

MONASH University

Impact of Feedback: Opportunities for Learning Analytics

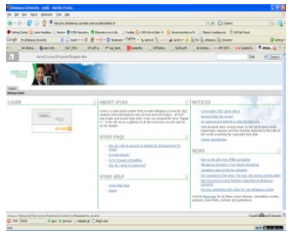
Dragan Gašević
@dgasevic

Sep 8, 2020
DAFFI 2020

Learning analytics

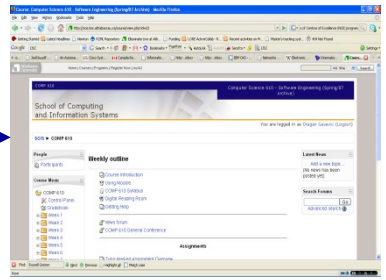
Learning analytics empower learners and educators

Feedback loops between students and instructors are missing/weak!





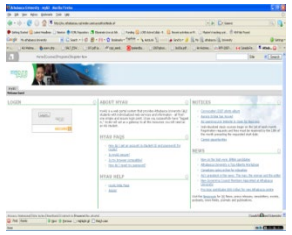
Educators



Learning environment

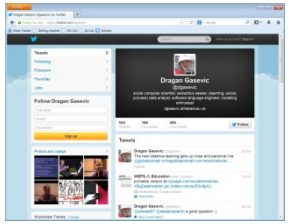
Learners

Student Information Systems





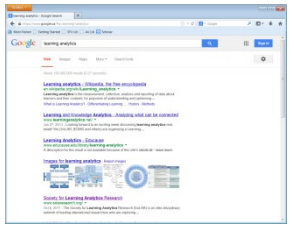
Mobile







Networks

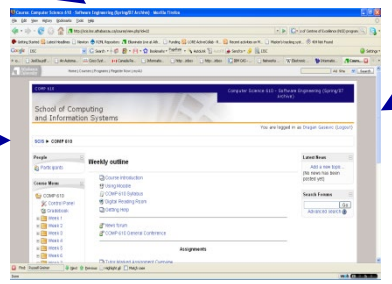




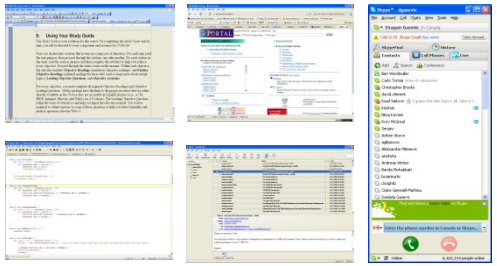
Search

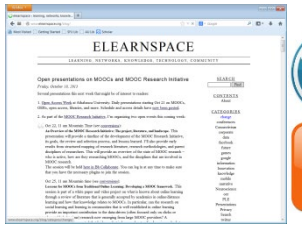
Educators





Learning environment







Blogs





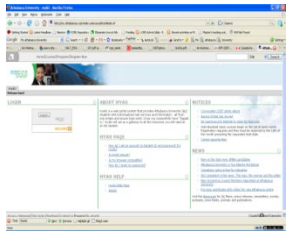


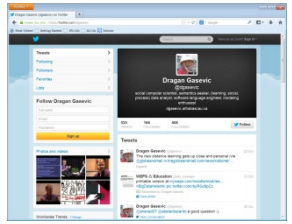


Videos/slides

Learners

Student Information Systems





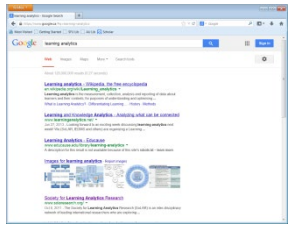




Networks

Mobile

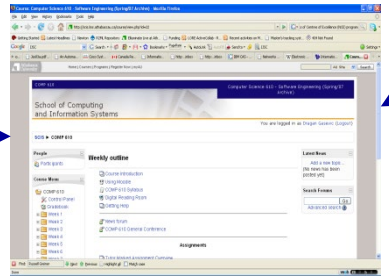




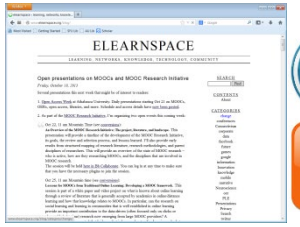


Search

Educators



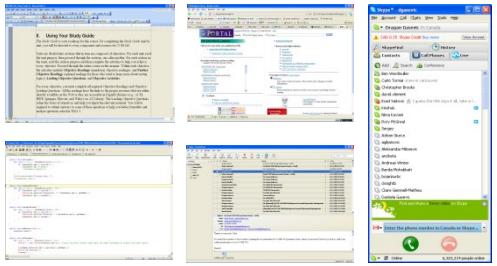
Learning environment





Blogs







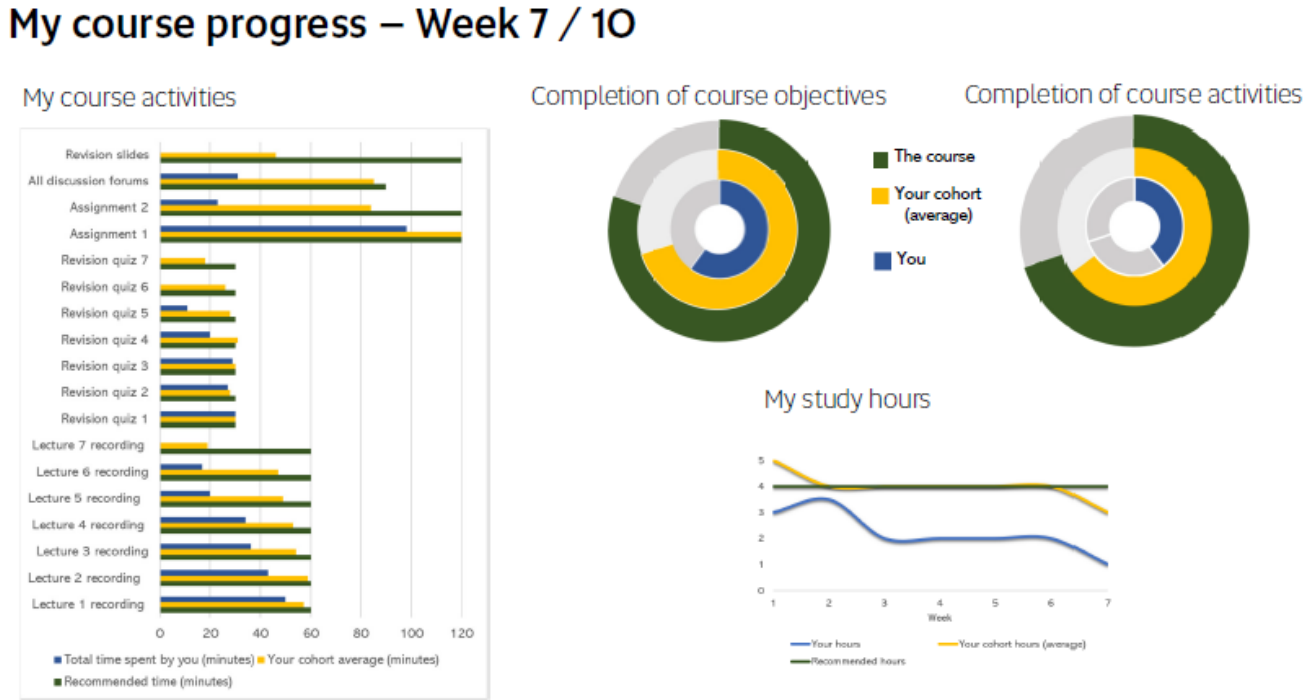


Videos/slides

DATA – THEORY – IMPACT – OPPORTUNITIES – FINAL REMARKS

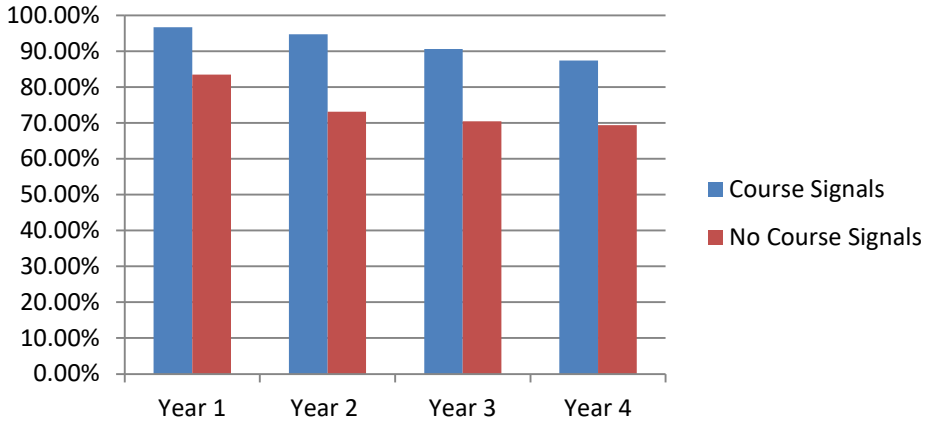
Feedback

Dashboards



course Signals





Student retention

Arnold, K. E., & Pistilli, M. D. (2012, April). Course Signals at Purdue: Using learning analytics to increase student success. In *Proceedings of the 2nd International Conference on Learning Analytics and Knowledge* (pp. 267-270).

