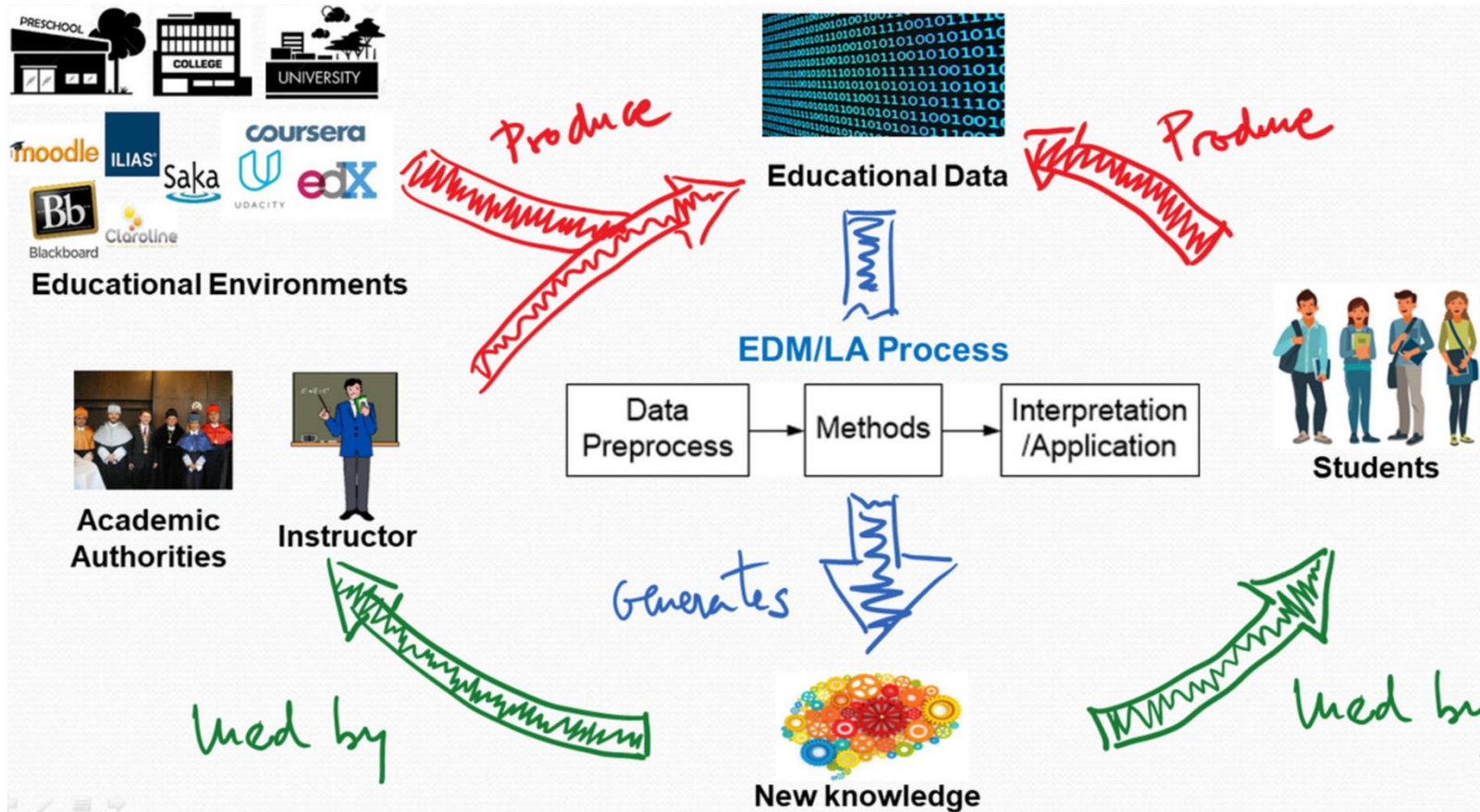


Learning Analytics

how to improve teaching learning processes using data

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Romero, C., & Ventura, S. (2020). Educational data mining and learning analytics: An updated survey. *Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery*, 10(3). <https://doi.org/10.1002/WIDM.1355>



- ✓ Learning analytics is the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimising learning and the environments in which it occurs.

Long, P., & Siemens, G. (2011, September 12). Penetrating the Fog: Analytics in Learning and Education | EDUCAUSE. EDUCAUSE. <https://er.educause.edu/articles/2011/9/penetrating-the-fog-analytics-in-learning-and-education>

- ✓ **Learning Analytics** is the development and application of **data science methods** to the distinct characteristics, needs, and concerns of educational contexts and the data streams they generate for the purpose of **better understanding and supporting learning processes and outcomes**.

Wise, A. F. (2019). Learning Analytics: Using Data-Informed Decision-Making to Improve Teaching and Learning. In Contemporary Technologies in Education (pp. 119–143). Springer International Publishing. https://doi.org/10.1007/978-3-319-89680-9_7

Instructors can use Learning Analytics (LA) to:

- ✓ Improve learning materials (by tracking students' use)
- ✓ Visualize learning activities (student and teacher dashboards)
- ✓ Offer adaptive or personalized learning experiences
- ✓ Predict student performance (statistical models and machine learning techniques) and to identify at-risk students

As in many other disciplines (finance, commerce, industry, health...), LA can help us in *data-informed decision-making* and *evidence-based quality management*.

What data sources could be used to answer our question?

Institutional tools

- ✓ **University Information Systems**, which store data about each student (enrolment, parents' educational level, previous studies, transcript of records...)
- ✓ Attendance record systems
- ✓ **Learning Management Systems (LMS)**
- ✓ Library (visits, lending books, access to electronic publications).

