

## Implementing learning analytics in higher education: A case study on challenges and requirements

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**Abstract:** Learning analytics (LA) offers an effective solution for leveraging big data to increase retention rates, reduce quality gaps, improve resource allocation, monitor skills development, and raise graduation rates. To evaluate the potential benefits of this solution, this research explores learning analytics in Moroccan higher education, focusing on the implementation needs and challenges. The methodology is based on qualitative research conducted through 10 interviews with teachers from a multidisciplinary faculty in Nador. The findings of this research reveal that few professors use learning analytics tools on their own initiative. They express a need for guidance, support, and user-friendly tools. Most respondents also mentioned various challenges to adopting learning analytics, such as the inability to align learning analytics with teaching practices, ethical and confidentiality concerns, and limitations in data value, all of which can hinder the effectiveness of learning analytics. Additional challenges include a heavy workload, lack of necessary resources, insufficient technological and pedagogical skills, and difficulties in operating learning analytics tools. Furthermore, managing unorganized data and addressing the heterogeneity of databases and datasets present significant obstacles. Lastly, inadequate preparation on the part of faculty members can impede the full realization of the advantages of learning analytics. To address these challenges, several recommendations have been formulated, including the need for training, guidance, the development of policies, models, and frameworks for the adoption of learning analytics, and the certification of learning analytics tools that are useful and easy to use.

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**Keywords:** Challenges, Learning analytics, Moroccan higher education, Needs.

### 1. Introduction

In recent years, the proliferation of internet data has surged, with companies like Google, Yahoo, Facebook, and Amazon leveraging this wealth of information for commercial purposes such as marketing and personalized services, contributing to exponential growth. Simultaneously, the rise of online education has led to the creation of numerous learning platforms, generating vast amounts of tracking data. This data harbors untapped potential, capable of revealing insights into educational environments, including effective teaching methods and interventions to enhance student performance and retention (Wook et al., 2009). Among the tools available for extracting value from this data, learning analytics emerges as particularly notable.

Learning analytics stands out as an effective solution for addressing educational challenges by harnessing big data to improve retention rates, reduce disparities in educational quality, optimize resource allocation, monitor skill development, and boost graduation rates. It has the potential to transform teaching methods and enhance student learning outcomes and success (Williamson & Kizilcec, 2022). Despite its promise, the adoption of learning analytics among educators remains limited, often hindered by challenges in effectively utilizing LA technologies (Kaliisa et al., 2022; Sghir et al., 2023).

Thus, gaining a comprehensive understanding of the challenges associated with adopting and implementing learning analytics is crucial to fully realizing its potential in education.

## 2. State of the Art

Learning analytics, as defined by Long and Siemens (2011), encompasses the processes of measuring, collecting, analyzing, and reporting data about learners and their contexts to optimize learning environments. According to Brown (2011), its core components include data collection from various sources, qualitative and quantitative data analysis, and subsequent actions at both individual and institutional levels.

Scheffel et al. (2014) suggest that learning analytics offers educators insights into student engagement with course materials, interactions with peers and instructors, and overall participation in learning activities. By leveraging these analytics, educators can effectively intervene in students' learning processes, adjust curriculum designs, and refine teaching strategies to address learning gaps (Reyes, 2015).

Despite its potential benefits, the adoption of learning analytics (LA) remains relatively nascent (Dringus, 2012; Johnson et al., 2011). Johnson et al. (2011, p. 28) acknowledge LA as a critical area for development but highlight challenges related to procedural issues and practical applications.

A significant obstacle is meeting the diverse data access requirements of stakeholders who utilize this data. Securing permissions from multiple data owners to access and use data poses another substantial challenge. Additionally, prioritizing institutional learning analyses involves selecting pertinent questions aligned with available data.

In contexts where institutions have prepared by empowering stakeholders and establishing necessary policies, many of these challenges have been addressed. However, in Morocco, academic institutions lack preparedness and specific guidelines, amplifying these challenges. Consequently, Moroccan educators face uncertainties regarding their role in adopting learning analytics.

