



Reimagining Assessment in the Age of Artificial Intelligence

Dragan Gašević
@dgasevic

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CITERS 2024
University of Hong Kong

Generative Artificial Intelligence



The Effects of ChatGPT in Schools and Why It's Getting Banned

Many schools are banning ChatGPT for plagiarism, accuracy and privacy concerns. However, the chatbot could help students and teachers with the right application.

By **April Miller**, Managing Editor of Consumer Technology at ReHack Magazine on June 13, 2023 in **Artificial Intelligence**

Policy decisions about the use of artificial intelligence in schools

The Guardian
A decade of making a difference

Artificial intelligence (AI)

ChatGPT ban in Australia's public schools likely to be overturned

Government reveals a draft framework has been formulated for how ChatGPT rollout will work in schools



Artificial intelligence

Artificial intelligence
will not go away



Source: <https://bit.ly/47NbA7D>



Over 80% of jobs, especially writing and IT, are predicted have at least 19% exposure to generative AI



Productivity in **problem solving support** increased by 35% for novice, but not for experienced workers



46% productivity increase in software engineers while maintaining code quality by using AI



Generative AI does not have inherent mechanisms to **distinguish facts from falsehoods**

☰

The Sydney Morning Herald

National AI

OPINION

Empowering learners for the age of artificial intelligence

Dragan Gasevic and George Siemens

December 10, 2020 – 7.30pm

Gašević, D. & Siemens, G. (2020). Empowering learners for the age of artificial intelligence, <https://bit.ly/smh-empower-ai>

Developing *adaptive learners* for the age of AI

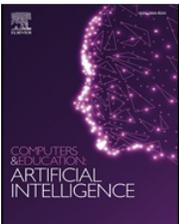
Computers and Education: Artificial Intelligence 4 (2023) 100130



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Computers and Education: Artificial Intelligence

journal homepage: www.sciencedirect.com/journal/computers-and-education-artificial-intelligence



Empowering learners for the age of artificial intelligence

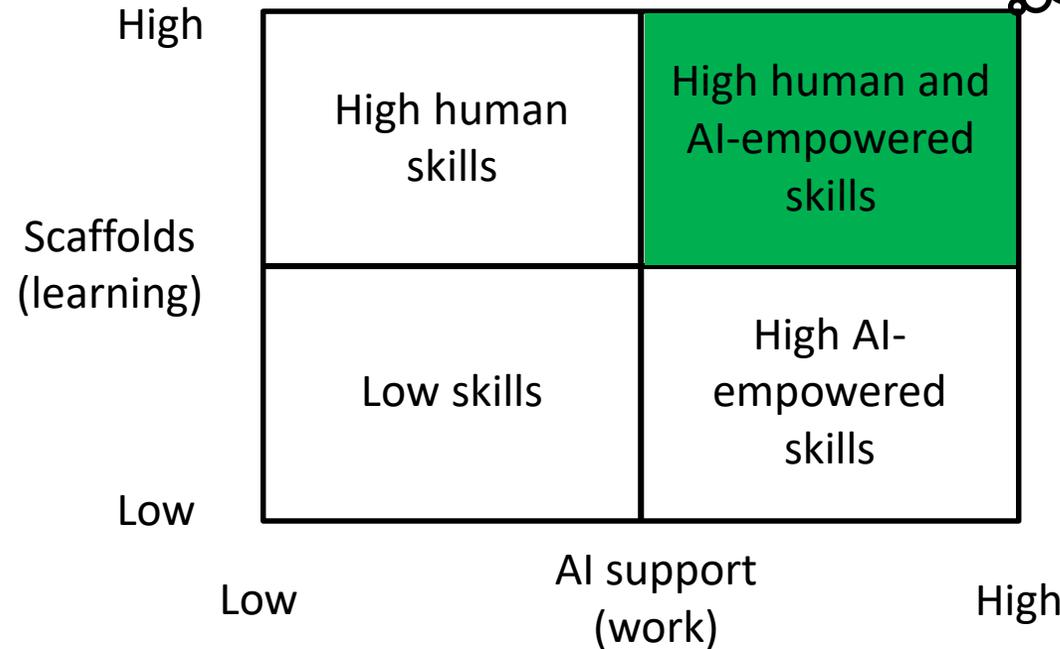


Gašević, D., Siemens, G., & Sadiq, S. (2023). Empowering learners for the age of artificial intelligence. *Computers and Education: Artificial Intelligence*, 4, 100130.

Ultimate goal

Developing human skills
while benefiting from the power of AI

Towards high human and AI-empowered skills



Scaffolds:

- aim to *improve human skills*
- can be implemented with AI

AI support:

- aims to *improve performance*
- has a good fit for the task
- requires knowledge of AI tool

Inspired by, but different conceptualization from

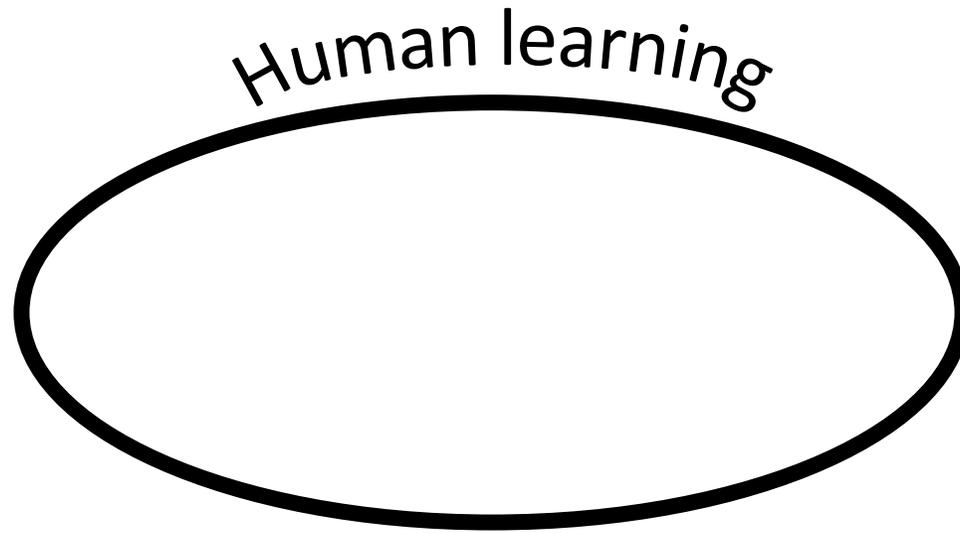
Cukurova, M. (2024). The interplay of learning, analytics, and artificial intelligence in education. *arXiv preprint arXiv:2403.16081*.

Shneiderman, B. (2022). *Human-centered artificial intelligence*. Oxford University Press

Today's talk

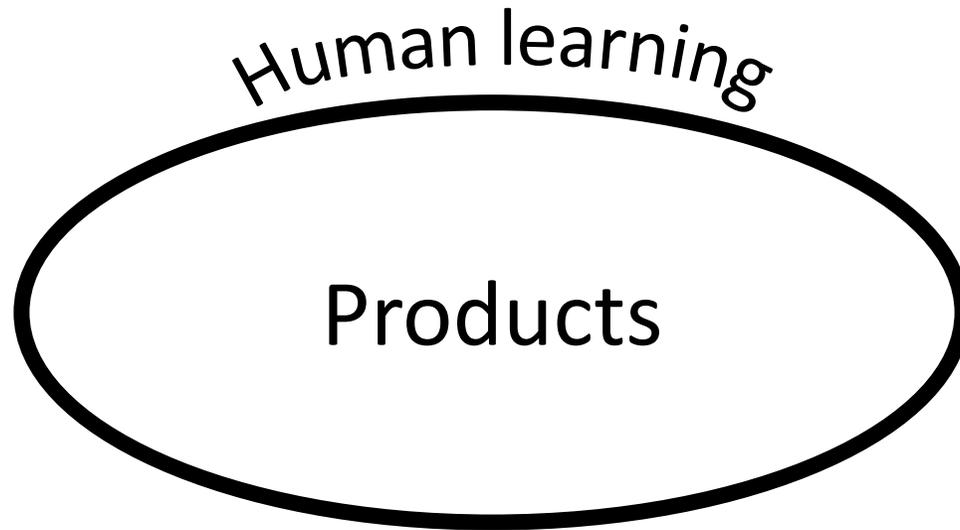
Reimagining the role of assessment in the age of AI

