

Towards Tangible Trusted Learning Analytics Prof. Dr. Hendrik Drachsler @hdrachsler

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WhoAml

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Research topics Recommender Systems Learning Analytics Multimodal Data for learning Computational Psychometrics

Application domains Schools HEI Medical education Educational Research and Educational Information

DIPF



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Society for LEARNING ANALYTICS RESEARCH



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Function: Management Assistent

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Hector Pijeira Diaz

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Lecture structure





4. Approaches towards Trusted Learning Analytics



What are learning analytics for you?





Greller, W. & Drachsler, H. (2012). Turning Learning into Numbers. Toward a Generic Framework for Learning Analytics. Journal of Educational Technology & Society. http://ifets.info/journals/15_3/4.pdf





Greller, W. & Drachsler, H. (2012). Turning Learning into Numbers. Toward a Generic Framework for Learning Analytics. Journal of Educational Technology & Society. http://ifets.info/journals/15_3/4.pdf







Maturity of Learning Analytics Deployment

Siemens, G., Dawson, S., & Lynch, G. (2014). Improving the Quality and Productivity of the Higher Education Sector – Policy and Strategy for Systems-Level Deployment of Learning Analytics. Canberra, Australia: Office of Learning and Teaching, Australian Government. Retrieved from http://solaresearch.org/Policy_Strategy_Analytics.pdf



Intranet >> Staff >> Teaching Innovation Unit >> Teaching >> Learning Analytics





How do you define trust?

Multiple definitions of Trust



Various Contexts

- oneself and others
- organizations
- intelligent systems
- automation
- money or political power

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Oxford Dictionary

Trust is about a firm belief in the reliability, truth, or ability of someone or something.

A trustful relation is mutually based on:

- openness
- truth
- reliability
- integrity
- belief
- faith
- freedom of suspicion

Trust =

a multidimensional and multidisciplinary construct

Picture by Terry Johnston https://www.flickr.com/photos/powerbooktrance/466709245/

A definition of Trust





Picture by: https://twitter.com/ niklasluhmann

Luhmann defined 'TRUST' as a way to cope with risk, complexity, and a lack of system understanding.

For Luhmann the concept of trust compensates *for insufficient capabilities for full understanding the complexity of the world.*

Niklas Luhmann. Trust and power. John Willey & Sons (1979).

Trust in Learning Analytics



Following Luhmann, we define trust as a social phenomenon with the following characteristics:



To gain trust from data subjects we need to demonstrate Transparency, Reliability, and Integrity. As a return the data subjects might 'choose' to trust us.

- Data subjects face uncertainty e.g. when receiving outcomes of learning analytics.
- Data subjects can not fully understand the complexity of learning analytics.
- Data subjects take a risk and making oneself vulnerable by feeding learning analytics with personal data.

Lecture structure





4. Approaches towards Trusted Learning Analytics





People are afraid of AI (in TEL)





Read CA's latest press releases

Facebook

Facebook emotion study breached ethical guidelines, researchers say



Cambridge Analytica

About This Advan

Data drives all we do.

Cambridge Analytica uses data to change audience behavior. Visit our Commercial or Political divisions to see how we can help you.



Keynote Neil Selwyn @ LAK 2018, Sydney, Australia



Learning Analytics has a trust problem ...



Keynote Neil Selwyn @ LAK 2018, Sydney, Australia



... because Learning Analytics has the potential of becoming a high stakes assessment.

Education in the Industrial Revolution





https://commons.wikimedia.org/w iki/File:Coalbrookdale_loco.jpg Being in the next industrial revolution means we are in an education system, where the *norms, relationships and ways of teaching and learning are impacted.*

- Authority: Public -> Private Influence and power are redistributed
- New (AI) actors: Feedback to students from machines
- Data ownership:

Increased access for some may mean reduced access for others

• False-truths:

Early products with simplistic reasoning don't represent what learning is really about

Black box vs. White box





Unknown algorithms Unknown data collection Automated decisions No access to raw data No control who uses it Assessment culture



Open algorithms Transparent indicators No automated decisions Full access to data Knowing who accesses your data Feedback culture

GDPR 2018



- Right to be informed
- Right of access
- Right to rectification
- Right to erasure
- Right to restrict processing
- Right to data portability
- Right to object automated decision making



Do your Learning Technology systems support these rights? Hands-up!