External tools: *student response systems*, programming environments, social networks...

Asignatura > Datos > Informes > Ayuda >

Columnas

Asignatura : Tecnología de computadores -- 11544 -- 2016/2017

Opciones	Grupo	Competencia	CT_13	LAB_17	TEST_ACTA_1P	TEST_ACTA_2P	PROB_ACTA_1P	PROB_ACTA_2P	ACTA_JUN
1C2		C - En desarr	4,00	2,55	0,90	2,40	1,50	3,15	
1A2		A - Excelente	7,50	2,40	0,00	2,40	2,30	4,14	
1A1		B - Adecuad	6,00	3,00	1,07	0,50	2,20	3,90	
1G2									
1H1		C - En desarr	4,12	3,00	1,71	0,00	2,00	3,93	
1I1		B - Adecuad	5,41	0,21	0,21	0,10	0,50	2,59	
1H1				1,80		0,00			
1I2		C - En desarr	4,25	1,71	0,64	0,10	0,00	2,59	
1D1		C - En desarr	4,25	1,71	4,50	2,10	0,00	4,70	
1I1		C - En desarr	4,87	1,80		0,10		2,53	
1H2		B - Adecuad	6,50	0,30	0,60	0,10	0,00	2,71	
1A2		C - En desarr	3,50	1,71	3,75	0,70	0,25	3,63	
1H1		C - En desarr	2,75	0,90	0,90	0,50	0,10	1,69	
1G2		B - Adecuad	6,12	3,75	0,86	0,30	2,00	4,04	
1H1		A - Excelente	9,25	2,79	0,00	0,00	1,45	4,04	
1E1		C - En desarr	4,37	5,40	0,67	2,75	0,10	3,91	
1H2		B - Adecuad	5,00	0,00	0,00	0,00	0,50	2,25	
1G1		C - En desarr	3,25	3,15	1,71	1,05	0,00	2,94	
1C1		B - Adecuad	6,71	3,86	0,00	0,70	2,00	4,11	
1F1				0,00		0,00			
1H2		B - Adecuad	5,56	1,29	1,95	2,20	2,25	4,40	
1H2		A - Excelente	7,62	0,00	2,79	0,25	0,00	3,75	
1G1				0,30		0,00			
1C2		B - Adecuad	5,00	3,30	1,07	1,60	4,00	4,48	
1G1				1,05		0,50			
1C2		D - No Alcan	0,30	2,40	2,14	2,90	3,00	3,11	
1H1		B - Adecuad	5,50	3,00		0,00			
1J2									

Exportar a excel

Alumnos

Visibles
 Todos
 Grupos seleccionados Selecciona

Columnas

Visibles
 Todas
 Columnas seleccionadas Selecciona

DNI, Nombre, Grupo, Titulación, Tipo de Matrícula, Convocatoria, Comentario Profesor, Condición, Competencias Transversales, CT_13, EXMONTAJE_17, EX_SIMUL_17_10, LAB_17, TEST_ACTA_1P, TEST_ACTA_2P, PROB_ACTA_1P,

nota : si no quiere exportar todas las columnas/alumnos, desactive la visualización de las que no quiera exportar, o bien, seleccione las columnas y/o los grupos de los alumnos que desee exportar.

(*) por visibles entendemos los que pueden acceder con scroll de pantalla .

(en cualquier caso y aunque no sean visibles deberían ir dni y nombre en 1er y 2do lugar)

Aceptar Cancelar

Alumnos totales: 484 (23 MH máx) - Alumnos visibles: 83 - Profesor conectado: Benloch Dualde, José Vicente

To export gradebook data to CSV files (including always ID and names)



Provided that in a subject, a policy of registration of attendance to face-to-face sessions is followed, the tool allows instructors:

- ✓ To export specific data to CSV files (including always ID and names)

Section	ID	Name	Sessions #	Attendance control #	Attendances #	Absences #	Attendances [%]	Absences [%]	Sessions [h]	Attendance control [h]	Attendances [h]	Absences [h]	Attendances [% h]
1B2			30	22	0	22	0	100	45	33	0	33	0
1D1			30	22	0	22	0	100	45	33	0	33	0
1-FLIP			30	22	2	20	9	91	45	33	3	30	9
1D1			30	22	1	21	5	95	45	33	1,5	31,5	5
1C2			30	22	0	22	0	100	45	33	0	33	0
1D2			30	22	0	22	0	100	45	33	0	33	0
1I1			30	22	0	22	0	100	45	33	0	33	0
1C2			30	22	1	21	5	95	45	33	1,5	31,5	5
1H2			30	22	3	19	14	86	45	33	4,5	28,5	14
1J1			30	21	1	20	5	95	45	31,5	1,5	30	5
1H1			30	22	0	22	0	100	45	33	0	33	0
1I2			30	22	0	22	0	100	45	33	0	33	0
1B2			30	22	0	22	0	100	45	33	0	33	0
1I2			30	22	3	19	14	86	45	33	4,5	28,5	14
1E			30	18	3	15	17	83	45	27	4,5	22,5	17



PoliformaT, the institutional LMS at UPV, based on Sakai, provide instructors with information on the interaction of students with the platform (log-trace data) thanks to the *Statistics* tool.