Type of feedback matters

Tanes, Z., Arnold, K. E., King, A. S., & Remnet, M. A. (2011). Using *Signals* for appropriate feedback: Perceptions and practices. *Computers & Education*, *57*(4), 2414-2422.

Learners

Dashboards can be harmful

Can lower motivation

Lonn, S., Aguilar, S. J., & Teasley, S. D. (2015). Investigating student motivation in the context of a learning analytics intervention during a summer bridge program. *Computers in Human Behavior, 47*, 90-97.

Learners

Dashboards can be harmful

Can lower GPA

Chaturapruek, S., Dee, T. S., Johari, R., Kizilcec, R. F., & Stevens, M. L. (2018). How a Data-driven Course Planning Tool Affects College Students' GPA: Evidence from Two Field Experiments. In *Proceedings of the Fifth Annual ACM Conference on Learning at Scale* (pp. 63:1–63:10). New York, NY, USA: ACM.

Learners

Dashboards can be harmful

Offer little guidance and evoke negative emotions

Lim, L., Dawson, S., Joksimović, S., Gašević, D. (2019). Exploring students' sensemaking of learning analytics dashboards: Does frame of reference make a difference?. In *Proceedings of the 9th International Conference on Learning Analytics and Knowledge* (pp. 250-259). New York: ACM Press.

Feedback

Is the current generation of dashboards feedback?

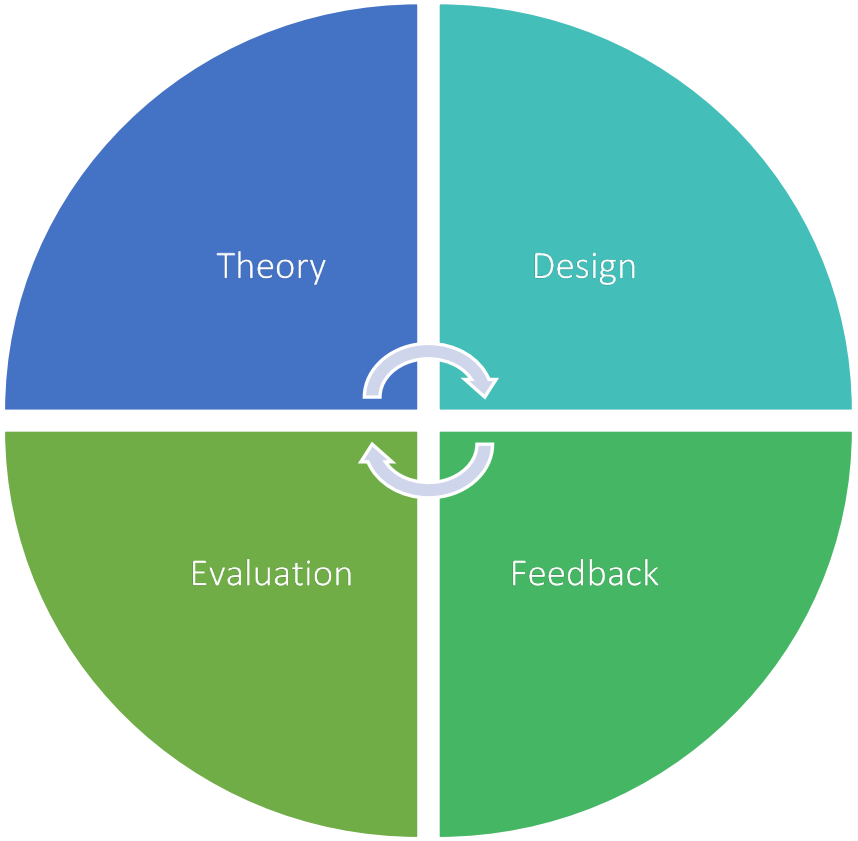
Matcha, W., Gasevic, D., & Pardo, A. (2020). A systematic review of empirical studies on learning analytics dashboards: A self-regulated learning perspective. *IEEE Transactions on Learning Technologies, 13*(2), pp. 226–245.

Direction

Abandoning preconceived design decisions

Don’t show what is easy to be visualized

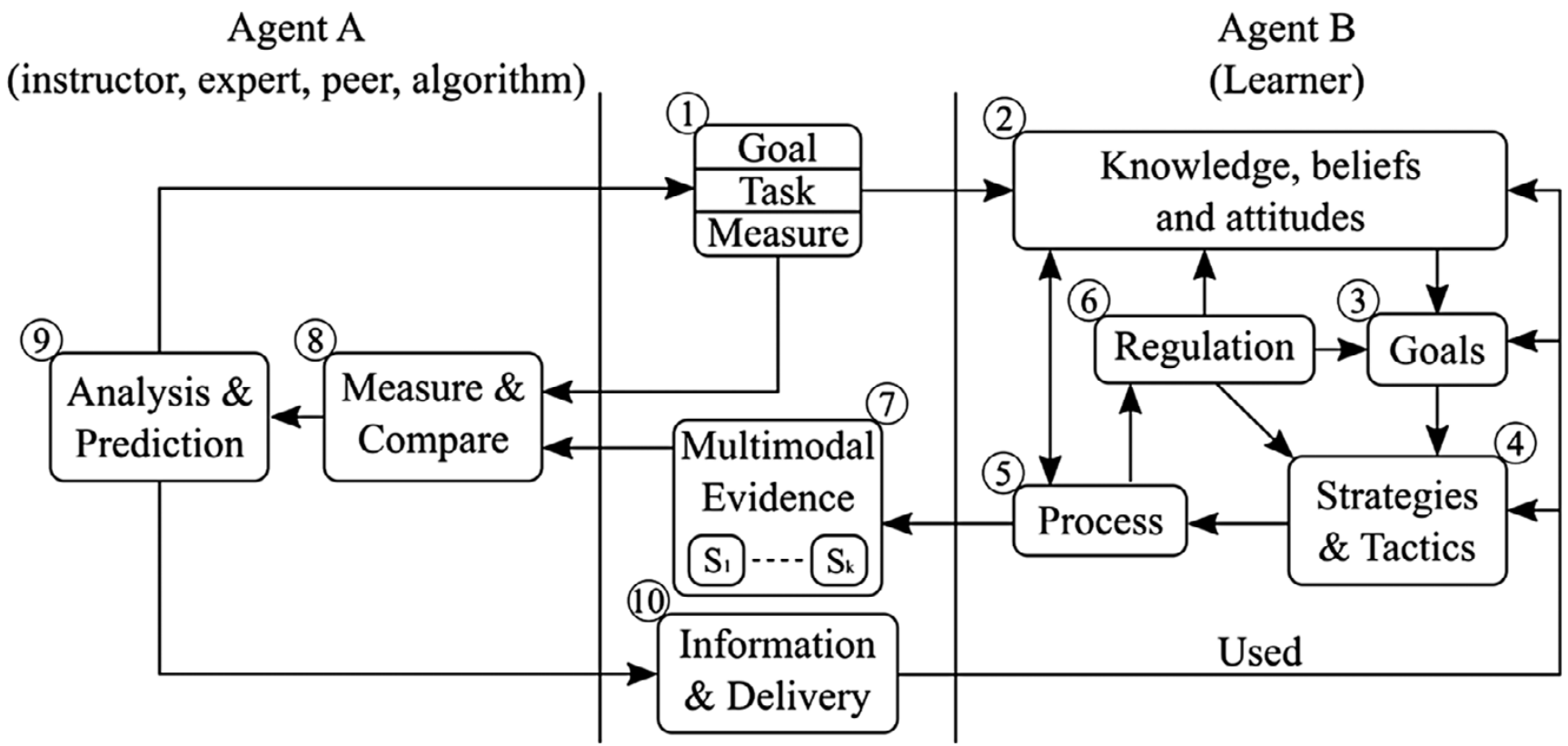
MULAS
Model of user-centered learning analytics systems



Matcha, W., Ahmad-Uzir, N., Gašević, D., Pardo, A., (2020). Systematic Review of Empirical Studies on Learning Analytics Dashboards: A Self-Regulated Learning Perspective. *IEEE Transactions on Learning Technology, 13*(2), 226–245.