Lecture structure





4. Approaches towards Trusted Learning Analytics

Some things are already on its way





http://www.open.ac.uk/students/charter/ess ential-documents/ethical-use-student-datalearning-analytics-policy#

Jisc		
Code learni	of practice for ng analytics	
June 2015		
Introduction Learning analysis	Educational metadors in the UK almostly have after management practices and their field almost students and their	mattan: ci tave
Code c analyti Setting out tl ensure that l appropriately	of practice for learning CS ne responsibilities of educational institutions to earning analytics is carried out responsibly, and effectively.	About this guide Authors Nisi Science Consultant and director, Solare Digital List Paul Baller Pedisisher 4 June 2015 Updated: 15 August 2016
Contents	Introduction	Download as PDE
Introduction Nexponsibility Transparency and consett	Learning analytics uses data about students and their activities to understand and improve educational processes, and provide bette	help institutions r support to learners.
Privace	Learning analytics should be used for the benefit of students. This	might be to assist

https://www.jisc.ac.uk/sites/default/file s/jd0040_code_of_practice_for_learni ng_analytics_190515_v1.pdf

Some things are already on its way

DETERMINATION – Why you want to apply Learning Analytics? What is the added value (Organisational and data subjects)?

What is the added value (Organisational and data subjects)?
 What are the rights of the data subjects (e.g., EU Directive 95/46/EC)

EXPLAIN – Be open about your intentions and objectives

- What data will be collected for which purpose?
- How long will this data be stored?
- Who has access to the data?

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LEGITIMATE – Why you are allowed to have the data?

- Which data sources you have already (aren't they enough)?
 Why are you allowed to collect additional data?
- INVOLVE Involve all stakeholders and the data subjects
- Be open about privacy concerns (of data subjects)
- Provide access to the personal data collected (about the data subjects)
- Training and qualification of staff

CONSENT - Make a contract with the data subjects

- Ask for a consent from the data subjects before the data collection
- Define clear and understandable consent questions (Yes / No options)
- Offer the possibility to opt-out of the data collection without consequences

ANONYMISE – Make the individual not retrievable

- Anonymise the data as far as possible
- Aggregate data to generate abstract metadata models (Those do not fall under EU Directive 95/46/EC)

TECHNICAL – Procedures to guarantee privacy

- Monitor regularly who has access to the data
- If the analytics change, update the privacy regulations (new consent needed)
- Make sure the data storage fulfills international security standards

EXTERNAL - If you work with external providers

- Make sure they also fulfil the national and organisational rules
- Sign a contract that clearly states responsibilities for data security
- Data should only be used for the intended services and no other purposes

Drachsler, H. & Greller, W. (2016). Privacy and Analytics – it's a DELICATE issue. A Checklist to establish trusted Learning Analytics. 6th Learning Analytics and Knowledge Conference 2016, April 25-29, 2016, Edinburgh, UK.

Online at: http://www.laceproject.eu/ethics-privacy/





Some things are already on its way





Yi-Shan Tsai, Pedro Manuel Moreno-Marcos, Kairit Tammets, Kaire Kollom, and Dragan Gašević. 2018. SHEILA policy framework:

There is no other Educational Technology discipline **like** Learning Analytics that critically works on social implications of their outcomes and addresses institutional development.



Analytics and Knowledge (LAK '18). ACM, New York, NY, USA, 320-329. DOI:

https://doi.org/10.1145/31703 58.3170367

http://www.sheilaproject.eu

Lecture structure





Participatory Design-Process



- Design-Based Research (DBR)
- AB- testing



Barab, S. A. (2014). <u>Design-based research: a methodological toolkit for</u>
<u>engineering change</u>. In K. Sawyer (ed.) *Handbook of the Learning Sciences*, Vol 2, (pp. 233-270), Cambridge, MA: Cambridge University Press.