Artificial intelligence

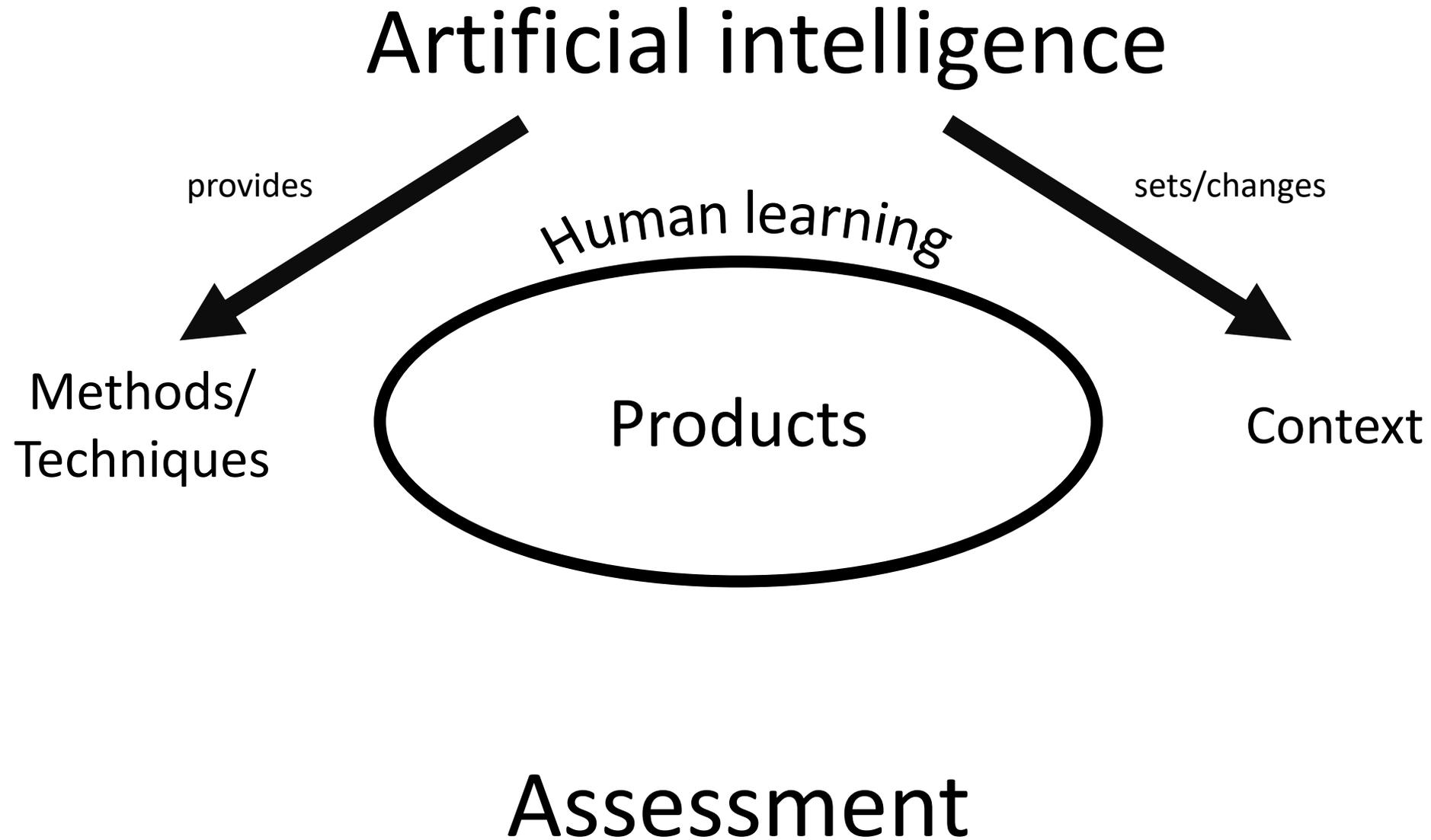


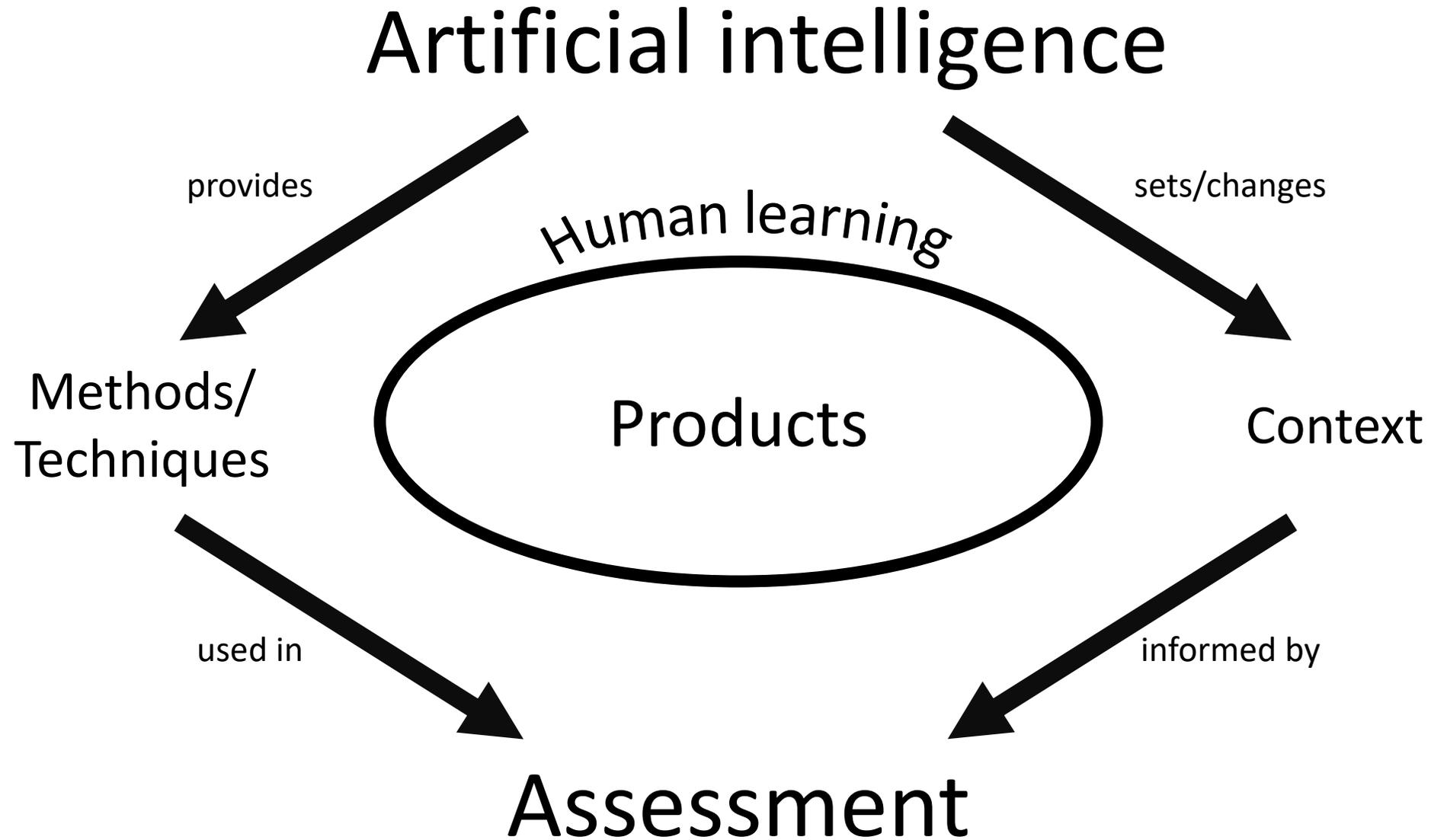
Assessment

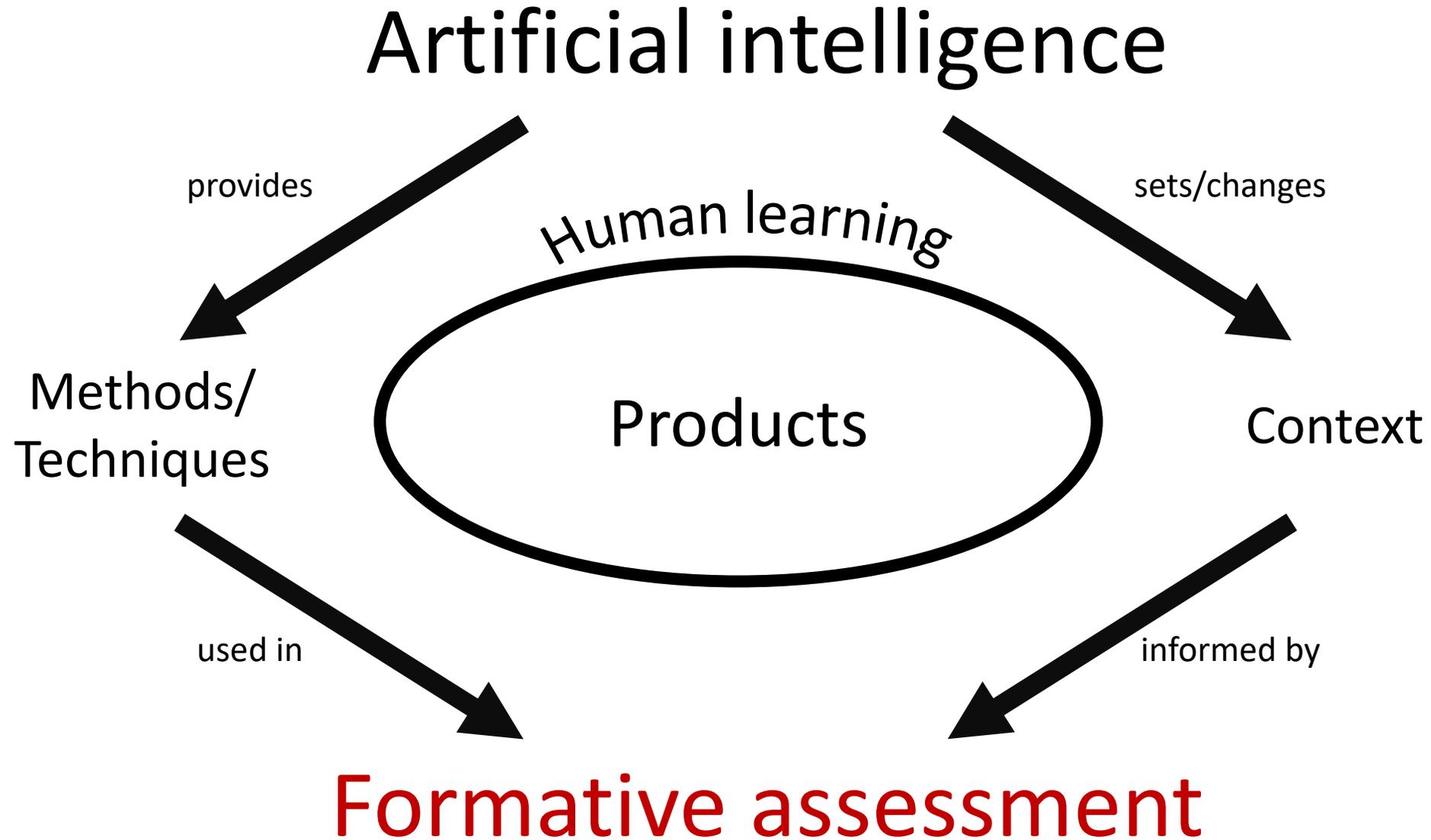
Artificial intelligence



Assessment







Key takeaway #1

Much promise of process assessment
in authentic situations over time

Key takeaway #2

Limited understanding of combining
human skills and AI support

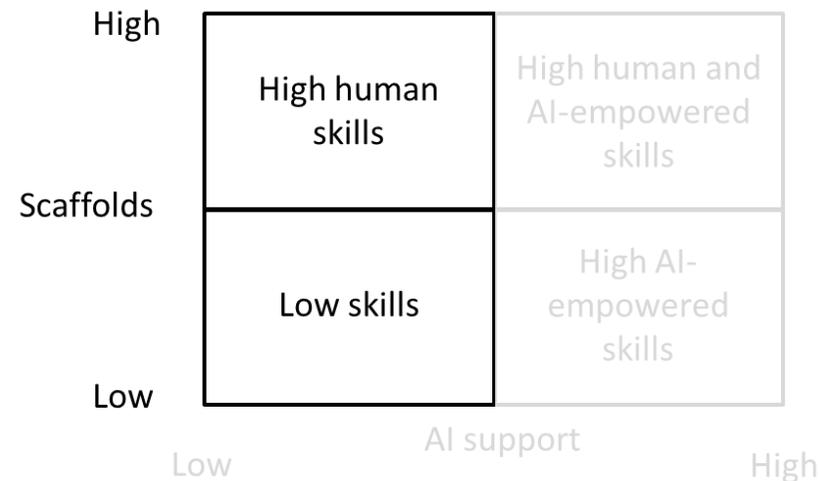
Key takeaway #3

Metacognition and process sit at the core of assessment for the age of AI

NEW METHODS – NEW CONTEXT–
FINAL REMARKS

Reimagining assessment

Novel ways to enhance
existing assessment practices



Opportunities for assessment provided by AI

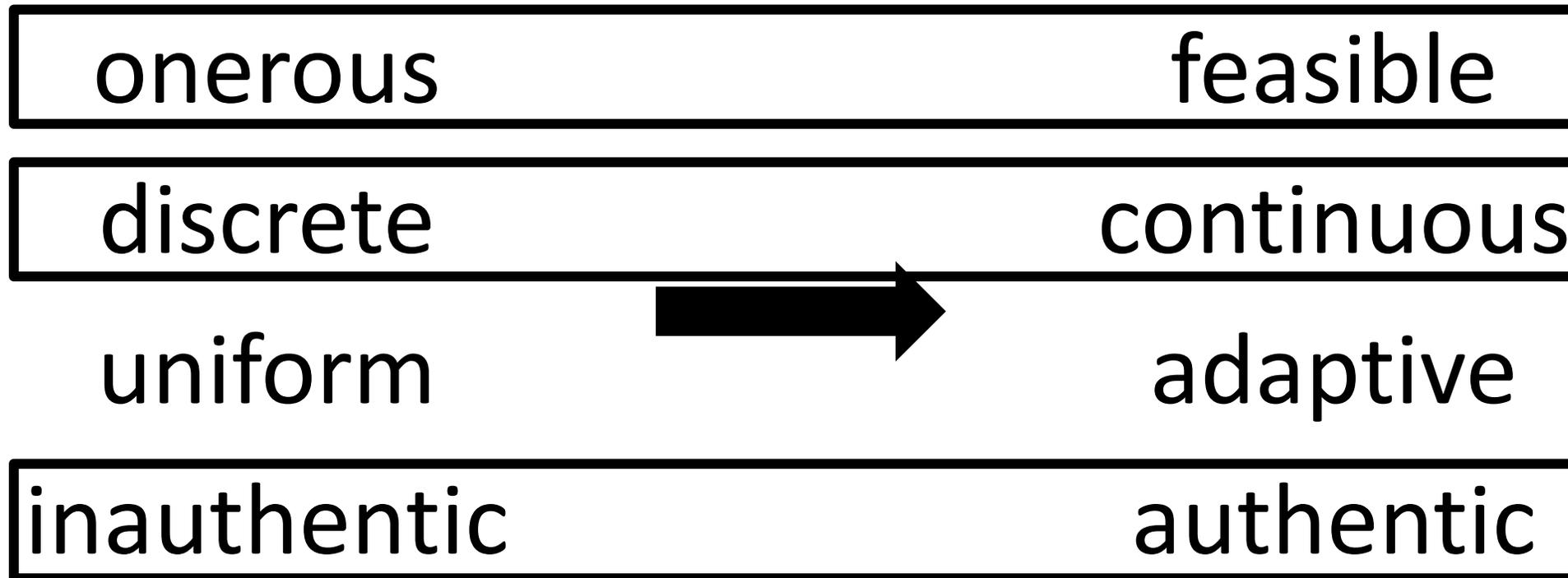
onerous
discrete
uniform
inauthentic



feasible
continuous
adaptive
authentic



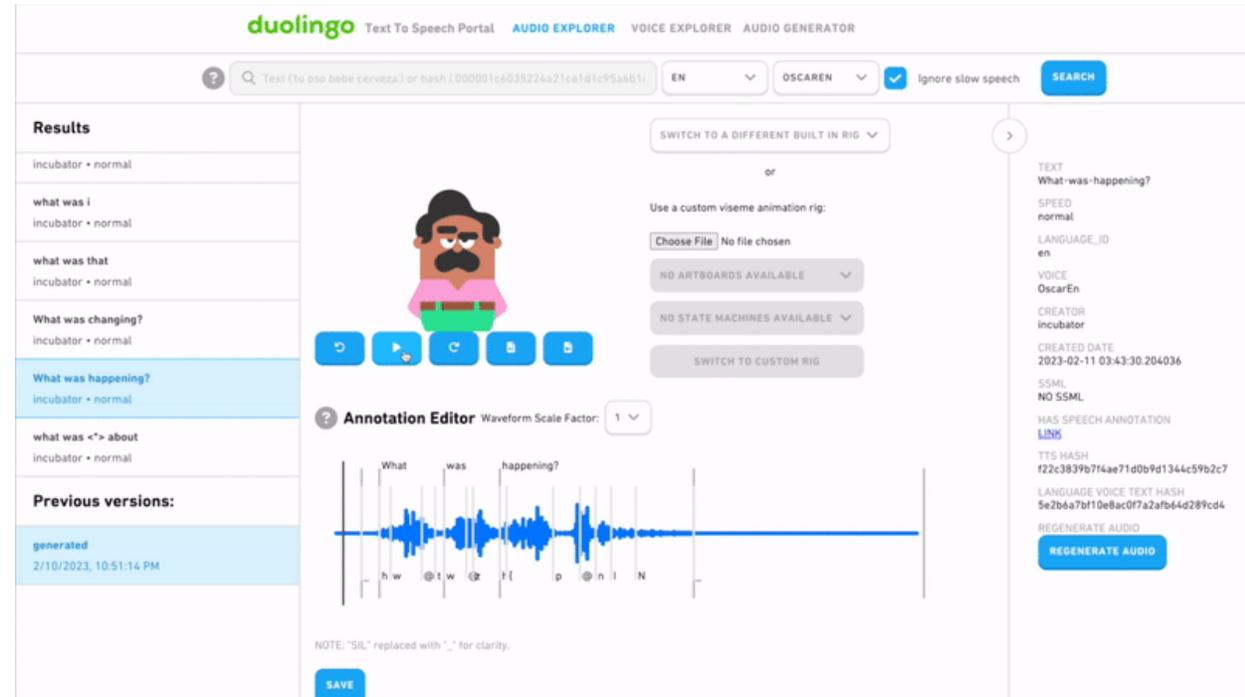
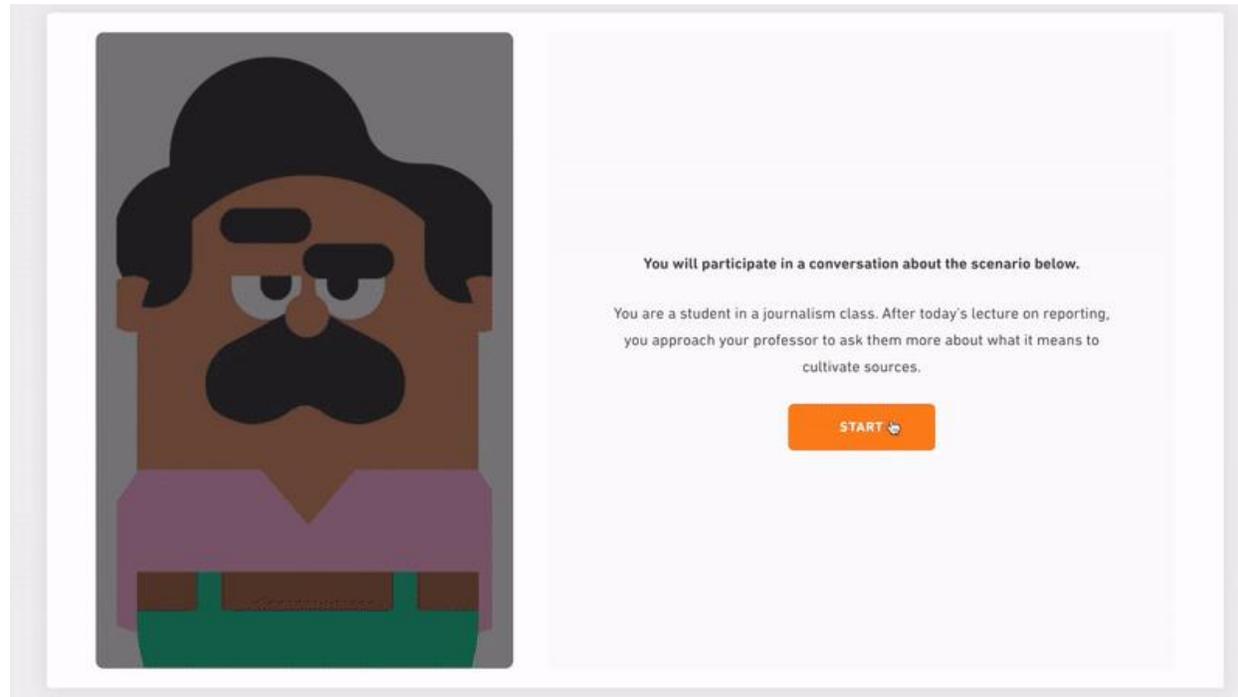
Opportunities for assessment provided by AI





Feasible assessment with AI

Duolingo English Test - AI is part of every step



Wodzak, S., (2023). Interactive tests for interactive skills. duolingo blog, <https://blog.duolingo.com/duolingo-english-test-interactive-skills/>

Hao, J., von Davier, A. A., Yaneva, V., Lottridge, S., von Davier, M., & Harris, D. J. (2024). Transforming Assessment: The Impacts and Implications of Large Language Models and Generative AI. Educational Measurement: Issues and Practice, in press.



Feasible assessment with AI

Good reliability in automated scoring of essays and short answers

“Old fashioned” machine learning, deep learning, LLMs, IRT



Feasible assessment with AI

Good reliability in automated analysis of rhetorical structures

“Old fashioned” machine learning, deep learning, LLMs, IRT



Feasible formative assessment with AI

- Instructions
- General Instructions
- Rubric
- 1: Artificial Intelligence i...
- 1.1 Definition of Artificial I...
- 1.2 History of Artificial Intel...
- 1.3 How does AI work?
- 1.4 Ethics and risks of deve...
- 1.5 Supervised machine lea...
- 1.6 Unsupervised machine...
- 1.7 Reinforcement learning
- 2: Scaffolding in Education
- 2.1 The development of sc...
- 2.2 What is cognitive appr...
- 2.3 What is scaffolding
- 2.4 Applications of scaffold...
- 2.5 Applications of coactiv...

General Instructions

AI in education is limited in some tangible educational products. More and more data are needed to make AI work better. And the scaffolding is that the work is shared alone between the learner and some more knowledgeable other or agent. In addition, it also enables learning from the experience. Scaffolding to optimize learning needs to acquire more knowledge. Besides, as we all know, differentiation is a combination of careful progress monitoring and adapting instruction in response. By this, students or learners could be divided into different groups by their teacher according to their competence degree. In these groups, students can learn knowledge that they don't understand and make progress belonging to themselves. Differentiation practices in the classroom will help students in their group process.

Integration of three topics is very essential and all three are indispensable. In the future education, the three should complement each other. Respectively, there are great expectations for AI in education to help students and teachers work better. To facilitate our independent and appropriate use in education in the future, we should learn more on how the scaffolding component skills work and so on. Furthermore, differentiation should be paid more attention in education. Beyond that, the three should continue to innovate, so as to better serve the education and other industries in the future.

Save Essay

Checklist Tool

Basic Academic Originality Integration and Collaboration

Essay Sentence: Nowadays, the role of AI in education is limited in some tangible educational products.
Integration Level: Remember and understanding

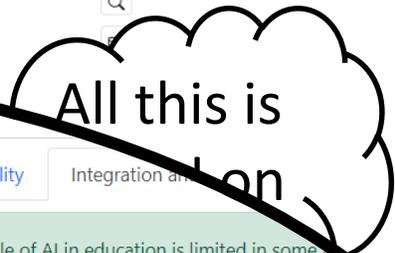
Essay Sentence: More and more data are needed to make AI work better.
Integration Level: Evaluate and create

Essay Sentence: And the scaffolding is that the work is shared alone between the learner and some more knowledgeable other or agent.
Integration Level: Evaluate and create

Essay Sentence: In addition, it also enables learning from the experience.
Integration Level: Apply and analyse

Essay Sentence: Scaffolding to optimize learning needs to acquire more knowledge.

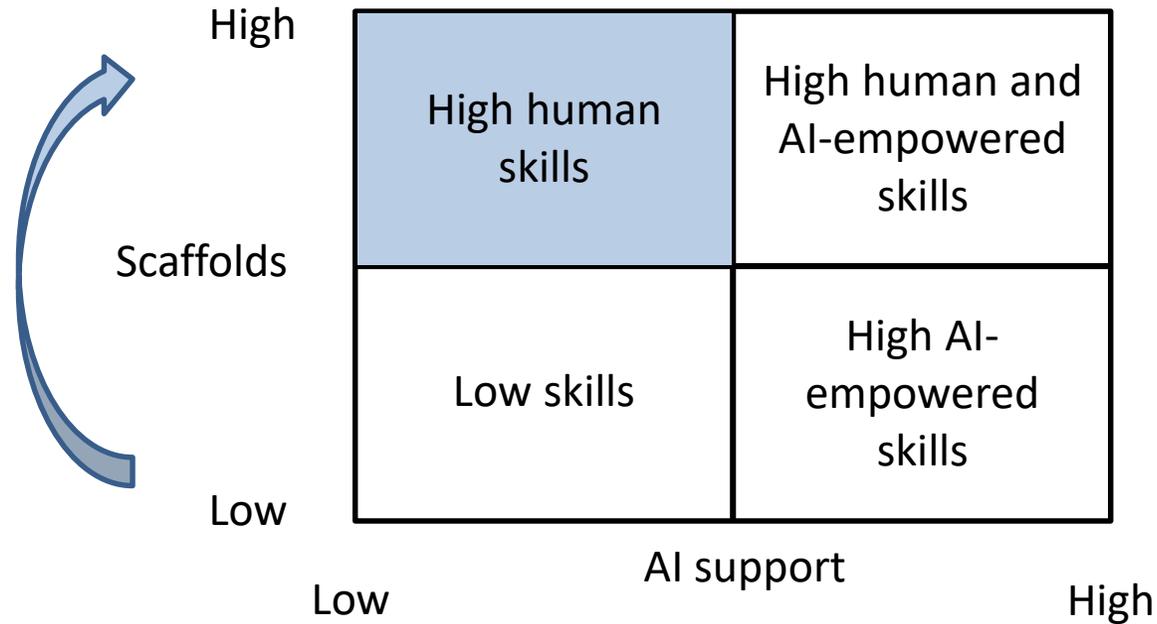
This analysis may take around 5 minutes.