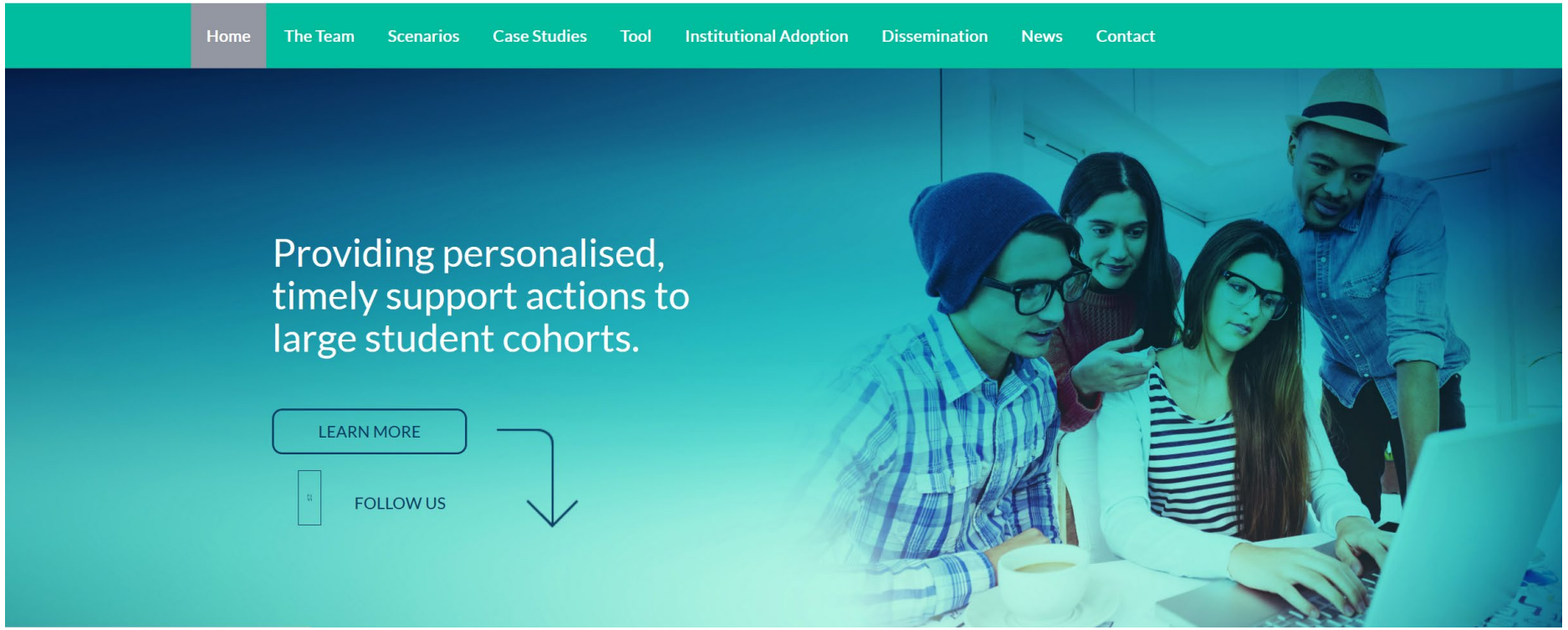
DATA – **THEORY** – IMPACT – OPPORTUNITIES – FINAL REMARKS

Feedback for data-rich learning experiences



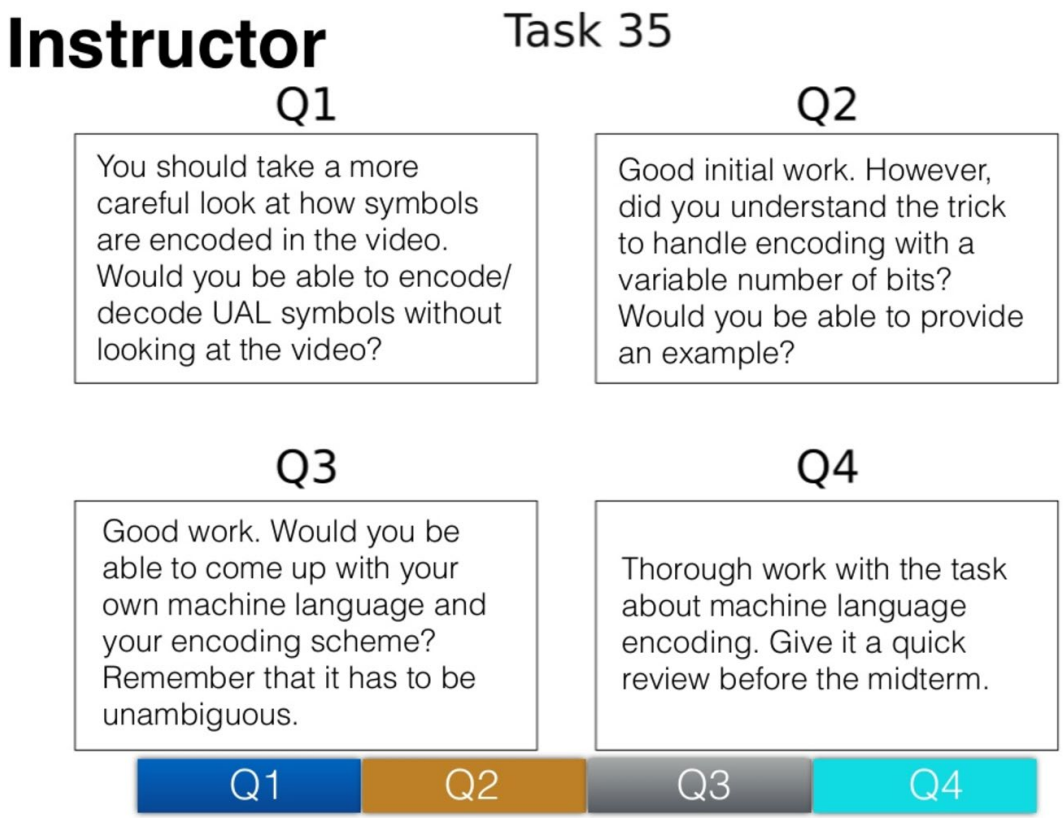
Pardo, A. (2018). A feedback model for data-rich learning experiences. *Assessment & Evaluation in Higher Education,* 43(3), 428-438.

