scale, where 1 indicates disagreement and 7 indicates agreement.

A set of questions represents whether you would like what is described in the statement to happen at your university. Note: If what is described in the statement is something that you consider highly desirable, select the maximum value on the scale (7).

Another set of questions represents your perception of what could actually happen at your institution (in relation to what is described in the statement). Note: If the description in the statement is something already implemented at your institution or you think it is highly likely to happen, select the maximum value on the scale (7).

The results of the survey will be used to develop policies associated with the collection and analysis of educational data at different Latin American universities through the project *Building Capacity to Use Learning Analytics to Improve Higher Education in Latin America (LALA)* (https://lalaproject.org/), which is financed by the European Commission and has Latin American and European universities participating. Your answers will be anonymous and will only be disclosed at the aggregate level.

☐

**Please, check the box to confirm that you have read previous information.**

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# A3.7. Contract for data use and sharing

Contract for the use and sharing of data with actors from the same institution or from other institutions.



## DATA USE AGREEMENT

In [Place], at [Month] [Day], [Year], the following data use agreement is agreed between [Name Institution who owns the data], represented by [Mr, Miss, Mrs., Dr.] [Name of person] domiciled in [mailing address], and the recipient of [data details], [name of the institution who received the data], represented by [Mr, Miss, Mrs., Dr.] [Name of person], domiciled in [mailing address].

The purpose of this agreement is to share data access in the context of the [Project Name], under the direct supervision of [Principal Investigator].

Both sides, recognizing each other through this agreement, ensure sharing information containing personal data, of which the recipient is responsible for its confidential use for the purposes stated in this document. According to the points made in Articles 4°, 5° and 12° of the Law No. 19.698 for the legislation and protection of personal data, both parties agree the following:

1. The issuer will be responsible for preparing data for submission.

2. The receiver will be responsible for processing and using the data for the purposes defined in this agreement.

3. This agreement will enter into force from the date of signature, and it will last until the agreed completion date.

4. The issuer will maintain at all times the ownership of the data, even with the modifications suffered during its analysis. Therefore, the exclusive property rights will be preserved.

5. The data will be treated only under the agreed purpose and it will not be used for a purpose other than the one specified in this agreement.

6. The receiver will not disclose personal information.

7. The receiver ensures that the staff who is going to access the data is subject to all the provisions of this agreement. This obligation extends to any person or company that through the receiver has access to the data.

**8. The receiver will be responsible for data breaches concerning the use of the data for purposes not agreed in this contract, and / or disclosure to persons or entities not specified in this document.**

**9. The documentation drawn up by the receiver's use of the data will be available to the issuer to their simple request.**

# A4. ANNEXO DIMENISÓN COMUNAL

All the documents in this annex can be found at the following link:
https://drive.google.com/open?id=1ak2QiW1vU9yBiGsXlB-we5B_4J0Wtmc1

## A4.1. LALA community statute

**WORKING STATUTES OF THE LALA COMMUNITY**

**CHAPTER ONE: GENERAL PROVISIONS.**

## Article 1 - Purpose

The purpose of this regulation is to regulate the operations of the Community of Learning Analytics, hereinafter LALA Community, as provided in the activity A 1.3 of the Erasmus + LALA project "Building Capacity to Use Learning Analytics to Improve Higher Education in Latin America", funded by the European Commission with reference 586120-EPP-1-2017-1-ES-EPPKA2-CBHE-JP.

## Article 2 - Scope

This Regulation establishes the operating bases of the LALA Community, as well as its main bodies. This is without prejudice to the specific agreements that the LALA Community implements as tools for its development and growth.

## Article 3 – Guiding principles

The following, among others, are considered guiding principles of the LALA Community's activity:

a. Effective communication
b. Permanent commitment to the activities convened by the Community
c. Transparency
d. Objectivity in decision making

All interpretations made with respect to the guiding principles and the scope of this Regulation should seek flexible, efficient and effective applications, in order to ensure the stability and strengthening of the LALA Community.

# Artícle 4 – Establishment of the LALA Community

The Learning Analytics Community for Latin America (hereinafter referred to as "LALA Community"), is an international group with open access formed by Higher Education Institutions and related companies, which aims to ensure the sustainability of the results of the LALA project, funded by the Erasmus+ programme of the European Union.

CHAPTER TWO: OBJECTIVES AND INTEGRATION OF THE LALA COMMUNITY

# Article 5 – Objectives and functions

The LALA Community's general objective is to promote long-term sustainable cooperation among their members, creating lasting relationships among its members, which contribute to the replication of the results obtained by the LALA project in other contexts. For this, through the LALA community, research and knowledge exchange will be sought to develop local capacity in Higher Education Institutions (hereinafter HEI) in Latin America to create, adapt, implement and adopt Data Analytics tools to improve the academic processes of decision making.