Effects of feasible formative assessment with AI

Increased judgement of learning with AI scaffolds for writing

Effects of formative assessment with AI





Continuous assessment

Process measurement is
the *dark side* of assessment

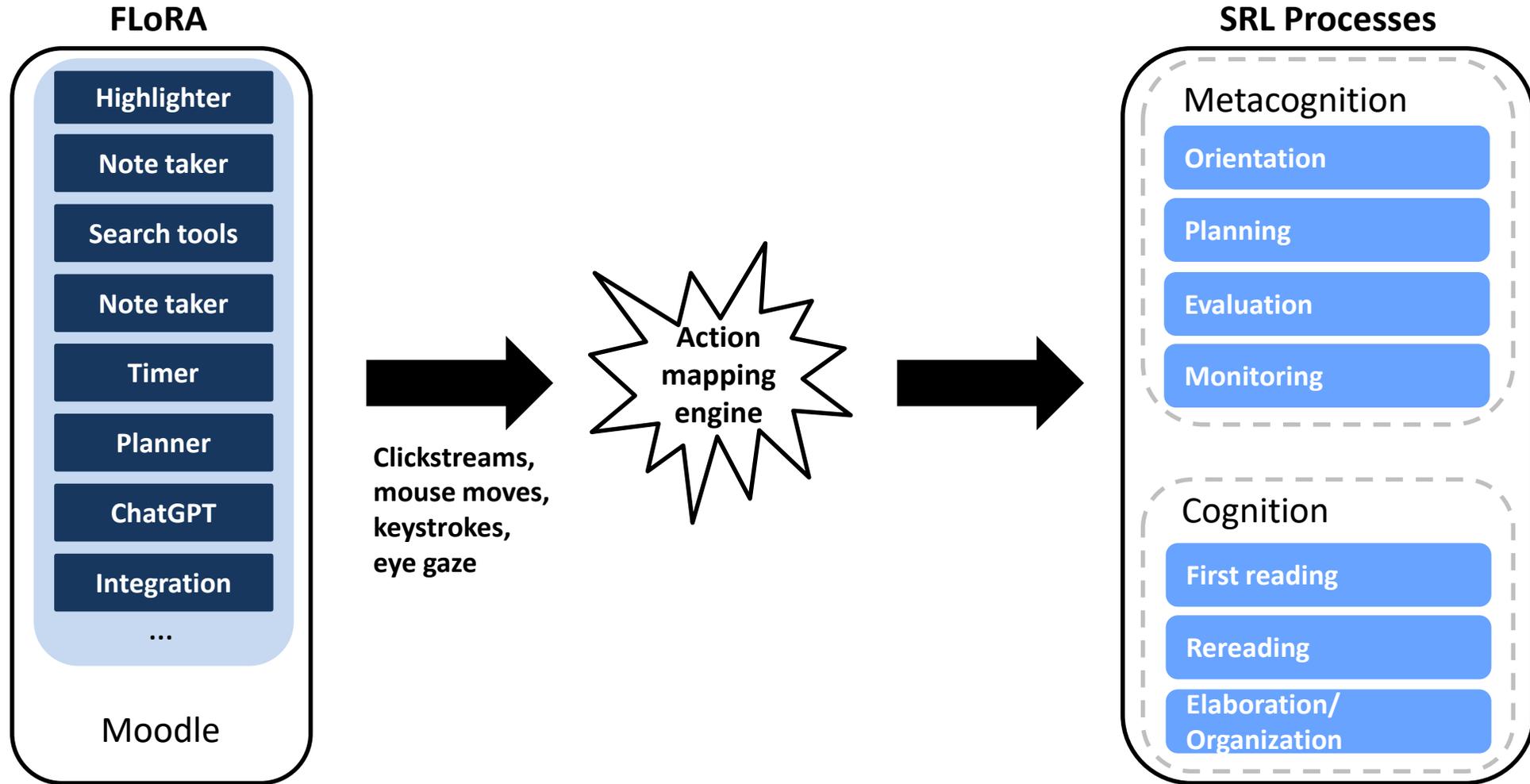
Machine/deep learning and
temporal/sequential modeling



Far side of the Moon
<https://images.nasa.gov/details-art001e000268>

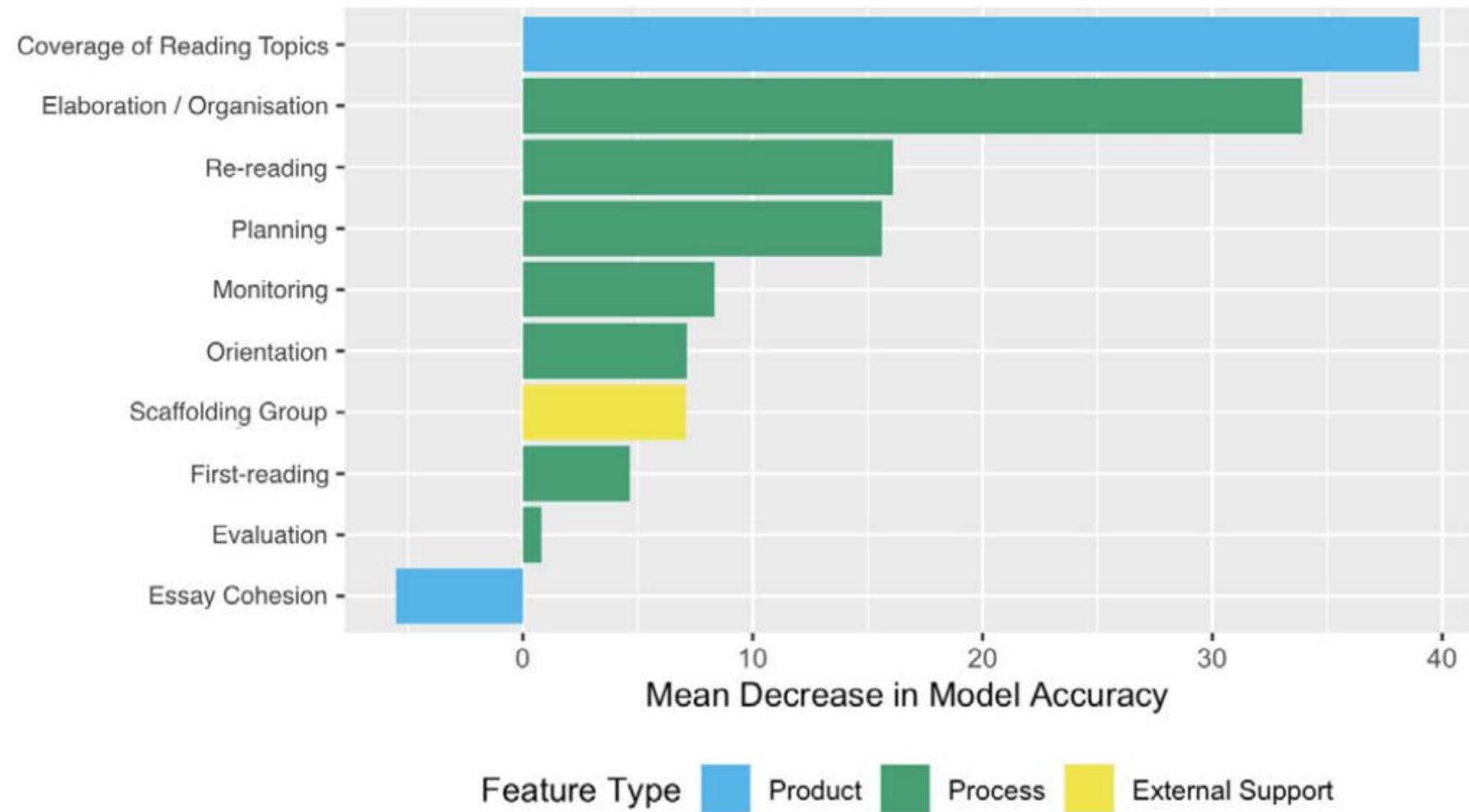


Mapping trace data to processes



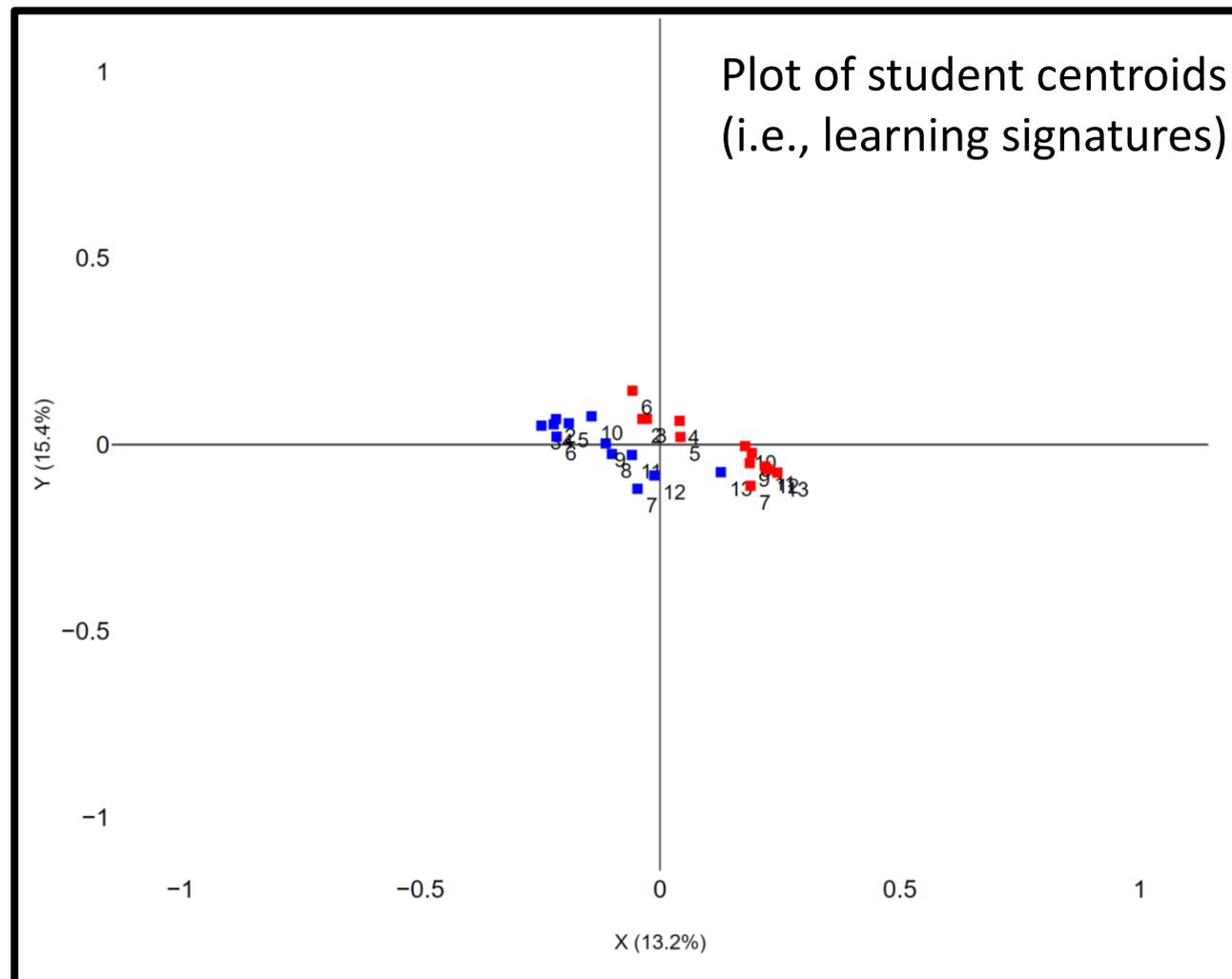


Process assessment with AI



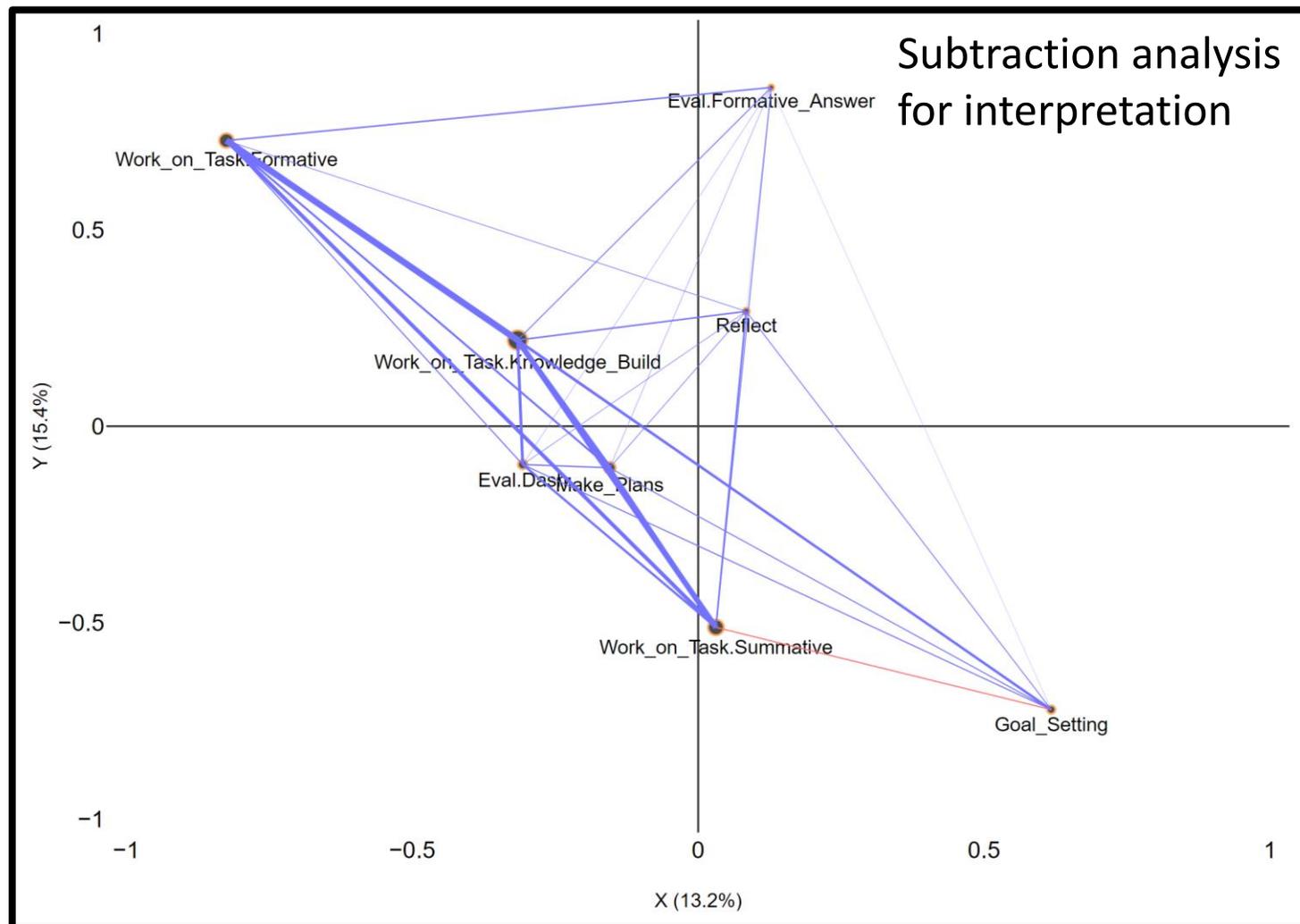


Process assessment with AI





Process assessment with AI



Saint, J., Gašević, D., Matcha, W., Uzir, N. A. A., & Pardo, A. (2020). Combining analytic methods to unlock sequential and temporal patterns of self-regulated learning. In *Proceedings of the tenth international conference on learning analytics & knowledge* (pp. 402-411).



Formative process assessment

FLoRA Home My courses Site administration

- Instructions
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 - 1.5 Supervised machine lea...
 - 1.6 Unsupervised machine ...
 - 1.7 Reinforcement learning
 - 1.8 Deep Learning
- 2: Differentiation in Educ...
 - 2.1 What is Differentiation?
 - 2.2 Using differentiation to...
 - 2.3 Standards for teaching
- 3: Scaffolding in Education
 - 3.1 The development of sc...
 - 3.2 What is cognitive appr...
 - 3.3 What is scaffolding
 - 3.4 Applications of scaffold...
 - 3.5 Applications of coactiv...

3: Future Learning / General Instructions

General Instructions

Page Settings More-

In this learning session, the goal is to write a vision essay that describes the future of education. Please describe, in 200 to 400 words, how you envision learning in a school in 2035.

Please consult the materials in this [learning](#) environment that provide information about three important topics for envisioning the future of education in 2035.

1. Artificial intelligence and its application
2. What differentiation is and how it is applied in the classroom context
3. The process of scaffolding and how it optimizes students learning

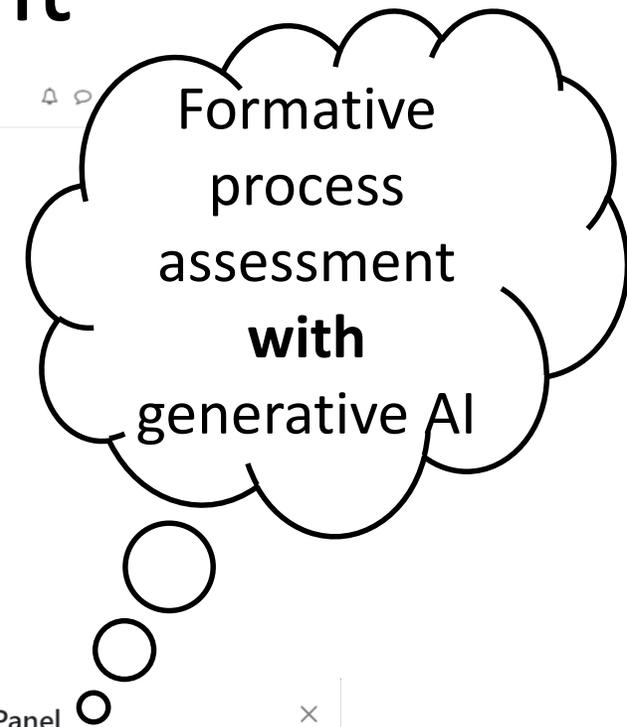
The goal of the learning session is to integrate these topics into a vision essay that describes learning in a school in 2035.

At the end of the learning session, you should be able to:

- explain the concepts of artificial intelligence, scaffolding and differentiation
- explain how they affect learning
- apply them in the context of education
- combine the concepts into a future vision for education

For more information about the criteria of the essay, see the [rubric](#).