http://ontasklearning.org



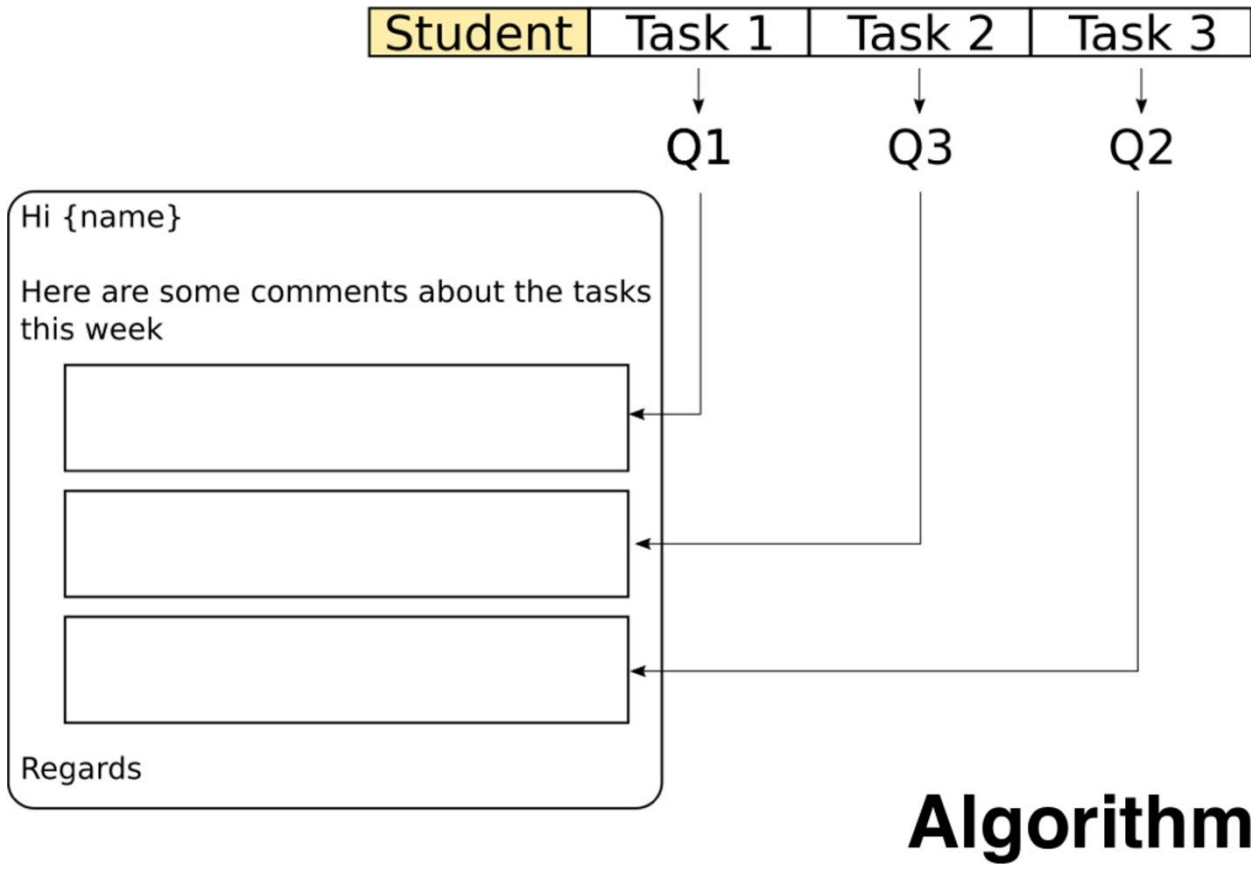
Pardo, A., Bartimote, K., Shum, S. B., Dawson, S., Gao, J., Gašević, D., ... & Moskal, A. C. M. (2018). OnTask: Delivering data-informed, personalized learning support actions. *Journal of Learning Analytics*, *5*(3), 235-249.

Analytics-based feedback



Pardo, A., Jovanović, J., Gašević, D., Dawson, S. (2019). Using Learning Analytics to Scale the Provision of Personalised Feedback. *British Journal of Educational Technology,* 50(1), 128-138.

Analytics-based feedback



Pardo, A., Jovanović, J., Gašević, D., Dawson, S. (2019). Using Learning Analytics to Scale the Provision of Personalised Feedback. *British Journal of Educational Technology,* 50(1), 128-138.

Analytics-based feedback

Hi [redacted]

Here are some comments and feedback about your lecture preparation in ELEC1601 during Week 2.

Automatic Email

Activity VIDEO: Encoding in base 2, 8 and 16

- Make sure you review again the whole content explained in the video of the activity. You could use a piece of paper and try to replicate the developments that are explained in the video.
- Give another round to the questions next to the video in this activity until you answer all of them correctly at the first attempt and without looking at the solutions.

VIDEO: Review of natural and integer number encoding

- Make sure you review again the whole content explained in the video in the activity. Encoding naturals is a procedure that you will be using very frequently in the following weeks.

VIDEO: Encoding Integers

- Review again the 2s complement encoding explained in the video in the activity. Repeat the procedure until you are able to do it very fast.
- You should give it another try to the questions next to the video in this activity. Try to work in the encoding until you have no incorrect answers in a full round.

Read about the floating point representation

- Good work with the questions in the section. You may take some of them and create variations (change number of bits for example) to make sure you fully understand the concepts.
- You should give it another try to the questions about range, accuracy and precision in section 2.7.2.
- Good work with the questions in section 2.7.3.

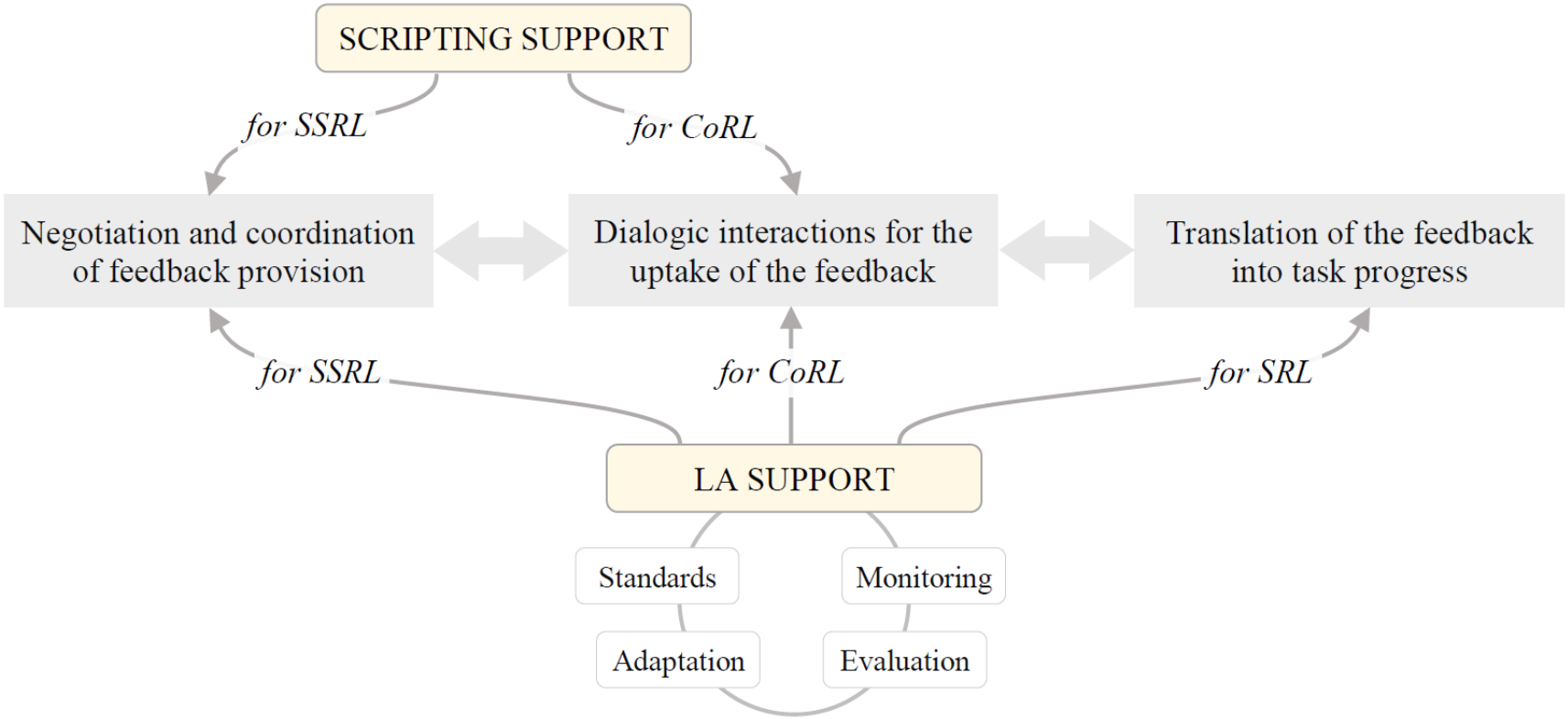
Sequence of problems about information encoding

- Good work with the exercises in the sequence. You may want to review it in a few days, or perhaps before the midterm.