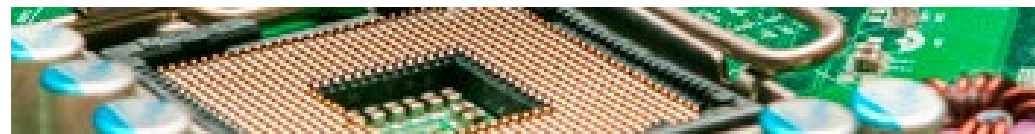
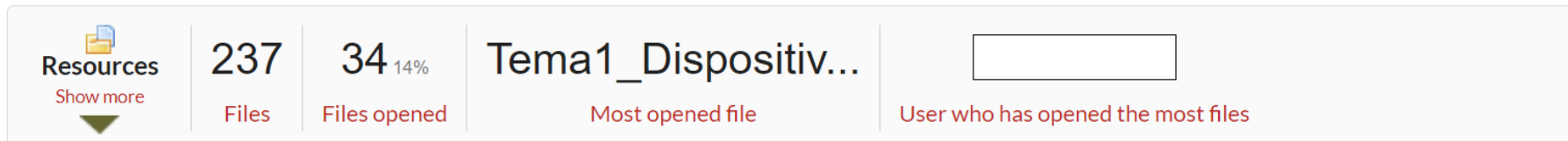
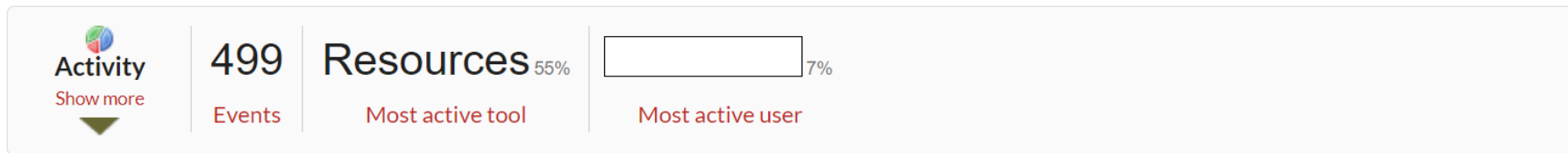
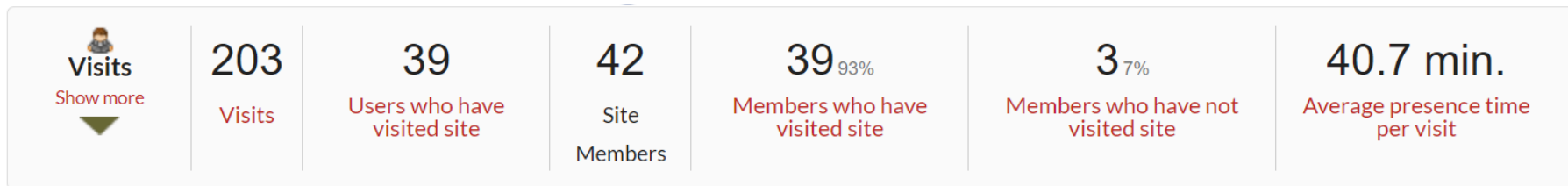
In addition, it offers teachers different tools to assess student learning:

- ✓ Tests and Quizzes
- ✓ Assignments
- ✓ Forums / Chat Room / Wiki (participation)



The first screen called *Overview* includes general data about the site (visits, activity, resources...):

Overview



Indicators:

- ✓ Visits
- ✓ Events
 - Select by tool
 - Select by event
- ✓ Resources
- ✓ Presence Time

Overview Reports User Activity Preferences

New report

Report Specify report title and description (required when saving/editing the report).

Title:

Description:

What? Select activity to report.

Activity:

When? Select time period to report.

Period: (PoliformaT server time zone)

Who? Select users to report.

Users:

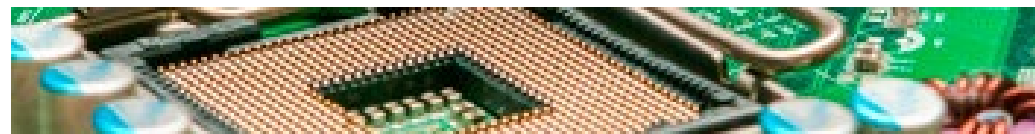
How? Specify how results should be presented.

Totals by:

Number of results: Limit to:

Presentation:

Generate report Save report Back



poli [format] Tecnología de computadores GII (DTU) > STATISTICS

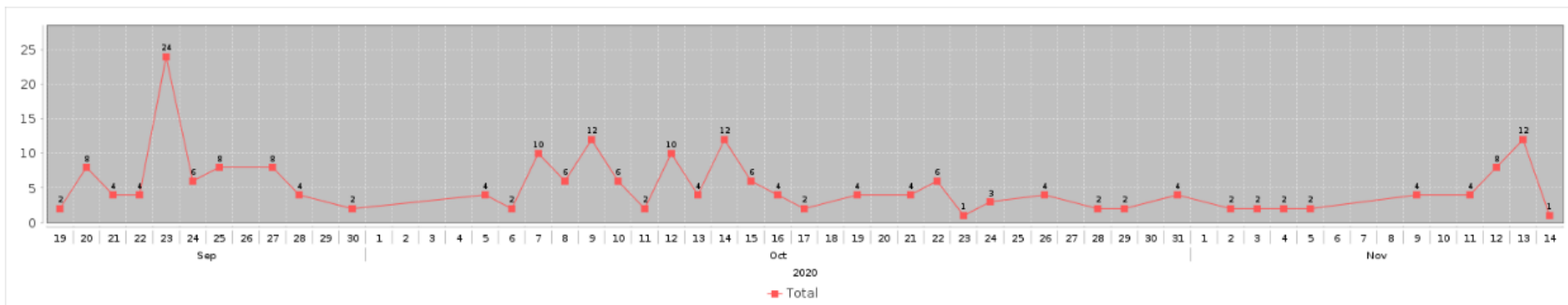
Overview Reports Preferences

LINK

Report: 'Acceso_DiarioAprendizaje_1P_TimeLine'