You will have 120 minutes to read the texts, study the concepts and write the essay. Please note that you should work efficiently. We advise you to focus on the three important concepts, their relationship; their combination can form a future vision for education.



GPT Scaffold Panel

Scaffold 1

You've made a good start, but remember to regularly refer back to the task instructions to ensure you're on track. This will help you focus your efforts and use your time efficiently. Keep up the good work and remember, understanding the task fully is key to a successful essay.

18:37:18



Formative process assessment

FLoRA Home My courses Site administration

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Scaffold Panel



PAGE

General Inst...

Page

Settings

Scaffold 1

In this learning s... describe, in 20...

Please consi... for envision...

1. Artificial
2. What d
3. The pr

The goal school in

You've made a good start, but remember to regularly refer back to the task instructions to ensure you're on track. This will help you focus your efforts and use your time efficiently. Keep up the good work and remember, understanding the task fully is key to a successful essay.

18:37:18

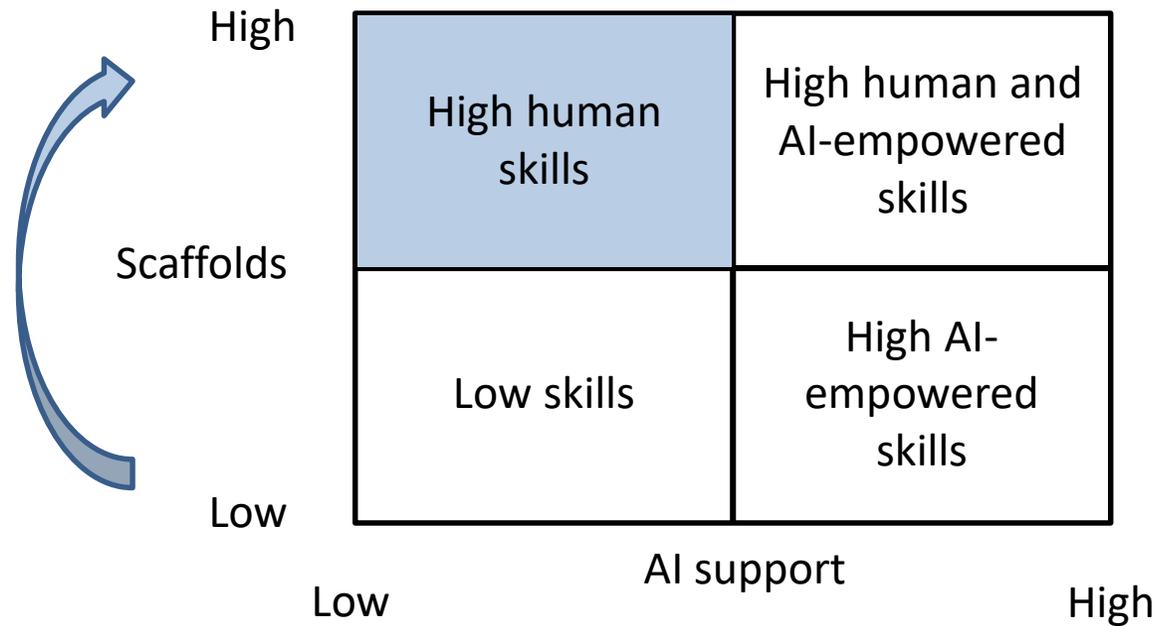
Formative process assessment

AI

Effects of formative process assessment

Positive association with
learning strategy improvement

Effects of formative assessment with AI



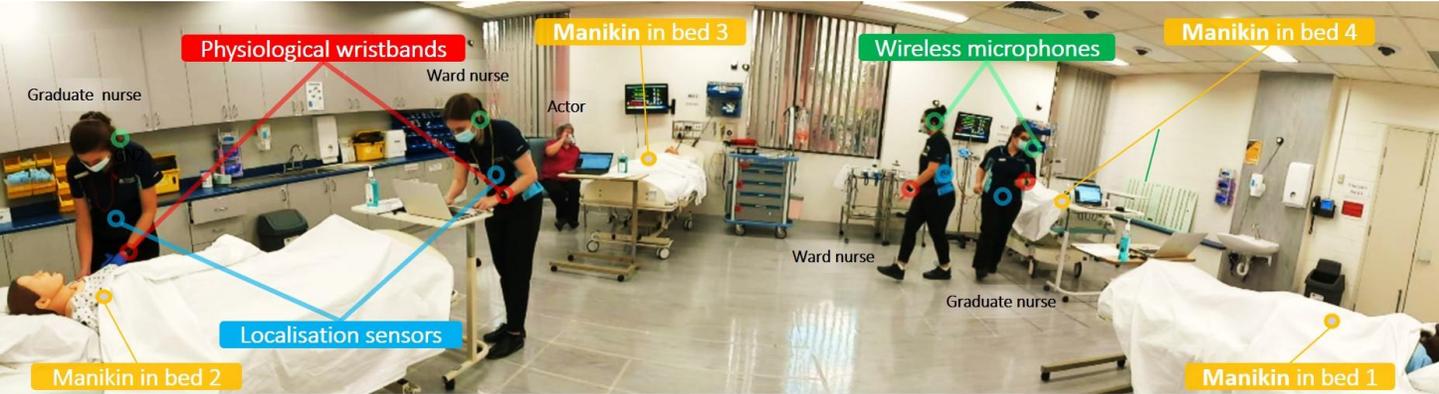


Authentic assessment

Measuring *when* and *where*
learning happens



Authentic assessment



Assessment in physical space

Assessment in digital space

- ✕
- ≡ 课程介绍
- ≡ 任务与要求
- 任务解释与说明
- 人工智能SP问诊
- 病史采集评分标准
- ≡ 阅读材料一：基础医学知识
 - 【解剖】胸壁结构与神经
 - 【解剖】胸膜及其神经
 - 【解剖】肺的血管和神经
 - 【解剖与生理】胸腔腔与...
 - 【解剖与生理】动脉结构...
 - 【生理】疼痛的产生机制
 - 【生理】胸痛的相关神经
 - 【生理】肺换气
 - 【病理生理】心包结构及...
 - 【病理生理】肺换气功能...
 - 【病理生理】冠脉供血与...

HTCR 3 / 人工智能SP问诊

网页

人工智能SP问诊

【场景】2023-06-13 15:09 门诊

【角色】你是一位内科门诊医生，现在来了一位病人。

【患者信息】许诺，男，25岁，未婚，住址：广东省汕头市金平区大学路21号

【任务要求】

- 请你与人工智能SP进行对话，完成完整的病史采集（系统回顾略）；
- 病史采集过程中，根据你对病史的掌握情况，在你认为合适的时候分别诊断（1个）及鉴别诊断（至少2个），可以参考阅读材料三中的相关疾病。
- 若有知识盲区，可自行查阅阅读材料。

patient

6:50:12 PM 医生

有放射痛吗？

6:50:13 PM

什么是放射痛？

6:50:15 PM 医生

最先是哪里痛？

6:50:16 PM

胸口最先开始痛。

6:50:23 PM 医生

是什么样的痛？能忍受吗？1-10评分，大概能评几分？

6:51:13 PM 医生

痛得非常厉害，受不了，大概评8分。

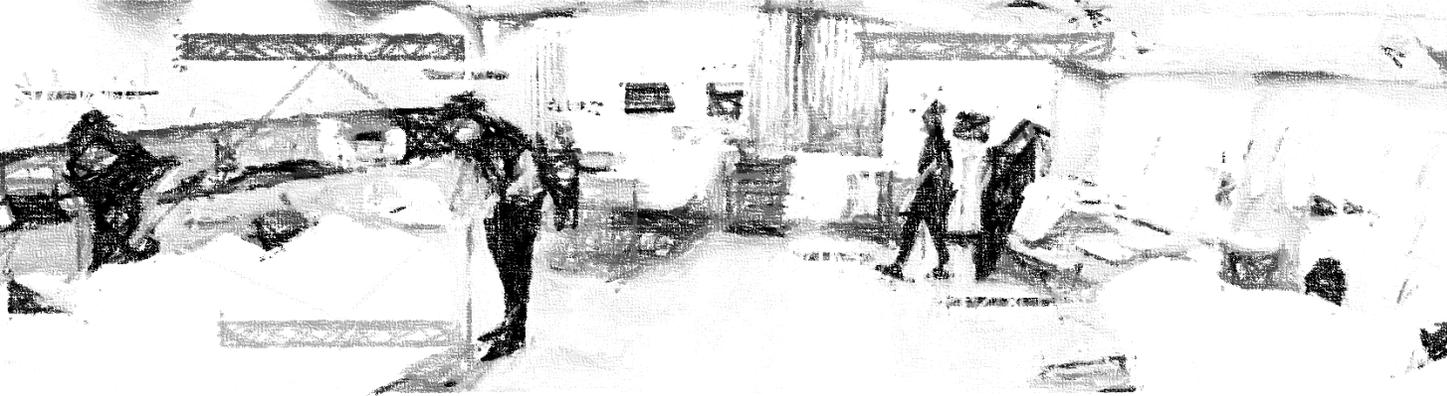
6:51:13 PM 医生

问一个问题...

发送



Authentic assessment



Assessment in physical space

Assessment in digital space

The screenshot shows a digital interface for an AI SP interview. On the left is a navigation menu with categories like '课程介绍', '任务与要求', and '人工智能SP问诊'. The main content area is titled 'HTCR 3 / 人工智能SP问诊' and includes a scenario, role, and patient information. It also lists task requirements. On the right is a chat window labeled 'patient' showing a simulated conversation between a doctor and a patient about chest pain.

HTCR 3 / 人工智能SP问诊

网页
人工智能SP问诊

【场景】2023-06-13 15:09 门诊
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【任务要求】

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3. 若有知识盲区，可自行查阅阅读材料。

patient

6:50:12 PM 医生
有放射痛吗？
6:50:13 PM

6:50:15 PM 患者
什么是放射痛？
6:50:16 PM

6:50:18 PM 医生
最先是哪里痛？
6:50:19 PM

6:50:23 PM 患者
胸口最先开始痛。
6:50:24 PM

6:51:10 PM 医生
是什么样的痛？能忍受吗？1-10评分，大概能评几分？
6:51:10 PM

6:51:13 PM 患者
痛得非常厉害，受不了，大概评8分。
6:51:13 PM

问一个问题... 发送



Authentic assessment with AI

- 课程介绍
- 任务与要求
 - 任务解释与说明
 - 人工智能SP问诊**
 - 病史采集评分标准
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 - 【解剖与生理】胸膜腔与...
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 - 【生理】疼痛的产生机制
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3. 若有知识盲区，可自行查阅阅读材料。

patient

6:50:12 PM 第6轮

有放射痛吗?
6:50:13 PM

什么是放射痛?
6:50:15 PM 第7轮

最先是哪里痛?
6:50:18 PM

胸口最先开始痛。
6:50:20 PM 第8轮

是什么样的痛？能忍受吗？
1-10评分，大概能评几分？
6:51:10 PM

痛得非常厉害，受不了，大概评8分。
6:51:13 PM 第9轮

问一个问题... 发送



Authentic assessment with AI

×

课程介绍

任务与要求

任务解释与说明

人工智能SP问诊

病史采集评分标准

阅读材料一：基础医学知识

- 【解剖】胸壁结构与神经
- 【解剖】胸膜及其神经
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- 【生理】肺换气
- 【病理生理】心包结构及...
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作文写作工具 3 words

Heading 2 B I U x₂ x² 列表 缩进 加粗 加粗 加粗

可能诊断：心绞痛，肺栓塞，心包炎，主动脉夹层
初步诊断：主动脉夹层
鉴别诊断：心肌梗塞，肺栓塞

保存作文

patient

6:50:12 PM 第6轮

有放射痛吗? 6:50:13 PM

6:50:15 PM 第7轮

什么是放射痛?

6:50:18 PM

最先是哪里痛?

6:50:20 PM 第8轮

胸口最先开始痛。

6:51:10 PM

是什么样的痛? 能忍受吗? 1-10评分, 大概能评几分?

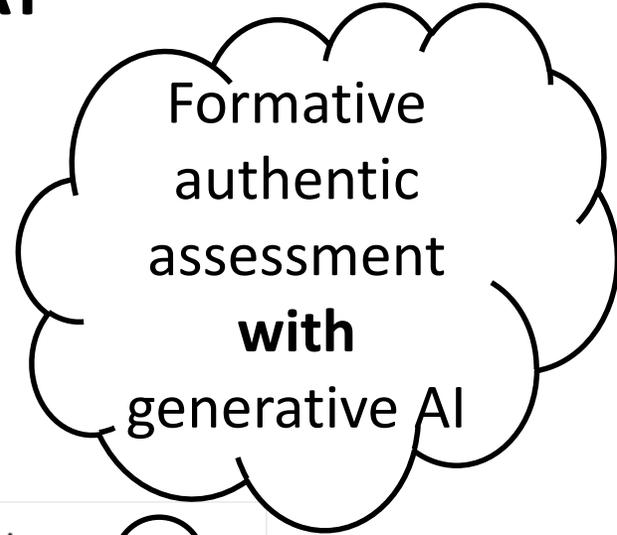
6:51:13 PM 第9轮

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问一个问题... 发送



Authentic assessment with AI



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- 阅读材料一：基础医学知识
 - 【解剖】胸壁结构与神经
 - 【解剖】胸膜及其神经
 - 【解剖】肺的血管和神经
 - 【解剖与生理】胸膜腔与...
 - 【解剖与生理】动脉结构...
 - 【生理】疼痛的产生机制
 - 【生理】胸痛的相关神经
 - 【生理】肺换气
 - 【病理生理】心包结构及...
 - 【病理生理】肺换气功能...
 - 【病理生理】冠脉供血与...

HTCR 3 / 人工智能SP问诊

人工智能SP问诊

【场景】2023-06-13 15: 09 门诊

【角色】你是一位内科门诊医生，现在来了一位病人。

【患者信息】许诺，男，25岁，未婚，住址：广东省汕头市金平区大学路21号。

【任务要求】

1. 请你与人工智能SP进行对话，完成完整的病史采集（系统回顾略）；
2. 病史采集过程中，根据你自己对病史的掌握情况，在你认为合适的时候分别诊断（1个）及鉴别诊断（至少2个）。可以参考阅读材料三中的相关疾病。
3. 若有知识盲区，可自行查阅阅读材料。

Medical Diagnosis

问诊完成！正在生成评分信息.....

6:49:27 PM

根据提供的对话及评分标准，以下是每项给出的评分：

问诊内容评分（共80分）：

1. 主诉（5分）：完全明确主要症状或体征及其发病的具体时间或者持续时间，因此得分为5分。
2. 胸痛的特点（25分）：覆盖了疼痛性质（撕裂样）和发病具体时间（2小时前，晚上八点）。覆盖的信息点数量为3/14，约21%，四舍五入到20%，因此得分为2分。
3. Associated symptoms（20分）：对话中未明

主动脉夹层

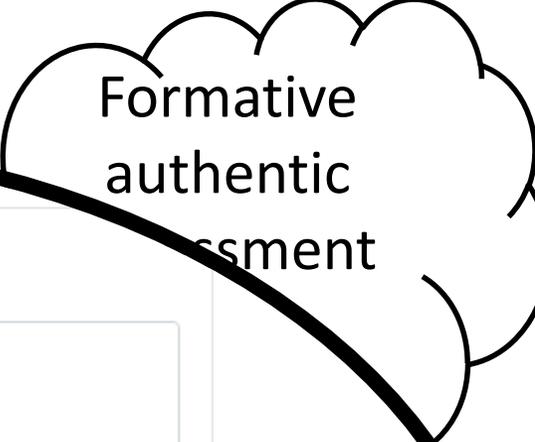
初步诊断：主动脉夹层

鉴别诊断：心肌梗塞，肺栓塞

结束问诊



Authentic assessment with AI



- ×
- 课程介绍
- 任务与要求
- 任务解释与说明
- 人工智能SP问诊**
- 病史采集评分标准
- 阅读材料一：基础医学知识
 - 【解剖】胸壁结构与神经
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 - 【解剖】肺的血管和神经
 - 【解剖与生理】胸膜腔与肺
 - 【生】
 - 【生】
 - 【病理】
 - 【病理生】
 - 【病理生理】冠脉供血与...

HTCR 3 / 人工智能SP问诊



【场景】2023
 【角色】你（系统回顾略）；
 【患者】你，在你认为合适的时候分别
 阅读材料三中的相关疾病。

Medical Diagnosis

问诊完成！正在生成评分信息.....

6:49:27 PM

根据提供的对话及评分标准，以下是每项给出的评分：

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主动脉夹层

初步诊断：主动脉夹层

鉴别诊断：心肌梗塞，肺栓塞

结束问诊



Authentic assessment with AI



- ×
- 课程介绍
- 任务与要求
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 - 【生】
 - 【生】
 - 【病理】
 - 【病理生】
 - 【病理生理】冠脉供血与...

HTCR 3 / 人工智能SP问诊



【场景】2023

【角色】你（系统回顾略）；

【患者】...在你认为合适的时候分别...
...阅读材料三中的相关疾病。

Medical Diagnosis

- 问诊过程 (5分): 对话结构并不清晰, 条理也不分明, 且未按照标准内容完整覆盖信息, 得分为 1 分。
- 问诊语言 (5分): 语言使用尚可, 但对话未示范解释医学术语或问题关注细节, 因此给分为 3 分。
- 宣教及对病史信息进行小总结 (5分): 对话中未进行宣教或总结, 得分为 1 分。

总计分数:

问诊内容评分: 7 / 80

问诊技巧评分: 6 / 20

总计: 13 / 100

6:50:02 PM

主动脉夹层

初步诊断: 主动脉夹层

鉴别诊断: 心肌梗塞, 肺栓塞

结束问诊

What's missing?