To facilitate the successful adoption of learning analytics in Moroccan higher education, this study explores the following inquiry: What challenges do Moroccan educators encounter when adopting learning analytics, and what prerequisites are essential for their successful implementation?

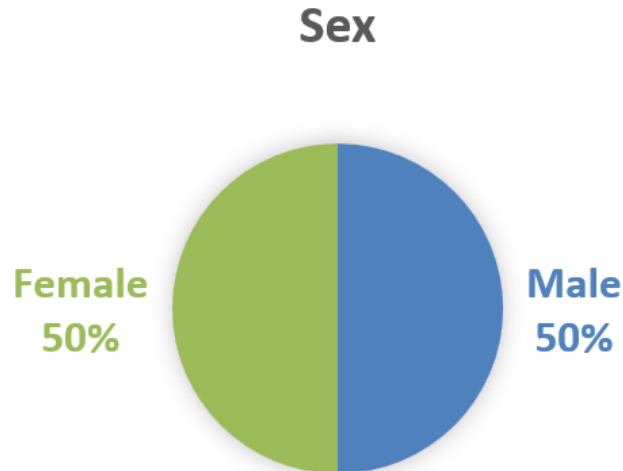
## 3. Methodology

This study investigates the challenges and prerequisites associated with learning analytics adoption. To achieve our research objectives, we employed a descriptive qualitative methodology, allowing each educator to provide detailed accounts of their experiences with various types of learning analytics and the obstacles they faced.

Data were collected through semi-structured interviews with 10 faculty members from a multidisciplinary faculty in Nador, chosen based on their prior use of learning analytics. Educators who had not utilized any form of learning analytics were not included in the study.

Interviews were conducted by the same researcher between February and March 2022, typically at the participants' workplaces after classes had ended and students had left the lecture hall. To ensure a comprehensive perspective, participants were selected from diverse academic disciplines, providing insights into potential implementation challenges of learning analytics. Interview questions were derived from a literature review.

Following data collection, a descriptive analysis was conducted to interpret and summarize the findings.



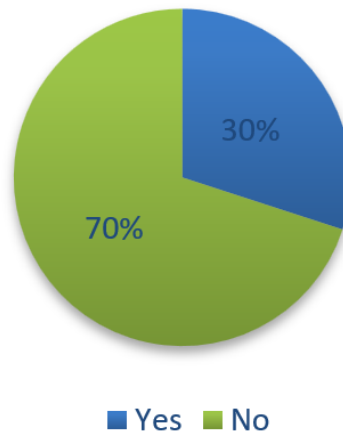
**Figure 1.**  
Gender distribution of the sample.

## 4. Results

### 4.1. Gender of the Sample Studied

The data indicates an equal distribution of male and female educators, each comprising 50% of the sample, engaged in distance teaching. Participants were selected based on their previous experience with learning analytics or distance learning platforms, ensuring comprehensive coverage of challenges and requirements across genders.

### Prior use of learning analytics



**Figure 2.**  
Prior use of learning analytics.

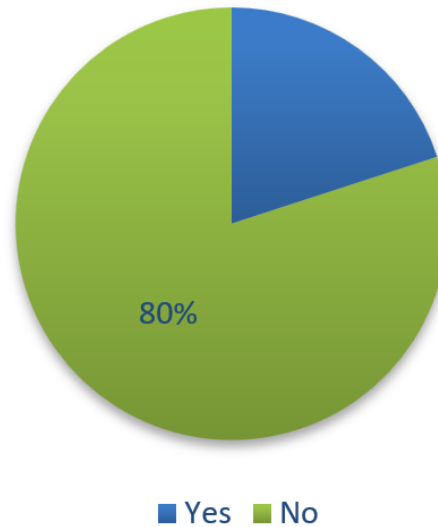
### 4.2. Prior use of Learning Analytics

The figure 2 shows that 30% of our study participants utilize learning analytics tools. Further investigation into the types of tools used revealed that they employed learning analytics tools incidentally within the Moodle platform. Specifically, they relied on the platform's integrated features without external add-ons. As a result, the specific goals for using learning analytics tools are not clearly defined. These findings suggest that the challenges ahead will be complex and varied.