Printable version

Site: "Tecnología de computadores GII (DTU)" (GRA_11544_2020_DTU)
 Activity type: Resources
 Resources action: Read
 Resources selected: Diario de Aprendizaje
 Time period: Sep 14, 2020 12:00 am - Nov 13, 2020 4:00 pm
 User selection type: Role
 Role selected: alumno
 Report date: Nov 15, 2020 5:54 pm

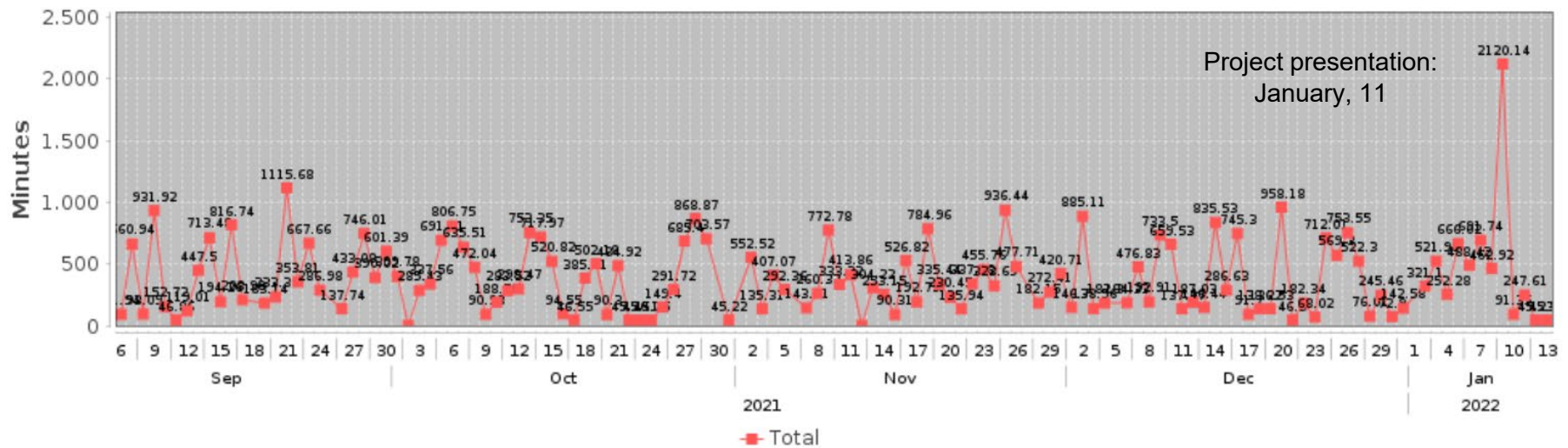


Back

Export -->

Report: Access to a specific resource





Site: "Elr" (DOC_33421_2021)

Activity type: *Presence Time*

Date range: Sep 6, 2021 - Jan 13, 2022

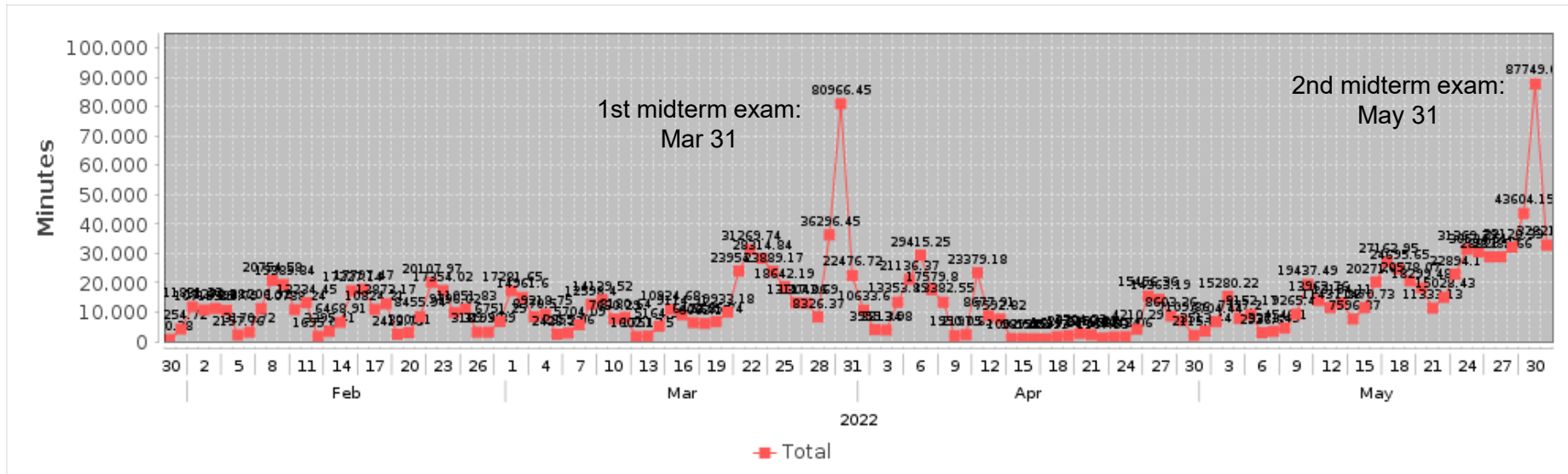
User selection type: Role

Role selected: Student

Report generated: Jun 2, 2022 4:07 PM CEST

Date	Duration (min.)
Jan 9, 2022	2120,1
Sep 21, 2021	1115,7
Dec 20, 2021	958,2
Nov 25, 2021	936,4
Sep 9, 2021	931,9
Dec 2, 2021	885,1
Oct 28, 2021	868,9
Dec 14, 2021	835,5
Sep 16, 2021	816,7
Oct 6, 2021	806,8





