Appendices

Appendix 1

[COREQ](#) checklist with item information for each university

Domain 1: Research team and reflexivity			
Personal characteristics	**U1**	**U2**	**U3**
1. Interviewer/facilitator *Which author(s) conducted the interview or focus group?*	Independent researcher expert in qualitative analysis.	Researcher of the School of Humanities and Education U2.	Researcher of the National System of Researchers; Head of Teaching Coordination
2. Credentials *What were the researcher's credentials? E.g., PhD, MD*	Master's degree in Psychology with a specialization in applied statistics	Bachelor in Social Sciences, PhD in Education	B.S. in Law, PhD in Education
3. Occupation *What was their occupation at the time of the study?*	Consultant scholar	Assistant Professor	Head of Teaching Coordination
4. Gender *Was the researcher male or female?*	Female	Male	Male
5. Experience and training *What experience or training did the researcher have?*	20 years of work and teaching experience in public and private educational sectors in Mexico, OCDE, OEI and UNESCO.	Training as interviewer, qualitative research, psychology	Experience in qualitative methods and coordination of research projects
Relationship with participants			
6. Relationship established *Was a relationship established prior to study commencement?*	No	With some groups.	No
7. Participant knowledge of the interviewer *What did the participants know about the researcher? e.g., personal goals, reasons for doing the research*	No	With some groups	They knew only synthetically the objectives of the project
8. Interviewer characteristics *What characteristics were reported about the interviewer/facilitator? e.g., Bias, assumptions, reasons and interests in the research topic*	First approximation to learning analytics by the researcher.	First approximation to learning analytics by the researcher.	First approximation to learning analytics by the researcher.
Domain 2: Study design			
Theoretical framework			
9. Methodological orientation and theory *What methodological orientation was stated to underpin the study? e.g., grounded theory, discourse analysis, ethnography, phenomenology, content analysis*	Interview, Content Analysis	Interview, Content Analysis	Grounded Theory and Phenomenology

Participant selection

10. Sampling *How were participants selected? e.g., purposive, convenience, consecutive, snowball*	Convenience (teachers, students), intentional by formal invitation (authorities)	Convenience (teachers, students), purposive (authorities)	Intentional by formal invitation
11. Method of approach *How were participants approached? e.g., face-to-face, telephone, mail, email*	Invitations by email	Mostly invitations by email.	Written request by official document.
12. Sample size *How many participants were in the study?*	99	30	38
13. Non-participation *How many people refused to participate or dropped out?*	No dropouts, some participants did not attend the focus groups.	No dropouts, some participants did not attend the focus groups.	1
14. Setting of data collection *Where was the data collected? e.g., home, clinic, workplace*	Video conferencing via Zoom (students and authorities) and seminar module (teachers)	Zoom session (online video conference software)	Video conferencing via Zoom.
15. Presence of non-participants *Was anyone else present besides the participants and researchers?*	Five observers	No	One observer.
16. Description of sample data collection *What are the important characteristics of the sample? e.g., demographic data, date*	University students, teachers and authorities (educational authorities and administrative staff), from November 2021 to May 2022	University students and Teachers Last quarter of 2022	4 university centers from different disciplines were selected and their Rectors were asked to nominate teachers and directors. Last quarter of 2022.

Data collection

17. Interview guide *Were questions, prompts, guides provided by the authors? Was it pilot tested?*	The focus groups and interviews were based on previous work and guidelines by the LALA project.	The focus groups and interviews were based on previous work and guidelines by the LALA project.	The focus groups and interviews were based on previous work and guidelines by the LALA project.
18. Repeat interviews *Were repeat interviews carried out? If yes, how many?*	No	No	No.
19. Audio/visual recording *Did the research use audio or visual recording to collect the data?*	Yes, audiovisual recording.	Yes, audiovisual recording.	Yes, audiovisual recording.
20. Field notes *Were field notes made during and/or after the interview or focus group?*	Yes	No	Yes
21. Duration *What was the duration of the interview or focus group?*	On average, 90 minutes	On average, 60 minutes	On average, 60 minutes.

22. Data saturation *Was data saturation discussed?*	No	No	Data saturation was a criterion for the selection of more robust categories for analysis
23. Transcripts returned *Were transcripts returned to participants for comment and/or correction?*	No	No	No
Domain 3: Analysis and findings			
Data analysis			
24. Number of data coders *How many data coders coded the data?*	One	One	3
25. Description of the coding tree *Did authors provide a description of the coding tree?*	Yes	Yes	Yes
26. Derivation of themes *Were themes identified in advance or derived from the data?*	Both, some were identified from previous research, while others derived from the data analysis.	Both, some were identified from previous research, while others derived from the data analysis.	Both, some were identified from previous research, while others derived from the data analysis.
27. Software *What software, if applicable, was used to manage the data?*	Excel	Atlas.ti	Atlas.ti
28. Participant checking *Did participants provide feedback on the findings?*	No	No	No
Reporting			
29. Quotations presented *Were participants quotations presented to illustrate the themes/findings? Was each quotation identified? e.g., participant number*	Yes	Yes	Yes
30. Data and findings consistent *Was there consistency between the data presented and the findings?*	Yes	Yes	Yes
31 Clarity of major themes *Were major themes clearly presented in the findings?*	Yes	Yes	Yes
32. Clarity of minor themes *Is there a description of diverse cases or discussion of minor themes?*	No	No	No

Appendix 2

Characteristics of universities

U1. Public university founded in 1910. Its substantive functions are teaching, research, and culture dissemination. It is a secular and free institution, with more than 370,000 students and 42,000 faculty. Its academic offerings include 3 high school programs, 133 undergraduate college degrees, and 42 graduate programs, with coverage throughout Mexico.

U2. Private Mexican university with 80 years since its foundation. Characterized by an active presence in the areas of business and technological innovation by its engineers. Its student population is 90,000 students and almost 11,500 teachers. It has presence in 26 campuses distributed in Mexico, and its academic offering includes high school programs, university degrees and postgraduate programs.

U3. State Public University founded in 1925. Currently, it integrates 18 University Centers, a Virtual Education System, a Higher Secondary Education System in addition to its central administration. It has an enrollment of more than 300,000 students and 17,500 teachers. It offers 31 upper secondary education programs, 130 undergraduate programs and 233 graduate programs.

Appendix 3

Participants' characteristics

U1: The structured interviews were conducted with four school deans. The focus groups included different types of participants: academic-administrative staff, faculty and college-level students from five schools. The schools included four disciplinary areas: 1) physics, mathematics and engineering sciences; 2) biology, chemistry and health sciences; 3) social sciences; 4) humanities and arts. Each school invited academic-administrative staff, and recruited participating teachers and students by email open invitations.

U2: Students that participated in focus groups were enrolled in undergraduate or graduate courses, and were selected via open invitation (with online forms) or convenience sampling (e.g., course students). Most were enrolled in 1) the School of Engineering, 2) Social Sciences or 3) Business. For teachers, an open invitation was made on institutional social networks groups, resulting in a similar profile in terms of School affiliation. For authorities, these were selected according to their opportunity to be involved in LA in the present or in the future, with different representatives of areas such as those associated to IT and research departments, data regulations and legal, or academic records areas.

U3: For the recruitment of informants, four university centers were selected in the areas of 1) Art, Architecture and Design; 2) Biological and Agricultural Sciences; 3) Health Sciences; and 4) Economic and Administrative Sciences. Subsequently, a formal request was made to the Rectors to nominate authorities related to the use and management of data, such as school administration, career and planning coordinators. In each center, a career was chosen and the rectors were asked to nominate teachers to participate in the study. The careers chosen were Architecture, Veterinary Medicine and Animal Husbandry, Surgeon and Midwife, and Government Administration and Public Policy. Students were invited through the teachers that attended the focus groups, and then offered an open invitation to their students. This institution did not include school Deans.

Appendix 4

Focus group questions (Adapted version)

The following table exhibits the adapted version of the questions to Spanish (Mexico) used for the focus groups, according to the type of participants (from left to right: authorities, teachers, and students).

1. Calentamiento

AUTORIDADES	DOCENTES	ESTUDIANTES
1. Menciona el cargo que desempeña actualmente y años de experiencia.	1. Menciona el cargo que desempeña, la facultad/carrera que pertenece y años de experiencia.	1. Menciona la carrera que estás cursando y en qué semestre/año te encuentras actualmente.
2. ¿Qué datos son relevantes para saber cómo los estudiantes y docentes se están desempeñando?	2a. ¿Qué datos son relevantes para saber cómo sus *estudiantes* se están desempeñando Ud *como docente*?	2. ¿Qué datos son relevantes para saber cómo te estás desempeñando en la carrera?
3. ¿Qué datos provee a los estudiantes y docentes para dar retroalimentación sobre su desempeño? ¿Cuán efectivo es?	3a. ¿Qué datos le provee la institución para dar retroalimentación sobre su desempeño docente? ¿Cuán efectivo es?	3. ¿Qué datos te proveen los profesores y la institución para darte retroalimentación sobre tu desempeño académico? ¿Cuán efectivo es?

2. Explorando puntos de discusión

Tema: Transparencia, ética y privacidad de datos

AUTORIDADES	DOCENTES		ESTUDIANTES
4. ¿Qué tipos de datos la universidad recopila acerca de los estudiantes y docentes?	4a. ¿Qué tipos de datos cree que la universidad ha estado recopilando acerca de usted?	4b. ¿Qué tipos de datos cree que la universidad ha estado recopilando sobre los estudiantes?	4. ¿Qué tipos de datos crees que la universidad ha estado recopilando acerca de ti?
5. ¿Los docentes y los estudiantes firman algún consentimiento donde se les dice que se van a usar sus datos? ¿En qué momento?	5a. ¿Ud ha firmado algún consentimiento donde se le diga que se van a usar sus datos? ¿En qué momento?	5b. ¿Ud sabe si los estudiantes han firmado algún consentimiento donde se le diga que se van a usar sus datos? ¿En qué momento?	5. ¿Has firmado algún consentimiento donde se te diga que se van a usar tus datos? ¿En qué momento?
6. ¿Existen políticas disponibles acerca de cómo la universidad recopila y analiza los datos de profesores y estudiantes?	6a. ¿Existen políticas disponibles acerca de cómo la universidad recopila y analiza sus datos y los de sus estudiantes?	6b. ¿Ud sabe si los estudiantes están informados de la manera que la universidad recopila y analiza sus datos?	6. ¿Existe información clara disponible acerca de cómo la universidad recopila y analiza tus datos?
7. ¿Existe una política para determinar quién tiene acceso a los datos que la universidad recopila sobre los estudiantes y docentes? ¿Quién tiene acceso a los datos?	7a. ¿Sabe quién tiene acceso a sus datos? ¿A quién debería concederse el derecho de acceder a sus datos? ¿Debería ser informado de las personas que pueden acceder a sus datos?	7b. ¿Sabe quién tiene acceso a s los datos de los estudiantes? ¿A quién debería concederse el derecho de acceder a sus datos? ¿Debería ser informado de las personas que pueden acceder a sus datos?	7. ¿Sabes quién tiene acceso a tus datos? ¿A quién debería concederse el derecho de acceder a tus datos? ¿Deberías ser informado de las personas que pueden acceder a tus datos?
8. ¿Existe algún tipo de datos para los que la universidad debería pedir explícitamente consentimiento a profesores y estudiantes (por ejemplo, datos acerca de su salud o tus preferencias sexuales)?	8a. ¿Existe algún tipo de datos para los que la universidad debería pedirle explícitamente su consentimiento (por ejemplo, datos acerca de su salud o tus preferencias sexuales)?	8b. ¿Existe algún tipo de datos para los que la universidad debería pedirle explícitamente el consentimiento a los estudiantes (por ejemplo, datos acerca de sus creencias religiosas o tus preferencias sexuales)?	8. ¿Existe algún tipo de datos para los que la universidad debería pedir explícitamente tu consentimiento (por ejemplo, datos acerca de tu salud o tus preferencias sexuales)?