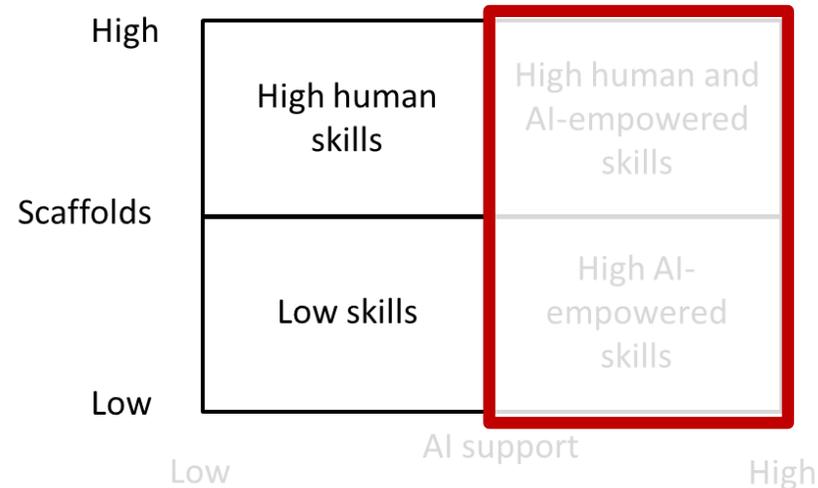
Assessment that has
all four properties at the same time



What's missing?



Modern assessment is more than measurement of AI literacy



NEW METHODS – **NEW CONTEXT** –
FINAL REMARKS





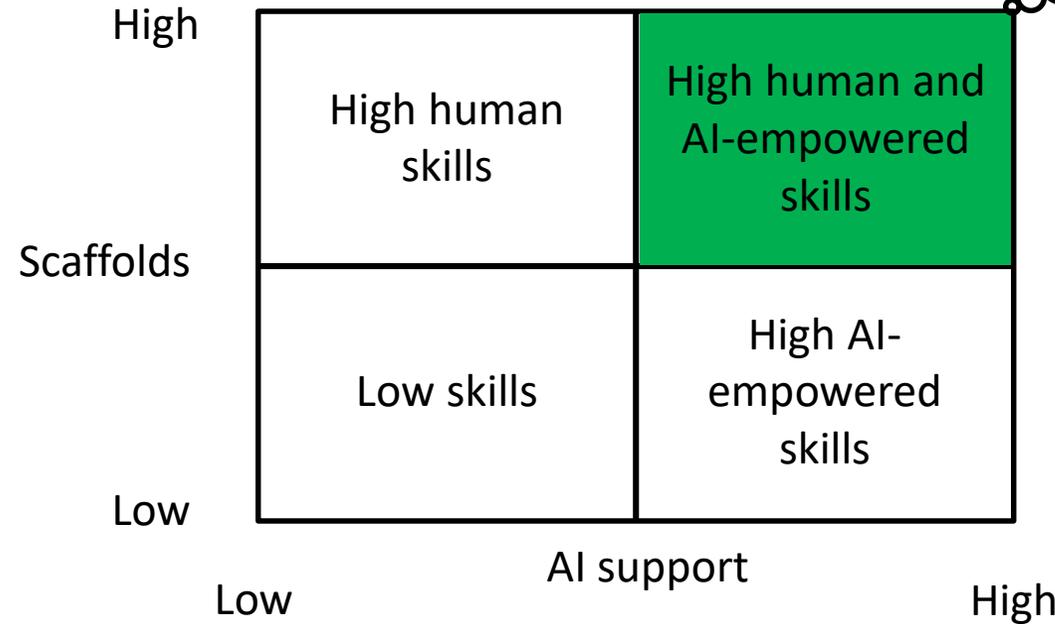
1

Key challenge

We need to know first
what we are assessing

Towards high human and AI-empowered skills

How do we conceptualize these skills?



Scaffolds:

- aim to *improve human skills*
- can be implemented with AI

AI support:

- aims to *improve performance*
- has a good fit for the task
- requires knowledge of AI tool

Inspired by, but different conceptualization from

Cukurova, M. (2024). The interplay of learning, analytics, and artificial intelligence in education. *arXiv preprint arXiv:2403.16081*.

Shneiderman, B. (2022). *Human-centered artificial intelligence*. Oxford University Press

Key challenge

Limited evidence of ***combined***
high human and AI-empowered skills

Key challenge

Limited evidence of ***combined***
high human and AI-empowered skills

Example study #1 – peer feedback

AI support and judgment of learning

← RETURN REPORT HOW DO I MODERATE? SKIP RESOURCE

Resource Feedback I don't want to moderate this resource

Please evaluate the resource based on the following criteria:

Alignment with course content & objectives:	Poor	Needs Improvement	Satisfactory	Great	Outstanding
Correctness, clarity & ease of understanding:	Poor	Needs Improvement	Satisfactory	Great	Outstanding
Appropriateness of difficulty:	Poor	Needs Improvement	Satisfactory	Great	Outstanding
Encouragement of critical thinking and reasoning:	Poor	Needs Improvement	Satisfactory	Great	Outstanding

Justify your responses & provide feedback

Please provide constructive feedback & justify your responses to the author so they can improve the resource.

A) It's unclear what this means, so I initially didn't mark it as false - maybe reword? also, are street number and name partial keys? Should they be marked as such? C) I think for this one you need the double line connecting the restaurant to the manage relationship, rather than a double line around the manage relationship itself (which represents that the relationship can have more than one value) E) since you can't say, it's not necessarily false it's just also not necessarily true. Maybe switch to "a restaurant needs at least one chef" or something that can be proven false by the diagram - something with "must" in it rather than just "has"

Decision

Please rate the overall quality of this resource based on the criteria above.

The overall quality of this resource is:	Poor	Needs Improvement	Satisfactory	Great	Outstanding
Rate your confidence in assessing this resource:	Very low	Low	Medium	High	Very High

SUBMIT

Moderator	Decision	Weight	Comment	
1	2	16%	A) It's unclear what this means, so I initially didn't mark it as false - maybe reword? also, are street number and name partial keys? Should they be marked as such? C) I think for this one you need the double line connecting the restaurant to the manage relationship, rather than a double line around the manage relationship itself (which represents that the relationship can have more than one value) E) since you can't say, it's not necessarily false it's just also not necessarily true. Maybe switch to "a restaurant needs at least one chef" or something that can be proven false by the diagram - something with "must" in it rather than just "has"	2 0
2	3	13%	Most of the answers which you say are false are right but I am unsure if the second answer is entirely false. That might just be me.	0 0
3	5	20%	good question with complex attributes	0 1
4	4	16%	great question	0 0
5	2	13%	1. Making "A restaurant" a weak entity is entirely incorrect here as it is not dependent on a key of another owner entity as it has its own unique key. Thus, both "a restaurant" and "manage" should not be double lined. 2. Remove F. It's just a weird option to have. For all we know, the restaurant does have 2 chefs and they just didn't want it recorded in the ER diagram.	1 0
6	5	22%	This question is very useful for students to understand the details of ER-model, and reduce mistake they make when painting their own ER diagram. But there is a problem in this ER diagram, the line between "A restaurant" and "manage" need to be two lines, because the weak entity set must necessarily participate totally in their identifying relationship.	0 0
Result: Approved (3.7)				

AI support and judgment of learning

Our algorithms have flagged that this comment may not be helpful.

- Please ensure that the comment:
 - Is specific to this resource
 - Suggests meaningful improvements for the author
 - Aligns with the grades assigned in the rubric

Our algorithms have flagged that this comment may not be helpful.

- Your moderation comment is too similar to your previous comments

Previous Comment	Date
Interesting question with well explanation. I could not add more to it. Well done.	Sep 01, 2021

[I don't want to moderate this resource](#)

Resource Feedback

Please evaluate the resource based on the following criteria:

Alignment with course content & objectives:	Poor	Needs Improvement	Satisfactory	Great	Outstanding
Correctness, clarity & ease of understanding:	Poor	Needs Improvement	Satisfactory	Great	Outstanding
Appropriateness of difficulty:	Poor	Needs Improvement	Satisfactory	Great	Outstanding
Encouragement of critical thinking and reasoning:	Poor	Needs Improvement	Satisfactory	Great	Outstanding

Justify your responses & provide feedback

Please provide constructive feedback & justify your responses to the author so they can improve the resource. ?

Align feedback with rubric
 Be detailed & specific
 Suggest improvements
 Use constructive language

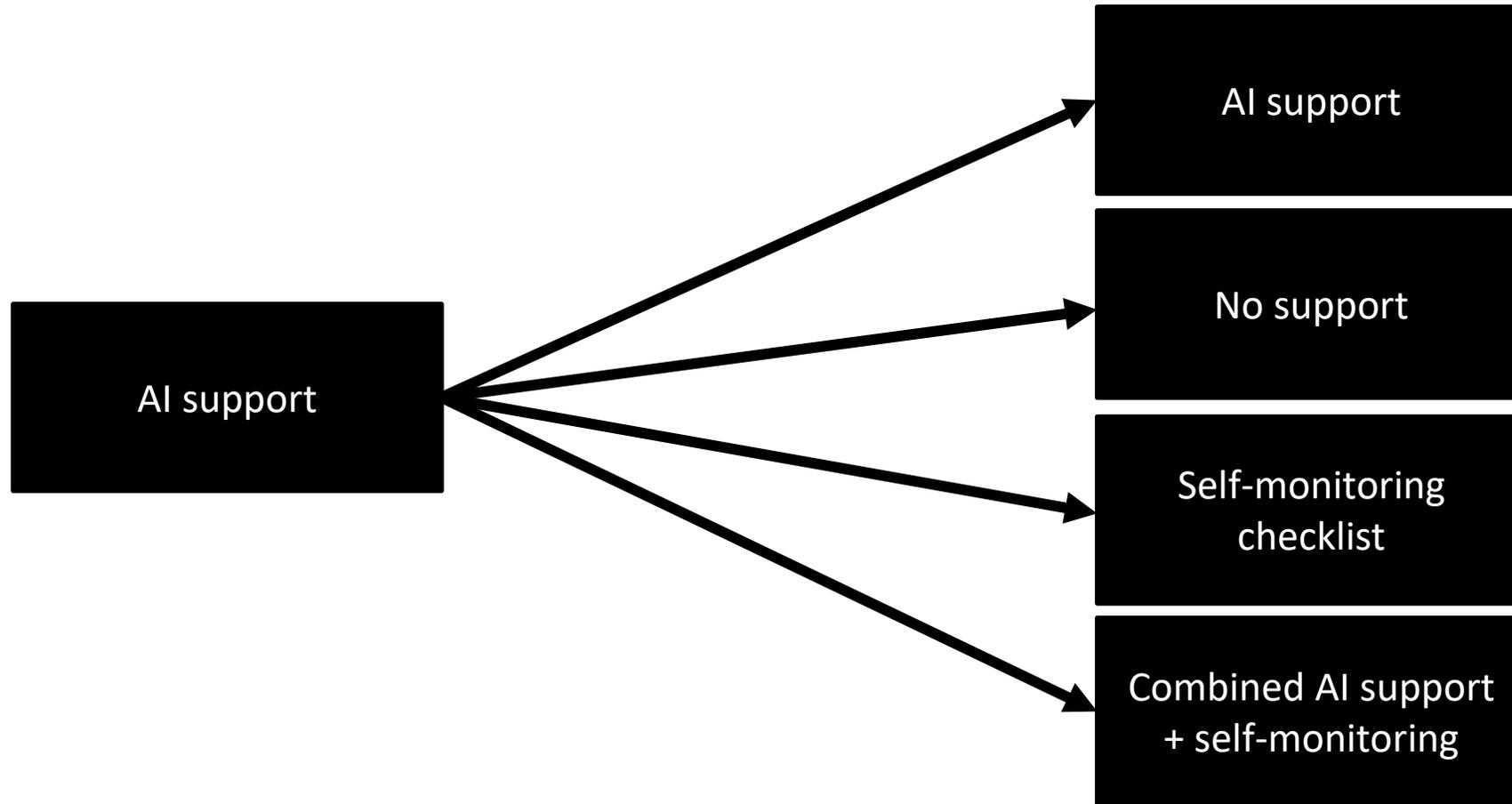
The content of the question is good. However, please revise the answer. Distractor C is also correct in addition to the option A that has been selected. It would be better to change the question either by making it a multiple-answer or negating option C.

Decision

Please rate the overall quality of this resource based on the criteria above.

The overall quality of this resource is:	Poor	Needs Improvement	Satisfactory	Great	Outstanding
Rate your confidence in assessing this resource:	Very low	Low	Medium	High	Very High

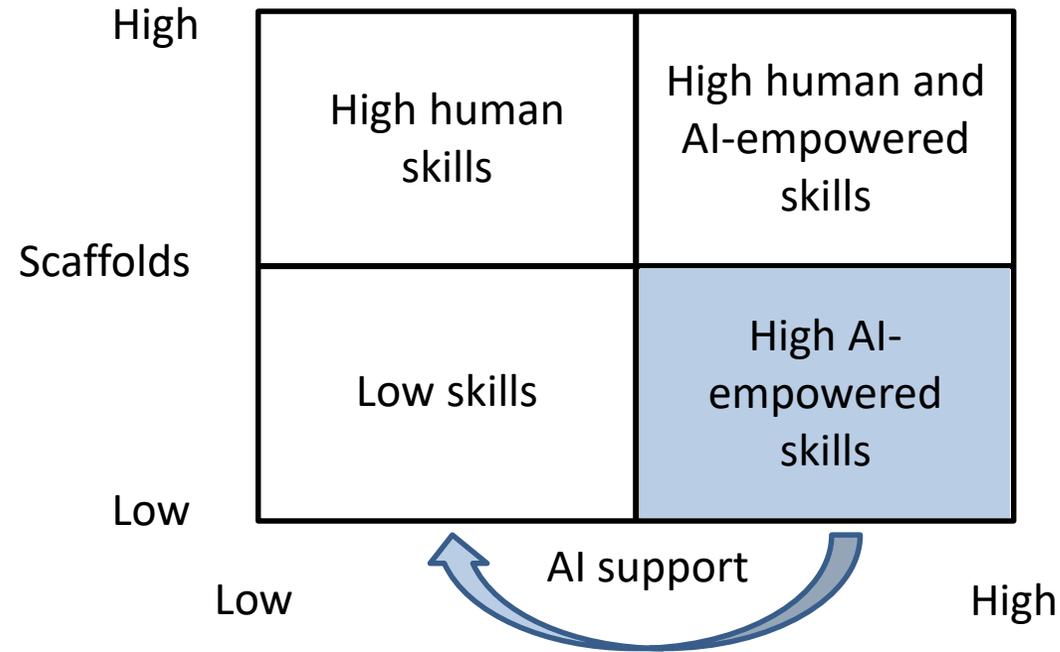
Longitudinal impact on judgment of learning



AI support and judgment of learning

Benefits deteriorate when
AI support is removed

Long term effects of AI-support

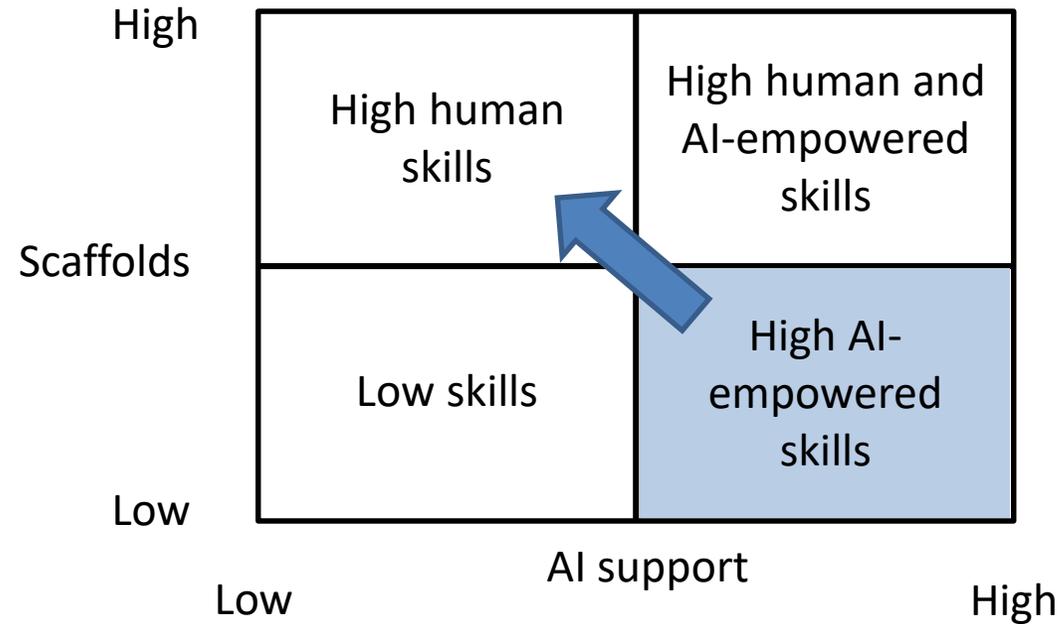


Concern

AI support and judgment of learning

Benefits remain when AI support replaced by scaffolds

AI-support after replaced with scaffolds

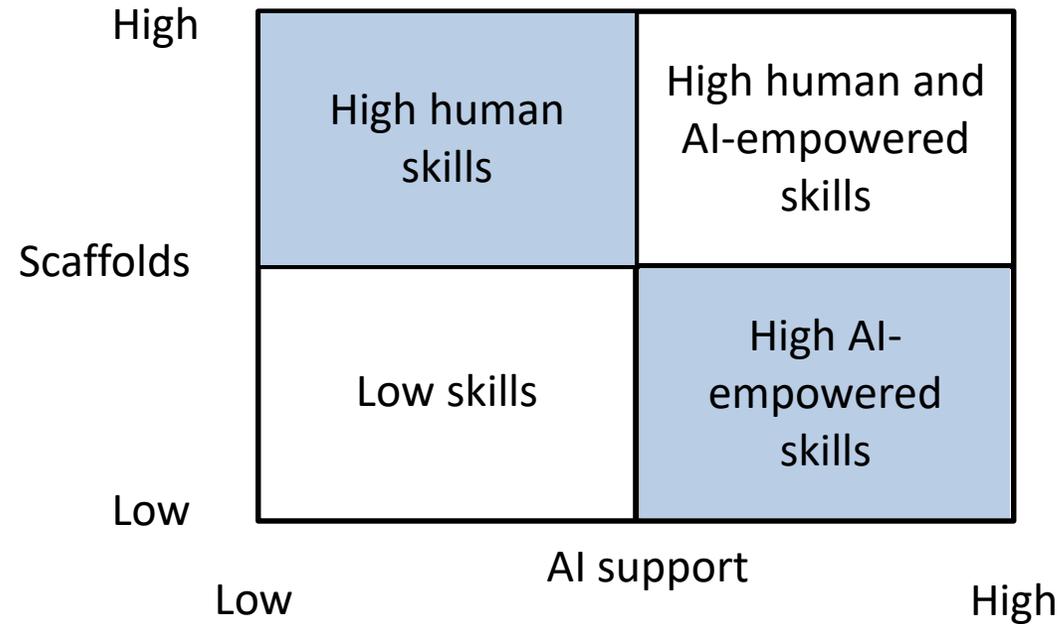


Positive, but not novel

AI support and judgment of learning

Combining scaffolds and AI support
does not produce additive effects

Towards high human and AI-empowered skills



No additive effect of scaffolds and AI support

Key challenge

Limited evidence of *combined*
high human and AI-empowered skills

Example study #2 – information problem solving

ChatGPT in FLoRA

- ✕
- General Instructions
 - Rubric
 - 1: Artificial Intelligence...
 - 1.1 Definition of Artificial...
 - 1.2 History of Artificial Int...
 - 1.3 How does AI work?
 - 1.4 Ethics and risks of de...
 - 1.5 Supervised machine l...
 - 1.6 Unsupervised machin...
 - 1.7 Reinforcement learning
 - 1.8 Deep Learning
 - 2: Differentiation in Ed...
 - 2.1 What is Differentiation?
 - 2.2 Using differentiation t...
 - 2.3 Standards for teaching
 - 3: Scaffolding in Educa...
 - 3.1 The development of s...