Site: "Tecnología de computadores GII" (GRA_11544_2021)

Activity type: **Presence Time**

Date range: Jan 30, 2022 - May 31, 2022

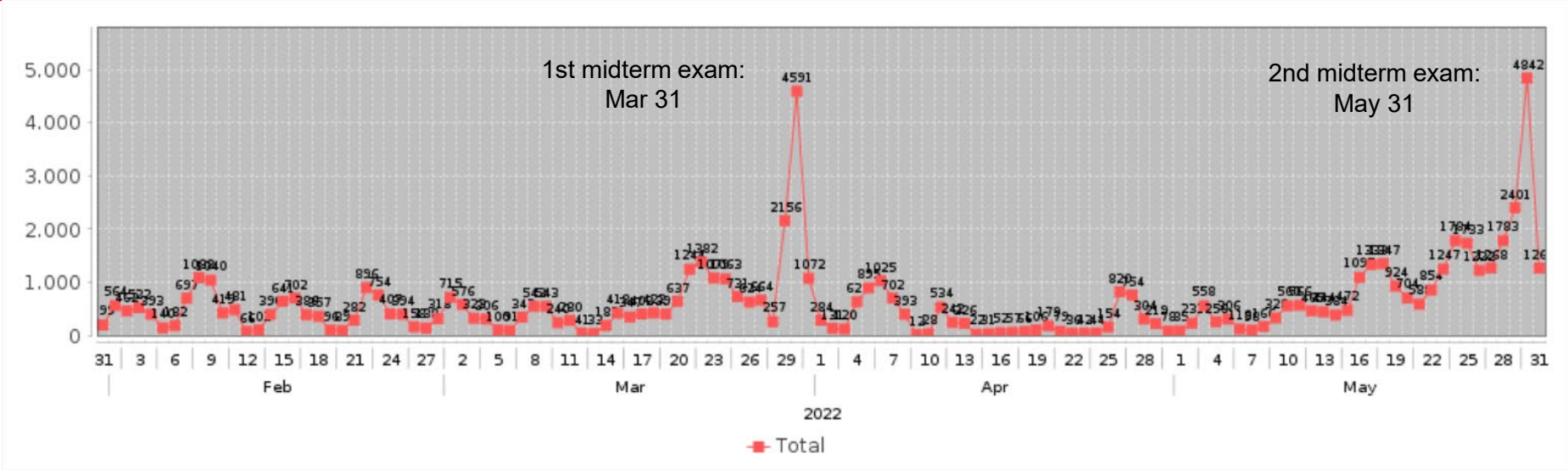
User selection type: Role

Role selected: Student

Report generated: Jun 02, 2022 4:25 PM CEST

Date	Duration (min.)
May 30, 2022	87749,1
Mar 30, 2022	80966,4
May 29, 2022	43604,1
Mar 29, 2022	36296,5
May 31, 2022	32821,8
May 28, 2022	32120,3
May 24, 2022	31369,8
Mar 22, 2022	31269,7
May 25, 2022	30534,5
Apr 6, 2022	29415,2





Site: "Tecnología de computadores GII" (GRA_11544_2021)

Activity type: **Events** (Select by tool)

Tools selected: **Resources**

Date range: Jan 30, 2022 - May 31, 2022

User selection type: Role

Role selected: Student

Report generated: Jun 2, 2022 4:45 PM CEST

Date	Total
May 30, 2022	4842
Mar 30, 2022	4591
May 29, 2022	2401
Mar 29, 2022	2156
May 24, 2022	1784
May 28, 2022	1783
May 25, 2022	1733
Mar 22, 2022	1382
May 18, 2022	1347
May 17, 2022	1333

LAUNCH LIBRARY ROOMS **REPORTS** RESULTS

< Reports

TCO_23_MOSFET1 i

Wednesday, March 8, 2023 at 11:22 AM

Show Names
 Show Responses
 Show Results

NAME ▲	SCORE % †	1	2	3	4	5	6
.....	✓ 83%	✓ D	✓ B	✓ C	✓ A	✓ C	✗ C
.....	✓ 50%	✗ B	✓ B	✓ C	✓ A	✗ B	✗ C
.....	✓ 50%	✗ B	✓ B	✓ C	✓ A	✗ B	✗ C
.....	✓ 67%	✗ A	✗ A	✓ C	✓ A	✓ C	✓ B
.....	✓ 100%	✓ D	✓ B	✓ C	✓ A	✓ C	✓ B
.....	✓ 17%	✓ D	✗ A	✗ B	✗ C	✗ B	✗ C
.....	✓ 33%	✓ D	✗ D	✗ B	✗ B	✓ C	✗ A
.....	33%	✓ D	✓ B			✗ A	
.....	✓ 100%	✓ D	✓ B	✓ C	✓ A	✓ C	✓ B
.....	✓ 83%	✓ D	✗ D	✓ C	✓ A	✓ C	✓ B
.....	✓ 100%	✓ D	✓ B	✓ C	✓ A	✓ C	✓ B

Table of questionnaire results



Export Results

Complete Results Excel

Individual Student PDFs

Results Summary PDF

Answer Key PDF

Complete Results Excel ✕

Export an Excel file of responses and scores for all students who took part in the activity.