Tema: Uso académico de los Datos

AUTORIDADES	DOCENTES	ESTUDIANTES
9. ¿Qué uso le da la institución a los datos recopilados de los estudiantes y maestros para mejorar en su desempeño académico y docente? ¿Ejemplos?	9. Estos son algunos ejemplos del uso de los datos para ayudar a los estudiantes en su aprendizaje. ¿Cuáles de estos ejemplos preferiría que se implementaran? Organizar en orden de importancia. a. Mejorar los consejos que recibe del personal docente o con los tutores. b. Mejorar su experiencia de aprendizaje en su conjunto, y su bienestar. c. Detectar puntos débiles en su aprendizaje, y sugerirle formas de mejorarlo. d. Alertar lo antes posible al personal docente, si tiene un bajo desempeño, está en riesgo de reprobar o abandonar un módulo o curso, o si pudiera mejorar su aprendizaje. e. Identificar, con base en su plan de estudios, el camino óptimo para sus estudios (por ejemplo, sugiriendo asignaturas optativas, cursos adicionales o actividades extracurriculares). f. Ofrecerle un perfil completo de su aprendizaje en cada módulo. g. Otro, ¿cuál?	9. Estos son algunos ejemplos del uso de tus datos para ayudarte en tu aprendizaje. ¿Cuáles de estos ejemplos preferirías que se implementaran? Organizar en orden de importancia. h. Mejorar los consejos que recibes del personal docente o con los tutores. i. Mejorar tu experiencia de aprendizaje en conjunto, y tu bienestar. j. Detectar puntos débiles en tu aprendizaje, y sugerirte formas de mejorarlo. k. Alertar lo antes posible al personal docente, si tienes un bajo desempeño, estás en riesgo de reprobar o abandonar un módulo o curso o si pudieras mejorar tu aprendizaje. l. Identificar, con base en el plan de estudios, el mejor camino posible para tus estudios (por ejemplo, sugiriendo asignaturas optativas, cursos adicionales o actividades extracurriculares). m. Ofrecerle un perfil completo de tu aprendizaje en cada módulo. n. Otro, ¿cuál?
10./11. ¿De qué otra manera se podrían usar los datos de los estudiantes y docentes para mejorar el entendimiento de su desempeño académico y docente en la universidad?	10. ¿De qué otra manera se podrían usar los datos de los estudiantes para mejorar el entendimiento de su desempeño académico en la universidad?	10. ¿De qué otra manera se podrían usar tus datos para mejorar el entendimiento de tu desempeño académico en la universidad?
	11. ¿De qué manera se podrían usar los datos que obtienen de los estudiantes para mejorar el entendimiento de tu práctica docente en la universidad?	11. ¿De qué manera se podrían usar los datos que obtienen de los profesores para mejorar el entendimiento de tu desempeño en la universidad?

Tema: Retroalimentación de Datos

AUTORIDADES	DOCENTES	ESTUDIANTES
12. ¿Cuál sería la mejor manera de mostrar los resultados del análisis de datos educativos?	12. ¿Cuál sería la mejor manera de mostrar los resultados del análisis de datos educativos? (docente y de estudiantes)	12. ¿Cómo te gustaría recibir los resultados del análisis de tus datos educativos? a. En persona (por ejemplo, de su tutor). b. En un texto (por ejemplo, mediante un correo electrónico). c. A través de visualizaciones (por ejemplo, mediante una interfaz gráfica en una herramienta software). d. De entre estas tres opciones, ¿cuál crees que es la más útil para tu aprendizaje?
13. ¿Con qué frecuencia se debería enviar los resultados? Por ejemplo, cada día, una vez a la semana, etcétera.	13. ¿Con qué frecuencia le gustaría recibir los resultados? Por ejemplo, cada día, una vez a la semana, etcétera. (docente y de estudiantes)	13. ¿Con qué frecuencia te gustaría recibir los resultados? Por ejemplo, cada día, una vez a la semana, etcétera.

AUTORIDADES	DOCENTES	ESTUDIANTES
14. ¿Los resultados deberían incluir una comparación del progreso del docente/estudiante con respecto al progreso del resto de sus compañeros?	14. ¿Los resultados deberían incluir una comparación de su progreso con respecto al progreso del resto de sus compañeros?	14. ¿Los resultados deberían incluir una comparación de tu progreso con respecto al progreso del resto de tus compañeros?

Tema: Intervención con base en resultados

AUTORIDADES	DOCENTES	ESTUDIANTES
15. ¿Cómo abordan los resultados de los datos de docentes y estudiantes? ¿Qué acciones se toman? ¿Qué acciones se deberían tomar?	15. ¿Cómo abordan los resultados de sus datos? ¿Qué acciones se toman? ¿Qué acciones se deberían tomar?	15. ¿Cómo abordan los resultados de tus datos? ¿Qué acciones se toman? ¿Qué acciones se deberían tomar? ¿Cómo debería abordar la institución el análisis de tus datos? a. ¿Deberían tener la obligación de actuar si detectan que tienes un bajo desempeño, estás en riesgo de reprobar o abandonar un módulo o, curso, o si pudieras mejorar tu aprendizaje? b. ¿El personal docente debería recibir algún tipo de formación para comprender el análisis de tus datos educativos?, ¿y para proporcionarte unos resultados que te sean útiles? c. ¿La universidad debería ofrecer a los estudiantes la posibilidad de rechazar el apoyo?

3. **Cierre**

AUTORIDADES	DOCENTES	ESTUDIANTES
16. ¿Existe alguna información adicional que sería importante de obtener de estudiantes y docentes? ¿Por qué?	16. ¿Existe alguna información adicional que sería importante de obtener de estudiantes y usted? ¿Por qué?	16. ¿Existe alguna información adicional que sería importante de obtener de ti y los docentes? ¿Por qué?

17. ¿Quisiera agregar algo más?

Appendix 5

Testimonies by section and university

1. General Use of Data

a) University 1 (U1, public)

In relation to the general use of data, most students agreed that it is very important to identify the data that **allows the identification of their academic performance**. Firstly, academic data such as their learning strategies, self-management, **teaching styles of their teachers** *(U1S2)*; modality of their studies, shift (morning or evening), the times when they carry out school activities, the academic load, and the number of hours they dedicate to studying *(U1S1)*.

> U1S2: "(...) I also think the strategies that students have to learn are important, and also that they know their learning methods and can implement them. I think it also has to do with self-management, that is, the student also can manage their time and organize themselves beyond spending one or five hours studying, **but really paying attention and knowing their best strategies**".

> *U1S1: "I think it also has a lot to do with modality, time, how many courses are taken, because sometimes the hours he invests are not the same in face-to-face, open or distance activities, not the same days (...). Most of us in the open and distance system do things at night".*

Additionally, data like students' academic trajectories, grade point averages, grades, current and past courses are important *(U1S3)*. Likewise, they **considered that their physical and mental health states are crucial for influencing school performance** *(U1S4)*.

> U1S3: "(...) I would think that the grade point average is another topic to review, because whether we like it or not, it is the assessment we have today, so we have to look at the average".

> U1S4: "(...) it also has to do with the emotional issues in this case, the mental aspect, because I believe that if a student is not feeling well mentally, emotionally, they cannot have a good performance at school".

And finally, the data about the current conditions and resources, such as their employment situation, distance and travel time from their homes to the university *(U1S5)*.

> U1S5: "Not all of us have the same possibilities, some have to work to be able to support themselves, others live two hours away from school (...). So, someone who may have a low grade due to certain circumstances, but it could be because they work or live far away, it doesn't mean that they are a bad student, it just means that they don't have enough time".

Regarding the data to provide feedback on their school performance, students mentioned that they receive reviews that their teachers perform, **these assessments however, are not always accompanied by qualitative feedback that includes comments, observations, and other suggestions for improvement on their school performance, which would be extremely useful** *(U1S6)*. They also commented that they are not always clear about their school performance, since each teacher uses their own evaluation criteria and personal measurement instruments such as exams, essays, or rubrics *(U1S7)*.

> U1S6: "There are teachers who kind of feel sorry or feel bad and they don't want to tell you that you're not performing well, that doesn't help you and you continue with your strategies; and there are teachers who are very harsh and make you feel bad, they make you feel stupid and that does not help you improve; and on the other hand there are teachers who simply do not say anything, they just give you a grade and that's it, you don't know what you did wrong, what you did well, what you have to improve. So, it is very rare to find a teacher who is assertive in giving an evaluation and feedback where they do not focus on the errors, but on what you can improve".

> U1S7: "So each teacher has different criteria and in general they do not provide more data than the grade, the grade is the most visible data that we have, and hence the feedback is variable and only - your work was very good - and that's it, congratulations, period".

Teachers agreed that it is very important to know and analyze the data from the university community. In particular, data on student performance, such as test scores and learning activities *(U1T14)*; criteria in quality of exam responses, punctuality in assignments' completion *(U1T15)*; attendance, participation in synchronous sessions (chat), records of the didactic use of digital platforms and video recordings of classes *(U1T16)*.

> U1T14: "The first thing is grades, in relation to student performance activities (...)".

U1T15: "(...) the quality and punctuality of class work".

U1T16: "(...) the attendance data, now with virtual, thinking how to systematize it, would be the records in Zoom of connection times, more data for evaluation with the digital tool, the records of the Moodle platform about how many times they used the didactic resources".

Regarding their academic performance, teachers mentioned that perceptions of their own performance are reflected in the grades obtained by students and the surveys students answer at the end of the semester *(U1T1)*. Other relevant information is the number and type of faculty development courses, the development of didactic material, and instruments that provide qualitative information on their performance *(U1T17, U1T18, U1T2)*.

U1T1: "The first thing is the grades, activities that reflect students' and teachers' performance, results in individual or group tutorials. Also, the teacher evaluations the students do at the end of the semester, the information that is provided by the students about the teacher's performance".

U1T17: "(...) the records that the institution has about the faculty courses that teachers take, either pedagogical or personal development".

U1T18: "…the collection of information about the didactic material that teachers have prepared to facilitate student learning, more so in this pandemic time".

U1T2: "As for teachers, I think that this type of information is not routinely collected, I think it is very quantitative… I think it would be worth having non-quantitative instruments to evaluate our performance".

Additionally, teachers recognized that data is also collected on the students' available technological resources and their level of technology management, since they have an important impact on their learning.

U1T6: "I thought about the technological resources available to the students, because they do not all have the same technological resources (...). The software, sometimes they do not have the tools, or they do not use it properly and that also creates performance issues".

Regarding data to provide feedback on performance, teachers indicated that they retrieve data from the use of **measurement instruments like rubrics or checklists**, to have more clarity about what they are expected to assess *(U1T5)*. Using rubrics with a qualitative perspective and highlighting the importance of providing feedback to students' projects in a timely manner *(U1T18-19)*.

U1T5: "Regarding the evaluation of students, I try to use rubrics or checklists, (...) in these instruments, the criteria that are really being met and that in my course are covered".

U1T18: "(...) I would add that an important part has to do with qualitative information, identifying precisely areas of strength, taking the checklists and rubrics as a reference, but also giving individuality to each of the students' activities (...)".

U1T19: "Timely project reviews are very important because frequently some teachers review only one exam almost at the end, and the truth is that students do not learn well because they made a mistake, and they did not face appropriately that knowledge (...)".