Regards

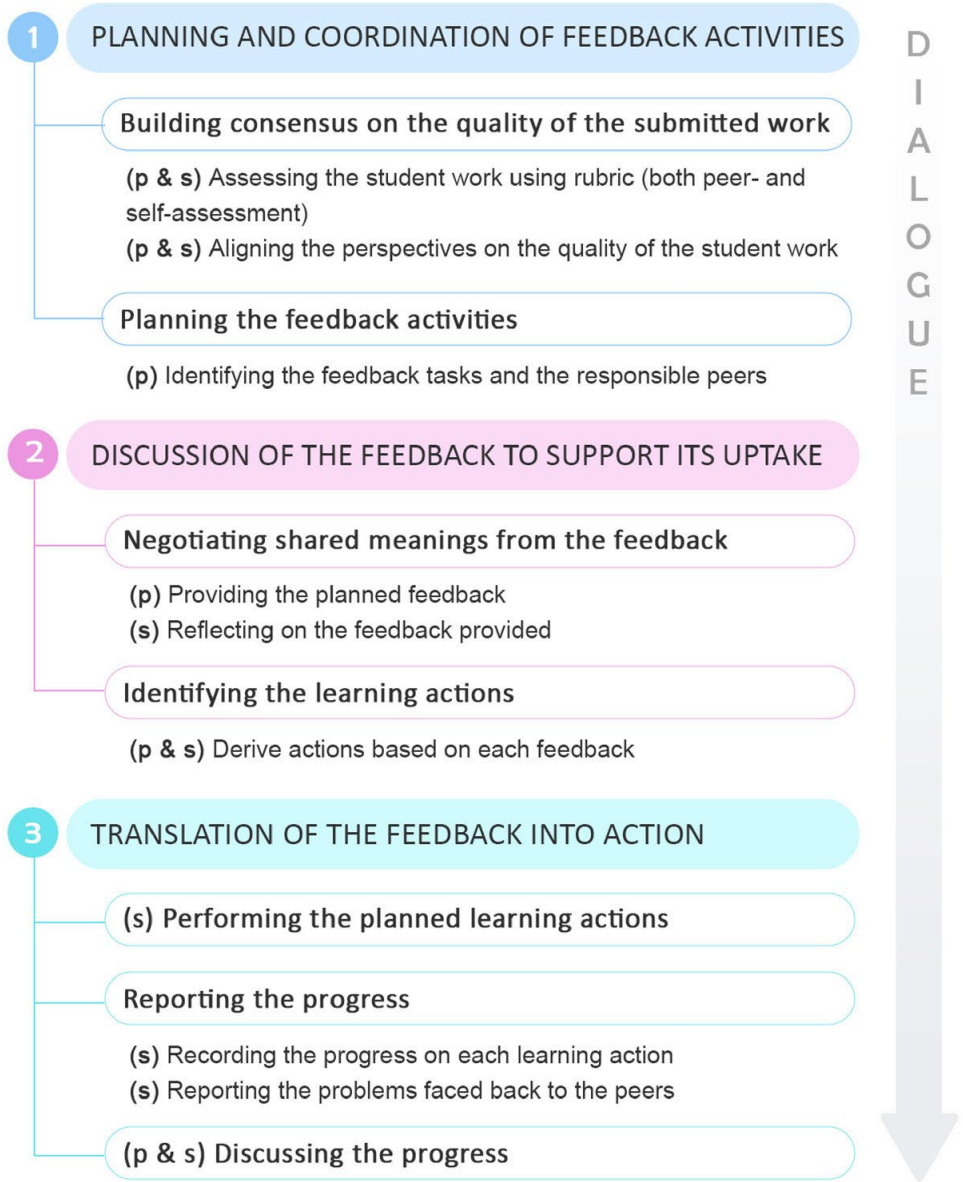
Pardo, A., Jovanović, J., Gašević, D., Dawson, S. (2019). Using Learning Analytics to Scale the Provision of Personalised Feedback. *British Journal of Educational Technology,* 50(1), 128-138.

Dialogic Peer Feedback



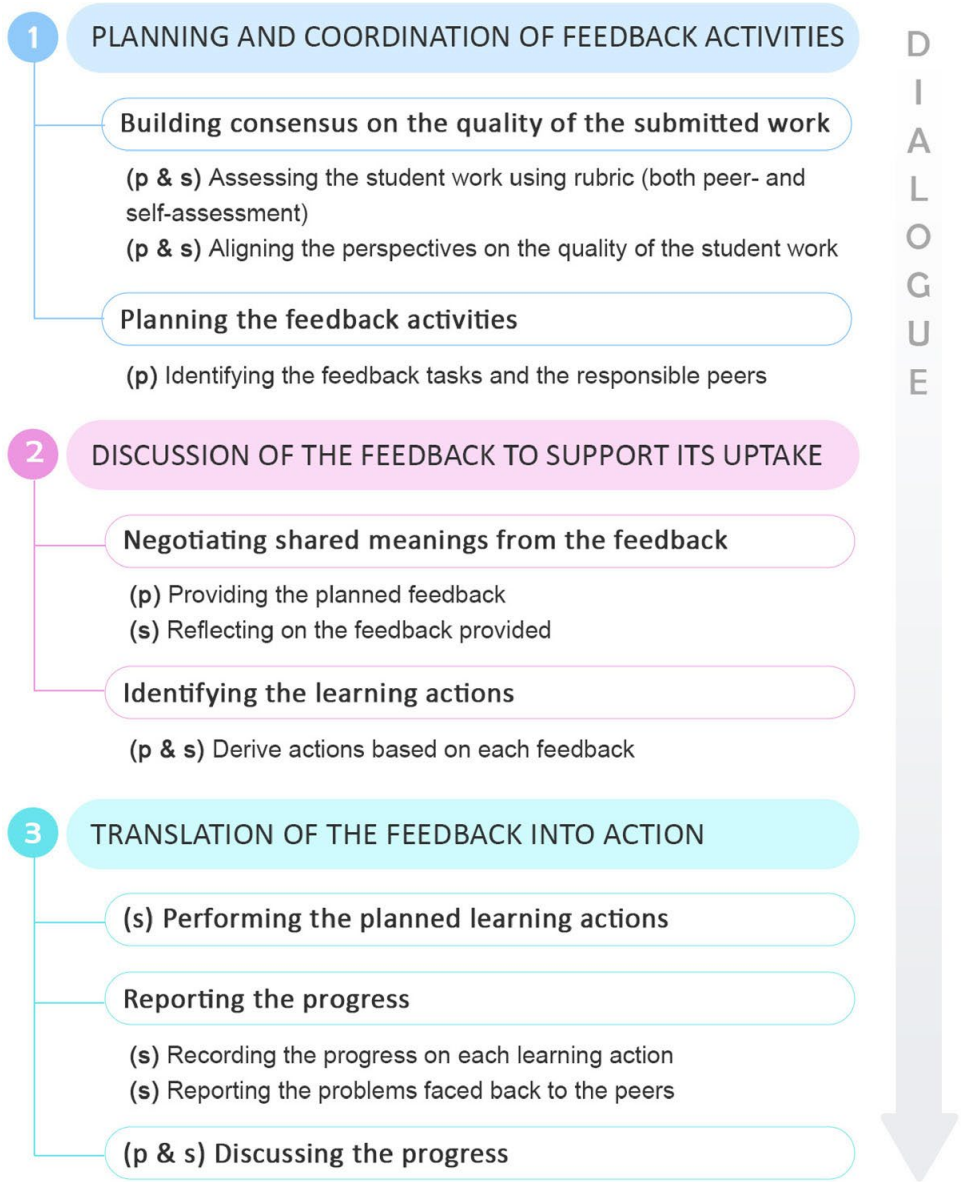
SRL – self-regulated learning, SSRL – socially-shared regulated learning, CoRL – co-regulated learning

Er, E., Dimitriadis, Y., Gašević, D. (2019). Scaling Dialogic Peer Feedback via Learning Analytics and Scripts. In *Proceedings of the 13th International Conference Computer Supported Collaborative Learning (CSCL 2019), Volume 2* (pp. 813-814). Lyon, France: ISLS