Include Multiple-Choice Answer Content **PRO**



 Download

 Email Me

 Save to Drive

Exporting questionnaire results in Excel



	username	T0_09_09	T1_11_09	T1_16_09	T1_18_09	T1_02_10	T2_08_10	T2_10_10	T3_06_11	T3_18_11	T4_2_12	T4_9_12	T5_16_12	Agregado	#NP	Nota (1)
2	fezamar	5	2	5	3	4	5	5	5	5	5	5	6	55	0	0,93
3	pabmoen	6	4	3	2	3	5	5	5	4	5	5	6	53	0	0,90
4	silma4	6	4	4	2	3	5	3	5	4	4	5	5	50	0	0,85
5	alboica1	3	1	5	3	3	5	5	4	4	5	5	6	49	0	0,83
6	laumoas1	4	2	5	3	4	4	4	4	3	5	5	6	49	0	0,83
7	dasanpue	6	4	4	2	3	5	4	5	3	5	NP11	5	46	1	0,78
8	nialcha	5	4	3	2	3	5	4	5	3	4	5	3	46	0	0,78
9	luipebo	4	4	4	3	3	4	3	3	3	5	5	4	45	0	0,76
10	vicpelo2	4	4	3	3	3	4	3	5	3	2	4	5	43	0	0,73
11	alsansar	5	2	5	3	3	5	2	4	4	4	5	NP12	42	1	0,71
12	blalodeo	5	1	5	3	3	4	3	3	4	4	5	NP12	40	1	0,68
13	enmacbal	5	4	4	3	3	4	5	NP8	3	5	NP11	4	40	2	0,68
14	allomuo	5	2	4	2	2	5	3	4	3	3	NP11	5	38	1	0,64
15	pabbere1	5	4	4	3	3	4	3	4	3	5	NP11	NP12	38	2	0,64
16	jaferbel	5	4	4	2	3	4	2	3	2	0	4	3	36	0	0,61
17	daibeal	NP1	4	4	2	NP5	3	3	4	3	3	4	5	35	2	0,59
18	diesvaz	4	2	2	2	3	4	NP7	3	2	5	4	4	35	1	0,59
19	yemarsan	4	2	4	2	3	3	2	4	2	2	5	NP12	33	1	0,56
20	daespe2	5	4	2	3	3	5	2	2	2	4	NP11	NP12	32	2	0,54
21	gefegir	5	2	4	3	3	4	4	4	3	NP10	NP11	NP12	32	3	0,54
22	jormolm3	5	2	2	1	2	4	1	2	2	2	5	4	32	0	0,54
23	adtator	5	2	3	2	2	3	NP7	3	2	0	5	4	31	1	0,53
24	alcodia	4	2	3	2	3	3	0	3	1	4	5	NP12	30	1	0,51
25	miberve	4	NP2	2	2	3	NP6	NP7	3	NP9	5	5	4	28	4	0,47
26	edponvi	3	2	3	0	3	3	2	0	2	1	3	5	27	0	0,46
27	cargope5	4	2	4	2	NP5	3	3	4	2	0	NP11	NP12	24	3	0,41
28	viclubor	4	2	4	2	3	3	2	NP8	2	2	NP11	NP12	24	3	0,41
29	advic	5	NP2	4	2	2	3	NP7	NP8	2	NP10	NP11	4	22	5	0,37
30	ivnuemo	1	NP2	1	1	2	1	2	3	2	0	3	2	18	1	0,31
31	juapelo6	3	NP2	3	1	2	NP6	NP7	NP8	NP9	NP10	NP11	NP12	9	8	0,15
32	josaba1	3	NP2	1	0	2	NP6	NP7	NP8	NP9	NP10	NP11	NP12	6	8	0,10
33	raguaal	3	NP2	1	NP4	2	NP6	NP7	NP8	NP9	NP10	NP11	NP12	6	9	0,10
34	luigius	NP1	NP2	2	0	3	NP6	NP7	NP8	NP9	NP10	NP11	NP12	5	9	0,08
35	irotdia	NP1	NP2	NP3	NP4	NP5	NP6	NP7	NP8	NP9	NP10	NP11	NP12	0	12	0,00
36	sercomsa	NP1	NP2	NP3	NP4	NP5	NP6	NP7	NP8	NP9	NP10	NP11	NP12	0	12	0,00
37	# items	6	4	5	3	5	5	5	5	5	5	5	6	59		
38	#NP	4	9	2	3	4	7	10	9	7	8	15	15	Total items		
39	#P	31	26	33	32	31	28	25	26	28	27	20	20			
40																

Aggregating data in Excel



Institutional Project "Detection and prevention of academic dropout at the UPV".

The general objective of the project is **to reduce the dropout rate of UPV students.**

The specific objectives are as follows:

- ✓ SO₁: Predict dropout, using artificial intelligence and data mining tools.
- ✓ SO₂: Detect *students at risk* in order to intervene early.
- ✓ SO₃: Analyze the causes of these situations.
- ✓ SO₄: Promote actions at different levels of the organization to reduce the risk of dropout.