The LALA Community seeks to provide training on optimized methodological processes for the design and implementation of Data Analytics in HEIs.

The LALA Community seeks to promote the training of professionals, professors and researchers related to the processes of creation and administration of Learning Analytics.

The LALA Community seeks to facilitate among its members the exchange of information, good practices, success stories and experiences in the management of Learning Analytics.

The LALA Community seeks to promote and encourage training programs on capacity building in Learning Analytics that will lead to the transformation, modernization and decision making of Higher Education in Latin America.

The LALA Community seeks to promote and facilitate councelling to Higher Education Institutions in the creation of Learning Analytics.

The LALA Community seeks to encourage the periodic holding of conferences and meetings for the exchange of experiences and research results on issues of capacity building in Learning Analytics.

# Article 6 – Community members

Active members of the Community are Higher Education Institutions, Research Centers and Regional Organizations linked to Higher Education, which manifest, through the Membership Letter, their interest in being the part of it, agree with the Community's purposes and declare to know and accept the conditions indicated in this Regulation.

There are 2 (two) levels of institution or organization membership, with different rights and obligations:

> The level 0: Receive related news and important information related to the LALA community. They are welcome to meetings and events organized by the LALA community.

> The level 1: Contribute knowledge to the community, perform trainings on how to create, adapt and implement Learning Analytics tools, also contribute materials and tutoring. They are welcome to meetings and events organized by the LALA community.

# Article 7 – New members of the Community

The LALA Community has an open subscription policy, so without distinction, organizations, companies or academic entities can be added to the community.

The mechanism for incorporating new members into the LALA Community is the approval of the membership application, made through the Membership Letter published on the web, addressed to the coordinator of the LALA Community sent to the following email address: **lalaproject@cti.espol.edu.ec** The coordinator of the LALA community is a person different to the coordinator of the LALA project. Please see Article 12 for more details about the coordinator of the LALA community.

The coordinator of the LALA community will inform the other members of the advisory committee about the request received, either in the monthly on-line meeting or in any of the face to-face meetings held during the year, in order to resolve the acceptance or not of the applicant's incorporation into the LALA Community. Said decision is made using any electronic means available through direct vote and by simple majority.

# Article 8 – Membership and registration

The coordinator of the LALA community will perform the registration and control of the applicant in the community, according to the resolution of the

advisory committee together with the signed Membership Letter.

The coordinator of the LALA community will inform the corresponding resolution to the institution applying, by means of a response letter.

In case of acceptance, once the applicant receives the letter from the coordinator of the LALA community, the applicant is officially considered a member of the Community, acquiring validity the rights and obligations established in this Regulation. Likewise, the new member is informed that their logo already appears in the corresponding section on the LALA project page.

# Article 9 – Membership duration

The membership has an indefinite duration barring the following exceptions:

a. Expressed statement to the contrary by the partner institution, which must state it in writing to the coordinator of the LALA community.

b. Exclusion of the associated institution, by deliberation of the advisory committee, due to:
b.1 Failure to comply with its obligations
b.2 Violation of these Regulations, as well as of other regulations issued by the advisory committee
b.3 Confirmation of a Member's conduct that is detrimental to the interests of the Community

CHAPTER THREE: MEMBERS' RIGHTS AND OBLIGATIONS

# Artículo 10 - Rights of the members of the Community

a) Appoint a representative to the Community, in writing, by a letter addressed to the coordinator of the LALA Community.

b) Participate, through its representative, in the activities performed within the Community

c) Use the tools and services available on the web portal of the LALA project.

d) Access qualified and systematized information of good practices and success cases in the implementation of Data Analytics

# Artículo 11 - Obligations of HEIs members of the Community in Latin America

a) Facilitate, through its representative, the participation of local specialists required in the various activities and projects developed by the LALA Community.

b) Support the articulation of the LALA Community and the HEIs that comprise it, with other actors that make up Networks and Organizations of cooperation in management and investigation of Data Analytics.

c) Comply with the commitments that your institution assumes in the Annual Work Plans.

CHAPTER FOUR: COMMUNITY STRUCTURE

# Artículo 12 – Organisational Structure of the LALA Community

To ensure the fulfillment of its mission and objectives, the Community will have a basic structure of organization with the following components:

- Advisory committee comprised of one representative of each one of the founding entities of the LALA Community, i.e. for all regular partners of the LALA project.

- The coordinator of the LALA community appointed by the Advisory committee. It is mandatory that this person must be from Latin America and this person will belong to a Latin American institution, but this person must not belong to a European institution in any case.