#### 4.3. Information About LA Used

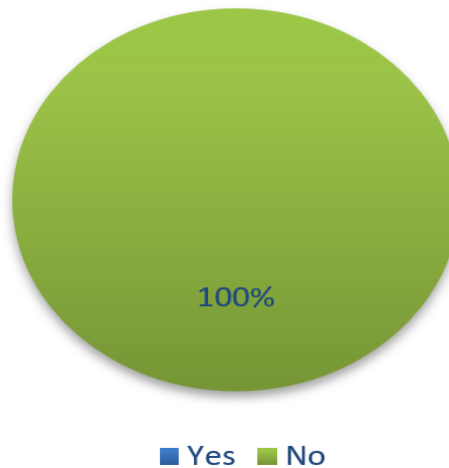
For educators who have utilized learning analytics, we inquired about the resources that aided them in utilizing learning analytics and whether they implemented a particular usage approach.

#### A specific strategy for learning analytics



**Figure 3.**  
A specific strategy for learning analytics.

#### Auxiliary tools for using learning analytics



**Figure 4.**  
Auxiliary tools for using learning analytics.

The data reveals that none of the participants in our study utilized any supportive tools like frameworks or guides. Moreover, 80% of the participants did not follow a specific strategy, while the remaining 20% independently utilized existing learning analytics tools to monitor student progress and engagement. This subgroup used the tools according to their own objectives and showed strong

motivation towards adopting learning analytics. Thus, effective adoption of learning analytics hinges on using them purposefully and with clear intentions.

#### *4.4. Justifications for use of Learning Analytics*

The findings of this research have led to the conclusion that some teachers are using learning analytics tools on their own initiative to track students' work, monitor their performance progress, and assess their engagement. For instance, one teacher mentioned that after transitioning from in-person teaching to distance teaching, he was unprepared for the challenges it posed. Despite using distance teaching as a supplement to face-to-face instruction, he had not anticipated the specific issues of remote teaching. However, he later discovered that he could monitor students' work progress and engagement levels by consulting the reports available on the platform.

Another teacher stated that he utilized the reports and dashboards available on learning platforms to monitor student progress, albeit without realizing it was considered learning analytics.

In this context, learning analytics has been primarily used for descriptive purposes, indicating that the challenges and needs identified are related to descriptive learning analytics.

#### *4.5. Challenges for Successful Implementaton of Learning Analytics*

Teachers foresee several challenges when considering the adoption of learning analytics. Analysis of their feedback has revealed several recurring themes. These include concerns about inadequate training in using learning analytics tools, a lack of concrete examples, limited resources, restricted access to educational data, the necessity for new infrastructure, a lack of organizational culture supportive of learning analytics, and resistance to change from various stakeholders.

Many teachers expressed significant concerns about insufficient training, feeling that their pedagogical and technical skills might not be adequate for adopting learning analytics effectively. They emphasized the importance of having clear examples to understand how to implement and utilize learning analytics; without such guidance, the adoption process could be daunting.

Participants using learning analytics tools within Moodle emphasized the critical need for robust technical infrastructure, which may not be uniformly available across all academic institutions. They stressed the importance of having dedicated personnel who are motivated to utilize these tools effectively, as any shortcomings in infrastructure or personnel readiness could impede educators' work.

Furthermore, one participant highlighted the crucial issue of access to comprehensive learning data, arguing that technical and ethical constraints, especially related to privacy, could hinder the adoption process and undermine the effectiveness of learning analytics.

#### *4.6. Teachers' Needs to Adopt Learning Analytics*

We conducted an evaluation of the essential conditions, expectations, and specifications that teachers deem necessary for learning analytics tools.

The findings show that the majority of teachers consider several prerequisites crucial, including guidance, robust technical infrastructure, technical proficiency, motivation to utilize learning analytics, and legal safeguards for student data.

In terms of expectations, teachers emphasized the importance of learning analytics in facilitating their teaching practices by reducing workload and stress. They also expressed a need for regular updates on curriculum progress, indicators to identify high rates of academic failure and dropout risk, and transparent feedback on student satisfaction with courses and programs.