- ✓ Different studies have attempted to figure out which variables are most correlated with dropout.
- ✓ In the last decade, some works include a broad set of variables, known as the *holistic approach*.
- ✓ Among the most frequently identified variables, the following stand out:
 - previous academic performance
 - class attendance
 - relationship with teachers
 - student activity

Esteban, M., Bernardo, A., Tuero, E., Cervero, A., & Casanova, J. (2017). Variables influyentes en progreso académico y permanencia en la universidad. *European Journal of Education and Psychology*, 10, 75–81. <https://doi.org/10.1016/j.ejeps.2017.07.003>

156 - Grado en Ingeniería Informática

Filtro: Titulación

156 - Grado en Ingeniería Informática

Número de estudiantes

2074

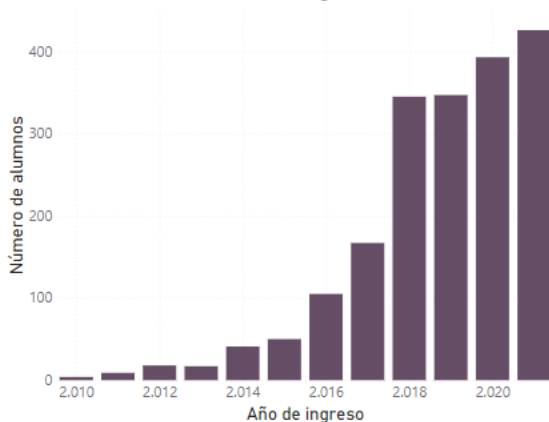
Índices de las notas de acceso a la universidad

Media	10,51
Máximo	13,92
Mínimo	5,00
Desviación típica	1,57
Mediana	10,65

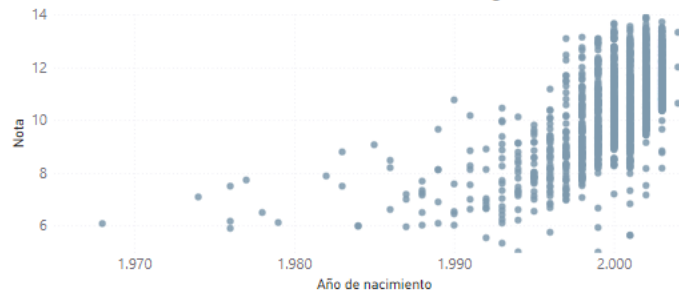
Alumnos por género y nacionalidad

Género / Nacionalidad	M	V	Total
Española	240	1619	1859
Extranjera	50	165	215
Total	290	1784	2074

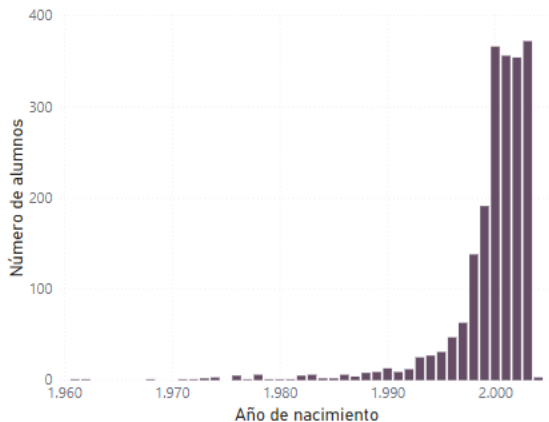
Número de ingresos



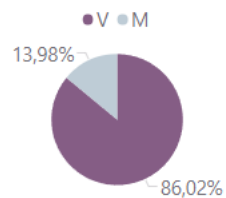
Evolución de las notas de ingreso



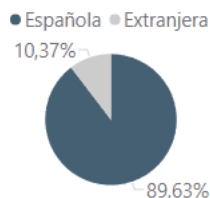
Fechas de nacimiento



Géneros



Nacionalidades



Análisis por asignaturas



11544 - Tecnología de computadores

Titulación

156 - Grado en Ingeniería
Informática

Filtro: Asignatura

- 11538 - Fundamentos de organización ...
- 11539 - Estadística
- 11540 - Fundamentos Físicos de la Info...
- 11541 - Introducción a la informática y ...
- 11542 - Fundamentos de computadores
- 11543 - Programación
- 11544 - Tecnología de computadores
- 11545 - Análisis matemático
- 11546 - Álgebra
- 11547 - Matemática discreta
- 11548 - Bases de datos y sistemas de i...
- 11549 - Computación paralela
- 11550 - Deontología y profesionalismo
- 11551 - Estructuras de datos y algoritm...
- 11552 - Estructura de computadores
- 11553 - Arquitectura e ingeniería de co...
- 11554 - Gestión de proyectos
- 11555 - Ingeniería del software
- 11556 - Interfaces persona computador

Curso
Primero

Cuatrimestre
B

Estudiantes para el estudio
Estudiantes con registros de actividad y nota
480

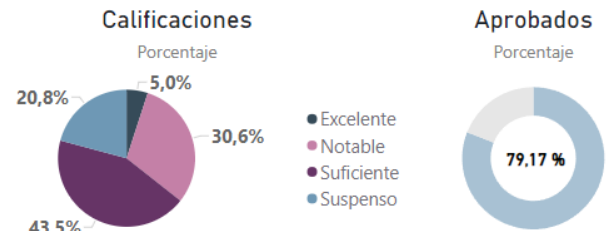
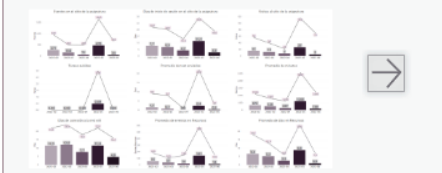
Estudiantes dados de baja
11