Moodle environment





Trusted Learning Analytics Infrastructure



- TLA is the first GDPR 2018
 conform Big Data
 infrastructure followed a
 value-based design
 approach
- Joined project with GU, DIPF und OU
- Among 'traditional' learning data we also aim to collect multimodal data.



Trusted Learning Analytics Dashboard



TRU LA		=			4 P 9	efaan Ternier 🛛 😋
Search	Q	Consent give or revoke permission for tracking				B Settings > Consent
MAIN NAVIGATION		Introduction				
🚯 Courses	~	This form provides you with detailed information about your rights when using the Trusted law provides to you in regard to the data that will be collected you you, test course	Learning Analytics Platform, Below	w, you are given an o	verview over all r	ghts that the
🏟 My Activities	×.		-			
		Data Collection This section provides detailed information about the data that is collected for use in	Data by Course			
		the TRULA environment. While the data is not collected on the TRULA website itself, you will be able to access and control the collection of the data from within the TRULA website.	Number of Forum Posts	thatled		
		Exam Grade Tracking	Assignment Grades	Enabled		DELETE
		A feature that tracks the grades of your exams. I agree to the collection of this data and understand the advantages that it will bring me From Oracle Teaching	Number of videos watched Number of messages to peers	Enabled		DELETE
		A feature that tracks the grades of your exams.	Download			
		me	You can download all the dats that has be created and you will be able to download / Create Download Archive Delete You can delete all of the dats that is store	en collected about you. If you t once it is ready. d about you.	s choose to do so, an ar	chove (.ztp) will be
			Contact			

You can contact us at any time if you have questions regarding the collection, storage, or processing of your data. If you want, you can contact us via Email or use the contact form below.

A Contact

Declaration of Consent



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How does the Technology-E



	What data will be collected from you?
nology-Enhanced Learr	Each of the four applications collects different types of data. Below you can read more details about the various types of data that will be collected in the environment.
Click to read more The Technology-Enhanced Lear 1. Virtual Learning Environn 2. Survey System (xAPI-Pro 3. Self Regulated Learning I 4. Lecture Attendance Appli These four applications are con from your interaction with the a need your consent to the collect	Vou can give your consent to each item individually. Alternatively, you can click the button below to give consent to all items at once. Cinsent to all Virtual Learning Environment (Moodle) Click to read more I consent to the usage of Virtual Learning Environment (Moodle) Self-Regulated Learning Dashboard (SEREne) Click to read more I consent to the usage of Self-Regulated Learning Dashboard (SEREne)
	Click to read more Click to read more Click to read more (xAPI-Probe)
	Lecture Attendance application (LAtency)
	Click to read more

I consent to the usage of Lecture Attendance application (LAtency)

SEREne Dashboard



Forethought Phase

	<	29.10.2018 - 04.11.2018	>
Plan		Monitor	Reflect
Study go	oal for	this week	
Daily Tir	ne Inve	estment	
Mon:		•	2.50
Tue:	0-		0.00
Wed:	0-		0.00
Thu:	0-		0.00
Fri:	0		0.00
Sat:	0-		0.00
Sun:	_	•	6.25
		Total: 8.75	

Performance Phase



Self-Reflection Phase



Weekly Goal Achievement



Top Reasons

Helped:

MIGN/95-12017		
Good Teacher Support		0
O	Good Time Management	0
63	Good Peer support	0
Sufficient Available Information		0
0	Too ambitious Learning Goals	0
0	Low Motivation	0
0	Bad Learning Strategy	
O	Bad Time Management	0

How to design your Trusted Learning Analytics





TACTIC Cube Trusted **A**nalytics Cube to Teach Institutional Change





- 1. Interviews with students (n=46)
- 2. Survey on Learning Analytics (n=166)
- 3. Group Concept Mapping Study (n=101, 46)
- 4. Feedback from students, and teachers on dashboards