PAGE
General Instructions

Essay Writing 236 words

Normal **B** *I* U 🔗 x₂ x² ☰ ☷ ☹️ ↶ ☷ ☷

AI in Education. Ai plays an important role in Education. Nowadays, the role of AI in education is limited in some tangible educational products. More and more data are needed to make AI work better. And the scaffolding is that the work is shared alone between the learner and some more knowledgeable other or agent. In addition, it also enables learning from the experience. Scaffolding to optimize learning needs to acquire more knowledge. Besides, as we all know, differentiation is a combination of careful progress monitoring and adapting instruction in response. By this, students or learners could be divided into different groups by their teacher according to their competence degree. In these groups, students can learn knowledge that they don't understand and make progress belonging to themselves. Differentiation practices in the classroom will help students in their group process.

Integration of three topics is very essential and all three are indispensable. In the future education, the three should complement each other. Respectively, there are great expectations for AI in education to help students and teachers work better. To facilitate our independent and appropriate use in education in the future, we should learn more on how the scaffolding component skills work and so on. Furthermore, differentiation should be paid more attention in education. Beyond that, the three should continue to innovate, so as to better serve the education and other industries in the future. Ai is good now.

Save Essay

ChatGPT Tool

Can you give more advice on how to improve the essay?
18:20:01

Certainly! Here are some additional suggestions to improve your essay:

1. Expand on the role of AI in education: Discuss specific examples of how AI can be applied to learning, such as personalized learning, adaptive assessments, and intelligent tutoring systems. Explain how these applications can contribute to an innovative vision of education in 2035.
2. Elaborate on scaffolding to optimize learning: Provide examples of how scaffolding techniques can be used to support learners in acquiring new

? Ask a question... Send

Learning content

Navigation menu

(Stage 1)

CN

COLAM
Revise essay
by themselves

AI



HE



CL

Checklist Tool

Basic Academic Originality Integration and elaboration

Sentence Text: Artificial intelligence has been rapidly developing for years, leading to the emergence of a wide variety of products.
Error Position: variety
Error Correction: variety
Error Explanation: The correct spelling of the word is "variety."
Error Type: Spelling

Sentence Text: However, limited extent in tangible AI-based educational products can be seen.
Error Position: limited extent
Error Correction: a limited extent
Error Explanation: The phrase should include an article "a" to make it grammatically correct.

This analysis may take around 5-10 min to process. **Analyse**

ChatGPT Tool

could you give me some advice on the academic writing skills of my essay?
16:12:08

Certainly! Here are some suggestions to improve the academic writing skills in your essay:

1. Use clear and concise language: Aim for clarity in your writing by choosing precise words and avoiding unnecessary jargon or overly complex language. Make sure each sentence contributes to your overall argument.

Ask a question... **Send**

Ask Teacher Tool

Connected to server: ● Teacher is typing...
Teacher online status: ●

Hello
16:42:38

hi
16:42:41

could you give me some advice on the structure of my essay?
16:43:04

Ask a question... **Send**

Checklist Tool

Basic Academic Originality Integration and elaboration

Essay Sentence: Nowadays, the role of AI in education is left in some tangible educational products.
Integration Level: Remember and understanding

Essay Sentence: More and more data are needed to make AI work better.
Integration Level: Evaluate and create

Essay Sentence: And the scaffolding is that the work is shared alone between the learner and some more knowledgeable other or agent.
Integration Level: Evaluate and create

Essay Sentence: In addition, it also enables learning from the experience.
Integration Level: Apply and analyse

Essay Sentence: Scaffolding to optimize learning needs to acquire more knowledge.
Integration Level: Apply and analyse

This analysis may take around 5-10 min to process. **Analyse**

Learning content

Navigation menu

3: Future Learning_1 / General Instructions

General Instructions

In this learning session, the goal is to write a vision essay that describes the future of education. Please describe, in 200 to 400 words, how you envision learning in a school in 2035.

Please consult the materials in this learning environment that provide information about three important topics for envisioning the future:

1. Artificial intelligence and its applications
2. What differentiation is and how it works
3. The process of scaffolding a learning session

The goal of the learning session is to write a vision essay about the future of education in a school in 2035.

At the end of the learning session, you will be asked to:

- explain the concepts of artificial intelligence and its applications
- explain how they affect learning and teaching
- apply them in the context of your own school
- combine the concepts into a vision of the future of education

For more information about the topics, please refer to the materials in this learning environment.

(Stage 1)

- Notes Panel
- Search Tool
- Essay tool
- Planner Tool
- Dictionary Tool
- Timer
- Checklist Tool
- ChatGPT Tool
- Ask Teacher Tool

(Stage 2)

CN

COLAM
Revise essay
by themselves

AI



ChatGPT 4

HE



Checklist Tool

Basic Academic Originality Integration and elaboration

Sentence Text: Artificial intelligence has been rapidly developing for years, leading to the emergence of a wide variety of products.
Error Position: variety
Error Correction: variety
Error Explanation: The correct spelling of the word is "variety."
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ChatGPT Tool

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Ask a question... **Send**

Ask Teacher Tool

Connected to server: ● Teacher is typing...
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Hello
16:42:38

hi
16:42:41

could you give me some advice on the structure of my essay?
16:43:04

Ask a question... **Send**

CL

Checklist Tool

Basic Academic Originality Integration and elaboration

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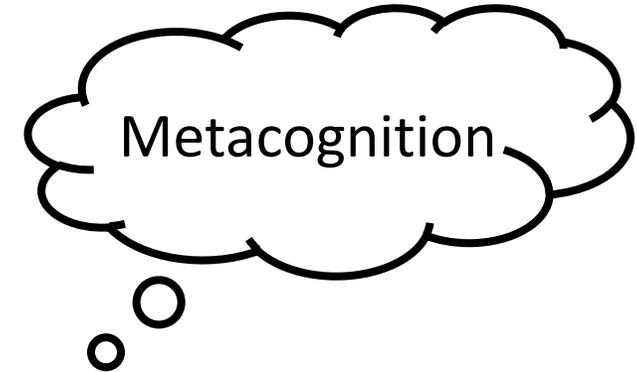
This analysis may take around 5-10 min to process. **Analyse**

Writing performance

Unsurprisingly writing performance is improved when using ChatGPT

ChatGPT significantly higher essay scores than the other three

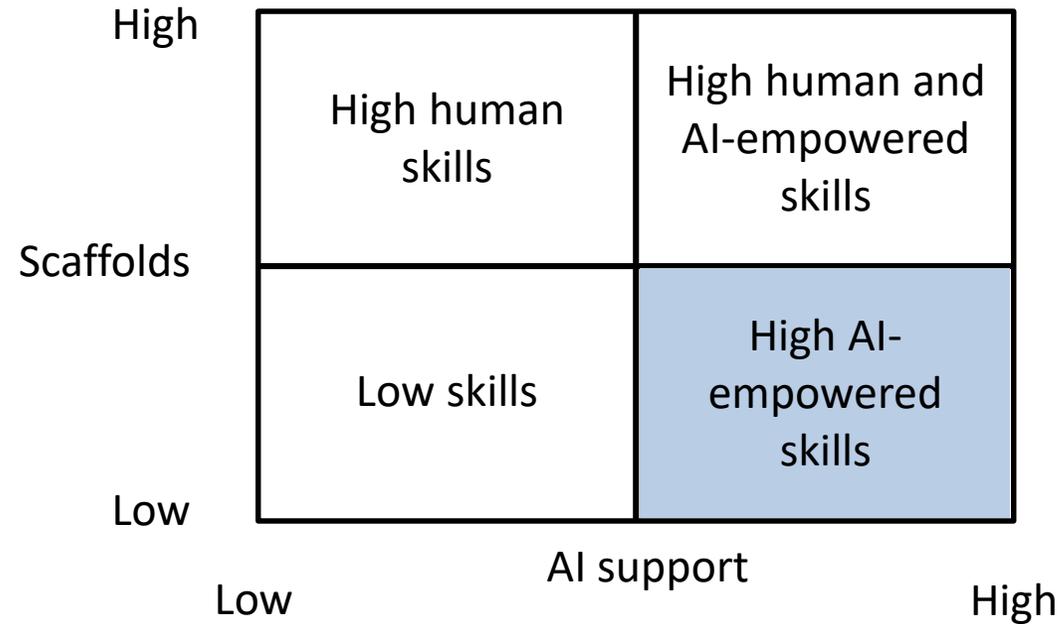
Metacognition in information problem solving



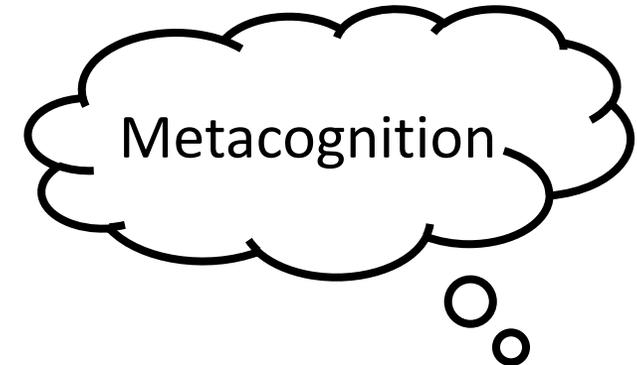
Limited evidence of judgment about
information provided by generative AI

Towards high human and AI-empowered skills

Ask ChatGPT



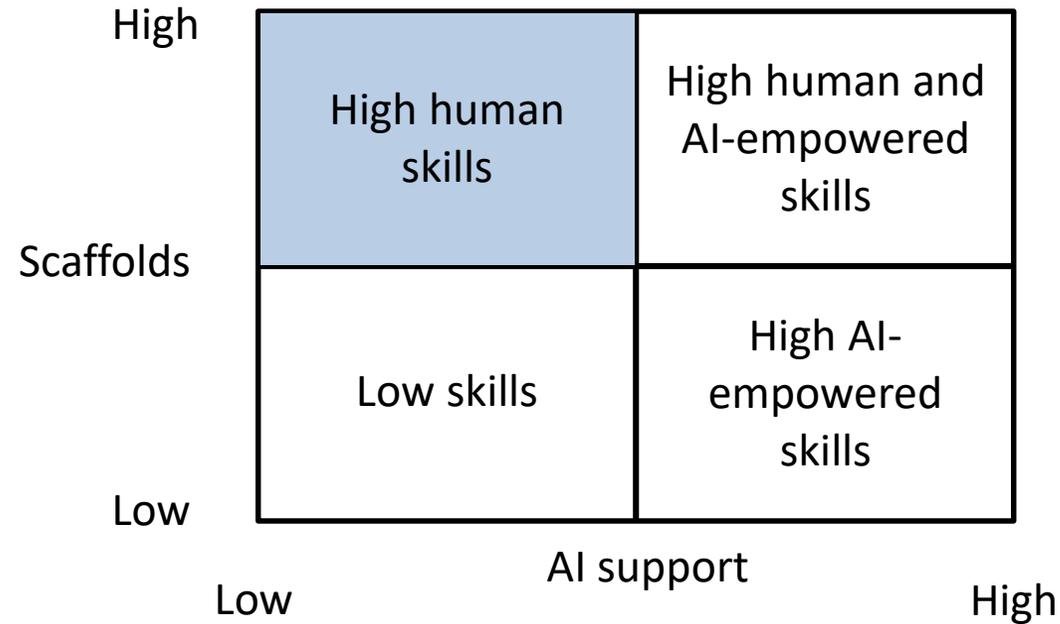
Metacognition in information problem solving



Always observed evidence of judgment
about human provided information

Towards high human and AI-empowered skills

Ask Teacher

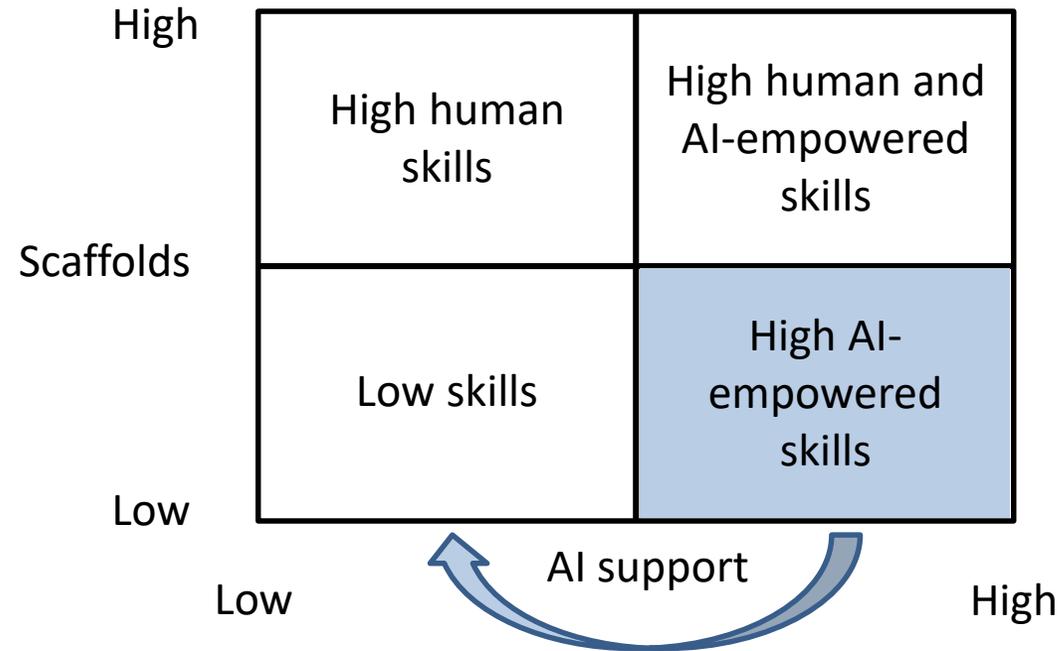


Metacognitive engagement

What are long term implications of limited metacognitive activity?