# Article 13 - Organizational functions and responsibilities, and of the LALA Community coordinator

The Advisory Committee of the LALA Community, will be formed by the representatives of the institutions that have participated in the LALA Project as regular partners, being these: Universidad Carlos III de Madrid (Spain),

University of Edinburgh (United Kingdom), Catholic University of Leuven (Belgium), Escuela Politécnica del Litoral (Ecuador), Universidad de Cuenca (Ecuador), Pontificia Universidad Católica de Chile (Chile), Universidad Austral de Chile (Chile).

The members of the Advisory Committee have the function of defining and establishing the LALA Community and these statutes, from the various plenary meetings that have been held within the framework of the LALA project.

The members of the Advisory Committee have the right to belong to it because they are founders of the Community, as well as the right to request the nomination of a substitute or their exclusion from the Committee in writing at any time.

The Advisory Committee will have the power to hold virtual and face to face meetings with its members to modify statutes or make relevant decisions in relation to the strategies and objectives of the Community. For the meetings, the participation and approval of at least 50% of their representatives will be sufficient.

The coordinator of the LALA community will carry out the different Community operational actions based on the objectives established in these founding statutes.

The following are competences of the coordinator of the LALA community:

> a. To inform the advisory committee about the requests for incorporation of new entities into the Community and their inclusion in the channels.

> b. Manage the Community communications in communication channels.

> c. Ensure the promotion of the Community to incorporate more interested parties.

> d. Represent the LALA Community in congresses or inclusive networks.

> e. Resolve any conflicts that may exist among the members of the Community.

# Article 14 - Articulation of the LALA Community with other Networks and Institutions

Other organizations related to the nature and objectives of the LALA Community can become associated as guests. The LALA Community seeks the highest spirit

of cooperation and articulation with other networks, associations and national and international organizations.

# Article 15 – Logo and corporate identity of the LALA Community

The members of the Community accept that, without the prior and written consent of the coordinator of the LALA community, they will not use the name, symbol, brand, banner or any other abbreviation belonging to the LALA Community in advertisements, publicity, etc. In case of expressly authorizing the use of the same, the owner entity will indicate the protocol to be followed for its possible use.

# Article 16 – Personal Data Protection Regime

The personal data collected related to this statutes in relationship with the LALA community will only be data of institutions and persons from Latin America. Moreover, personal data collected related to the LALA community will be treated and managed by the coordinator of the LALA community, who will be a person from Latin America and will belong to a Latin American institution.

Personal data will not be transferred or communicated to third parties not even for preservation, so that the LALA Community or external members should refrain from requesting the list of members. The transfer of data to the Public Administration is excepted when it comes from a legal obligation.

The LALA Community seeks the implementation of the necessary technical and organizational measures that guarantee the security and integrity of personal data and avoid their alteration, loss, treatment or unauthorized access.

# Article 17 - Amendments to the Statutes

The Statutes may be amended by the LALA Advisory Committee and public notification to the members of the LALA Community through the communication channels.

# Article 18 – Settlement of Disputes

In case of dispute over the implementation of these statutes, the parties will seek to resolve them through direct negotiations, previously requesting the advice of the Advisory Committee

## Artícle 19 – Final provisions

Any case not contemplated in these statutes will be considered by the Advisory Committee, which must propose to the Parties a solution for said case and subsequent proposal of amendments to the statutes as necessary

## Artículo 20 - Statutes' entry into force

The present Statutes will come into force as of April 10th, 2019, based on agreement by the Advisory Committee.

# A4.2. Letter of membership in LALA Community

## Letter of Interest in joining the LALA Community

**Country, date**

**Dear LALA Community Coordinator,**

**In representation of the institution [name_of_institution], we express our interest in being part of the LALA Community, as part of the Erasmus + LALA project.**

*Write a brief description of your institution, organization, company and why do you want to be a part of the LALA Community.*

**In addition, we are committed to disseminate the activities of the LALA project and to participate in the events they organize in order to help to create a learning analytics community in Latin America.**

**Choose the member level with which you want to join to the network:**

☐      **Level 0**      ☐      **Level 1**

*(Note: Before choosing the member level, it is important that you have read the rights and obligations in the constitution agreement of the LALA Community).*

**Sincerely,**

| | |
|---|---|
| Name of person filling in the letter of interest | |
| Position | |
| Email | |
| Name of institution, organization or company | |
| Area (educational, commercial, NGO, etc.). | |
| Country | |
| Web page | |

_____

**Signature and Date**

# A4.3. Researcher registration in the LALA Community

Questionnaire to register as a researcher in the LALA community

**URL:** **https://es.surveymonkey.com/r/ComunidadLALA**