Reflection





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Prediction



Customer	Reviews			
Average (Customer Rating			
***** (213 customer reviews)		Appearance	***** (277)	
5 star:	(153)	Portability	***** (270)	
4 star:	(38)	Bluetooth compatibility	****** (265)	
3 star:	(10)	Battery life	++++++ (244)	
2 star:	(8)	<u>Ductory me</u>	AAAAA (= V)	
<u>1 star</u> :	(4)	See and rate all 6 attri	butes.	















Scheffel, M., Ternier, S., & Drachsler, H. (2016a). *The Dutch xAPI Specification for Learning Activities (DSLA) – Registry*. Retrieved from <u>http://bit.ly/DutchXAPIreg</u> <u>http://www.laceproject.eu/blog/xapi-dsla/</u>







seming Analytics



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Verbert, K., Duval, E., Klerkx, J., Govaerts, S., & Santos, J. L. (2013). Learning analytics dashboard applications. *American Behavioral Scientist*.





DETERMINATION - Why you want to apply Learning Analytics? What is the added value (Organisational and data subjects)? • What are the rights of the data subjects (e.g., EU Directive 95/46/EC) EXPLAIN – Be open about your intentions and objectives F What data will be collected for which purpose? How long will this data be stored? Who has access to the data? LEGITIMATE – Why you are allowed to have the data? Which data sources you have already (aren't they enough)? Why are you allowed to collect additional data? INVOLVE - Involve all stakeholders and the data subjects Be open about privacy concerns (of data subjects) ► Provide access to the personal data collected (about the data subjects) Training and qualification of staff CONSENT - Make a contract with the data subjects Ask for a consent from the data subjects before the data collection Define clear and understandable consent questions (Yes / No options) Offer the possibility to opt-out of the data collection without consequences ANONYMISE – Make the individual not retrievable Anonymise the data as far as possible Aggregate data to generate abstract metadata models (Those do not fall under EU Directive 95/46/EC) TECHNICAL – Procedures to guarantee privacy Monitor regularly who has access to the data If the analytics change, update the privacy regulations (new consent needed) Make sure the data storage fulfills international security standards EXTERNAL – If you work with external providers Ε Make sure they also fulfil the national and organisational rules Sign a contract that clearly states responsibilities for data security Data should only be used for the intended services and no other purposes

Drachsler, H. & Greller, W. (2016). Privacy and Analytics – it's a DELICATE issue. A Checklist to establish trusted Learning Analytics. LAK 2016, April 25-29, Edinburgh, UK.

Engelfriet, A., Jeunink, E., Manderveld, J. (2015). Learning analytics onder de Wet bescherming persoonsgegevens

LEARNING ANALYTICS ONDER DE WET BESCHERMING PERSOONSGEGEVENS

IPF

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Drachsler, H., Stoyanov, S., d'Aquin, M., Herder, E., Dietze, S., & Guy, M. (2014, 16-19 September). An Evaluation Framework for Data Competitions in TEL. 9th European Conference on Technology-Enhanced Learning (EC-TEL 2014), Graz, Austria.







Critical thinking



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1.Data literacy

2.Agency

3. Privacy understanding







Trusted Learning Analytics Cube





Take home messages



- 1. We need to actively develop and apply learning analytics tools to have informed discussion what are the effects on the stakeholders.
- 2. We need participatory design approaches to involve all stakeholders in learning analytics and train their agency and data literacy skills.
- 3. We have an **opportunity** through the GDPR and the stakeholder discourse in point 2 to **design more humanistic Trusted Learning Analytics**.

Learning Analytics & **Knowledge Conference 2020**



Educational Research and Educational Information



http://lak20.solaresearch.org

- Past, present and future friends of the LAK community will discuss challenges faced and opportunities for the future
- In the heart of Europe, at Germany's most beautiful campus
- Easy fly in and out











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