In terms of providing feedback on their own performance, most teachers said they had access to the quantitative and qualitative results of the **surveys answered by students** *(U1T3)*. They also suggested analyzing **social networks**, since it can be a means to obtain students' opinion about teacher's performance *(U1T20)* and know the courses with greater or lesser demand *(U1T4)*. Finally, information about faculty academic meetings, as well as the degree of interactions with the students *(U1T21)*.

U1T3: "(...) Institutionally, teachers receive the results of students' teaching evaluations, where items tell you about your performance (...)".

U1T20: "(...) it would also be good to find in the social networks, the students' opinions about the teachers, I feel this has the advantage that, by not being institutional information, **opinions are more freely expressed, it turns out that the student can say things without a certain bias** (...)".

U1T4: "(...) we can see which groups fill up first. Is it because it is easier to pass with that teacher or is it because they are interested in attending and learning more? **Groups are identified in which it is easier to pass and those in which it is more difficult.**"

U1T21: "(...) academic meetings are this listening space that we have among teachers to share our strategies that we make our own and the closeness that we have with the target population that allows us to say -hey, that student was great- or -I liked that technique you did (...). So that gives us teachers elements to guide our activities, both pedagogical and community".

In relation to the general use of the data, university authorities mentioned that it is very important to know the conditions and resources available to the community in relation to technological resources, equipment and connectivity infrastructure, spaces available to work at home *(U1A12)*; type and degree of students' family support; socioeconomic information and scholarships *(U1A13)*.

U1A12: "(...) obviously their living conditions, technology equipment, are important. We have seen **not all teachers have the space and devices in these virtual conditions"**.

U1A13: "(...) we do an analysis of **socioeconomic conditions**; with the pandemic we did an analysis of travel times, modes of transport; we did technology analysis (of what the students have to be able to participate in distance classes); **information about their scholarships**; information regarding failure to pass courses; academic trajectory indicators; health conditions; information (very basic) on close family environment, family numbers, educational levels at home".

To know the school performance of students, **authorities recognize that grades by themselves do not reflect the true degree of students' learning or their real abilities** (U1A7). In addition, we have the data from diagnostic exams that students take when they are admitted to the University, these provide general prior knowledge about the chosen area of knowledge and psychometric information (U1A7).

U1A7: "(...) of course they are going to do the tests that the teacher assigns to find out their academic performance during the course, but there are also attributes that have to be assessed about abilities the student is acquiring, which are not usually evaluated, only perceived".

U1A7: "The diagnostic exam when they are admitted to the university, this information is very important because it gives us an overview, a point in time at the beginning, and it gives us elements and areas of opportunity. Let's say it's the reality of their knowledge at the time of admission".

Regarding the academic performance of teachers, authorities specified that **data is collected through questionnaires applied to students at the beginning or end of each semester** *(U1A5)*, as well as data from the courses and materials they create, number of courses taught, participation in institutional projects and publications *(U1A6)*.

U1A5: "At the end of each course, after the final exams, with assigned grades, with no pressure, students make teacher evaluations with a questionnaire".

U1A6: "(...) beyond weighing the student's grade for that course, it is also to evaluate teachers; in addition, they ask us for a certain number of faculty development courses, development of materials, especially now that we were at a distance, development of visual and multimedia material; how many courses are taught, (...) how many research projects we carry out; how many publications we have ".

Finally, data on the expectations, goals and wishes of students and teachers. The authorities pointed out that they are important for **having a broader vision of the congruence between students' life objectives and the career they are studying**, as well as the feeling of teachers' comfort in relation to the role they represent.

*U1A7: "**It is important to know their aspirations, their goals and their life objectives. We receive them with the goal of reaching a degree and we believe that they are clear about their goals related to it (...) But they don't necessarily have clarity about that career track, even the disciplinary field"**.*

*U1A8: "But I think it would be useful to know what their life wishes are. **Although when we are adults we rather live life as it happens**. But, if they like to teach, if they enjoy it, find out how students think... I mean their perspective of teaching, the work they do".*

Related to providing feedback on performance, academic authorities mentioned that the relevant data to provide feedback on teacher performance is a two-way street. Firstly, from the questionnaires or forms applied by each academic entity and from the reports generated by teachers as part of their duties *(U1A9-10)*. Secondly, results of internal and external evaluations that are carried out through the quality management mechanisms of each school, external evaluations, and partial evaluations that teachers apply in the classroom *(U1A11-12)*.

U1A9: "(...) the survey that is carried out generates specific index information. We use a Likert scale and a graphic evaluation where they establish the levels that the students consider regarding the teaching activity. The students give different information. The consolidated data are provided to the teacher".

U1A10: "(...) but the teachers also give us a report that allows us to cross-reference this information, that the students tell us -the teacher performs in such a way- but the teacher says -the students or the group performed in this other way- we match the data".

U1A11: "These are basically the exam results. There are different methodologies for each teacher, in which they do review the exam, which are the correct answers. But that varies from teacher to teacher".

U1A12: "(...) externally, we are immersed in the process of evaluating the quality management systems. We also take these indicators as relevant because they evaluate the impact on some issues that perhaps we did not consider a priority".

Lastly, authorities highlighted that in order to provide effective feedback to teachers and students, it is crucial to have monitoring mechanisms for the results generated by academic services, students' use, tutoring programs, teaching records, as well as quality management systems *(U1A2-14).*

*U1A2: "(...) I do want to emphasize that **vital importance is given to monitoring students in the first semesters and hence the importance of the tutoring program.** They are collecting qualitative and quantitative data from the students and the teachers, ... also of facilities such as libraries, to provide the best conditions so that students can perform properly (...)".*

U1A14: "And since the teachers are also monitoring the performance of the students, these are data that can be useful to us, and of course all the statistics that the University itself provides that allows us to make decisions."

b) University 2 (U2, private)

Explanatory note: Double coding is shown for these quotes. The first, shows the order of the quotes according to the group in which these belong (i.e., students, authorities, teachers), in chronological order (according to appearance) during the transcription (U2SG1-1). For the second code, it presents the order in which these are cited within the research article. These stand out for encompassing only the groups, and are enclosed by using brackets (e.g. [U2S1]).

When asked about which data do students believe is important to understand their performance, they mentioned variables such as averages, class attendance, performance in projects, and for graduate students, scientific production. In the general use of data, students remark that **exams are not enough to reflect their capabilities or aptitudes in general** [U2-SG1], supported by other participant in the way that scores should consider how the **own student evaluates his/her self-performance** according to his/her own goals or common standards [SG1-SG2], providing a new opportunity for learner to achieve proficiency in one competency, while not forgetting their own goals.

U2SG1-1 [U2S2]: "Understand how the students evaluate their own performance (compared to themselves or with their own goals or common standards). Comprehend the andragogy, the goals that the own adult learner expects from themselves (...) As such, an exam doesn't reflect your capabilities or aptitudes in general".

In comparison, one student from another focus group [SG2] reflected on how it would be great to know "how other students from other universities are doing in a career as mine" for comparison purposes, which the student considers is valuable, being that they would like to understand how good positioned in the job market they are in contrast with their peers.

U2SG2-1 [U2S1]: "Get to know how other students from other universities are performing in an educational program as mine (...) to know, for example, the curricular program of my university, compared to the one available for [university A] or [university B] which have a similar program".

The point of view of authorities, on the other hand, was characterized more by their focus on the data story of students, instead of particular data variables, as A2 and A7 quotes exhibit.

U2A-1: "Something that is key is to follow the cycle that students are living with us, because when we look at that cycle (...) we can learn so much from it: about whom are struggling, let's say, to advance for the achievement of their goals, but also to know where this is happening".

U2A-2 [U2A1]: "What is the level that the student has in face of this new challenge? (...) I believe that it would be better to know about their attitudes instead of their scores, being that scores doesn't always reflect the progress of knowledge and skills (...) to understand better how they are performing in each of their courses, for example, or what skills we would wish them to have, how they have developed, at what depth level we may observe this would be greatly beneficial".

In contrast, teachers believe that there is too much potential data to analyze about students, with classic examples as averages, percentage of the program completed, failed and passed courses. However, teachers report that some situations - as the Covid-19 pandemic - have an impact on students, implying that issues such as these may be observed by data.

> *U2TG1-1: "Maybe they are great students, but with this situation of the quarantine and everything else, I somehow observe some changes in the students and their performance".*

In terms of feedback of academic performance, teachers affirm that students receive feedback through different ways, being their grades and teacher's feedback the most common. However, one observation given about this point refer that the feedback given to students and its effectiveness is difficult to provide or measure for many reasons: some teachers may review everything fast as an example - something similar found with students, where they point is important to not overload teachers with many tasks [LINK QUOTE OF STUDENTS].

> *U2TG1-2 [U2T1]: "In terms of feedback from us to our students, there are many teachers who review everything too fast, and don't take enough time to provide that feedback for their students to enrich their (understanding about their) grades".*

Teachers, on the other hand, are found to have a survey that gathers students' opinions of their courses as one of the main sources of information about their class performance. However, as some teachers said during the focus groups, these tools may provide an operative challenge, being that the experience provided by students is anonymized, and this promotes in some cases the gathering of harsh comments to teachers, that may be real or not, and are available for academic coordinators and other profiles to review, as well as could be associated with the teachers during their career.

> *U2TG1-3: "Sometimes there are harsh comments from the students, in which their hide themselves behind anonymity and write you things that are not (real), but you can see that it can be only one or two comments from thirty that you receive (...) but sometimes this is terrifying, because if you receive a bad score in the students' survey, the university thanks you for your service (implying being fired as a teacher)".*

c) University 3 (U3, public)

The U3 students mentioned that more than its value in itself, the grade becomes important because various decisions are made based on it, such as the advantage given to students with better averages to schedule subjects in a higher priority. To a certain extent, they downplay the importance of qualification, but consider it necessary.

> *U3S1: "matters of how the grade is something that affects or helps you for many things that we do, specially at the moment of choosing the courses in which we would like to be in the next semester, or when we want to choose, I don't know, the social service. There is much pressure in the university because many things occur according to your grades".*

> *U3S2: "For us as students it is not so significant if you get a 7, if you get an 8, if at the end of the story you learned and have the knowledge of how to perform and how to carry out all those activities or diagnosis treatment plan that we have to do, **then for us it is at the end of the story a number, is not like it defines us how much**".*

Beyond the importance they give to the grade, **feedback is important for students**, especially in careers in which the development of practical skills is essential, that is, they have a significant load of applied knowledge.

> *U3S3: "In this career, I do give more weight to the practical skills you acquire".*

> *U3S4: "What one as a student looks for above all in our degree is more than anything the practice than theory, I know that the theoretical is very important but to do things as related to our topics".*

Among the data that students consider relevant about the academic performance of their teachers are: "that they know how to teach", "that they have clarity" and "that they are entertaining".

> *U3S5: "I would say the most important thing is how the classes are taught.*

> *U3S6: "As enjoyable as it is, I mean, it's very, very important how enjoyable it is.*

> *U3S7:"I was always very interested in having classes with doctors who are well trained, who know how to teach because you can master a subject, but really not everyone is good at teaching, they don't know how to communicate with students, they don't know how to empathize with them and if you don't achieve this, you're not going to get them to connect with you."*

> *U3S8:"The most important thing is to know the topics well, to master your subject well and what you connect with your students that you know how to teach, because there are times when I met good doctors but they don't know how to teach."*

Students **ask for feedback**, especially when the teacher asks them to participate by presenting in front of the class.

*U3S9: "Lately, doctors have begun to use **the method that we, the students, explain**, and I think that on the one hand it is fine, but most of the time they do not help us, they do not complement us and they leave everything to us and the truth is that this is a part that leaves us with many doubts."*

*U3S12: "They don't complement us and they leave all of us and the truth is that that's a part that leaves us with a lot of doubts (...) I don't see it as a bad thing, **the fact that they mention your mistakes, your details, I mean, it's feedback."***

U3S13:"That after the exhibition you give what you understood and the idea of the exhibition is that the student knows certain topics and then those are fed back with what the teacher mentions, the detail and I think that is what afflicts and afflicts some of them".