Dialogic Peer Feedback via Learning Analytics and Scripts

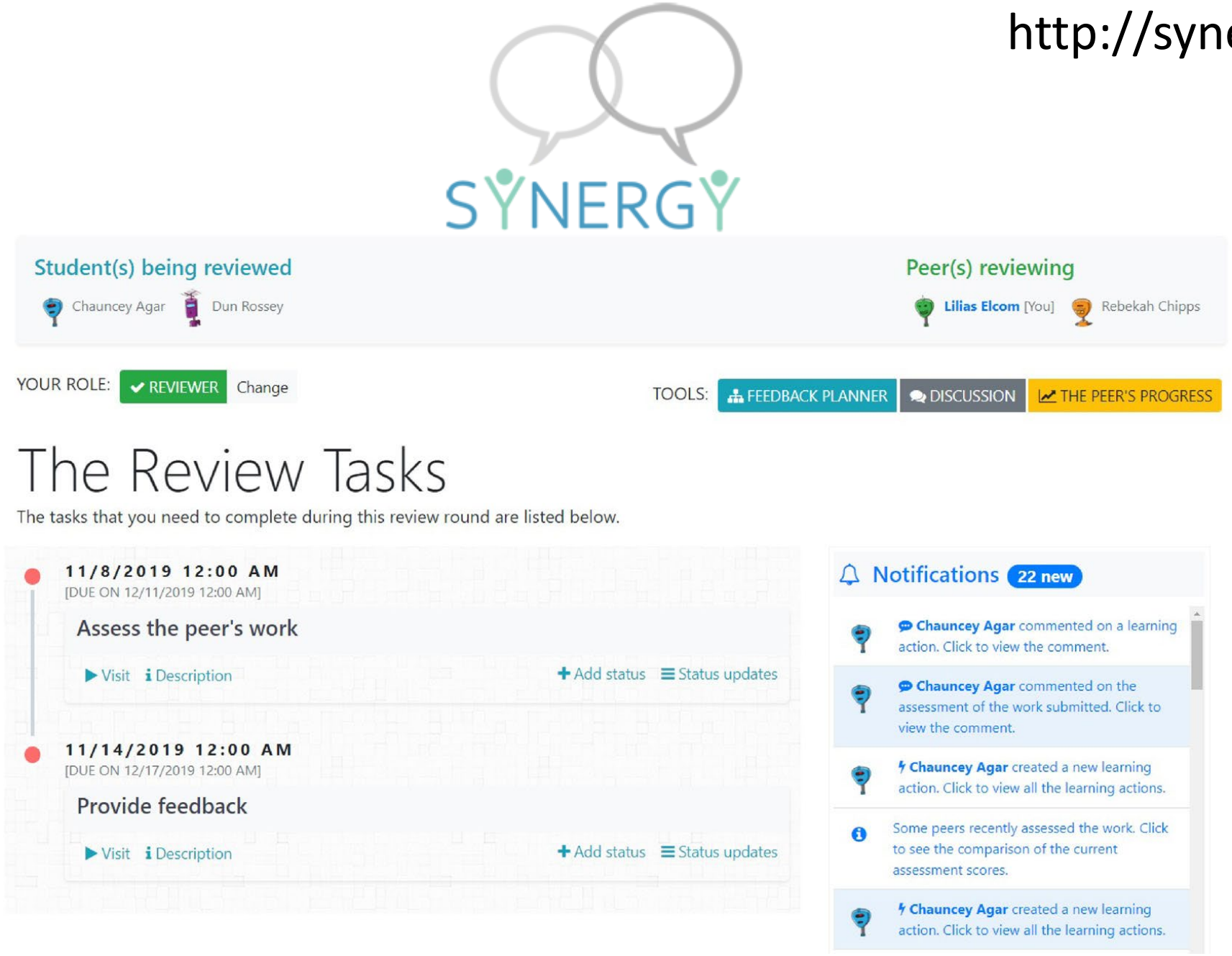
Er, E., Dimitriadis, Y., & Gašević, D. (in press). Collaborative peer feedback and learning analytics: theory-oriented design for supporting class-wide interventions. *Assessment & Evaluation in Higher Education*.



Dialogic Peer Feedback via Learning Analytics and Scripts

Er, E., Dimitriadis, Y., & Gašević, D. (in press). Collaborative peer feedback and learning analytics: theory-oriented design for supporting class-wide interventions. *Assessment & Evaluation in Higher Education*.

http://synergylearn.net



Er, E., Dimitriadis, Y., & Gašević, D. (in press). Collaborative peer feedback and learning analytics: theory-oriented design for supporting class-wide interventions. *Assessment & Evaluation in Higher Education*.

http://synergylearn.net

Assessments & Feedback Planning

« Go Back

Overview

34 students *(91.89 %)* participated in assessments.

3.34 is the average score based on all assessment scores.

2 discussion posts *(0.22 per submission)* about assessment scores.

14 feedback tasks *(1.56 per submission)* are created.

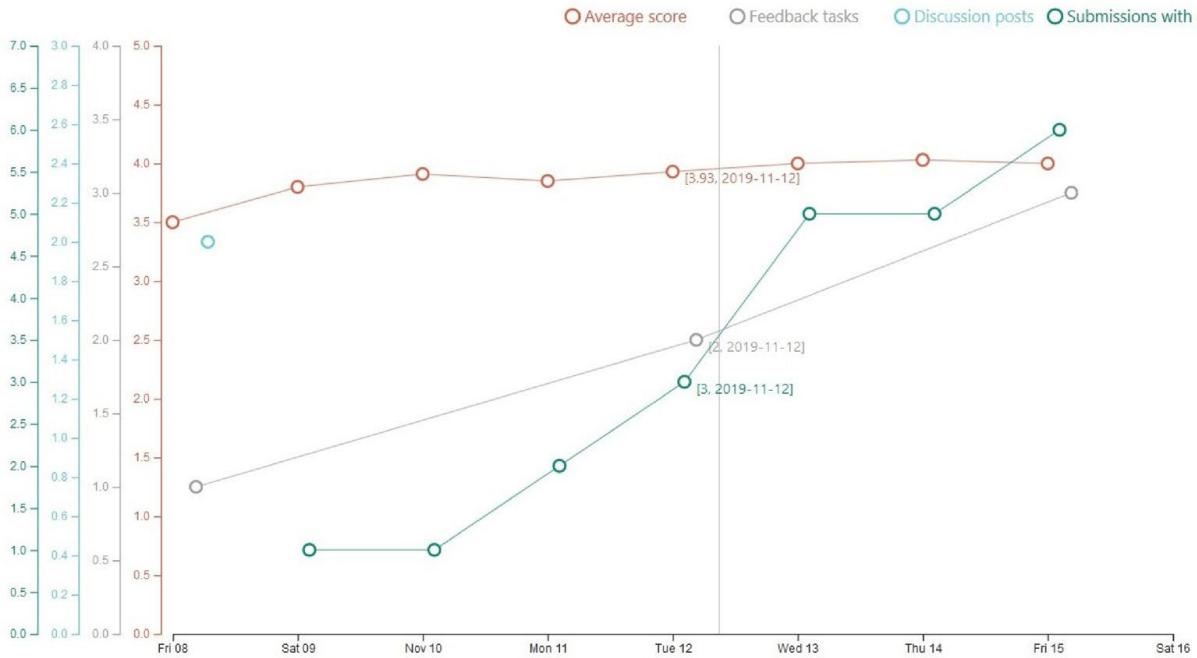
Highlights

Item(s) with the lowest (average) score:	CC	Item(s) with the highest (average) score:	AU
Item(s) with the least discussion:	AU TS	Item(s) with the most discussions:	PE
Item(s) with the least feedback tasks:	CC	Item(s) with the most feedback tasks:	CC
Item(s) with least conflicts :	AU	Item(s) with the most conflicts :	TI

Analytics per rubric item:

CC: CURRICULUM INTEGRATION

4 average score | feedback tasks | 2 discussion posts | 6 submissions with conflicts