Nota media
5,87

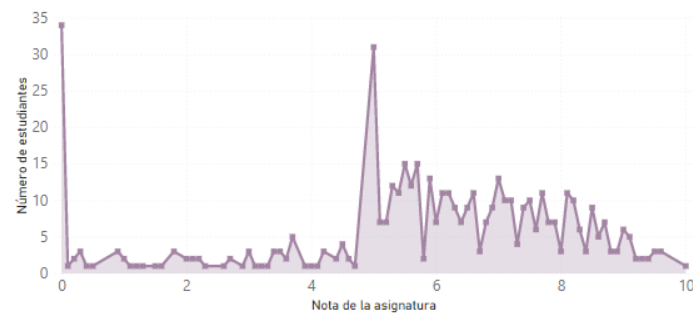
Nota máxima
10,00

Nota mínima
0,00

Evolución temporal de la actividad y las conexiones wifi de los estudiantes



Distribución de calificaciones



Indicadores

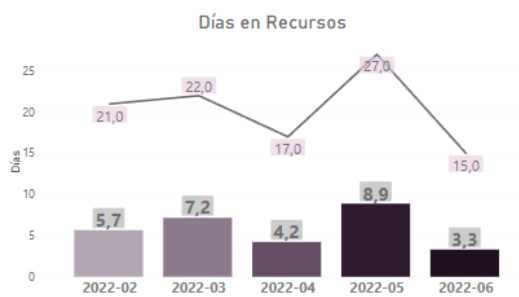
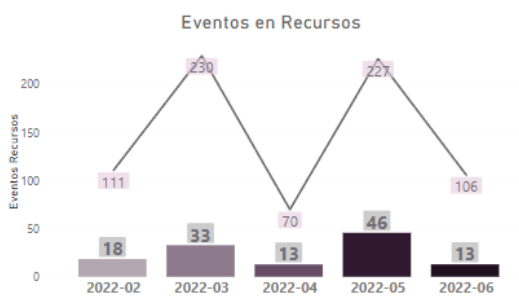
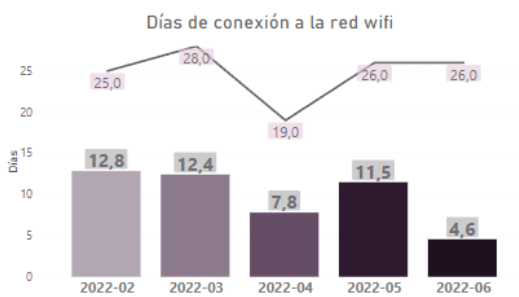
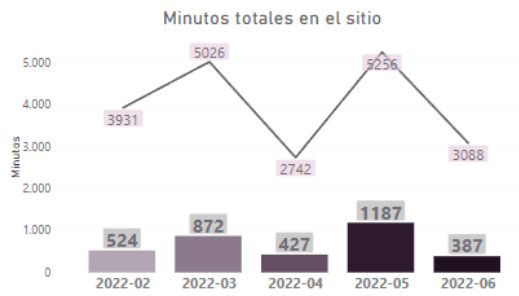
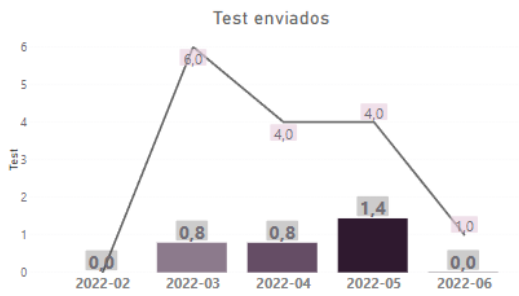
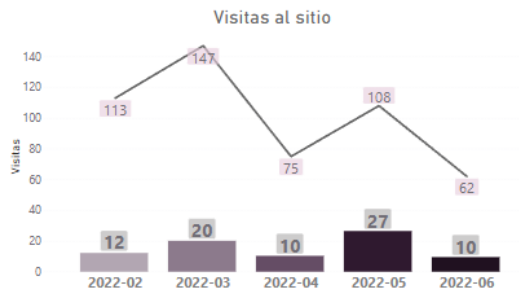
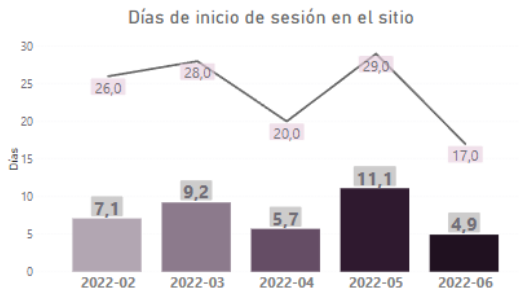
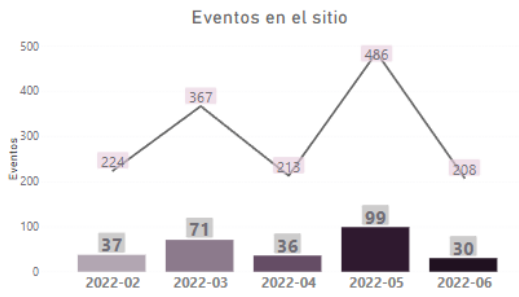
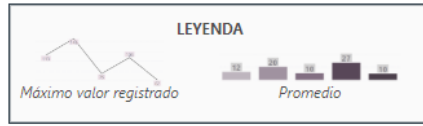
Media	5,87
Mínimo	0,00
Máximo	10,00
Desviación típica	2,36
Varianza	5,55
Mediana	6,20

Categorías

Categoría	Número de estudiantes
Excelente	24
Notable	147
Suficiente	209
Suspense	100



Evolución de la actividad en PoliformaT y conexión wifi de los estudiantes de Tecnología de computadores



Learning Analytics and Data Visualization module

- ✓ Offered to UPV instructors
- ✓ 8-hour module
- ✓ Face-to face sessions
- ✓ Web contents
 - Unit 1. Learning Analytics
 - Data collection
 - Data visualization with Power BI
- Small project in the instructor context (dashboard)



Thanks for your attention

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