The teachers commented that the data they have on their training and updating are important, such as: level of studies, technological skills, knowledge, aptitudes and pedagogical training.

U3T1:"In medicine, it is very important, in addition to the master's degree and the doctorate, the medical specialty you have, but in addition to that, for example, the degree of updating."

U3T2: "Both technological and non-technological skills, obviously of the teacher, level of studies, [...] What is the teacher's level of education? aptitudes, also external to it, studies or knowledge in the area of teaching. We will be very good at times in our area of work, but is there knowledge in the area of teaching or not? ... knowledge in the area of information technology".

U3T3:"The teacher has to have not only the knowledge regarding the training and updating of their subject, but also teaching updating, for example, we go from learning objectives to objectives of, what is this called professional competences? (...) Student evaluations are essential, that's fundamental. What other relevant information? Well, it's all this information, do you have courses? the degree of, for example, ICT enablement."

U3T4: "How up-to-date is a teacher on their own topic? Yes, I think that all these courses of the institutional teacher training program, closely linked to the issue of stimuli, closely linked to all that, has been a motivation that one sees, in the academics, and many of the courses that were offered were ICTs and all that, and it has been very important. but something fundamental, in addition to all this, is that how up-to-date are they?"

In the case of teachers, they mentioned that data on students' backgrounds, trajectory and previous average are important.

U3T5:"According to the subject I teach and if the University could provide us with data on it, I think it would be an important network of, mainly, where it comes from and what are its grades of the subjects in which it has been studied."

*U3T6: **"The average entry tells us a little bit about the student: who is the student academically speaking?"***

Regarding the teachers' own data, they proposed to have a general knowledge of themselves, as well as their profile and results of their teaching.

U3T7: "How many teachers are we? And I don't have access to know that fact. What features do we have? As I mentioned before, uh, especially in the sense of specialties. In other words, what are the areas of expertise? And this would also help us not only in the area of teaching, but also in the area of research. That we know ourselves and who we are. The teaching staff, what are the subjects we teach? yes, I think that's an important point."

*U3T8: **"The information that is available is still limited**, I, as Head of Department, have tried to make the most of what information can be found from appointments, from validity, etc."*

U3T9: "There is a strict control of class attendance, because you have to be signing and you have an estimated time, yes, before class or after class just to give that signature, and I think that despite that, you know which are the teachers who in a certain way are missing these class attendances and are repeated."

*U3T10: **"In terms of data on teaching outcomes. Could it be known by generation?** How are the averages going? o How are the groups progressing? Yes. This is to have an integration of information, not specifically to point fingers at anyone, but to see how we are going, yes, what course would need to be modified. Who do we apply to?"*

Teachers said they do their own research and get their own information about their students' conditions, such as: vulnerability, disability and problems in general.

*U3T11: "I do two sessions, in the first session, what I tell them, clinical record or the technical file of my own students, I ask, the basic issues, as the teacher also commented, what are name, age and for me the marital status is also very important, **I have had many problematic situations for the continuation of education in my students when their marital status is married or divorced**. So I try to adapt, but I ask this situation beforehand. We made a very basic presentation regarding this, age, I also consider it of utmost importance, which was in other very, very general data."*

> *U3T12: "I ask them if they are here in Guadalajara, or living in the metropolitan area, with their parents, or are they alone, do they live with someone else, do they live with other relatives, I think that is also important and I ask them, in addition to knowing if they have children and if they work, that they write down their work schedules and the activities they do in that job. When doing their homework, if they do it at home, or they do it during work hours, if it is at home, in what area, well, **this gives me an idea of the opportunity they have, for example, to concentrate on tasks, because there are those who do it in the living room of the house or they do it in their bedroom.**"*

> *U3T13: "As a teacher, from the first day, in addition to doing a dynamic where they tell me where they are from, what high school they come from, because as it is still, in the initial semesters of the medical career, and their hobbies, and especially, one of the questions of the dynamic, **What do they expect from the course?**"*

> *U3T15: "In any case, internally, as we mentioned, we make a small diagnosis to identify some issues, socioeconomic levels, if they have a computer, they don't have a computer, and so on."*

> *U3T16: "Also something very effective that I do, is a respectful question, **if they have a condition, a social, economic, sentimental or emotional condition.**"*

In relation to the medical data, one of the teachers gave the following testimony.

> *U3T17: "Do teachers have any disabilities? In my case I have it, eh, I think there are many teachers who could also have them, we are not limited by wanting to give knowledge. But sometimes we have some place of that kind of health situation. That prevents us from one or another type of teaching style, in my case, for example, I use oxygen, so, well, I think that each one could have problems in mobility, etcetera."*

Regarding expectations, goals, and desires, teachers commented that they ask their students explicit questions about their expectations at the beginning of class.

> *U3T18: "And finally, what do you expect from this matter? Yes, to see their expectations" (...) "How do they come, eh if it's what they expected from the career, if it's really what they're looking for or there are practically some students who come, who don't even know why they're studying the career" (...) "I also see their internal issues. **Aspirations of where they are going, what they want out of their lives. To understand or try to understand in some way who they are or how they come from**."*

Feedback from teachers can be found in two ways. The first is related to knowing which issues become areas of opportunity to improve their performance, and the second is to have information on teachers' performance in order to reward and incentivize them through support.

> *U3T18*: "I would like a personal feedback by subject in the system, it seems to me that the doctor (...) Luz told us and that they already gave us the average, I would like a feedback to me, to have from each of the teachers the same commented by the doctor (...) Dr. Adrián that it is very complicated, perhaps above all, when they are very large groups, but well, I would like that, I don't have it, I would like to have feedback from each of my students by subject and that it is with access, accessibility, forgiveness in the system, in this case that we use, because it is the system of the SIIAU university".*

> *U3T19: "To reward or give recognition in some way to the teachers who have stood out and obviously the teachers who have not and why. And well, also to have support."*

The authorities place emphasis on teacher control data, as is the case of attendance control and performance indicators in the case of students.

> *U3A1: "There is a strict control of class attendance, because you have to be signing and you have an estimated time, yes, before class or after class just to give that signature, and I think that despite that, it is known who are the teachers who in some ways are missing these class attendances? And they are repeated."*

> *U3A2: "The question of relevant, necessary information, I think it will depend on what and for whom, that is, I am raising it in the sense that we are now in a process as part of the General Coordination of Planning and Evaluations they are asking us for a series of indicators that are supposed to be important and relevant for the institution, no, Indicators that have to do with students for example, as a percentage of graduates from a generational division with a story in relation to the total number of students who entered in a generation.”*

> *U3A3: "Total number of students graduating on schedule."*

Authorities indicate that to some extent they do have access to student information, such as student academic records. They also recognize that more information is needed from students.

U3A4: "In the case of the career coordinators, we do have access to certain types of information about the students, that is, in a very brief way, he told them about the issue that has to do with the academic history of the students to review their trajectory and the issue that has to do with the average degree index."

U3A5: "I receive and handle information, from various things related to students among others that refer to tutoring problems, everything that is part of the behavior of students in the classroom."

U3A6: "If we adopt universal design of learning, you need information from the student: how they learn, what problems they bring, what work history they bring."

In relation to health data, the authorities point out that there is no capacity to generate certain data related to mental health, and emphasize general indicators.

U3A7: "Percentage of enrolment of students with vulnerability".

U3A8: "Number of students admitted with disabilities".

2. Transparency, Ethics and Privacy

a) University 1 (U1, public)

In the framework of transparency, ethics, and privacy, the student body recognizes that the University systematically collects various data of a personal, socioeconomic, and academic nature, as well as school records, since admission and during the academic trajectory *(U1S7)*. They state that the institution also collects sensitive data, mainly on health and sexuality *(U1S8)*. From the student's point of view, these data shape their school trajectory.

U1S7: "(…) our ages, when we are admitted they ask many things, if we are married, if we have children. They ask all our information; they know us even better than we do sometimes".

U1S8: "Well, I agree with my classmates, they ask us for personal data, socioeconomic, medical, and if we want to join some sports they ask us for very specific data".

The teachers emphasized the collection of sensitive data related to their feelings in the classroom spaces, in the context of the pandemic *(U1T7)*.

U1T7: 'The information that is being collected lately for teachers is, this observance that teachers have about feelings in the classroom, how you feel, if you feel a certain way or not".

The university authorities approached two categories of data based on their origin, that is, from teachers and students. They counted the identification data of teachers, annual reports for qualitative and quantitative evaluations, to which the collegiate bodies have access *(U1A8)*. They also alluded to surveys in anonymous formats without explicitly stating the purpose of these data *(U1A6)*. Regarding student data, they said that they retrieve data regarding failure to pass, retention and graduation *(U1A7)*.

U1A8: "Regarding the teachers, the information we collect include their IRS number, their data and institutional email, but this type of information is not shared".

U1A6: "In the case of teacher evaluation surveys, this information is by agreement of the Technical Council, as a fixed academic activity. It is a recurring measurement activity. In such a way that the student, when enrolled, accepts to participate. There is no document that specifies it tacitly with respect to each student, but there is an agreement from the Technical Council that establishes the application of this instrument every end of semester".

U1A7: "Under this logic, we constantly review the records, referring to disapproval, retention, discharge in curricular time, in short, all this information".

Regarding the **signing of consent** for the use of data, ignorance or forgetfulness prevails among students *(U1S3)*.

U1S3: "And as for signing any papers, I don't think so. I think we often just sign documents without knowing what they are, but I couldn't tell you no, I'm not really sure, since we often just accept terms and conditions everywhere and never read them. And I think it's very important to read those fine print, but well, after all this I don't think I've signed anything to give that consent".

Most teachers expressed having signed a consent for the University regarding the collection of sensitive data, use of their image, and creation of materials. The contract on the use of data and its scope should be legible for students and teachers; therefore, the Institution is urged to carry out adequate dissemination on access and use of personal data *(U1T8)*.

U1T8: "I think this is where the University is not clear and does not have a way to do it, although legislation exists as we have mentioned in this group, but it is not fully disseminated either. Also as citizens, as a community of the University, we have an obligation to know that legislation, but the dissemination work by the University is not very good to say the least".

From the authorities' point of view, systematic and recurrent measurement methods such as surveys do not require a consent signature since students would have to accept it by being enrolled, endorsed by the collegiate body *(U1A6)*.

U1A6: "In the case of surveys conducted for teachers, this information is generated by agreement of the Technical Council as a fixed academic activity. In theory, it is already part of a constant and recurrent measurement activity. So that students would have to accept this by being enrolled." "There is no document that specifies it tacitly with respect to each student, but there is an agreement of the Technical Council that establishes the realization of this instrument [of consent] every semester-end."

Regarding the **policies for collecting and analyzing data**, in terms of respecting the regulations for access and use of data protection, and the institutional purpose based on the treatment they receive, students are accustomed to receiving requests to provide their data, and they believe that they are used for statistical purposes *(U1S11)*.

U1S11: "What will they use them for? I imagine it's for a good purpose like taking statistics on certain groups or where we students are divided in the University. I would think it's with good intentions".

From a duty standpoint, teachers consider it important to have clarity about the use and purpose given to the data. Therefore, they urge the Institution to build a culture of data protection *(U1T9)*.

U1T9: "Regarding the use of student data, I think the University should be clearer about information on sexual preferences, religion, health, ideology, etc., because I think there has been inadequate handling or poor communication regarding that data. Young people and students do not know what or to what extent they can be asked for, many times they arrive and say - because I say so - (...)".