Unreliable information produced by GenAI

Long term effects of AI-support



Concern

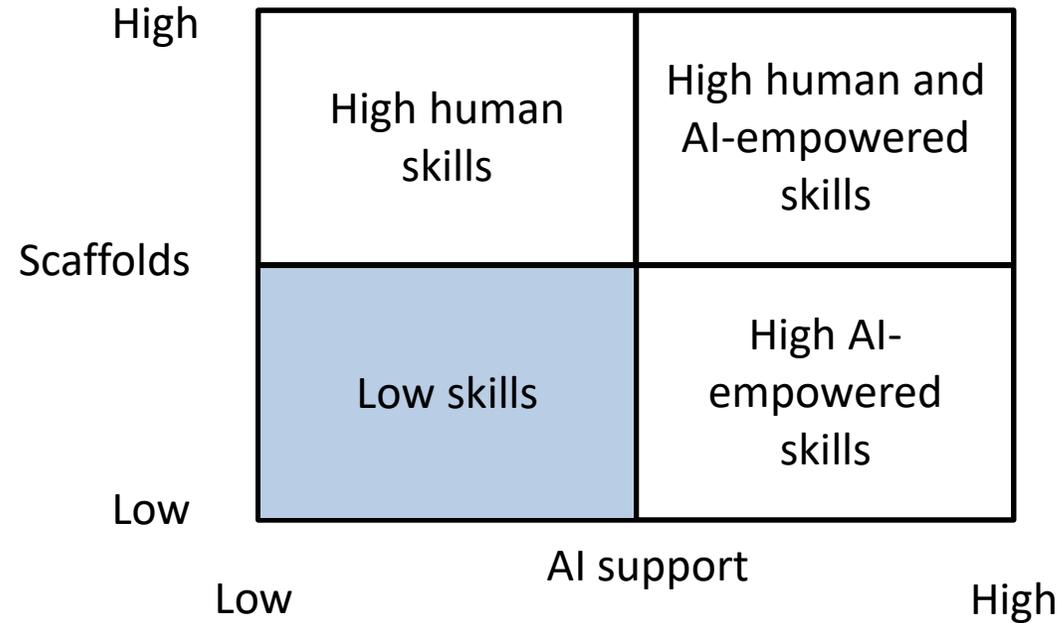
High processing fluency influence selection of strategy

Inadvertent deception of ChatGPT

Inaccurate and verbose, but
users prefer ChatGPT responses

Processing fluency – illusion of truth effect

Towards high human and AI-empowered skills



AI support:

- aims to improve performance
- ~~has a fit for the task~~
- ~~knowledge of AI tool~~

Corollary #1

Metacognition is a key dimension of high human and AI-empowered skills

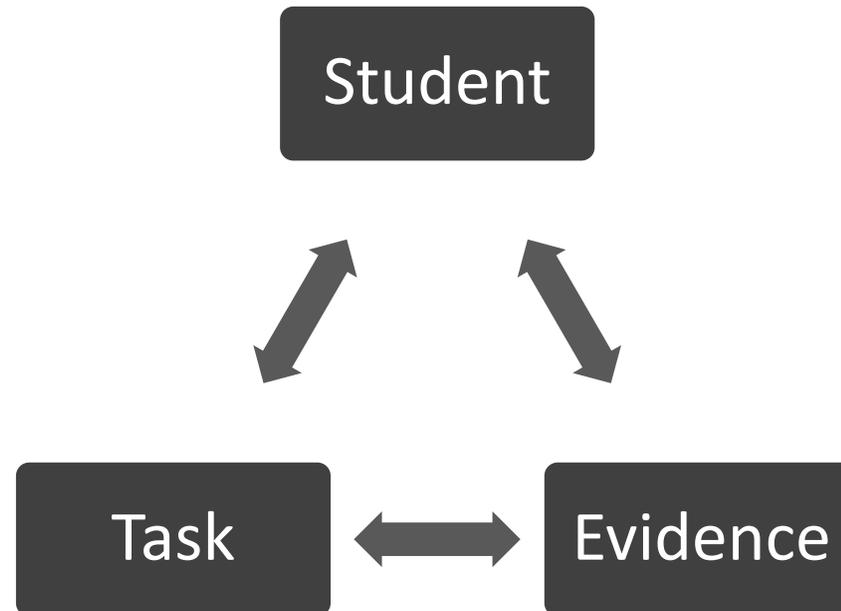
Corollary #2

Longitudinal approach to assessment of
high human and AI-empowered skills

2

Direction

Evidence-centered design



Student



Task

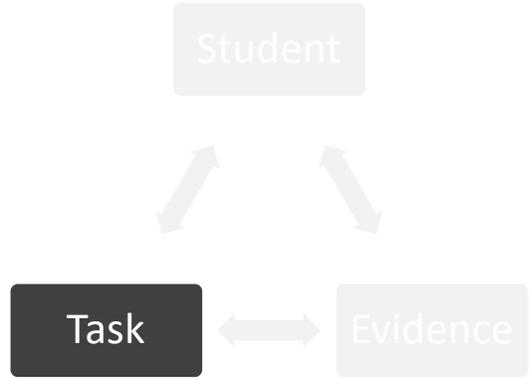
Evidence



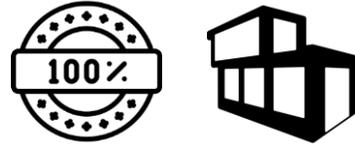
Example



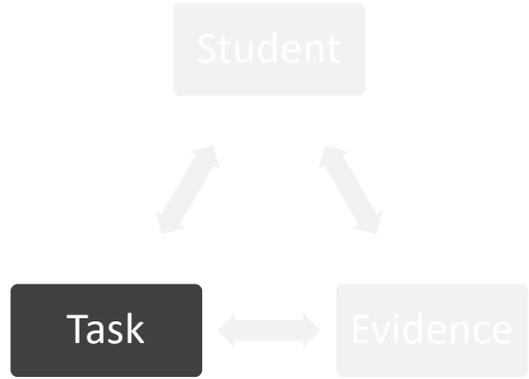
High human and AI-empowered
medical diagnosing



Direction



Tasks to be authentic

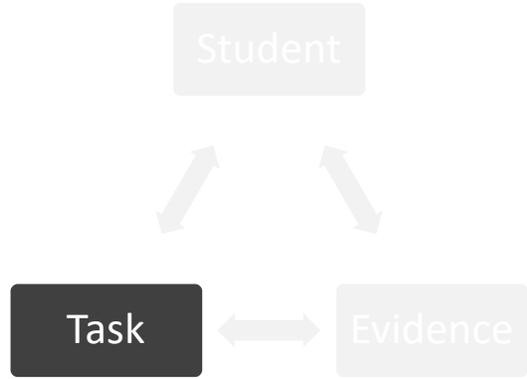


Direction



High	High human skills	High human and AI-empowered skills
Scaffolds (learning)	Low skills	High AI-empowered skills
Low	Low	High
	AI support (work)	

Tasks to include scaffolds, AI support, and metacognition



Direction

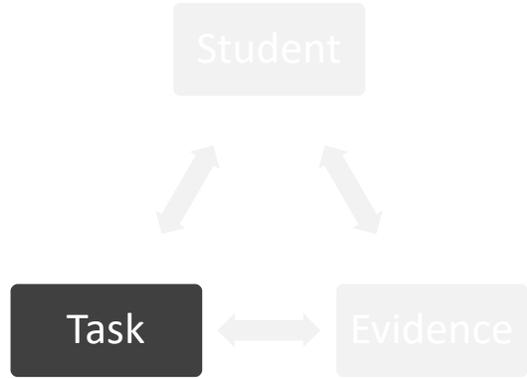


High	High human skills	High human and AI-empowered skills
Low	Low skills	High AI-empowered skills
	Low	High
	AI support (work)	

Scaffolds (learning)

Tasks to include

scaffolds, AI support, and metacognition

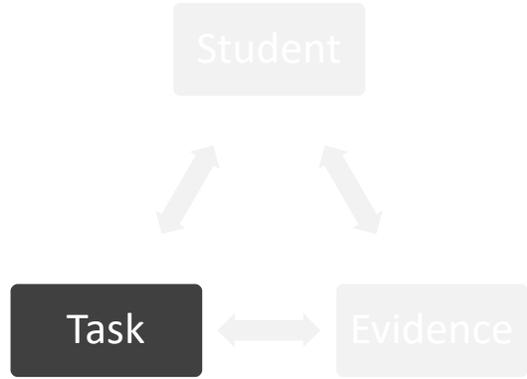


Direction



High	High human skills	High human and AI-empowered skills
Scaffolds (learning)	Low skills	High AI-empowered skills
Low	Low	High
		AI support (work)

Tasks to include scaffolds, **AI support**, and metacognition

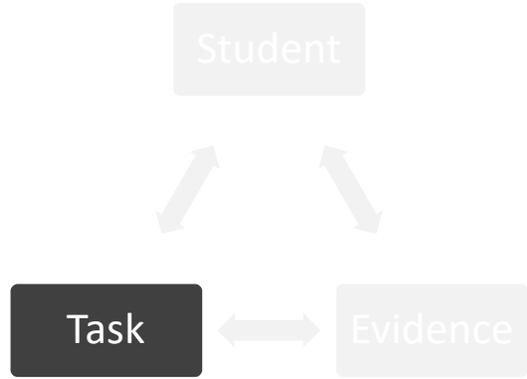


Direction

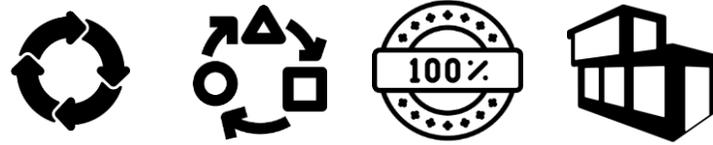


High	High human skills	High human and AI-empowered skills
Scaffolds (learning)	Low skills	High AI-empowered skills
Low	Low	High
	AI support (work)	

Tasks to include scaffolds, AI support, and **metacognition**

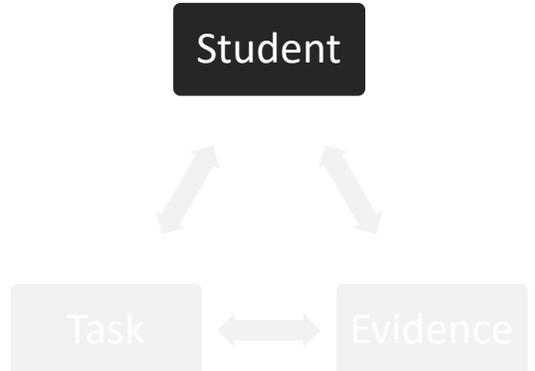


Direction



Tasks to be
over extended period of time

Longitudinal assessment



A diagram illustrating the relationships between three entities: Student, Task, and Evidence. The 'Student' box is at the top, 'Task' is at the bottom left, and 'Evidence' is at the bottom right. A double-headed arrow connects 'Student' and 'Task'. A double-headed arrow connects 'Student' and 'Evidence'. A double-headed arrow connects 'Task' and 'Evidence'.

Student

Task

Evidence

Example

High human and AI-empowered
medical diagnostics

Human skills

Authentic
task

✕

- ✕ 课程介绍
- ✕ 任务与要求
- 任务解释与说明
- 人工智能SP问诊
- 病史采集评分标准
- ✕ 阅读材料一：基础医学知识
 - 【解剖】胸壁结构与神经
 - 【解剖】胸膜及其神经
 - 【解剖】肺的血管和神经
 - 【解剖与生理】胸膜腔与...
 - 【解剖与生理】动脉结构...
 - 【生理】疼痛的产生机制
 - 【生理】胸痛的相关神经
 - 【生理】肺换气
 - 【病理生理】心包结构及...
 - 【病理生理】肺换气功能...
 - 【病理生理】冠脉供血与...

[HTCR 3](#) / 人工智能SP问诊

 网页 **人工智能SP问诊**

【场景】2023-06-13 15: 09 门诊

【角色】你是一位内科门诊医生，现在来了一位病人。

【患者信息】许诺，男，25岁，未婚，住址：广东省汕头市金平区大学路21号

patient

6:50:12 PM 第6轮

有放射痛吗? 6:50:13 PM

6:50:15 PM 第7轮

什么是放射痛?

6:50:18 PM

最先是哪里痛?

6:50:20 PM 第8轮

胸口最先开始痛。

6:51:10 PM

是什么样的痛? 能忍受吗? 1-10评分, 大概能评几分?

6:51:13 PM 第9轮

痛得非常厉害, 受不了, 大概评8分。

问一个问题... 发送

作文写作工具 3 words

Heading 2 B I U x₂ x² 列表 缩进 加粗 加粗 加粗

可能诊断：心绞痛，肺栓塞，心包炎，主动脉夹层
初步诊断：主动脉夹层
鉴别诊断：心肌梗塞，肺栓塞

保存作文

Scaffolding metacognition



ChatGPT: 好的，我已经了解了病人的情况问诊了。

You: 你今天为什么来呀？

ChatGPT: 我昨天又感觉胸口痛了，跟之前。

You: 具体哪里痛？

ChatGPT: 胸口正中间，大概手掌大小的地。

You: 什么样的痛？能具体描述一下吗？

ChatGPT: 就感觉那块地方绷紧了一样。

You: 很难受吗？

ChatGPT: 挺难受的，每次痛得我不敢再走，只能。

You: 会觉得受不了吗？

ChatGPT: 嗯，是的，很不舒服，得坐下来休息才。

You: 痛多久了？

ChatGPT: 这种痛已经半年了，这半年里发作了4。

You: 这4次都一样吗？

ChatGPT: 是的，每次都是一样的感觉。

You: 你有吸烟吗？

ChatGPT: 是的，我吸烟已经40年了，一天大约一包。

You: 你有药物过敏吗？

ChatGPT: 对，我对头孢类抗生素过敏。以前用过一次，全身出现了红疹。

You: 好的，我就问这么多，谢谢你的配合。

ChatGPT: 不客气，医生。请问我这种情况，您觉得是什么问题？需要什么治疗？

You: 问题不大，再做些检查。你还有什么问题吗？

ChatGPT: 好的，谢谢医生。我想问问，我以后还能干重活或者爬坡吗？这对我的身体有影响吗？

Scaffolding metacognition



<p>ChatGPT 好的，我已经了解了病人的情况问诊了。</p> <p>You 你今天为什么来呀？</p> <p>ChatGPT 我昨天又感觉胸口痛了，跟之前。</p> <p>You 具体哪里痛？</p> <p>ChatGPT 胸口正中间，大概手掌大小的地。</p> <p>You 什么样的痛？能具体描述一下吗？</p> <p>ChatGPT 就感觉那块地方绷紧了一样。</p>	<p>You 很难受吗？</p> <p>ChatGPT 挺难受的，每次痛得我不敢再走，只能。</p> <p>You 会觉得受不了吗？</p> <p>ChatGPT 嗯，是的，很不舒服，得坐下来休息才。</p> <p>You 痛多久了？</p> <p>ChatGPT 这种痛已经半年了，这半年里发作了4。</p> <p>You 这4次都一样吗？</p> <p>ChatGPT 是的，每次都是一样的感觉。</p>	<p>You 你有吸烟吗？</p> <p>ChatGPT 是的，我吸烟已经40年了，一天大约一包。</p> <p>You 你有药物过敏吗？</p> <p>ChatGPT 对，我对头孢类抗生素过敏。以前用过一次，全身出现了红疹。</p> <p>You 好的，我就问这么多，谢谢你的配合。</p> <p>ChatGPT 不客气，医生。请问我这种情况，您觉得是什么问题？需要怎么治疗？</p> <p>You 问题不大，再做些检查。你还有什么问题吗？</p> <p>ChatGPT 好的，谢谢医生。我想问问，我以后还能干重活或者爬坡吗？这对我的身体有影响吗？</p>
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AI-empowered skills

✕

课程介绍

任务与要求

任务解释与说明

人工智能SP问题

病史采集评分表

阅读材料一：基础

【解剖】胸壁结构

【解剖】胸膜及肺

【解剖】肺的血管

【解剖与生理】

【解剖与生理】

【生理】疼痛的

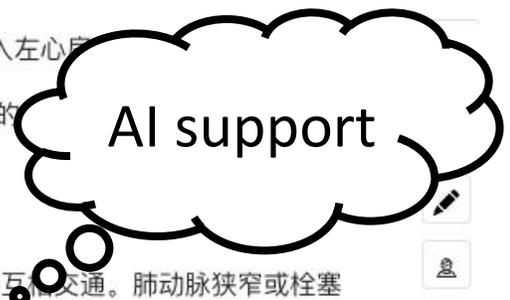
【生理】胸痛的

肺静脉 左、右各两条，分别为上肺静脉和下肺静脉，分别平第3、4肋软骨高度注入左心房。

支气管动脉 又称为支气管支，有1-3支，起自胸主动脉或右肋间后动脉，与支气管的支气管、肺动脉、肺静脉、肺淋巴结、肺实质和脏胸膜等。

支气管静脉 肺中的静脉汇集而成，出肺门，注入静脉系统。

肺动脉和支气管动脉的终末支之间存在吻合，共同分布于肺泡，使体循环和肺循环互相交通。肺动脉狭窄或栓塞时，吻合支可扩大，支气管动脉则会代偿肺动脉，参与气体交换。



AI support

作文写作工具 3 words

Heading 2 : B I U

可能诊断：心绞痛，肺栓塞，心包炎，主动脉夹层
初步诊断：主动脉夹层
鉴别诊断：心肌梗塞，肺栓塞

保存作文

ChatGPT Tool

我的病人左肘部隐隐作痛。可能的诊断是什么？
18:20:01

左肘部钝痛可能由多种原因引起。一些可能的诊断包括：

1. 网球肘（外上髁炎）：连接前臂肌肉和肘部的肌腱发炎。它通常是由于过度使用或重复动作造成的。
2. 滑囊炎：滑囊炎·滑囊是一种充满液体的囊，可以缓冲肘关节。这可能是由于外伤、重复运动或感染造成的。
3. 关节炎：肘关节炎·如类风湿性关节炎或骨关节炎·会导致疼痛和僵硬。
4. 肌肉拉伤或扭伤：过度使用、提重物或突然运动导致肘部周围的肌肉或韧带受伤。
5. 牵涉性疼痛：有时肘部的疼痛可能是

Ask a question... Send

Metacognition

✕

▼ 课程介绍

▼ 任务与要求

任务解释与说明

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【解剖】肺的血管和神经

【解剖与生理】胸膜腔与...

【解剖与生理】动脉结构...

【生理】疼痛的产生机制

【生理】胸痛的相关神经

[HTCR 3](#) / 病史采集评分标准

网页 病史采集评分标准

问诊内容评分（共80分）

I 主诉（5分）：明确描述患者最痛苦的症状或最明显的体征

I 主要症状的

记笔记

重要的

有用的

- 16~20分：覆盖了80%~100%的详细信息。
- 11~15分：覆盖了51%~79%的详细信息。
- 5~10分：覆盖了30%~50%的详细信息。
- 0~5分：覆盖了0%~29%的详细信息。

I 伴随症状（20分）：伴随的阳性症状、与主要症状之间

- 16~20分：覆盖了80%~100%的详细信息。
- 11~15分：覆盖了51%~79%的详细信息。
- 5~10分：覆盖了30%~50%的详细信息。

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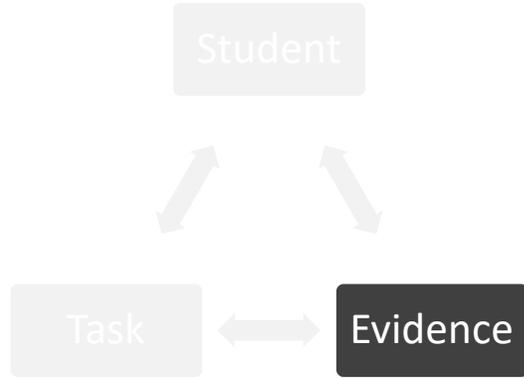
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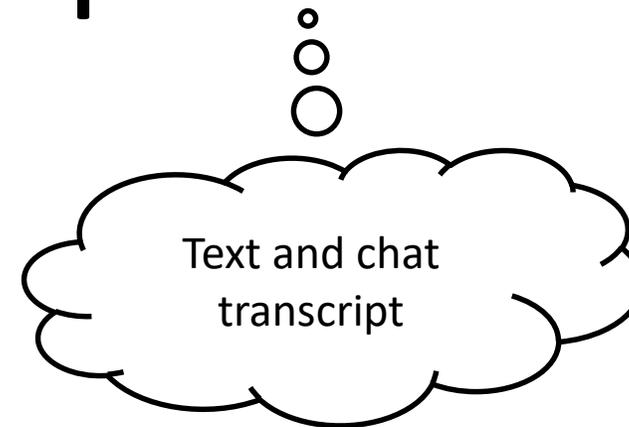
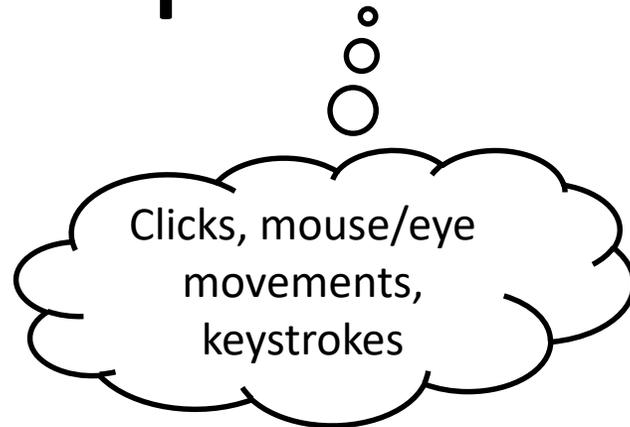
Ask a question...

