

Can you tell if they're learning?

Using a pedagogical framework to measure pedagogical activity

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Motivations

- Problems finding/evaluating Web resources¹.
- Ineffective tagging².
- Resources unrecognised as useful for learning.
- Potential for comments.

[1] M. B. Eisenberg, “Information literacy: essential skills for the information age,” *DESIDOC Journal of Library and Information Technology*, vol. 28, no. 2, 2010, pp. 39-47.

[2] M. Bienkowski & J. Klo, “The Learning Registry: applying social metadata for learning resource recommendations,” Springer, 2014, pp. 77-95.

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Learning analytics

- ‘Trace data’ proxy for learning.
- SNA, discourse, predictive modelling³.
- Methods are inaccurate⁴.



[3] S. Dawson, D. Gašević, G. Siemens & S. Joksimovic, “Current state and future trends: a citation network analysis of the learning analytics field,” ACM International Conference Proceeding Series, 2014, pp. 231-240.

[4] Gašević, D. 2015. Comments during plenary session at LAK '15 the 5th International Learning Analytics and Knowledge Conference. Poughkeepsie, NY, USA — March 16 - 20, 2015

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...typical measurements include time spent, number of logins, number of mouse clicks, number of accessed resources, number of artifacts produced, number of finished assignments, etc. But is this really getting to the heart of the matter?

Eric Duval, 2011

Duval, E. (2011). Attention please! Learning Analytics for Visualization and Recommendation. In Proceedings of LAK11: 1st International Conference on Learning Analytics and Knowledge, 9–17. February 27-March 1, 2011, Banff, Alberta.

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Pedagogical frameworks

- Develop effective interventions.
- Constructivism, experiential & reflection.
- Pragmatic methods.



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What is DiAL-e?

- Familiarity.
- Non-hierarchical⁵.
- Facilitates social interaction⁵.
- Suitable for evaluating comments



[5] S. Atkinson, "What is the DiAL-e Framework?," 2009; <http://dial-e.net/what-is-the-dial-e/>.

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What is DiAL-e?

Learning Design	Description
Engagement	
Stimulation	Inspiring learner engagement.
Narrative	Storytelling using digital artefacts.
Authoring	Creating a digital artefact. Learning by doing.
Empathising	Understanding other perspectives.
Knowledge construction	
Collaboration	Supportive interaction.
Conceptualisation	Consolidate learning about concepts & procedures.
Inquiry	Attempting to solve a real world issue.
Reflection	
Research	Searching for and researching materials.
Representations	Developing skills in media-literacy.
Figurative	Using content as a metaphor for other purposes.
Non-DiAL-e categories	
Technical	Related to course management.
Non-relevant	Off-topic.

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Language analysis

- Word pattern and content analysis⁶.
- Coding patterns in dialogue⁷.
- Identify pedagogically meaningful dialogue⁸.

[6] J. W. Pennebaker, M. R. Mehl, & K. G. Niederhoffer, “Psychological aspects of natural language use: our words, our selves,” *Annual Review of Psychology*, 54(1), 2003, pp. 547-577.

[7] M. A. Khawaja, F. Chen, & N. Marcus, “Using language complexity to measure cognitive load for adaptive interaction design,” *Proc.15th International Conference on Intelligent User Interfaces*, 2010, pp. 333-336.

[8] A. De Liddo et al., “Discourse-centric learning analytic,” *Proc. of the 1st International Conference on Learning Analytics and Knowledge*, 2011, 23–33

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Data



Archaeology of Portus: exploring the lost harbour of ancient Rome

Learn how ancient artefacts, written evidence, excavation and digital technologies are transforming understanding of this harbour.

Go to course - started 19
May

UNIVERSITY OF
Southampton

FREE online course

Duration: 6 weeks

2 hours pw

Method



- Code 525 comments from 12 steps (2.4%).
- Categorised and scored learning activity by DiAL-e.
- Calculate average Dial-e values per step (PV).

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Examples

Narrative	“I see a lot of activity and people...Walking around I find a few shops, mostly selling food and drink...”
Authoring	“I have started my digital museum by collecting the exhibits: http://www.scoop.it/t/xxxx ”
Empathising	“If I had a circus in my gardens, I would put it to all sorts of uses depending on season.”
Collaboration	“The Louvre site is amazing! The Atlas database even tells you what floors the artist I was looking for are on. Thank you again.”
Conceptualisation	“The theory of a training amphitheatre may be credible as we have learned that animals used in the Coliseum arrived by ship”
Inquiry	“Is it not possible that candidates might have had a small training area?”
Research	“Roman theatres were half circles and had a back wall: there is a beautiful one near Avignon”
Representations	“My museum would start with aerial photographs of the area, then a description of the history...”
Figurative	No examples found.
Technical	“I have spent three hours looking at the data, etc.”
Non-relevant	“I have absolutely loved this course and I don't want it to end!”