The authorities criticize the disposition of institutional and federal regulatory frameworks; however, they consider it important that a culture of data protection be built based on current regulations *(U1A5)* and analyze and build an adequate number of indicators *(U1A6)*.

U1A5: "Well, there has also been a need to transition to this notion of the ethics of what precisely sharing our personal information entails in these relationships between teachers, students, and faculty. So regarding these policies you mentioned, in fact, there is this legal framework, national, let's say in terms of Mexico City, well, finally the school, the University has been very careful with these policies on the use of personal data, but still I would insist that it is necessary to promote this culture precisely regarding this environment in which we are now where everything has become virtual, and now in these mixed environments where we cannot do without them".

U1A6: "The University has a very large number of indicators. And monitoring all indicators, from my perspective, is not the most appropriate".

b) University 2 (U2, private)

When speaking of data collected by the university, students believe that the university records and stores a considerable amount of information related to them, going from academic records (survey opinions, scores, career, campus of attendance) to sensible information related to their families and assets (name of parents, parents' work information, information about properties) and medical data. In specific to concerns related to ethical use of data and privacy issues, we observe that students are preoccupied about which other data is being collected about them, considering different opinions inside one focus group [SG2] exhibits how they may feel unaware of what is being collected in reality and what is suggest a possibility.

*U2SG2 [U2S3]: "Everything (laughs). Everything, from the class recordings, the university collects everything. They do know where I live, the name of my parents, even my bank account that I use to pay them, I don't know, in my opinion, yes, **the university collects too many things.** Very sensible data, as I tell you (...) addresses, names of my relatives, even the recordings they have for security purposes. And yes, also I could believe the consumption trends, I would not doubt it. Consumption trends inside the campus, courses, scores, in which semester I am, in what educational program I am enrolled.... or if I use, as example, the job platforms offered by the university, which companies are of my interest. I mean, I feel that the university has gathered too much of the information and I expect it to be safeguarding it".*

U2SG2: "When we do our admission process, they also collect socioeconomic data (...) I also believe that it is very extensive the quantity of data they collect, not only about us, but also about our families, what they work, even if they have properties".

U2SG2: "I believe they also gather medical data (...) and too from the Counseling department, like how many times do you attend sessions with them, if you attended the session, what kind of issues you have".

These results are similar to the ones found in the Student Focus Group 1 [SG1], in which different students have shared how they didn't expect to find data from decades ago - such as an exam results - or discussing how other data is requested voluntarily after graduation. In comparison to other groups, these groups being mostly composed of graduate students acknowledge that there is also data regarding employability that is being shared with the institution.

U2SG1: "It surprised me to find one exam that I didn't even remember was stored (by the university). From what I see, the university stores everything (telling a story about how a student found an exam that she took in the beginning of 2000s)".

U2SG1 [U2S3]: "The university gathers too much information (...) from how is your progress during your career, your sex, age, when did you graduate, if you got a job, how long did it take, continuing education, your files, copies of your professional certificate, your academic title, English exam scores, opinions about the library, cafeteria…"

U2SG1 [U2S4]: "They do collect a lot of data about graduated students: where they work, salaries, they generate reports about them, prospective reports showing where you could be if you enroll in certain careers. I believe that it is very important to regulate it".

Related to the concern in the last quote, authorities are confident that they are on the right track, promoting efforts for data governance, identifying what information is obtained from students, validating its data provenance and recognizing challenges in internal organization, as well as enforced regulations.

U2A [U2A2]: "We know what data we collect from students (...) at a clear and very detailed level for their information".

U2A [U2A3]: "Most of the information comes from the admission form, and starting from it we request more information as needed. Sometimes, it should appear in only one system, sometimes we review it more than one time, other times it is updated, others don't".

Regarding the role of employees in their involvement with data, it is found that authorities aim to build and enforce systems, while considering some cybersecurity and data protection principles — with goes in accordance with the least privilege principle, which promotes that a "security architecture should be designed so that each entity is granted the minimum system resources and authorizations that the entity needs to perform its function" ([Reference](#)).

*U2A [U2A4]: "In the case of employees, we are requested information to identify ourselves for the work that we perform, with information about our academic degrees for an organizational purpose (...) but we have made an institutional effort to prevent excesses, what I mean is, **that there should not be more privileges to access data than needed**".*

For teachers, they believe that the university collects many different types of data from students and from them. In their case, they are aware of their personal data being stored and used by the institution (such as their names, addresses, civil status, health conditions, their academic history (where they did obtain their grade, their score, how many grades they have), academic evaluations, students' survey opinions, courses, certifications, and more.

The right to be informed about what data would be collected by an institution, how it will be treated and for what purposes it will be used is usually recognized in Data Policies, Terms of Service and Privacy Notices. While in many countries there are legal requirements to be covered by educational institutions and this information is commonly given to students and teachers, most of them recognize that they are unaware of the scope of data that is requested by their institutions, sometimes having trust in their right use, while in others students were left with some doubts:

U2SG1 [U2S5]: "I don't remember that I've signed any consent… but I remember that there are times in which we have answered surveys without previous information, or we have been recorded without our consent, and these (materials) have been used for something, I don't know, research that could be performed at the institution".

U2SG2: "I can't recall any information about that moment (...) it was until we begin classes that I believe I signed something when we were in the admission process, but it was like "just give me the scholarship" and those type of things, but after that I am still like "how was that?" (...) I don't remember receiving it, it was just like "so ok, we are going to have your data, and that's it".

These findings about not being really aware about what is being signed was found as well in the teachers' survey, with many of them not calling exactly the documents.

U2TG1: "I believe that I was very excited when I signed the contract, that you don't read everything, you see? But sincerely, I can't remember".

*U2TG1: "I remember that I received a **privacy notice** or something like that, and the contract".*

Comparing both groups with the information obtained from authorities, they identify how the information should be collected from every stakeholder group at the institution, as the following quotes exhibits:

*U2A [U2A6]: "At the moment that a student or a collaborator joins the institution, they sign a **privacy notice.** In this notice, the primary and secondary purposes, transferences (are presented). The treatment required that we should do in the lawful relationship between these purposes cannot be opposed neither by the students, nor teachers, with exception of the secondary purposes where they can claim their ARCO rights (Access, Rectification, Cancelation, Opposition)".*

As a result of the focus group, there was a general consensus among students and teachers where they do not recognize if there exists some kind of document in which it is specified how their data is collected and analyzed by the university. Some of them reported that in the past, they have looked around the institutional and student internal websites, while not finding anything. However, in a few cases, the **privacy notice** was mentioned by students as a potential source in which some believed they could find answers related to this question.

U2SG2: "(I recall that) in the privacy notice there was something about that, but I believe that it was not like, very detailed about where all of our data is, specially, for the physical documents that we provide (to the university)".

In the authorities focus group, on the other hand, some participants were quick to identify that this question could be answered by referring to the privacy notices available on the public website of the university, and for different profiles such as students, prospects, parents, teachers, researchers, and more.

Focus group of authorities referred that the data policy keeps evolving over time, in principle, being that data management attributions could be provided by directors of each department, but now changing more to Data Governance approach, in which the privileges of a user to access to information, to which information and under what conditions is now better specified.

U2A: "If we have clear (set of rules), according to the guidelines and documents, confidentiality and commitment letters by which we are ruled, and obviously by our yearly commitment to the privacy and confidentiality (program) of data (we understand that), we don't need to know more than we need to know, and I believe that this applies to all the departments, and if not, I would invite to review the following documents".

Adding up to the previous point, another participant in the same focus group included the idea of the Data Governance efforts:

U2A: "We continue to build a model of Data Governance, that precisely goes around the different business capacities associated with the students' and teachers' data management, and its structure will (...) define who could have access to this data. Then, both things would be clear: who has the privilege to provide the access in the institutions, and who can give it".

While this information was clear for authorities, students and professors and comparison were not aware of what efforts or processes were executed by the institution. Students, as example, said that it would be relevant for them to have transparency about what is happening with their data, being that in some cases, sensible information is provided through different channels.

U2SG1: "Knowing that your information could be crossed with your student id, and is backed up until the hard drive is done (full or stops working), until the information is destroyed by accident… It should be worrying, isn't it?

In other focus groups, similar multiple comments about transparency, responsibility and anonymity of data about students was a common theme.

U2SG2: "I believe that we should know which people with our data… I believe that yes, it is better to have (more) information than a lack of it".

U2SG2 [U2S6]: "I believe that there should be some requirements to access the data and I don't know if the university has some control over it. I think that clearly, every employee of the institution should sign a data privacy agreement, and should be very careful with the data".

U2SG3: "Students should have the option to know who has (or uses) their data and for what purpose".

U2SG3: "I believe that, yes or yes, they have to use anonymized data, don't deliver data as it is, with all the full names or the names of the parents or tutors. I mean, I believe that there should also be some limits about what type of data should and should not be shared, independently of the business (a company or department) that may request it".

For teachers, they acknowledge that their data was mainly in the hands of the department of human resources/organizational development, and that there is some data that could be accessed publicly. For teachers, they agreed that the information was

normally accessed by the program directors or coordinators, and they didn't have a problem with this permission, yet, some concerns about how data could be misused was as well shared in the case of one teacher.

> U2TG1: "Students, for example, have seen my LinkedIn account, and I see that the parents of my students have already searched for me too, then I see that there are many ways to obtain information (...) I believe there is a thin line when it comes to privacy. It is not only now at the university, but in many organizations, commonly here around Mexico, when there is no consideration (about this topic) (...) (however) I have been penalized because of this (not adding data to academic profile with personal information, as the LinkedIn account)".

Related to data that should require an additional step, such as explicit consent from their users to be used, teachers told during the focus group that personal data (such as personal cell phone numbers), medical data or sexual preferences should be treated with special care.

> U2TG1: "I believe that the institution management of data is good in general, and they are private about what is private and public about what is public in general (...) in terms of sexuality (data), I do not know if it would be relevant to collect that, because I feel that they should not, I do not how it could be useful if it is not for issues as equity (...) because it is obvious that there is still positions in where some people could be affected by this information".

The opinion of students agreed that there is some data that somehow, it is clear that it should be private (such as socioeconomic data or religious beliefs), but in general, they present themselves not fully aware about the scope of data that it is being collected and should be protected. Cases of which students believe should have a previous request before using their data were shared, specifically for a case of mental health and privacy of information in that setting [U2SG2]:

> U2SG1: "(Too much information it is being shared that) I believe that even ourselves are not fully aware of all the information that we share, and I believe that there is a need, it is needed that from this transparency, we have this approach to a website in which visually, we know too what information the university has, for us to remember and to reinforce our confidence".

> U2SG2: "I used the services for psychology of the university and underwent in their process (...) and like half semester ago, I was invited to participate in a research protocol, but it was specifically for people diagnosed with depression, and they only invited a certain group of people. Then, it was very interesting to me that they had this information so specific. I didn't get the chance to question where they obtained from (...) but I believe that they have some kind of database or something of students that attended a psychiatrist, and I knew because I got to meet those people, but we didn't know that the university also knew that".

For authorities, the answer was divided between what is required by the law, but also by the interpretation of what could lead to an impact in their students and teachers, as it is presented in the following quote:

> U2A [U2A5]: "The Law of Personal Data and its bylaw establish what is sensible data. Sensible data is considered that data or information that could be used to discriminate against one individual: medical data, as example, knowing if a person has diabetes, HIV, political preferences, sexual preferences, all of these could lead to discrimination (...) however, playing as the Devil's Lawyer, sensible data (...) could be anything leading to discrimination, like their own name, if they have a scholarship, how much money they earn or do not earn (...)".

c) University 3 (U3, public)

The students express a lack of knowledge of the data that the institution and its teachers have about them. They speculate about their personal data to which their institution has access and make it clear that they need to be informed about what the teacher knows about them.