Send

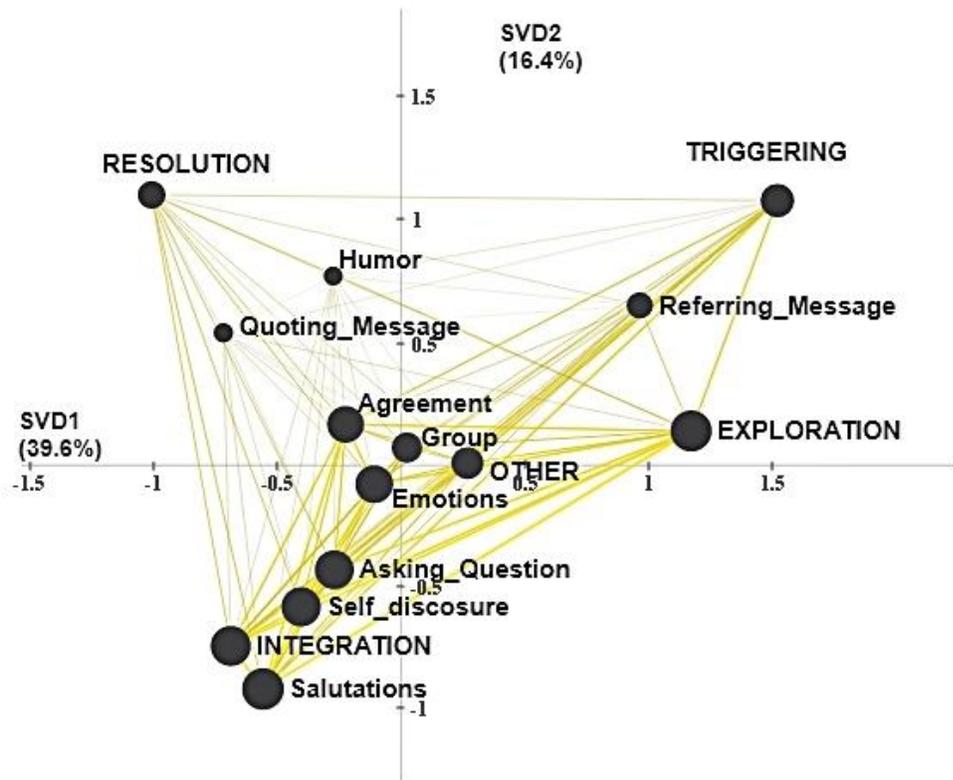
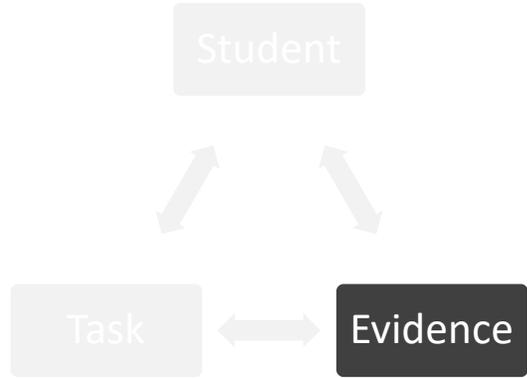
Direction



Assessment to include data about
process and product



Assessment of modern skills



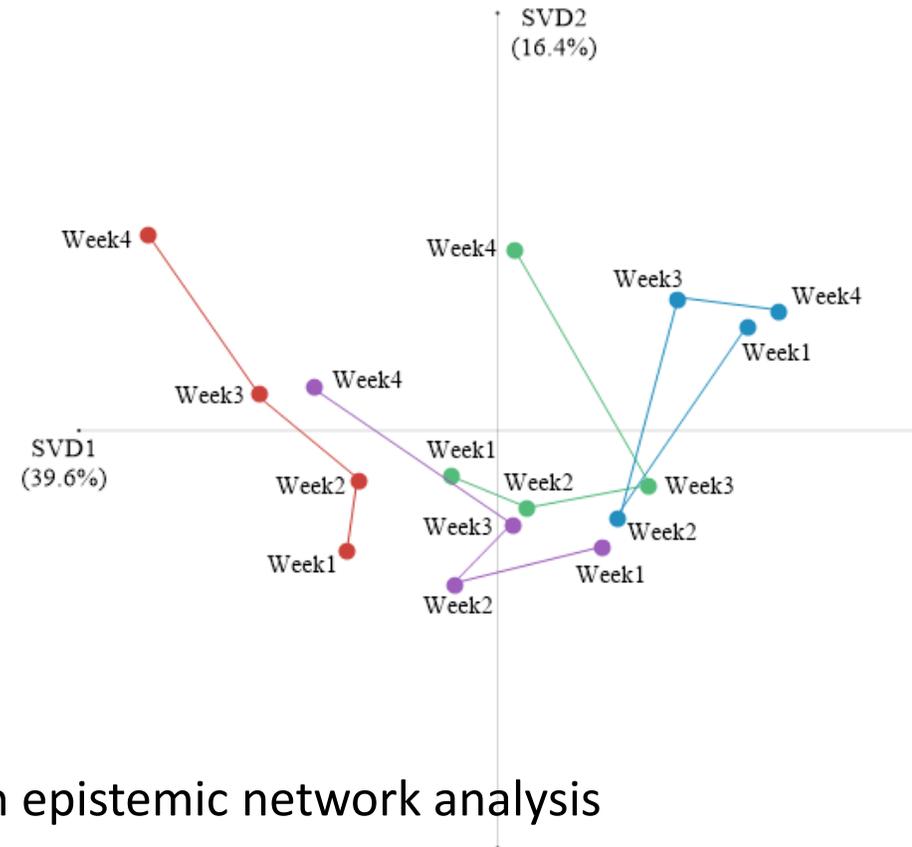
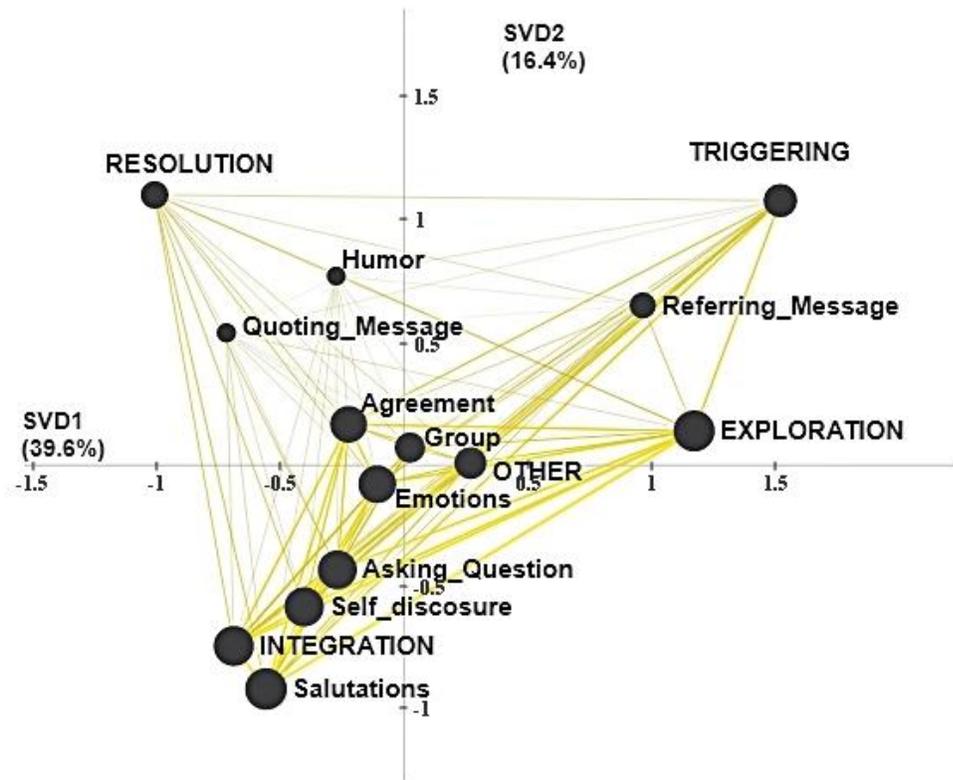
Combining large language models with epistemic network analysis

Assessment of modern skills

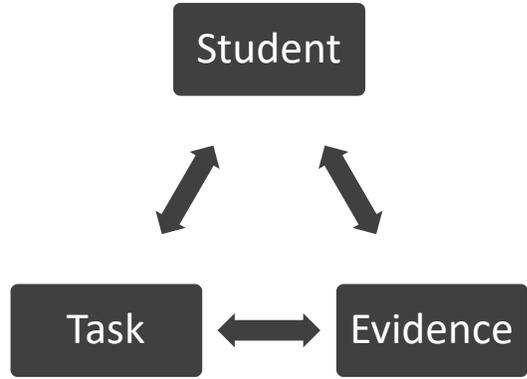
Student

Task

Evidence



Combining large language models with epistemic network analysis



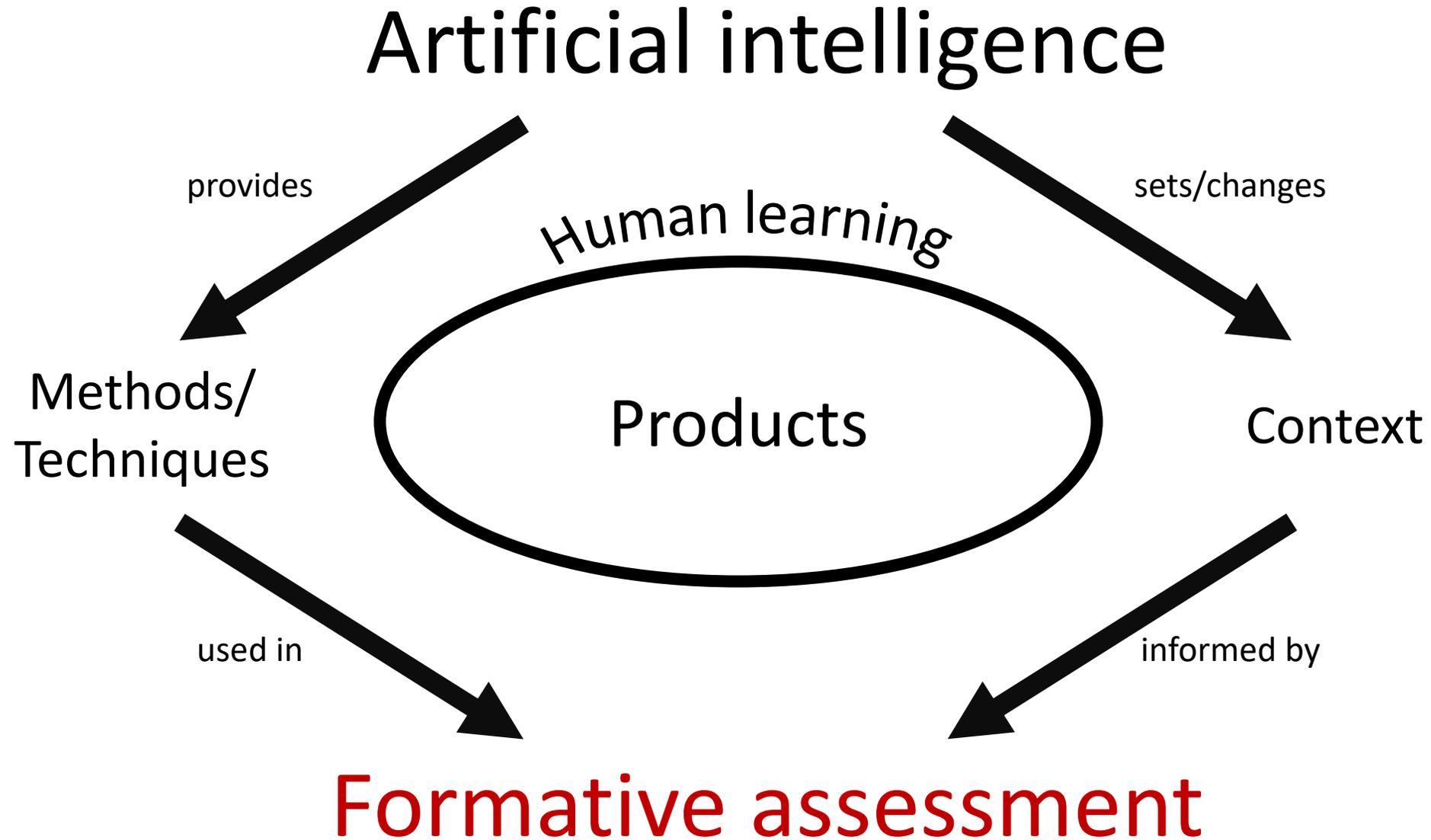
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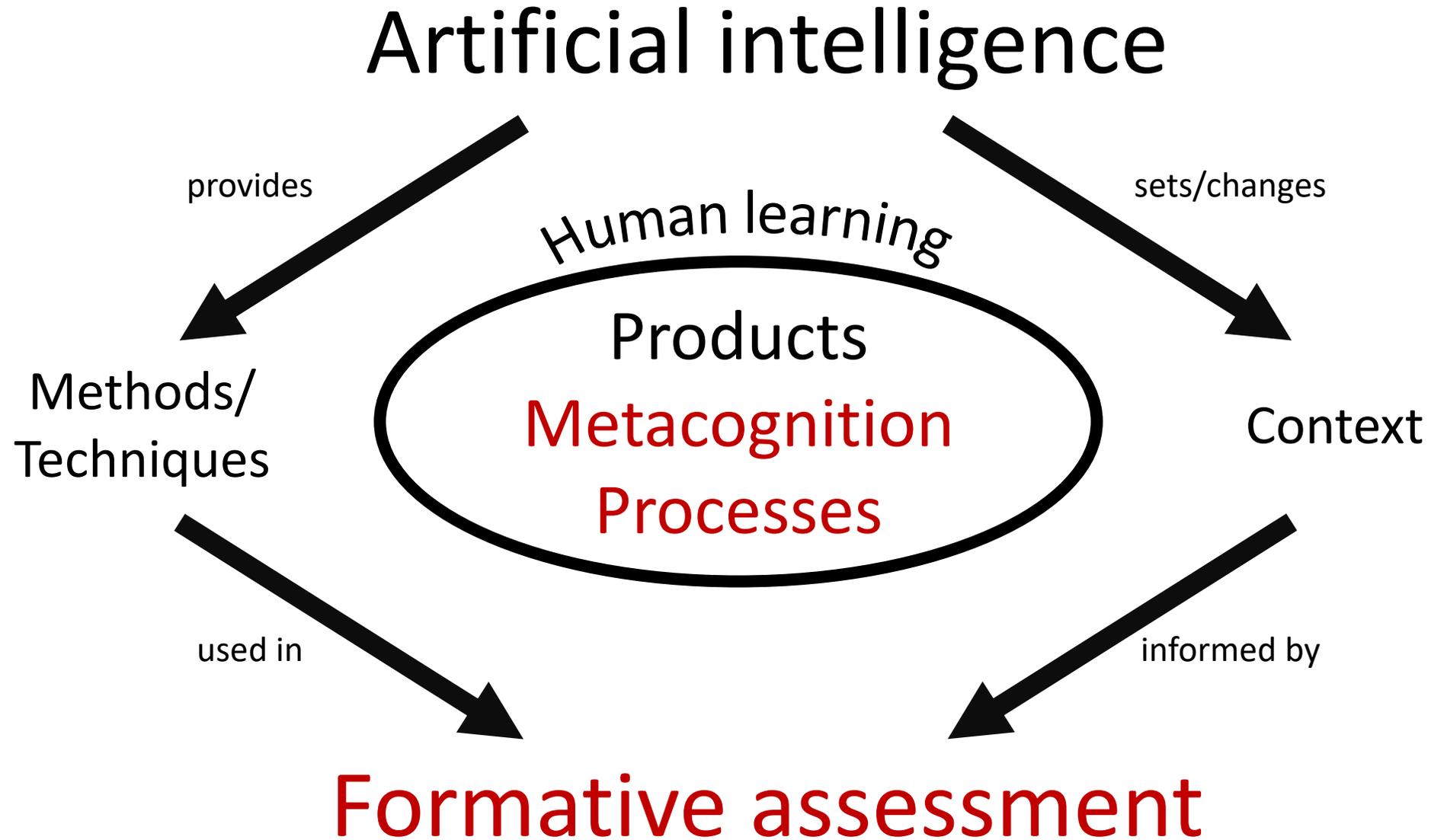


Assessment is feasible and scalable
due to the use of AI

NEW METHODS – NEW CONTEXT –
FINAL REMARKS







Prerequisite for assessment in the age of AI

Urgent need to understand ***combined***
high human and AI-empowered skills

AI and human learning



Image: Flaticon.com

Embracing the opportunity



Reimagining Assessment in the Age of Artificial Intelligence

Dragan Gašević
@dgasevic



Australian Government
Australian Research Council