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Method

- Linguistic Inquiry and Word Count¹⁰.
- Graph density¹¹.



[10] J. W. Pennebaker et al., “The development and psychometric properties of LIWC2007,” University of Texas, 2007.

[11] D. W. Wortham, “Nodal and matrix analyses of communication patterns in small groups,” *Proc. Computer Support for Collaborative Learning Conference (CSCL 1999)*, 1999, pp. 681-686.

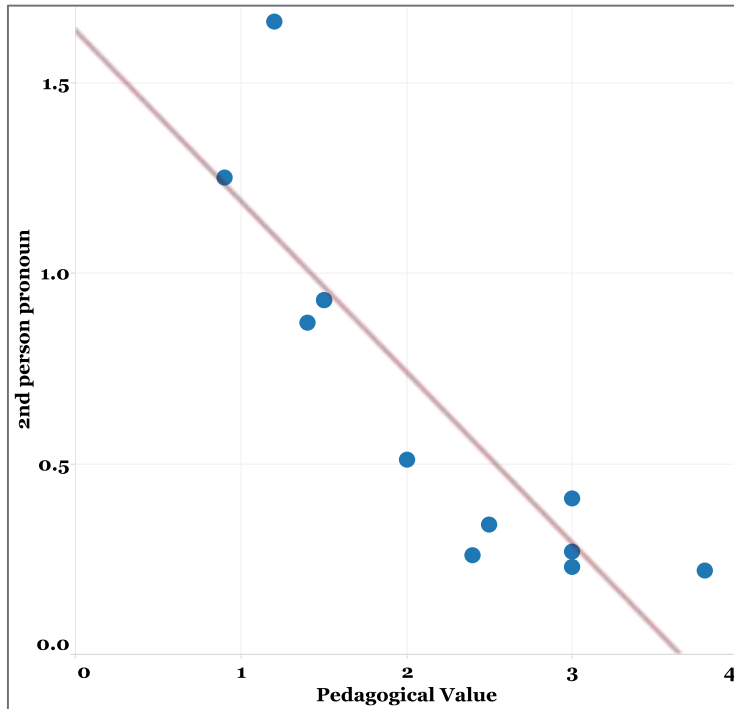
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Results

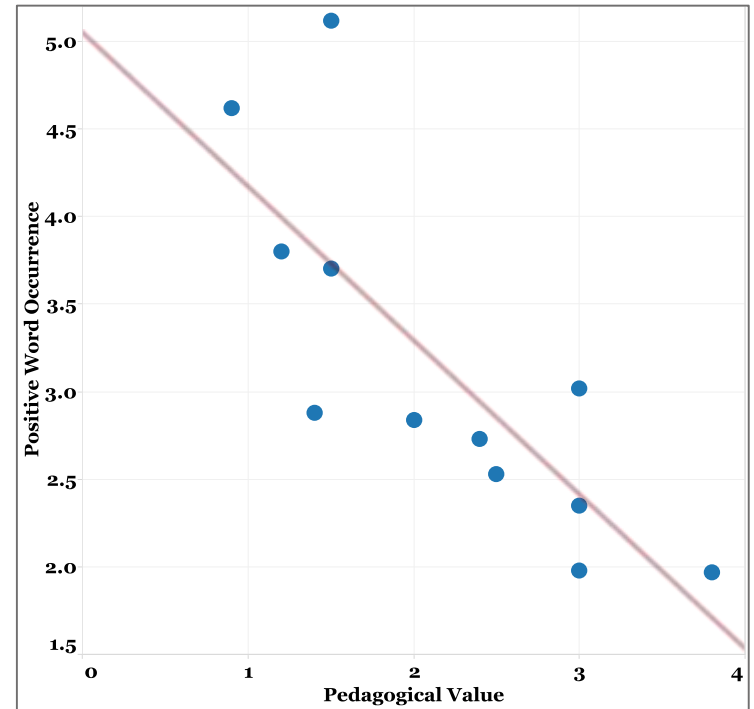
Variable	Adj. R ²	P-value	Corr. with PV
2nd person pronoun	0.721	<0.001	Negative
Positive emotion	0.601	0.002	Negative
Preps	0.463	0.009	Positive
Graph Density	0.068	0.21	Negative
Average words per sentence	0.049	0.239	Positive