Furthermore, the survey highlighted that most respondents require user-friendly tools, supplementary tools, feasibility tools, and tools for assessing learning. One participant suggested the necessity for a tool capable of data uploading and analysis capabilities.

#### 4.7. Overcoming Challenges

Several recommendations have been put forward to tackle the challenges and fulfill the requirements in this domain. Key recommendations include providing adequate training for teachers to effectively utilize learning analytics and offering ongoing guidance. Furthermore, it is advised to develop and implement policies, models, and frameworks to support the adoption of learning analytics. Lastly, there is a recommendation to equip educators with reliable, functional, and user-friendly tools for learning analytics.

### 5. Discussion

The aim of this research was to identify barriers that teachers may encounter when implementing learning analytics tools and to determine their requirements.

Key findings reveal that the majority of educational institutions are not utilizing learning analytics. Specifically, 70% of teachers familiar with Moodle and its features have not used learning analytics within the platform, while 30% have. The adoption and effective implementation of learning analytics in higher education face significant challenges and constraints (Guzmán-Valenzuela et al., 2021; Bonnin & Boyer, 2017; Tsai & Gasevic, 2017).

These challenges include inadequate training on learning analytics tools, lack of practical examples, resource scarcity, limited access to educational data, the need for new infrastructure, organizational culture gaps related to learning analytics, and resistance to change from stakeholders. To address these challenges, educators can engage in professional development opportunities aimed at enhancing their data literacy and understanding of learning analytics. Collaboration among educators and institutions to share experiences and best practices is also recommended (Kaliisa et al., 2022; Corrin et al., 2013).

Regarding teachers' needs in terms of prerequisites, expectations, and tool specifications, the research highlights several points:

Firstly, effective implementation of learning analytics requires mentoring, technical infrastructure and expertise, teacher motivation, and legal protections for student data. Addressing these needs involves providing mentoring, establishing technical expertise and infrastructure, motivating educators, and ensuring legal safeguards for student data. Institutions are encouraged to develop a strategic vision for learning analytics to align with long-term goals and objectives (Gasevic et al., 2019).

Secondly, teachers expect learning analytics to enhance their teaching practices by reducing workload and anxiety. They emphasize the need for timely and specific feedback to improve teaching and learning processes. Additionally, they seek tools to monitor curriculum progress, identify high failure rates and dropout risks, and obtain clear data on student satisfaction with courses and programs. Expectations regarding learning analytics tools may vary based on educators' experience, educational background, and specific tool features (Biancato et al., 2023; Schumacher & Ifenthaler, 2018; Ding, 2021).

Lastly, survey results indicate that most respondents require specific tools, including basic utilities, feasibility tools, learning measurement tools, and tools for data upload and analysis. Previous research emphasizes the need for standardized frameworks, automated data collection and processing, integration of diverse data sources, and standardized measurement and interoperability to support personalized learning experiences and predictive analytics (Dyckhoff et al., 2012; Phillips et al., 2021).

In summary, these findings underscore the importance of fostering an analytics-focused culture in higher education institutions and enhancing the expertise of individuals involved in learning analytics to leverage educational data effectively and improve learning outcomes. Therefore, leveraging existing frameworks such as the LALA model is recommended over starting from scratch.

### 6. Conclusion

This study investigates learning analytics in Moroccan higher education, specifically examining its justifications for use and implementation challenges. Our research methodology comprises qualitative analysis of 10 interviews conducted with teachers at the Polydisciplinary Faculty of Nador.

The research results indicate that only a minority of teachers independently utilize learning analysis tools with the goal of monitoring students' work, assessing their performance trajectory, and gauging their level of engagement. Furthermore, a majority of the participants cited several obstacles that must be addressed before implementing learning analytics, such as the restricted scope of the data obtained from learning analytics and the absence of adequate technological and pedagogical expertise. Several recommendations have been proposed to surmount these challenges, with the critical ones comprising the requirement for training and guidance and the creation of policies, models, and frameworks to embrace learning analytics. It is crucial to ensure that the learning analytics tools adopted are practical and user-friendly.

To help teachers, further research is needed into successful experiences and how teachers have used learning analysis tools.

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