> U3S15: "I also feel that it is relevant to know what kind of data the teachers have because right now we are talking and I really do not know what data the university has in its possession, I really do not know because I imagine that they must know as a personal thing, my name, where I am from, my number, but from then on I have no knowledge of what is known about my information."

> U3S28: "I believe that the student should be informed that the teacher is going to know these data, so that there is a better student-doctor relationship to reach that solution of a problem or a situation that the student has."

In general, students say they agree that teachers should have access to their data, however, they consider that for this the teacher must be prepared and have the ability to make appropriate use of the data.

*U3S22: "I think that **more preparation** is needed because maybe there can be good tutors, but nevertheless I speak from my personal experience, [...] It is not generated as that bond goes or simply with the fact that you know him not only via the internet but knowing him so that he generates that trust and if at a certain time you come to need something, then you feel with all the security of having your tutor".*

U3S23: "In my case, I always had the support of the tutor, I've already met her personally or I've met her personally, so it's not the same for me if it's like what to my tutor if he's prepared to have all the relevant data, my health, my sexual orientation, my socioeconomic level, if I live alone, if I live with people, If there really isn't support, or such, then I think there is in favor or if it's competent to know."

The teacher must have the ability **to generate proximity and trust** between the student and the teacher. From this relationship of proximity of direct contact emerges the idea of the usefulness of data, as a key to its access.

*U3S19: "Here I should know, well I consider that the tutor should first, but first he should **generate trust** with the student, to be able to tell his experience of what he is going through, and the tutor himself should, let him know if necessary with the others, the teachers, the doctors whoever is necessary to be able to talk about it, because there are times when the student himself doesn't feel confident about being able to talk about it."*

U3S21: "Yes, as long as they have the ability to approach the student... that has like that touch."

Ethical data literacy and the actions resulting from the understanding of the behavior revealed by the data, is one more reason to promote access to data. Access to sensitive health data, students believe that teachers should have them in order to know how to act in critical situations.

*U3S24: "It's good that there is always **an authorization** from the students, so that it is at the hands of the teachers, especially in many issues, those health issues."*

U3S26:"We know that the student So-and-so has certain health problems, if we can then invite him to a type of study, then we would ask for his authorization to know a little more about that, because sometimes they have told me about such health problems, but yes, as such, without asking me, that is, it is like the rumor."

*U3S29:"That there is always as a first **authorization** such as by the students, so that it is at the hand of the teachers, especially in many issues, those health issues, well, if one day a classmate comes to be going through something that the teacher does not have to be like questions, hey, do you know what happened? Well, he has the file available at hand and all that relevant information about that person."*

The teacher must be prepared to know when and how to use the data. An important aspect that students mention is the degree of privacy necessary, and they denounce situations in which they have publicly exposed the life situation of a student, which violates their condition.

*U3S25: "(...) that I don't want to express them or that I want to express them **in private**, because the situation was that they forced me to say it in class and well... Maybe I don't want all my colleagues to know right now, maybe I'm better, but I didn't want to express it, I mean, I wanted to express it privately so as not to alarm others."*

In this sense, it is necessary for teachers to ensure an ethical use of data. The teaching attitude from the students' point of view is not always favorable, sometimes, they are misused, to the extent that they have been used to generate feelings of shame, or unequal treatment.

U3S30: "When I was a graduate student, a teacher of mine always at the beginning of the class always asked us for information about what we were working on, what we did for a living, apart from the school, interests and I don't know what, but really that teacher used that information so that throughout the school year he would be referring to the context of the students to make fun of him, to do something, then they were people who had neither an adequate use of information, nor ethics in the use of information, nor even good anything to do with the academic use of information".

U3S31: "A doctor made a comment that did amaze me, which was that she could see with what average we entered, and she could see who had that famous privilege or children of teachers and it impacted me a lot because she told us that those we had, you had that preference because she wanted them to give the maximum percent because I knew who he was and every day he pasted them And that kind of hurt me that they had that data And at the end of the story it didn't come in anymore How can I enter being anyone".

Teachers have taken the initiative to collect data on the conditions of access to educational, geographical, and technological resources of students during the pandemic. However, they point out the care that must be taken over students' mental health data. The predominant situation, therefore, is data collection as a personal act, not systematic, and with the manifest need to

protect data for the good of students. Prioritizing access to data on a scale from open to restricted is a possibility proposed by teachers and, in addition to this, informed consent.

> U3T22: "How much facilities do they have for education with respect to technology, the internet and materials? I continue to use books physically, so well, also if they had access or not to libraries, facilities to go there, economic issues. I did a personal interview, where I asked them what possibilities they have to know how if I could with them, just connect, they had printed material, computer, they had tablets, I had to connect through the cell phone, etc., I think that these 2, as data of my students, were the most basic."

> U3T23: "And what do they have, if they have a computer to themselves? If they share it? or even if the homework is done on the cell phone?, since my class, which is not a medical student, is a bachelor's degree student in physical culture and sports, this class is also on the Schoology platform, so it has to be doing online activities."

> U3T24: "And if there was a third option of data or reservation over reserved, then I would consider it for the students who have some condition of psychological or medical treatment, right? Because it's not easy to say that everything is open. I think we must be sensitive so that we do not violate the privacy of both teachers and students."

> U3T27: "I would pretend that it may be that the University organizes this data, perhaps in **3 phases**, those of first access, second access and reserved access."

The purpose of access to the data generated controversy among them, because there is a sense of morbidity, particularly when it comes to data on the health of students, that is, the presence of the concept of inclination is present, as opposed to the concept of intention.

> U3T29: "No, no, I'm not interested in everything, if there was any problematic situation, personal, academic or work-related, that has caused a deficiency in academic achievement, what good would it do me? To judge him? To help him, to raise his grade, I don't think so, that it will help him."

> U3T31: "(...) I do think it's necessary, so that we could review the student' s record."

> U3T32: "It's important to look at the information in the Kardex and know how the student has fared. It's basic because it does give us a lot of information about what our class could look like, right?"

> U3T33: "We must improve accessibility, in the quality of the data we have for decision-making."

They agree that there must be consent.

> U3T34: " (...) the consent of the information so that the opening of this data could be generated, both from teachers and students".

> U3T35: "Well, we should be asked to open it because on some other occasion teachers commented that to give a report on the activity carried out in our semester, that we share the classroom with the head of the department, well, it seems too much to me."

From the point of view of the administrators, at the institutional level, the university collects a series of data based on the indicators constructed by the planning coordination. There are questions about the disposition of data in the hands of teachers. The common practice is denial of access, mainly for fear of violating regulations. At the same time, they pointed out that informed consent is a practice of the University from the moment of admission.

> U3A10: "Why does a teacher need to   know about their students' mental health?"

> U3A11: "What good is it to the teacher? Is it just for the morbidity of having the information or to develop the academic function?"

> U3A13: "In short, we don't give them any information, but when the father and mother come and when we interview both of them and we see that it is a problem felt and the two come together and all that, we give them a little more information, if we give them nothing printed, nothing in capture, nothing printed and delivered nothing."

> U3A15: "Why would the teacher ask for a psychological diagnosis of a student? The tutor because he would ask for a psychological diagnosis of a student? It's not really a tutor's or a teacher's role."

> U3A18: "An exercise that the career coordinators then do is that before graduating the student they put together databases and request authorization from the student so that, at the time they are still in the last semesters, they allow us to communicate with them to have contact with the students. But that 's very complicated to be able to do this type of survey because then they changed the number and so on.

Administrators are cautious in the handling of data/data restriction policies/parents are denied/requests are answered for transparency.

> U3A19: "I think there is a very important interest on the part of the university to know the situation that students have in psychological issues, in issues of vulnerability, in issues of various kinds."

Fear of taking responsibility for obtaining or sharing information, restrictions on asking for information.

> U3A20: "Our CUCS graduates have done studies and it is a battle, to be able to collect the information because they need some contact information, nor can you share the information with external organizations because it is not legally appropriate to do so because for an external company to come and do the survey it cannot be sharing the information."

> U3A21: "In the case of tutoring, we have been **collecting information**, it is serious, we are going to the coordination, we are going to the Academic Secretary's Office, to School Control, and then we are going to School Control of the Administration General, and they give us the information cut off and some do not match, apart from they prohibit us from doing surveys of students."

> U3A22:"I think it's important that these issues that we suddenly want to open up other types of indicators and information regarding students, we must be very careful in who manages it, **how they manage it**, why they handle it and why they handle the information, because soon we are going to misuse or very misuse that data."

3. Academic Usage of Data

a) University 1 (U1, public)

The school loneliness, as a synonym of self-taught study, in the situation experienced in distance education, students demand the stimulus of personalized early alerts related to student and teaching activity, both in the curricular and learning planes. They believe that such alerts will enable adequate decision-making to strengthen their learning *(U1S11)*, which can be replicated in face-to-face education, not necessarily due to loneliness, but due to prevention.

> U1S11: "(...) well, maybe they can do some kind of survey with teachers when our unit comes out or when it ends to see what's going on with the students, how many finished on time, how many are behind, how many got 10, 9, 8 and so on to see what topics can be improved because **I'm at a distance and I think there's a lot missing because we're totally alone, we're literally alone, we're learning alone and we're not always receiving anything from the teachers"**.

Improving didactics based on alerts is an expectation that teachers have to improve the learning of those who are at risk of failing or dropping out of their studies. They are convinced that the quality of available data and its proper treatment make it possible to identify the causalities of phenomena that undermine school trajectories *(U1T12)*.

> U1T12: "As has already been said, there are different data that we can use, but if we look for that analysis and data collection and we clean that information, we can have behavioral factors, perhaps of school performance, and from there we can make decisions to land some m**ethod so that they can improve. I think of a remedial course in some subject of the curriculum that is causing some problem or causing desertion, a high index of students who are failing. Perhaps there we can determine a remedial course and then we can increase the performance of the students"**.

The authorities believe that the use of data can be used to generate specific courses, workshops, and training materials that address the educational needs of students, address the backlog and formative strengthening of pedagogical activities for teachers, provide academic information to tutors about their students, recommend activities and guidance on activities, as well as provide specific materials, detect students at risk of failing or dropping out in advance, and implement remedial actions to address these phenomena. Also, the directors believe that data can be used to understand academic and teaching performance, measure the impact of possible actions on school performance, address the special needs of minority groups, and provide information to authorities, graduates, employers, teachers and collegiate bodies to update curriculum content *(U1A9)*.

> U1A9: "(...) using this data gives us the possibility that everything that the University produces and generates can also be used by university students in these actions. For example, **this knowledge that was gained about the lack of equipment that students and teachers had led to an institutional policy to provide equipment"**.

> From the student, teacher, and authority experience, it is possible to affirm that anticipated actions from institutional, curricular, and learning planes will adequately address the phenomena of school abandonment and school lag.

b) University 2 (U2, private)

When students observed different possibilities to develop in the field of learning analytics, they were more interested in options focused on improving the advice received by their *U3A18: "An exercise that the career coordinators then do is that before*

graduating the student they put together databases and request authorization from the student so that, at the time they are still in the last semesters, they allow us to communicate with them to have contact with the students. But that 's very complicated to be able to do this type of survey because then they changed the number and so on. and tutors, their learning experience and wellbeing, and identifying the best paths for their development. In contrast, less interest was expressed for options such as having alerts for teachers when their performance is decreasing.