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Results



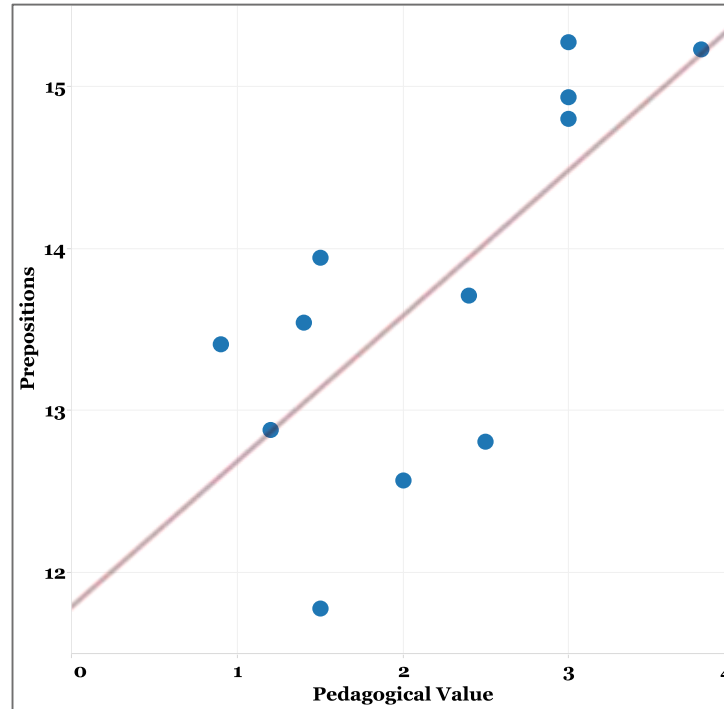
Correlation between
2nd person pronoun and PV



Correlation between
Positive emotion words and PV

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Results



Correlation between prepositions and PV

[12] Y. R. Tausczik & J. W. Pennebaker, "The psychological meaning of words: LIWC and computerized text analysis methods," *Journal of Language and Social Psychology*, vol. 29, no. 1, 2010, pp. 24-54.

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[13] A. F. Hadwin et al., "Examining trace data to explore self-regulated learning," *Metacognition and Learning*, vol. 2 no. 2-3, 2007, pp. 107-124.

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Conclusions

- no correlation between pedagogic activity and language complexity and graph density.
- correlation with linguistic markers of socially engaging language (-ve) and informational language (+ve).

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Recent work

- Coded a larger sample.
- Applied more, different frameworks.
- Undertaken IRR.

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Future work

- Diverse subjects.
- Machine learning.
- Interviews.
- Visualisation.

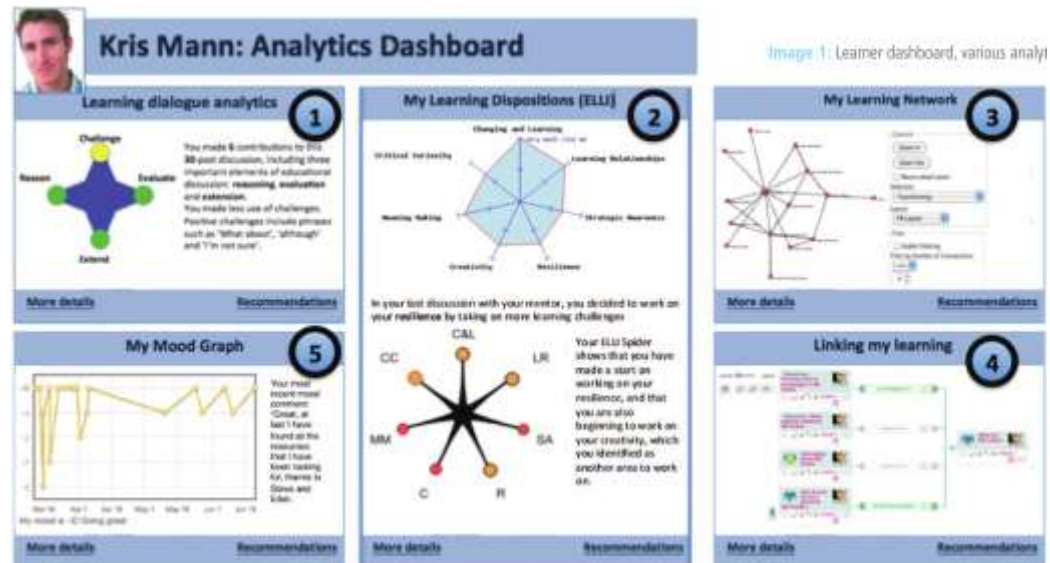


Image 1: Learner dashboard, various analyt

G. Siemens, D. Gasevic, C. Haythornthwaite, S. Dawson, S. B. Shum, and R. Ferguson (2011). "Open Learning Analytics : an integrated & modularized platform Proposal" Knowl. Creat. Diffus. Util.

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Thank you...



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