Instructor dashboard for assessments and feedback planning

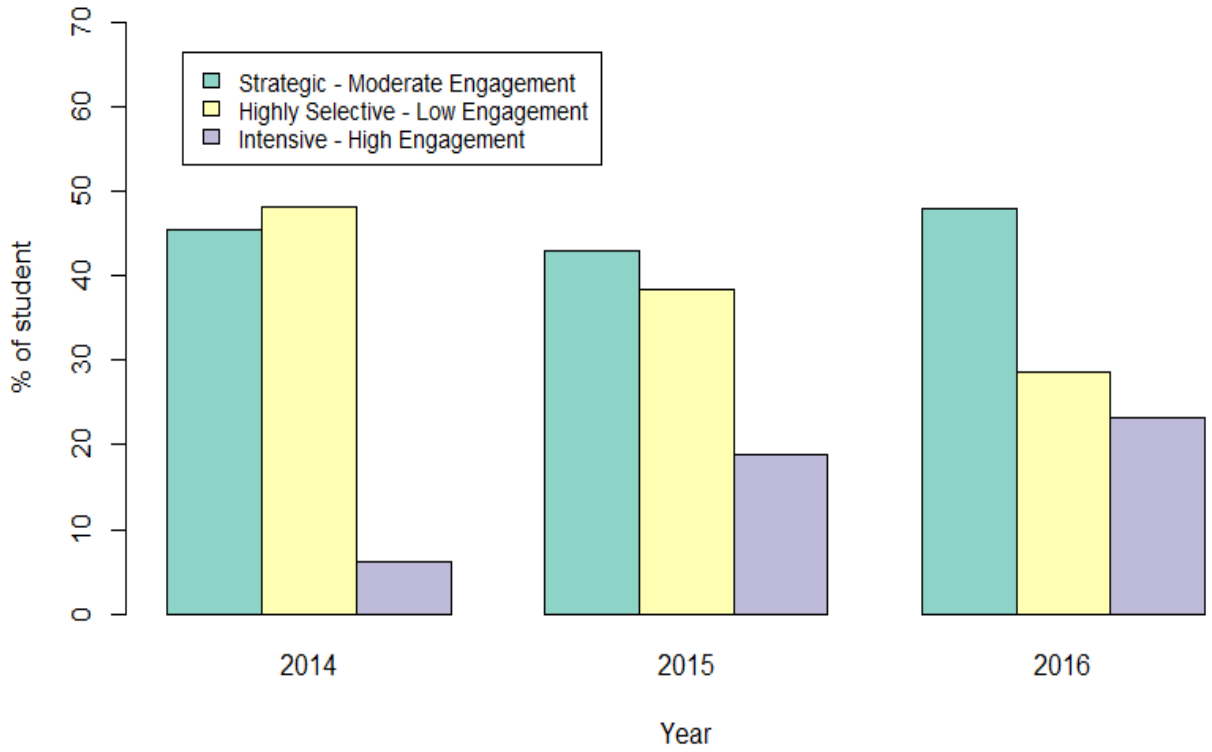
DATA – THEORY – **IMPACT** – OPPORTUNITIES – FINAL REMARKS

AI to measure impact of feedback

Effects on learning strategies, time management, and self-regulated learning

Fincham, E., Gašević, D., Jovanović, J., & Pardo, A. (2018). From study tactics to learning strategies: An analytical method for extracting interpretable representations. *IEEE Transactions on Learning Technologies*, *12*(1), 59-72.

Analytics-based feedback



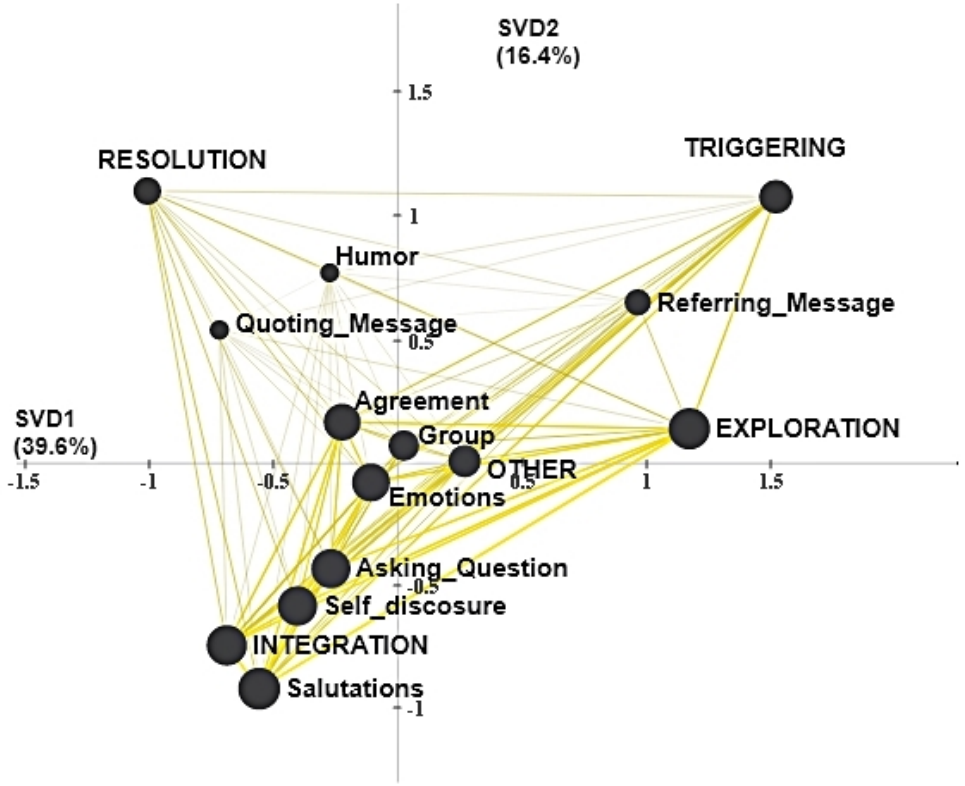
Matcha, W., Gašević, D., Ahmad Uzir, N., Jovanović, J., Pardo, A. (2019). Analytics of Learning Strategies: Associations with Academic Performance and Feedback. In *Proceedings of the 8th International Conference on Learning Analytics and Knowledge* (pp. 461-470), Tempe, AZ, USA.

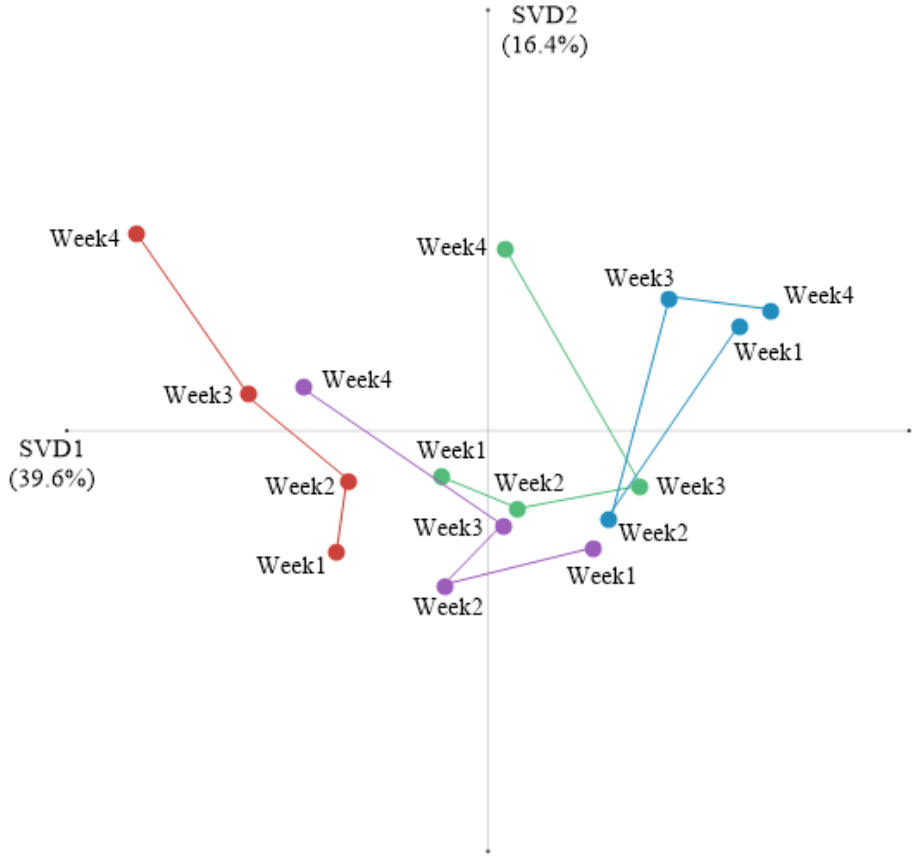
AI to measure impact of feedback

Effects on collaborative problem solving

Fincham, E., Gašević, D., Jovanović, J., & Pardo, A. (2018). From study tactics to learning strategies: An analytical method for extracting interpretable representations. *IEEE Transactions on Learning Technologies*, *12*(1), 59-72.