> *U2SG1-99 [U2S8]: "I would prefer the improvement of advice given by tutors or teachers and the improvement of the learning experience along with my wellbeing, because one important part of the development is **a pleasant learning experience**, and this only occurs along with **teachers and tutors**. I believe the most important thing is to care about your wellbeing (as students), remarking self-confidence as an element to improve your learning experience".*

Not over, other focus groups presented a diverging point of view to the discussion, choosing "third options", options not presented that are considered more relevant. In the case of the Student Focus Group 2, one participant mentioned that the wellbeing of the teacher is equally important for the performance of a student, and should be considered in the equation.

> *U2SG2-99 [U2S16]: "Something that catches my attention is that the five recommendations (of the question), I mean, maybe it is because we all are students (in the focus group), but as well, **the five examples focus on the student, there is no example that focuses on the teachers.** For example, there could exist some cases in which if you could **empower teachers, some of these examples here would improve."***

In other focus groups, students believe that the personalization of the study plans would be the best option for them, considering that the university could have enough data about them to be analyzed.

> *U2SG3: "If I could get a study program according to my data or to my person, it would be the best".*

> *U2SG3: "If the university could build a plan for me and identify my weaknesses, I think it would be of so much help".*

For authorities, the use of the data has already a use, as different data is used as variables for analysis. As an example, the U2 members say that they have developed programs for early alerts in education, to support the work of their mentors and teachers to react on time, helping students that struggle during their courses. Dashboards are another tool that has been implemented with the purpose of visualizing key data for different stakeholders of the information, with the purpose of observing trends of interest, or as well to answer research questions that may be of interest.

> *U2A-98 [U2A7]: "The program of early alerts, information about the performance of the students, for the mentors to review and act when needed to follow-up and prevent the failure or dropout of students. The studies of employment (...) so students may see which careers are with a low employability rate, and create strategies to improve employability. For other directors too, so they may review the study programmes, and evaluate their performance for those who have a low employability".*

> *U2A-99 [U2A8]: "(Data) is also used to define indicators for data science: what makes an early career researcher to become a senior researcher with a high (publication) impact? What do they do? What did they do? So then, with that information that is being fed by actual indicators (...) could be used to forecast (the development) of early career researchers to the future?".*

Regarding how data could be used to improve our understanding about their academic performance, teachers thought that it would be of interest to add some "marking information" about students with two examples, one focused in knowing more about the students in their academic performance, while the other was more focused on understanding if the student was undergoing a difficult situation that teachers should be aware of, such a physical or psychological condition that could affect their health or academic performance.

> *U2TG1-99 [U2T4]: "It would be great if for example, we could also see how a student is in other classes, their grades, but also their participation data, I mean, if there are any comments made by other teachers (...) it would give us a better idea of them, how to provide them a better attention to them".*

> *U2TG1-98 [U2T5]: "Maybe it would be achievable to have some kind of marker, or something that would determine (shows) **if a student is living some type of situation, of health, mental health, so teachers could relate with them (in other ways).** Because it is common that most of the times happens, "they are making just excuses and never delivered their projects" but maybe there is something in there that the university is aware of and (the notification) could be just a green mark (on a system), and the green mark means that the students is undergoing by something that may offer him some extra time. I believe it is not necessary that teachers need to know exactly all the information, but (...) this could lead to a better and more efficient interaction with students".*

For students, other ways to use their data to improve the academic performance would be through the use of adding data that they considered, is not yet considered in their actual analysis (internships and social service practices).

U2SG3-99 [U2S14]: It would be great if these same data (internships and professional concentrations) would be considered to define us in our professional field (...) and it would be an area helpful for students, considering all the available data associated with their academic history. "We request you to reinforce this with the following courses, so you may have greater professional opportunities or growth opportunities in these companies".

Similarly, students believe that surveys could offer insights of the students interests, and this could be the beginning to offer recommendations to them.

U2SG3-98: "I believe that the university could make surveys. There are always many things happening: programs, events, sport events. If you would make surveys with the interests of the students that would like to see an event like a hackathon, I believe it would be great".

Lastly, the idea of personalized recommendations continues to appear, as it has been found with other focus groups [SG1, SG] and quoted in previous sections. Nonetheless, students go further to the general idea of the suggestions and think of potential applications that would be of much help and interest for them, such as getting recommendations for social service work, internships, activities and events.

U2SG3-97 [U2S15]: "I believe that everyone wants more personalized recommendations. For example, we see proposals to know about projects, but most of the time, you get to know about them when it is already happening, you don't know before that or until it happened (...) it would be good if we could have a filter on a institutional portal where they ask you about your interests, and suggestions would appear about events, projects, even for the social service (...) I believe it could be great for the university to do something like that with our data, isn't it? So, let's say you have a person "and this person has been interested in many topics for care of humanity, has been interested in education", and using that information the institution could launch an initiative saying "look to these social projects, we find that these are aligned to your profile".

Reflecting about the data obtained from teachers and its possible use to improve their learning led to discussions about the issue of transparency of data, with a dual thinking of what data has been collected by teachers and reported to the institution for privacy issues, but as well as an interest for research purposes, since this data would be valuable for the work of graduate students.

U2SG1: "I would like to have a database where we could visualize and get to know what information there is stored about the students, and with this objective in mind, for us as students to know what information is there - but also, as researchers, to know what we could request access to".

Other student focus groups suggest that these data could be crossed with the initial results of students, to provide a better follow-up and guidance for some students that may feel insecure or struggling in their adaptation with the university. In comparison, other groups suggest that surveys that serve as feedback for teachers could be useful for students, to know more about the teachers (e.g., their teaching styles, experiences, theoretical or practical approaches).

U2SG2-98: "When we are starting our career program, I believe that all the tests that we took, both the academic and cognitive tests and everything else, I believe these could be serve to follow-up, a more personalized attention, for the adaptation to the university, because I feel that for some people it is difficult to adapt to this new environment and workload".

U2SG3 [U2S12]: "I believe that the feedback surveys for teachers could be used by students too, being that these are answered in anonymity, where teachers only get to see the feedback for them, I think that (this information) would be valuable for us to know as students."

U2SG3: "(...) I believe that there is also this possibility of, according to your learning style, describing how you felt, your opinion of the class, if it was dynamic or not. I believe that including new aspects to this feedback of the class, about the teachers, would be very helpful, and giving access to the students to this same data."

c) University 3 (U3, public)

Having data is a clear need for teachers in order to be able to make academic use of it for the benefit of students. This information makes it possible to understand the low performance, dropout and problematic situations experienced by students, as well as the contexts in which they work. Based on this, the teacher has the possibility of implementing strategies to improve and support students.

U3T37: "From the situation of each student, this information would be useful to us, even in knowing if the student comes with a problem, a background, something psychological (...)".

U3T38:"I ask them what their hobbies or attitudes are or some extra activities, and it turns out that they play instruments, they are high-level athletes, or any other issue and by virtue of that, I guide them personally. And I take that into account, I make them feel taken into account and I perfectly win them over to be an effective guide."

U3T40: "Yes, it is important, definitely the information that the students give us and not only at the beginning, not also in the course of the class, because incidents happen, right? Suddenly, there are deaths, there are problems of different types that one must understand in order to be able to guide the student and obviously also support them."

U3T43: "Also, it's definitely important to look at the information in the Kardex and know how the student has fared. It's basic because it does give us a lot of information about how, what our class could look like, right?"

4. Data Feedback

a) University 1 (U1, public)

The feedback is conditioned by its **purpose**, **temporality**, and the **quality of the data**. Avoiding the delay of feedback is a suggestion made by the group of students, because sometimes it is given immediately or at the end of the course with consequences on student performance *(U1S10)*. That is, they believe that feedback is given discreetly and not as a continuous act to recognize the inflection points of their school performance, which makes reflection possible. They themselves pointed out that the detection of good student practices and their replication in other groups will bring benefits to learning. From the sensitivity of the students in the framework of feedback, a concern is the comparison between students, mainly when there are situations of vulnerability associated with their mental health *(U1S13)*.

U1S10: "I also did not receive feedback on time, I am in my second semester and I had a teacher who gave us grades until the end, so all that time you are sending the work without knowing if it is well done or not, unlike a teacher who answered us immediately every time we submitted the activity. So thanks to that, I had time to correct and know what to do".

U1S13: "Even then, everything has to do with mental health because if you are not well, if you live with the idea that grades are everything, then in the end, if you see someone else's grades or if it happens that it is no longer a healthy competition that your own classmates throw in your face - well, I'm better than you at this and I'm more than you -. So, you can get demotivated, your performance can drop even more".

Also in the exercise of comparison, teachers propose the construction of patterns so that students can perform qualitative analysis, contrasting their performance against such patterns of group behavior *(U1T10)*; however, among teachers, there is also concern about the exacerbation of hostile competition among students *(U1T11)*.

U1T10: "(...) the presentation format, I think something that would be important that can be different for large and small groups, but the identification of patterns of students that allow separating an individual issue, which may be specific to a student due to their individuality (...). So, that identification of patterns that reflects the students' experience in the process, not the numbers, not the grade, but the student's experience - yes/no, I learned, acquired these skills, or yes, I learned but I had a bad time or I had a good time, but I didn't learn (...)".

U1T11: "So, I think that evaluations, although the guys and ourselves do this closing at the end of the semester where we tell them - good in this, you have to improve in this - and they measure themselves against their peers because that is real, I don't know how much making that comparison official contributes to a more bloody educational environment, perhaps, much more competitive (...)".

The authorities also addressed the idea of comparison, temporality, and the presentation format of the processed data, according to student preferences and vocations *(U1A9)*. Semester periods are considered appropriate for feedback *(U1A14)*; this approach differs from what makes Learning Analytics immediately possible, related to the concept of latency.

U1A14: "Maybe, semesterly, inter-semesterly. I think that would be the most appropriate because actions can be taken and we are not so far from the information, temporally speaking".

U1A9: "When the analysis results are presented, the data of the individual who is viewing it is included, your performance is here and the performance of others is here. There are visualizations where both data, yours and the average or general of the group, are presented".

b) University 2 (U2, private)

In general, there is not a consensus between students about how they would like to receive the results of their educational data analysis, or how it should be presented. For some, feedback should be personal, but considering that people require some training to provide feedback to students in both, good and bad results. Feedback through digital media is relevant, with more

interest in the on-demand option by using a web portal or application with details of their performance. As example, one participant told the next comment:

> U2SG1: "I would like that it could be in the three ways (in persona, text report, dashboards). As an example, I have seen in nutrition, where they deliver to you an integral report of your caloric consumption, corporal fat, water volume, and based on that, they provide you with recommendations, which helps you to have a better interaction (with nutritionists) by what is written. This same principle could be applied to the university".

However, other participants considered that for younger learners, the channel used to deliver educational data analysis is important, as it is presented in the next quote:

> U2SG3 [U2S9]: "I believe that having visualizations would be better, because the email is outdated. I know many people that don't even receive email notifications on their smartphones or laptops, then, I believe it is not like they use it too much (...) if it is something updated every period or week, I believe it is better through visualizations".

For teachers, they would appreciate the opportunity to have more information than the one offered by students' feedback surveys. For them, it would be valuable to have 1) greater visualization opportunities of their own profiles, as well as 2) better understanding of their performance, compared to other teachers, with the addition of feedback to improve their teaching skills.

> U2TG1: "Related to students' feedback surveys, I would like to have, for example, not only a review of the comments made by students and an overall grade for each section (...) I would appreciate, for example, to know what is my average and if I am in a range, good or bad, (...) and to know "what actions could I do to improve myself in face of that feedback?".

From their perspective, authorities agree that disassociated information (that does not include personal identifiable information) would be useful for both students and teachers, but the arrangement of the information - the "data story" - should be different, depending on the public that will receive it, being an academic coordinator, a teacher or a student. However, as one participant adds in the discussion, there seems to be a consensus in their experience between universities, where they believe the information is not enough prepared yet to be delivered neither for students, nor teachers.

> U2A: "In interactions that we have had with other universities (we've learned) that when we talk about the student, in reality, we speak about the receiver that interacts with the student. And the same for teachers. Then, I believe that we are not in a phase in which there is information directly for the student, but instead, that is being articulated by a network of mentors".

Lastly, authorities discussed other potential projects as an example of other practices for the presentation of results that could help students to better understand their achievements and progress during their studies.

> U2A: "Something that we have started doing recently, specially for new students, is to generate some information that allows them to see how they have been advancing in their academic competencies, in English (...) if they are positioned or not for certain employment opportunities, because today it is not only about their academic success in the institution, but as well the opportunity of watching their objectives becoming materialized".

Students and teachers have a similar view in terms of the frequency and convenience of receiving updates of their academic results. In range of comparisons, students consider that feedback provided as short as weekly, and larger as one month would be useful for them, without adding too much data that could not be so useful.

> U2SG1: "It would depend on the objectives, and with the communication that you may have with your mentor, teacher or advisor".

> U2SG3 [U2S13]: "Weekly reports could be, because daily reports would be too much".

For teachers, the ideal period suggested was common between groups, with the ending of every short course, or in length of time, one month.

> U2TG1 [U2T3]: "When ending (a course period) would be perfect (...) it could be when you finish an educational unit, same for one month".

As a result of the focus group, teachers believe that comparison should be used only with the purpose of improving, but thinking about the potential undesired outcomes of those comparisons.

> U2TG1[U2T2]: "Obviously, being better is something that inspires us, but I don't know if comparisons would be a good idea".

For **students**, the idea of **competition** raised some concerns to understand what would be the purpose of aiming to have more c**ompetition instead of other alternatives**, like cooperative learning or self-growth, as it is exhibited in the following quote:

U2SG2 [U2S7]: "I should return to the question "(comparisons) for what?", I mean, what would be the objective of that? If you are aiming to generate a competitive environment between students or if you are really interested in their own growth. Because if you are interested in the growth of the student, it would be better to have a comparison between, for example, (with the data of the same student identifying) how did the student begin the semester, that would be the comparison that I would see instead of their other fellow students".

c) University 3 (U3, public)

Students request that feedback should be delivered face to face, taking into account the ways in which it is carried out so as not to feel exhibited, because teachers have sometimes shown their vulnerabilities in front of other students. Within the framework of feedback, they consider that the comparison is not healthy because it promotes competitiveness, because they recognize themselves as subjects who have their times and their ways of learning.

U3S35: "The best way is yes, face-to-face, which is preferred... Maybe I wouldn't say with the whole group (...) maybe not like putting yourself up front, so to speak."

U3S36: "If it gets to a point now uncomfortable or it doesn't make you feel in the best way and more for us who are in practice because there are times when even the teacher himself, the doctor more than anything in front of the patient scolds us and I think that is not right because the patient is staring at us."

U3S38: "It's something that you strive to do your bit, but when it comes to fouls, grades or so-and-so, you're bad in grades because your teammate is doing better in these, well, no, I don't see why I should compare myself to so-and-so."

From the teacher 's point of view, the grade is provided to the student at the end of a course, accompanied by comments that justify the number.

U3T44: "When the course was over, I personalized the grades, I always spoke directly with them and without the whole Group and told them about their grade and I told them why that grade apart from telling them in numerical matters, that is, to say, let's see, did you get this because you got so much? Obviously tell him about the effects it had on his work, but also the question of his personality, right?"

A concern mentioned by the administrators has to do with the fact that the data allows concrete and useful actions to be taken based on the detection of their needs.

U3A22:"I put the case of students with disabilities, when they go through the admission process they refer to themselves as students with a disability, but we have an inclusion unit here that the inclusion unit then receives that information to be able to make an analysis of the needs of the students who referred a disability and to be able to give them the due treatment and make the corresponding adjustments."

5. Results-based Intervention

a) University 1 (U1, public)

Students consider that data makes it possible to make adequate decisions, such as the early recognition of their needs and those of their teachers, as well as the identification of **alternatives for improving materials, educational activities, and the causes of school dropout or lag phenomena** *(U1S12)*.

U1S12: "(...) why is there so much dropout? If it is our issue, is it the teachers' issue?...it is a matter of programs".

The **fragmented disposition of data** is a teacher concern because it makes interventions impossible. Such data is found in different instances *(U1T13)*.

U1T13: "(...) what criteria or communication patterns do we have to establish among the actors because certain information is held by teachers, other by coordinators, and other by the University (...)".

The situation described above is remedied by academic entities themselves with actions that allow for the early and generalized knowledge of the conditions with which students start a course or subject and thus make pedagogical decisions *(U1T22)*.

U1T22: "We carry out a diagnostic exam to know how students arrive at each of the subjects, that information is passed on to teachers in the form of an average (...) and they make the decision to offer a remedial space".

Decision-making based on data from the experience of authorities is a complex phenomenon, **due to the absence of capacities and resources available in each entity** *(U1A11)*.

U1A11: "does what it can with what it has".

b) University 2 (U2, private)

When asking if institutions should have the obligation to act if they **identify students at risk of failing or dropout in a course,** students think that these interventions should happen, but in what terms was an issue of discussion. Example in the following quotes:

> U2SG1 [U2S18]: "I believe there are certain aspects in which they should make an intervention, but how much of that is considered in the responsibility of the teacher and their work at the university (remains as a question)".

Moreover, in another focus group a participant discussed **how the goals are usually analyzed just as numbers,** but just **under a numerical analysis**, instead of an analysis that focuses on understanding that behind the results, there is something occurring in the human development of a student.

> U2SG1 [U2S20]: "I am worried that we are very focused on the numerical: due dates, finishing at time, satisfying goals as a teacher, as a program director, that we get lost in the human aspect, isn't it? (...) there it is the part where the education, even when it is said to be humanistic and student-centered, it is a nice phrase, but it is not something that is being implemented, we forget about the human aspect and we follow the numbers, goals, medals, one more thing at the curriculum, another more, other accomplishment - and we just forget about the person".

> U2SG1 [U2S11]: "Behind those averages, there is a whole phenomena where many aspects are involved in the development of a student, and I believe too that, there is a lack of this integral comprehension of both, the student and the teacher, of training them, and being interested about their wellbeing, I mean, of taking care of their wellbeing, so starting from them, they could have the competencies to detect (these issues that affect their own wellbeing and the one of their students)".

When talking about if the teachers should receive some kind of training to better comprehend their students educational data, in their experience, they believe that the policy and strategies to approach to students should be made by the ones who live in the practice (the teachers) and not other people that is not fully aware of what happens in the day to day.

> U2SG1: "In the end, I think that sometimes, policies, strategies where people foreign to the practice (...) try to intervene, and I believe that at the end, the one who knows what really happens in their daily practice, in their environment, are the teachers".

> U2SG2 [U2S21]: "This definitely should happen, because what usefulness could information have if you don't know what it is?

In all the cases of student focus groups, they shared the belief that anyone should **have the opportunity to decline the support that** the university may offer at a first stage, recognizing that sometimes this may not be as useful for them as the institution may perceive.

> U2SG3 [U2S19]: "I believe that there should be an option to decline the support (offered by the institution) because something that happened to my brother is that he was performing very bad in his school, and the next semester the institution assigned him more self management courses. These kinds of things were not helpful for him, just adding more classes that he is not interested in".

> U2SG2 [U2S17]: "It is 100% that you should always have the freedom to make that decision. If you want it or not, because (...) it would look like an imposition on the other hand".

> U2SG1: "You should be the one who decides, but at least, to know if that support and guide exists".

In a section for a final reflection of the participants, they shared some concerns, ideas or general thoughts about their experience talking about learning analytics. Being the first time for many of them, these insights offer information about their desires, like the wish to participate with teachers that are similar to their interests, their interest for follow-up or opportunities to participate in projects related to learning analytics, to have better tools to assists students during their careers, as well as other initiatives as it is presented in the following quotes:

> U2SG1 [U2S10]: "Many times I have seen that everything focuses on the feedback between teacher-students, and for us as students, we don't have any feedback from the surveys that the institution applies. Then, we don't know anything about the follow-up that these may have, or how this information is used for the teachers (...) more as a support for these data to be distributed to the teachers, so they may improve their performance".

> U2SG3: "I believe that as a student, you wish to know what your teacher is working on, besides teaching. I believe it would be great to take the best from them (...) but I don't know how to have the best from them, or how they could get to know the best of me as a student".

*U2SG3: "If the institution is really going to have a greater use of data to help their students, (I wish that) communication should exist, we should be involved in the process, because **it is our data**. I would like to know more if this continues".*

U2TG1 [U2T6]: "I would like to have an approach more human, that it is not just by emails, because in this way, being coordinator or advisor, I would want to plan something when the student is not doing great, and not only receive the order as a teacher of "have some consideration", because do not receive explanations of what we can do to help them (...) then, I would love to have more of this support as a teacher".

In a similar fashion, authorities believe that if they continue to acquire data about students, it should have a purpose and use, pursuing the best outcome possibly in the institutional projects for students, teachers, and in general, the educational community that could benefit from the educational data analysis.

U2A: "I believe that if we conserve the data, the final objective (should be / is) to make decisions based on it. I believe that the topic of information goes by a decision making process (...) I am convinced that if we continue the issue of (data) governance, it is for that, to have the opportunity to take advantage of these data, and not (only) that these continue to be stored. Therefore, the idea is how we could make use of the institutional data of many academic years. Now, these (some projects) have been done with teachers, and others, aiming to contribute to institutional improvement (...) I believe in that direction is where our goals should continue".

c) University 3 (U3, public).

For **students, it is important that there is a sense of intervention based on the information they provide**. If the data they provide to the institution produces benefits to their school performance, it dilutes the idea of the inconvenience of using their data. Students demand interventions, not only didactic, but also other types of guidance that the institution can address.

U3S39: "If the student agrees that the teachers know and can help them, then yes."

U3S40: "To have that knowledge, and also of the emotional or family situation that a student is going through that affects their performance to learn that they also have that understanding... Ah is fine.. Well, I understand and support you in any way I can."

For their part, **teachers** consider that it is important to follow up with students once they are aware of **a special condition or problem they are going through**.

U3T45: "I ask a respectful question, if they have a condition, a social, economic, sentimental or emotional condition. Let me know so that I can help them at the right time and channel them to the interdisciplinary body that the University has for it."

U3T47: "It has been effective for me because when faced with a condition of a student who does not say it openly, he does it in this way and from the internet is that I open a survey to let him let me know and with it, in a very, very respectful and more private way, I follow up"

Authorities

There are institutional initiatives to obtain information in order to locate students who require support and intervention actions. From the administrative point of view, the data collected by the institution is the starting point for having the possibility of helping students. Currently, the University has undertaken actions to integrate the data into a supra system.

U3A22: "We did a survey on students after the pandemic, of hope and hopelessness after the pandemic and a survey was made in principle through institutional emails, which is available information that can be shared, so through the CTA area helped us to disseminate the survey but in the survey, the student is asked to be anonymous in principle, he is given the information about the confidentiality of the use of the information, but if he decides he can share some contact information to be able to contact him later and if necessary make the intervention that was derived from that work, then he asks for their authorization for the use of the information. It's a strategy we've implemented."

U3A23: "The school trajectory is good, the follow-up of the students, both aggregate and particular, in each student, the detail is in how you are going to help the students if we do not have information both about their school trajectory and from their personal health field and everything else that we know, and that is a problem that falls into tutoring."

U3A24: "The solution we have been looking for is to generate information modules and integration of information in a suprasystem, of course we have always dreamed of that suprasystem, but I believe that it is the solution, and that it has access, depending on the restriction, the student, the teacher, the career coordinator and the department."