Tracking progression

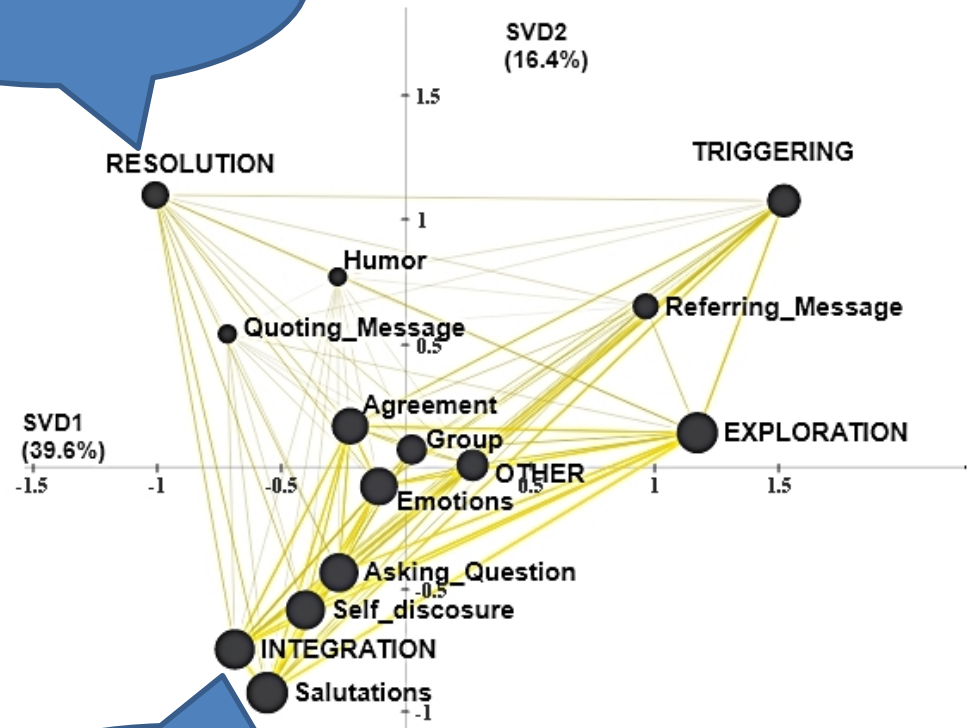




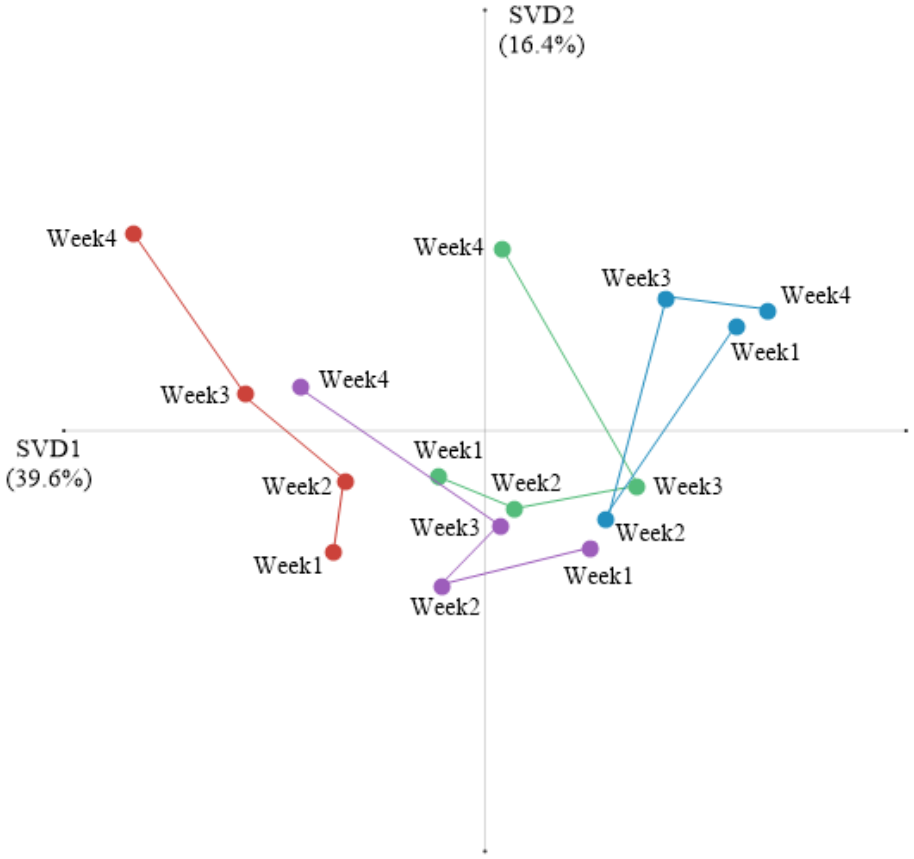
Rolim, V., Ferreira, R., Dueire, R., Gašević, D. (in press). A Network Analytic Approach to Uncovering the Relationship between Social and Cognitive Presences in Communities of Inquiry. *The Internet and Higher Education*.

Tracking progression

Resolution



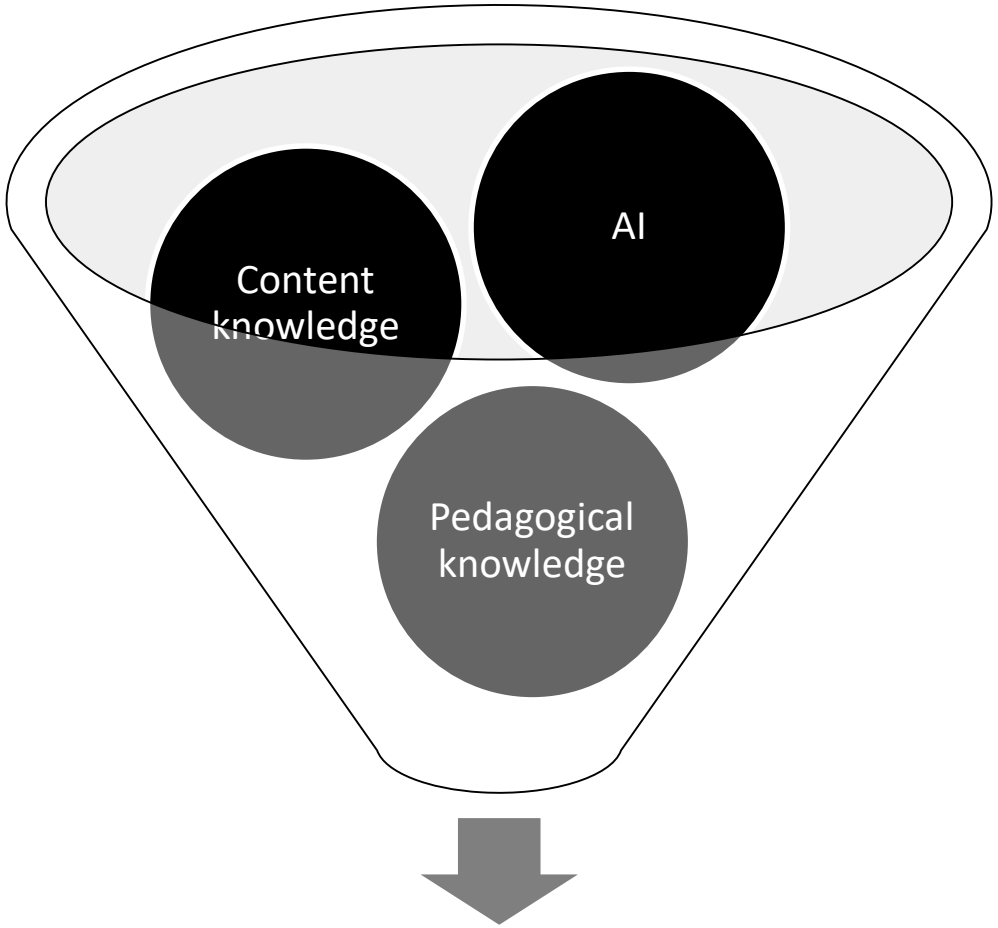
Integration



Rolim, V., Ferreira, R., Dueire, R., Gašević, D. (in press). A Network Analytic Approach to Uncovering the Relationship between Social and Cognitive Presences in Communities of Inquiry. *The Internet and Higher Education*.

DATA – THEORY – IMPACT – **OPPORTUNITIES** – FINAL REMARKS

Opportunities



Automated feedback analysis and generation

Analytics to enhance feedback quality

Automatic detection of use of good feedback practices

Cavalcanti, A. P., de Mello, R. F. L., Rolim, V., André, M., Freitas, F., & Gaševic, D. (2019). An analysis of the use of good feedback practices in online learning courses. In *2019 IEEE 19th International Conference on Advanced Learning Technologies (ICALT)* (pp. 153-157). IEEE.

Analytics to enhance feedback quality

Automatic detection of feedback types

Cavalcanti, A. P., Diego, A., Mello, R. F., Mangaroska, K., Nascimento, A., Freitas, F., & Gašević, D. (2020). How good is my feedback? a content analysis of written feedback. In *Proceedings of the Tenth International Conference on Learning Analytics & Knowledge* (pp. 428-437). ACM

Analytics to enhance feedback quality

Automatic detection of the ways how feedback is communicated

Lin, J., Lang, D., Xie, H., Gašević, D., & Chen, G. (2020). Investigating the Role of Politeness in Human-Human Online Tutoring. In *Proceedings of the 21st International Conference on Artificial Intelligence in Education* (pp. 174-179). Springer, Cham.

Analytics for feedback literacy

AI to generate feedback from data

Research in data-to-text and natural text generation

DATA – THEORY – IMPACT – OPPORTUNITIES –

FINAL REMARKS

Learning analytics

Learning analytics is about learning

Learning analytics

Learning analytics is about feedback

Learning analytics

Where data science, education, and design meet

Learning analytics

More opportunities for human-centred design needed



MONASH University

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@dgasevic

Sep 8, 2020
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